ORDERING, SHIPPING, DEVICE MARKING AND RESISTOR VALUES

Device	Package	Marking	R1 (K)	R2 (K)	Shipping†
MUN5311DW1T1 MUN5311DW1T1G	SOT−363 SOT−363 (Pb−Free)	11	10	10	3000/Tape & Reel
MUN5312DW1T1 MUN5312DW1T1G	SOT−363 SOT−363 (Pb−Free)	12	22	22	
MUN5313DW1T1 MUN5313DW1T1G	SOT−363 SOT−363 (Pb−Free)	13	47	47	
MUN5314DW1T1 MUN5314DW1T1G	SOT−363 SOT−363 (Pb−Free)	14	10	47	
MUN5315DW1T1 MUN5315DW1T1G	SOT−363 SOT−363 (Pb−Free)	15	10	∞	
MUN5316DW1T1 MUN5316DW1T1G	SOT−363 SOT−363 (Pb−Free)	16	4.7	∞	
MUN5330DW1T1 MUN5330DW1T1G	SOT−363 SOT−363 (Pb−Free)	30	1.0	1.0	
MUN5331DW1T1 MUN5331DW1T1G	SOT−363 SOT−363 (Pb−Free)	31	2.2	2.2	
MUN5332DW1T1 MUN5332DW1T1G	SOT−363 SOT−363 (Pb−Free)	32	4.7	4.7	
MUN5333DW1T1 MUN5333DW1T1G	SOT−363 SOT−363 (Pb−Free)	33	4.7	47	
MUN5334DW1T1 MUN5334DW1T1G	SOT−363 SOT−363 (Pb−Free)	34	22	47	
MUN5335DW1T1 MUN5335DW1T1G	SOT−363 SOT−363 (Pb−Free)	35	2.2	47	

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

ELECTRICAL CHARACTERISTICS

(T_A = 25°C unless otherwise noted, common for Q_1 and Q_2, – minus sign for Q_1 (PNP) omitted)

Characteristic		Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Collector-Base Cutoff Current (V_{CB} = 50 V, I_E = 0)		I_{CBO}	–	–	100	nAdc
Collector-Emitter Cutoff Current (V_{CE} = 50 V, I_B = 0)		I_{CEO}	–	–	500	nAdc
Emitter-Base Cutoff Current	MUN5311DW1T1	I_{EBO}	–	–	0.5	mAdc
(V_{EB} = 6.0 V, I_C = 0)	MUN5312DW1T1		–	–	0.2	
	MUN5313DW1T1		–	–	0.1	
	MUN5314DW1T1		–	–	0.2	
	MUN5315DW1T1		–	–	0.9	
	MUN5316DW1T1		–	–	1.9	
	MUN5330DW1T1		–	–	4.3	
	MUN5331DW1T1		–	–	2.3	
	MUN5332DW1T1		–	–	1.5	
	MUN5333DW1T1		–	–	0.18	
	MUN5334DW1T1		–	–	0.13	
	MUN5335DW1T1		–	–	0.2	
Collector-Base Breakdown Voltage (I_C = 10 μA, I_E = 0)		$V_{(BR)CBO}$	50	–	–	Vdc
Collector-Emitter Breakdown Voltage (Note 3) (I_C = 2.0 mA, I_B = 0)		$V_{(BR)CEO}$	50	–	–	Vdc

3. Pulse Test: Pulse Width < 300 μs, Duty Cycle < 2.0%

ELECTRICAL CHARACTERISTICS

(T_A = 25°C unless otherwise noted, common for Q_1 and Q_2, – minus sign for Q_1 (PNP) omitted) (Continued)

Characteristic		Symbol	Min	Typ	Max	Unit
ON CHARACTERISTICS (Note 4)						
DC Current Gain	MUN5311DW1T1	h_{FE}	35	60	–	
(V_{CE} = 10 V, I_C = 5.0 mA)	MUN5312DW1T1		60	100	–	
	MUN5313DW1T1		80	140	–	
	MUN5314DW1T1		80	140	–	
	MUN5315DW1T1		160	350	–	
	MUN5316DW1T1		160	350	–	
	MUN5330DW1T1		3.0	5.0	–	
	MUN5331DW1T1		8.0	15	–	
	MUN5332DW1T1		15	30	–	
	MUN5333DW1T1		80	200	–	
	MUN5334DW1T1		80	150	–	
	MUN5335DW1T1		80	140	–	
Collector-Emitter Saturation Voltage		$V_{CE(sat)}$				Vdc
(I_C = 10 mA, I_B = 0.3 mA)	MUN5311DW1T1		–	–	0.25	
	MUN5312DW1T1		–	–	0.25	
	MUN5313DW1T1		–	–	0.25	
	MUN5314DW1T1		–	–	0.25	
	MUN5335DW1T1		–	–	0.25	
(I_C = 10 mA, I_B = 5 mA)	MUN5330DW1T1		–	–	0.25	
	MUN5331DW1T1		–	–	0.25	
(I_C = 10 mA, I_B = 1 mA)	MUN5315DW1T1		–	–	0.25	
	MUN5316DW1T1		–	–	0.25	
	MUN5332DW1T1		–	–	0.25	
	MUN5333DW1T1		–	–	0.25	
	MUN5334DW1T1		–	–	0.25	

ELECTRICAL CHARACTERISTICS

(T_A = 25°C unless otherwise noted, common for Q_1 and Q_2, – minus sign for Q_1 (PNP) omitted) (Continued)

Characteristic		Symbol	Min	Typ	Max	Unit
ON CHARACTERISTICS (Note 4)						
Output Voltage (on)		V_{OL}				Vdc
(V_{CC} = 5.0 V, V_B = 2.5 V, R_L = 1.0 kΩ)	MUN5311DW1T1		–	–	0.2	
	MUN5312DW1T1		–	–	0.2	
	MUN5314DW1T1		–	–	0.2	
	MUN5315DW1T1		–	–	0.2	
	MUN5316DW1T1		–	–	0.2	
	MUN5330DW1T1		–	–	0.2	
	MUN5331DW1T1		–	–	0.2	
	MUN5332DW1T1		–	–	0.2	
	MUN5333DW1T1		–	–	0.2	
	MUN5334DW1T1		–	–	0.2	
	MUN5335DW1T1		–	–	0.2	
(V_{CC} = 5.0 V, V_B = 3.5 V, R_L = 1.0 kΩ)	MUN5313DW1T1		–	–	0.2	
Output Voltage (off)		V_{OH}				Vdc
(V_{CC} = 5.0 V, V_B = 0.5 V, R_L = 1.0 kΩ)	MUN5311DW1T1		4.9	–	–	
	MUN5312DW1T1		4.9	–	–	
	MUN5313DW1T1		4.9	–	–	
	MUN5314DW1T1		4.9	–	–	
	MUN5333DW1T1		4.9	–	–	
	MUN5334DW1T1		4.9	–	–	
	MUN5335DW1T1		4.9	–	–	
(V_{CC} = 5.0 V, V_B = 0.050 V, R_L = 1.0 kΩ)	MUN5330DW1T1		4.9	–	–	
(V_{CC} = 5.0 V, V_B = 0.25 V, R_L = 1.0 kΩ)	MUN5315DW1T1		4.9	–	–	
	MUN5316DW1T1		4.9	–	–	
	MUN5331DW1T1		4.9	–	–	
	MUN5332DW1T1		4.9	–	–	
Input Resistor	MUN5311DW1T1	R1	7.0	10	13	k Ω
	MUN5312DW1T1		15.4	22	28.6	
	MUN5313DW1T1		32.9	47	61.1	
	MUN5314DW1T1		7.0	10	13	
	MUN5315DW1T1		7.0	10	13	
	MUN5316DW1T1		3.3	4.7	6.1	
	MUN5330DW1T1		0.7	1.0	1.3	
	MUN5331DW1T1		1.5	2.2	2.9	
	MUN5332DW1T1		3.3	4.7	6.1	
	MUN5333DW1T1		3.3	4.7	6.1	
	MUN5334DW1T1		15.4	22	28.6	
	MUN5335DW1T1		1.54	2.2	2.86	
Resistor Ratio	MUN5311DW1T1/MUN5312DW1T1/MUN5313DW1T1	R1/R2	0.8	1.0	1.2	
	MUN5314DW1T1		0.17	0.21	0.25	
	MUN5315DW1T1/MUN5316DW1T1		–	–	–	
	MUN5330DW1T1/MUN5331DW1T1/MUN5332DW1T1		0.8	1.0	1.2	
	MUN5333DW1T1		0.055	0.1	0.185	
	MUN5334DW1T1		0.38	0.47	0.56	
	MUN5335DW1T1		0.038	0.047	0.056	

4. Pulse Test: Pulse Width < 300 μs, Duty Cycle < 2.0%

ALL MUN5311DW1T1 SERIES DEVICES

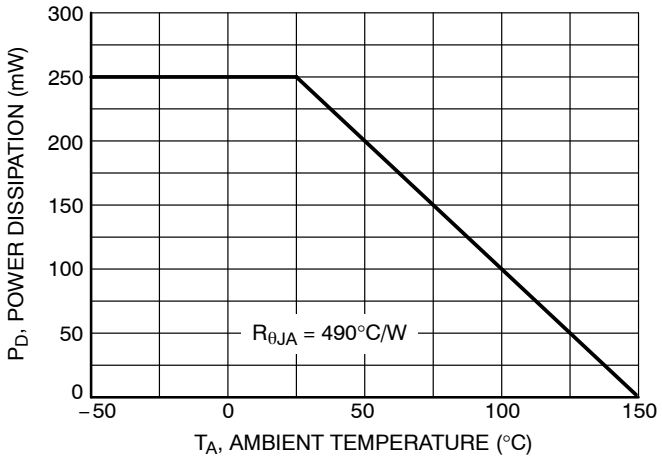


Figure 1. Derating Curve

TYPICAL ELECTRICAL CHARACTERISTICS – MUN5311DW1T1 NPN TRANSISTOR

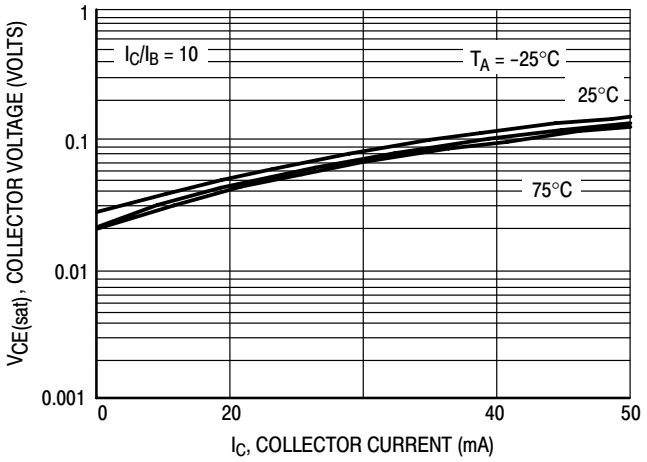


Figure 2. $V_{CE(sat)}$ versus I_C

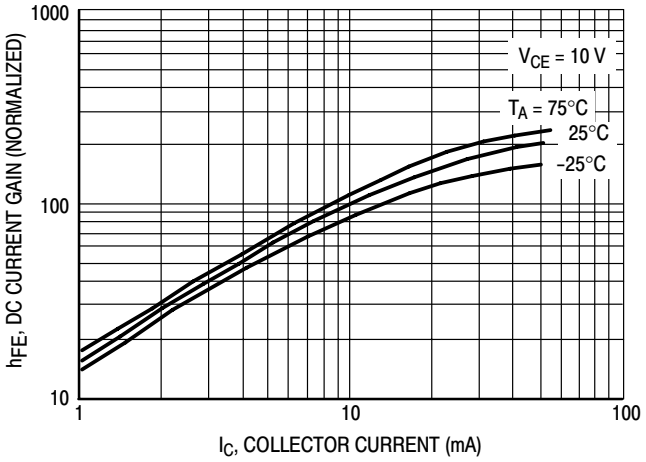


Figure 3. DC Current Gain

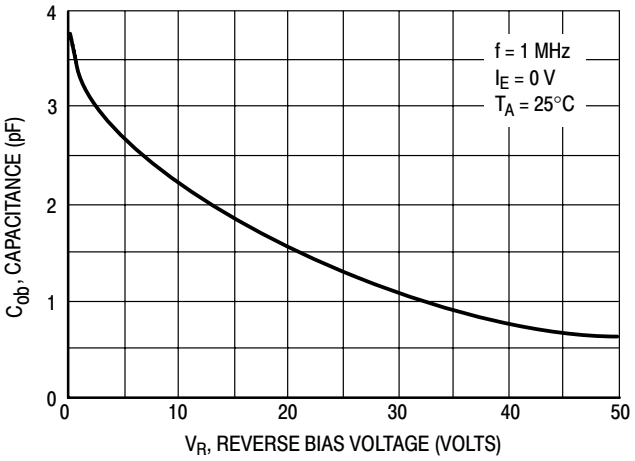


Figure 4. Output Capacitance

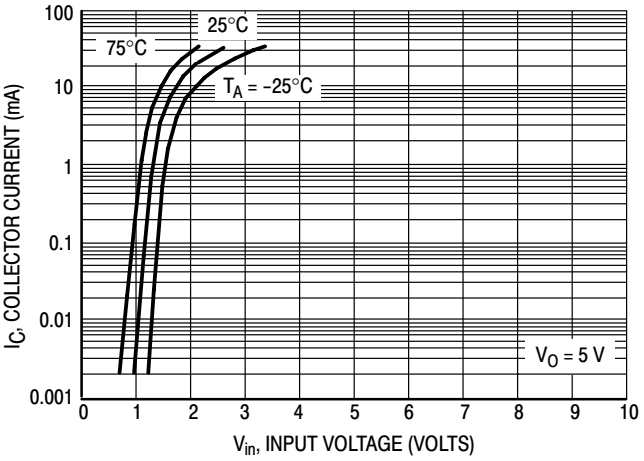


Figure 5. Output Current versus Input Voltage

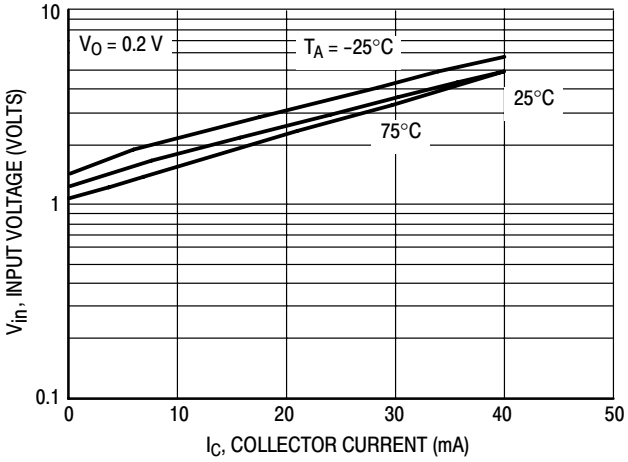


Figure 6. Input Voltage versus Output Current

TYPICAL ELECTRICAL CHARACTERISTICS – MUN5311DW1T1 PNP TRANSISTOR

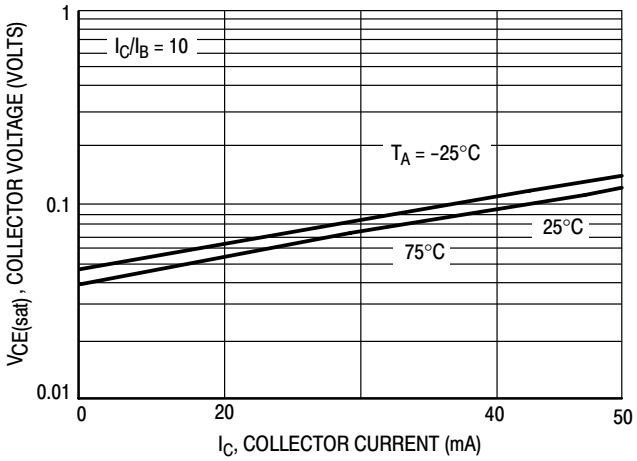


Figure 7. $V_{CE(sat)}$ versus I_C

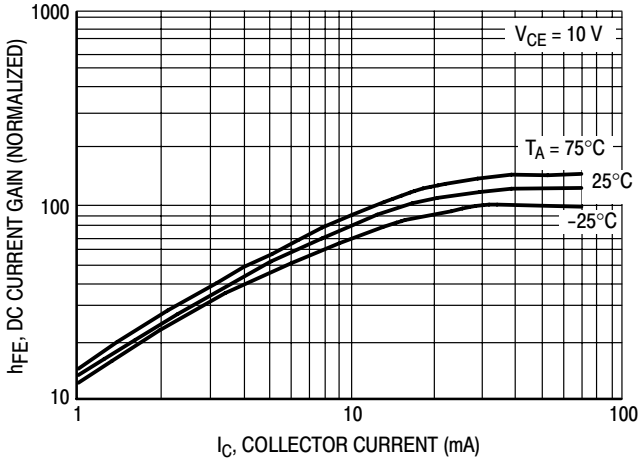


Figure 8. DC Current Gain

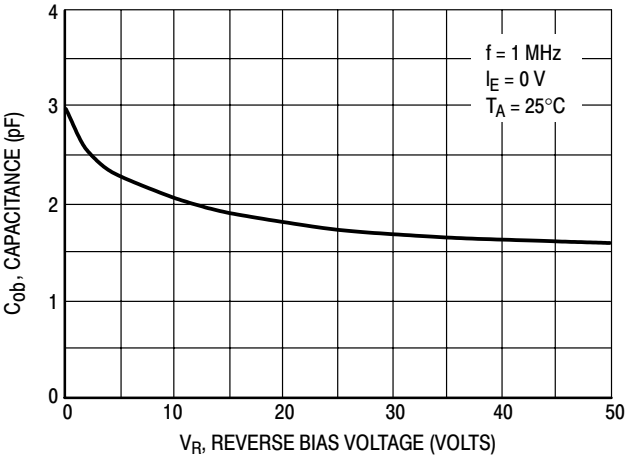


Figure 9. Output Capacitance

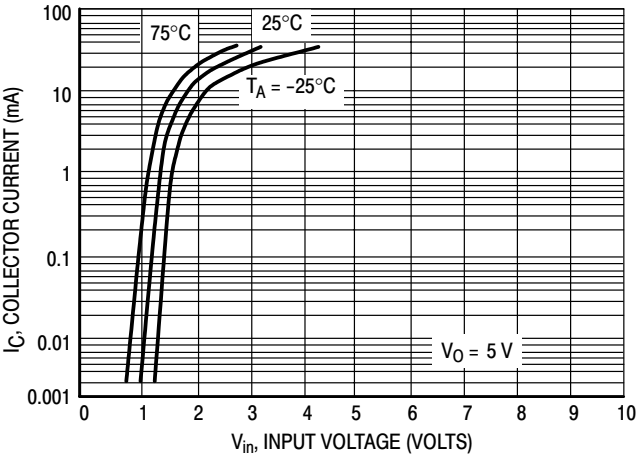


Figure 10. Output Current versus Input Voltage

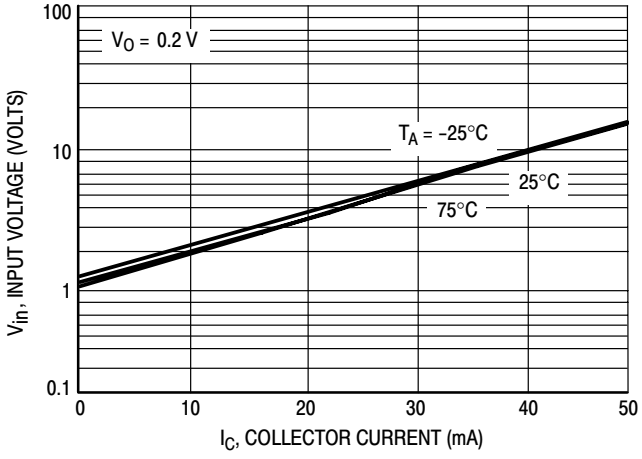


Figure 11. Input Voltage versus Output Current

TYPICAL ELECTRICAL CHARACTERISTICS – MUN5312DW1T1 NPN TRANSISTOR

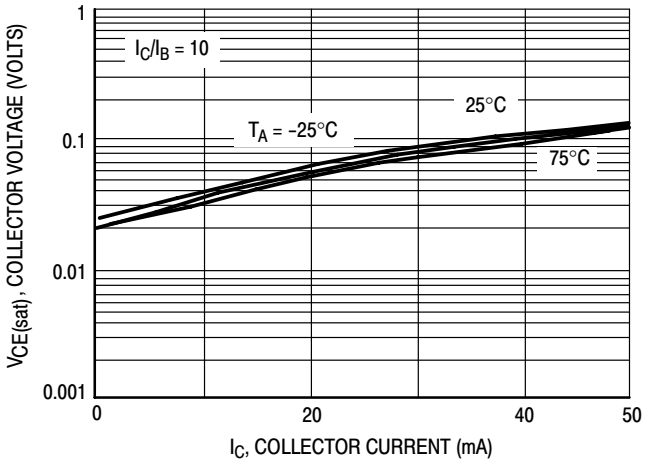


Figure 12. $V_{CE(sat)}$ versus I_C

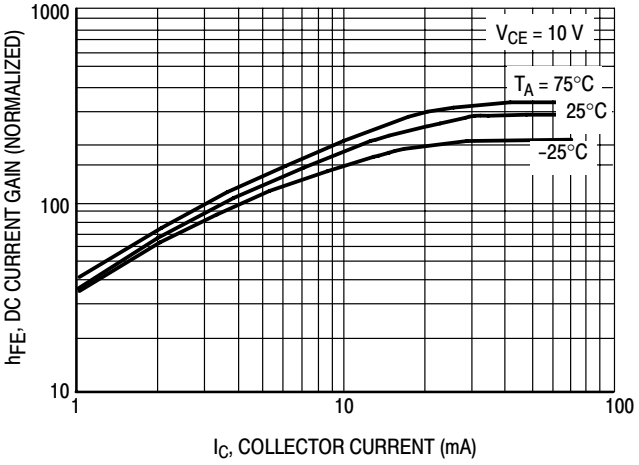


Figure 13. DC Current Gain

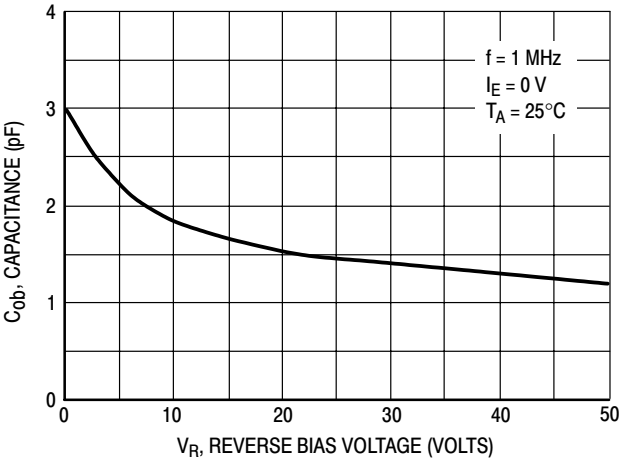


Figure 14. Output Capacitance

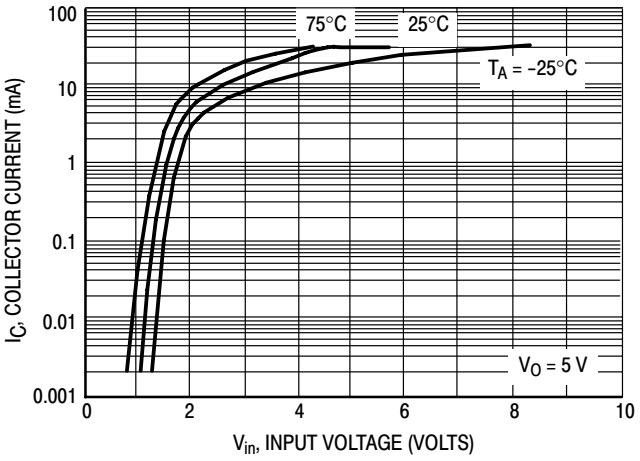


Figure 15. Output Current versus Input Voltage

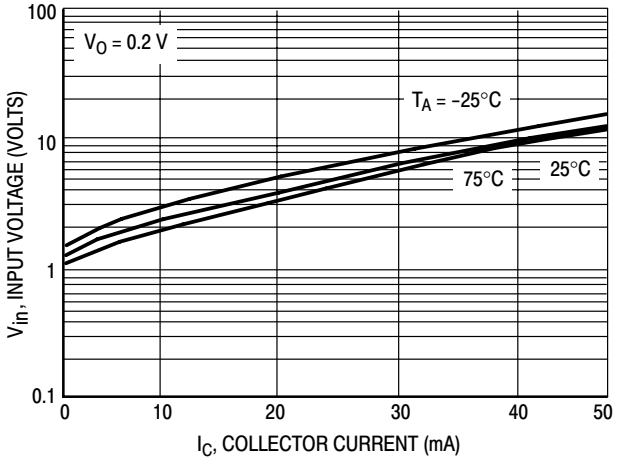


Figure 16. Input Voltage versus Output Current

TYPICAL ELECTRICAL CHARACTERISTICS – MUN5312DW1T1 PNP TRANSISTOR

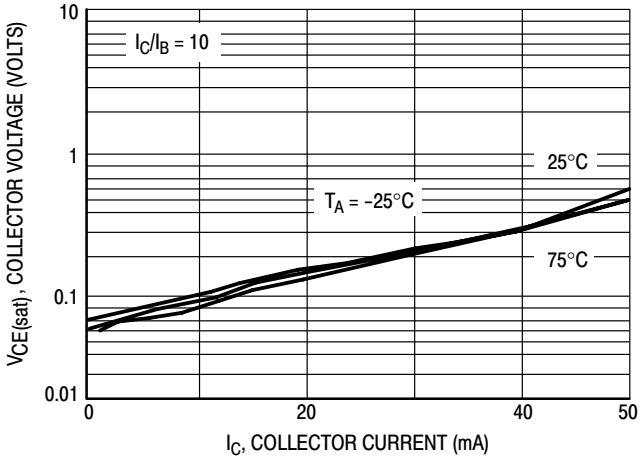


Figure 17. $V_{CE(sat)}$ versus I_C

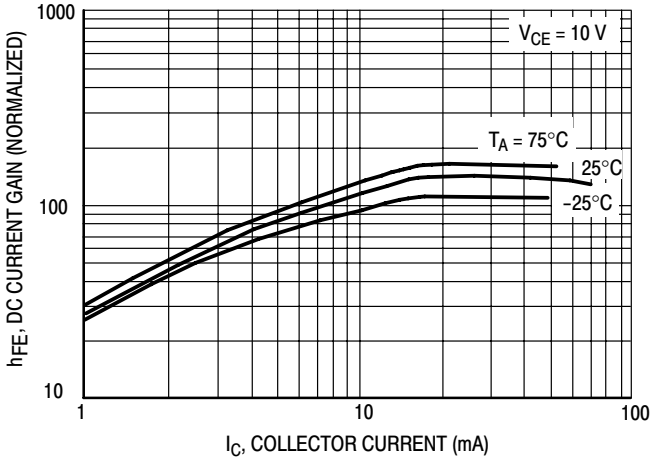


Figure 18. DC Current Gain

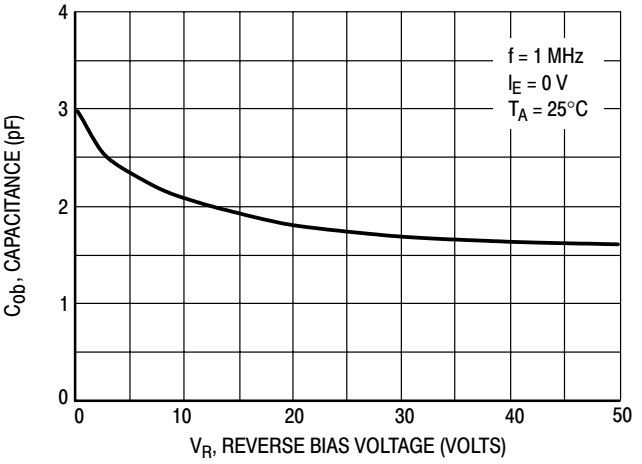


Figure 19. Output Capacitance

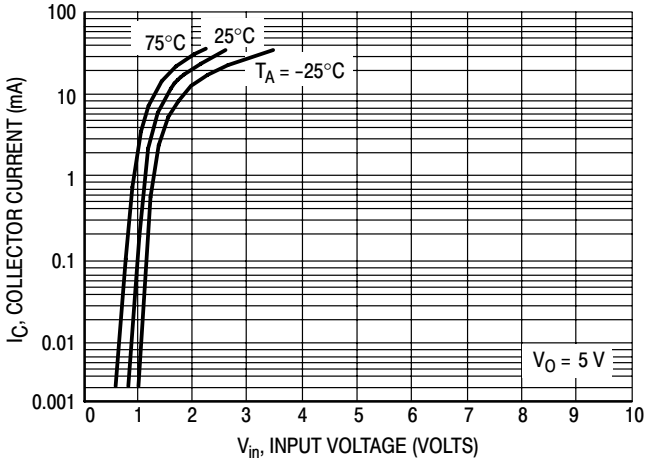


Figure 20. Output Current versus Input Voltage

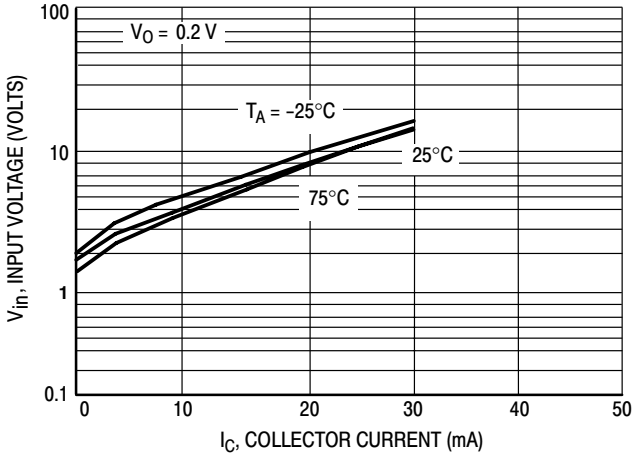


Figure 21. Input Voltage versus Output Current

TYPICAL ELECTRICAL CHARACTERISTICS – MUN5313DW1T1 NPN TRANSISTOR

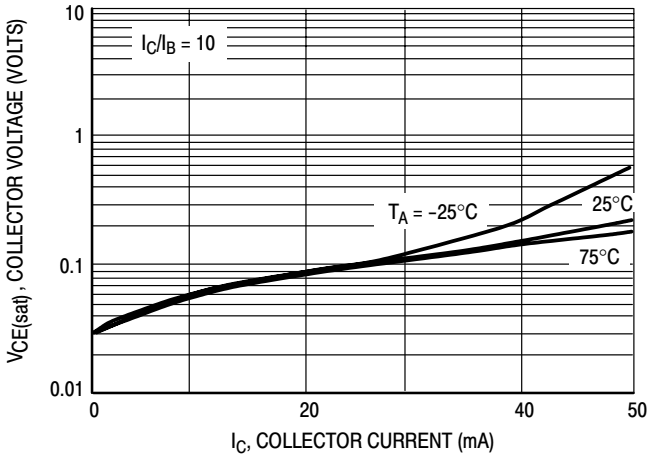


Figure 22. $V_{CE(sat)}$ versus I_C

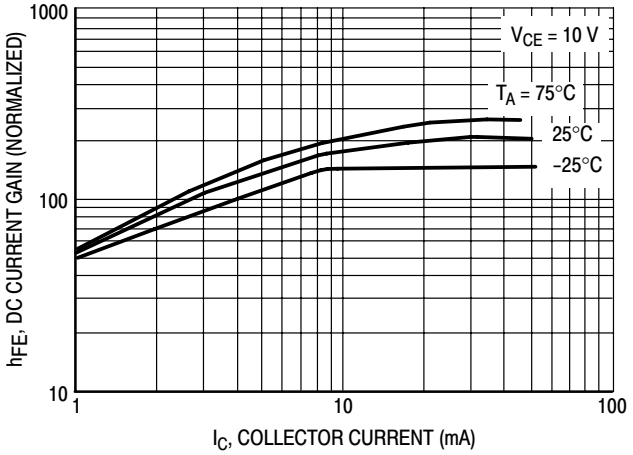


Figure 23. DC Current Gain

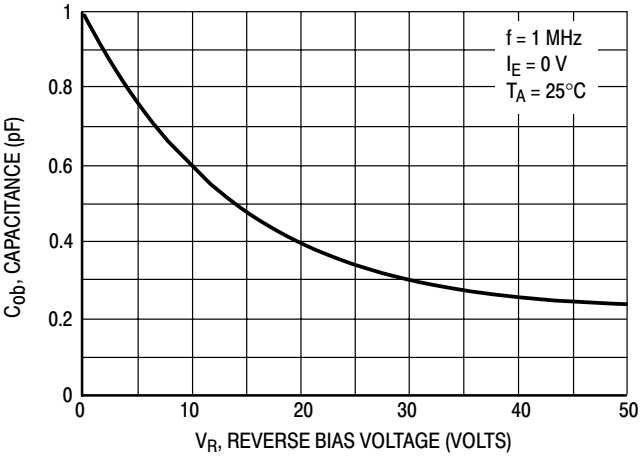


Figure 24. Output Capacitance

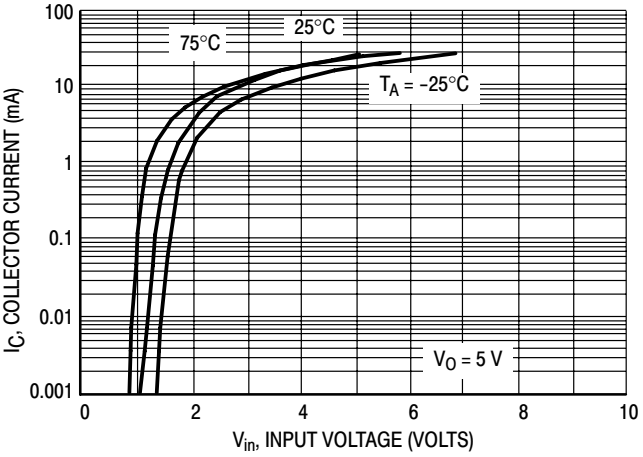


Figure 25. Output Current versus Input Voltage

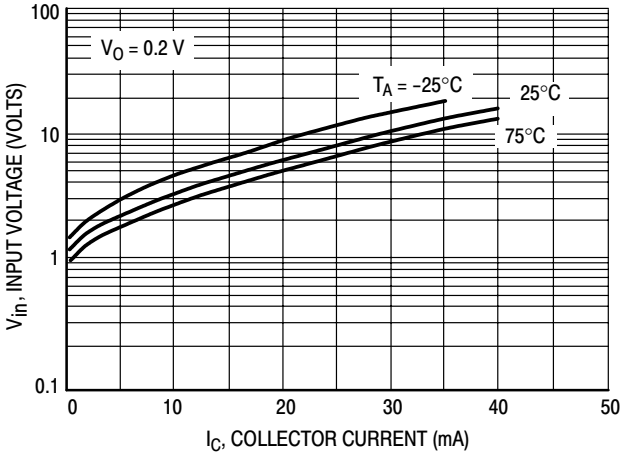


Figure 26. Input Voltage versus Output Current

TYPICAL ELECTRICAL CHARACTERISTICS – MUN5313DW1T1 PNP TRANSISTOR

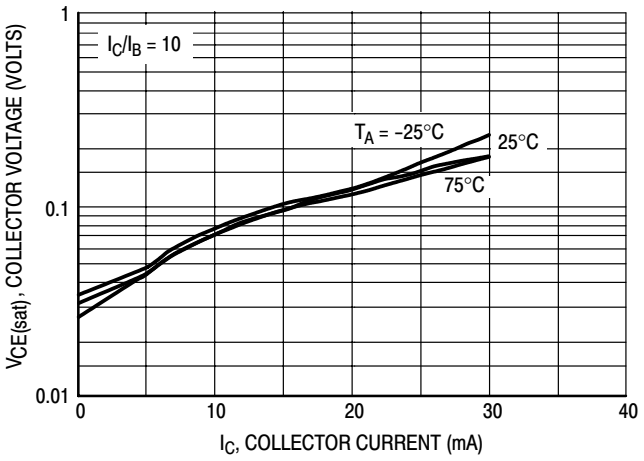


Figure 27. $V_{CE(sat)}$ versus I_C

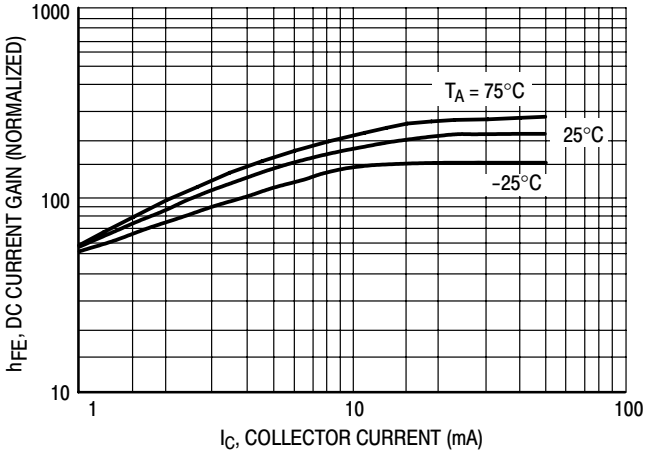


Figure 28. DC Current Gain

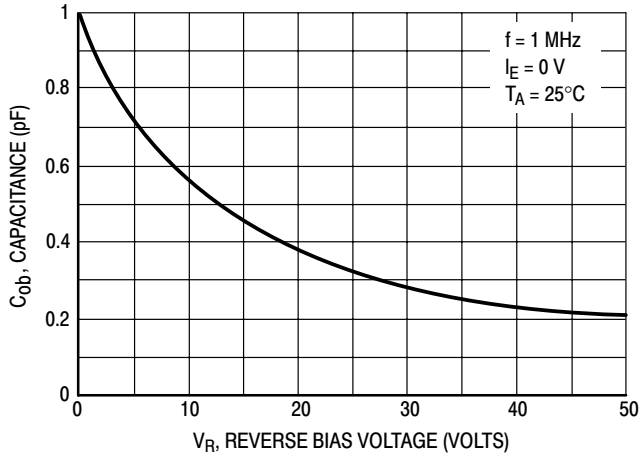


Figure 29. Output Capacitance

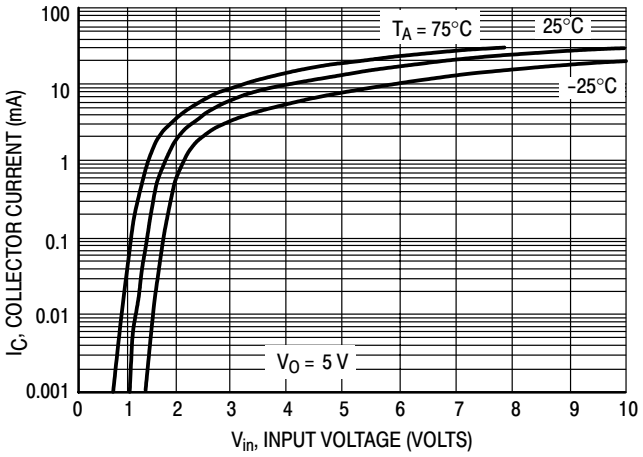


Figure 30. Output Current versus Input Voltage

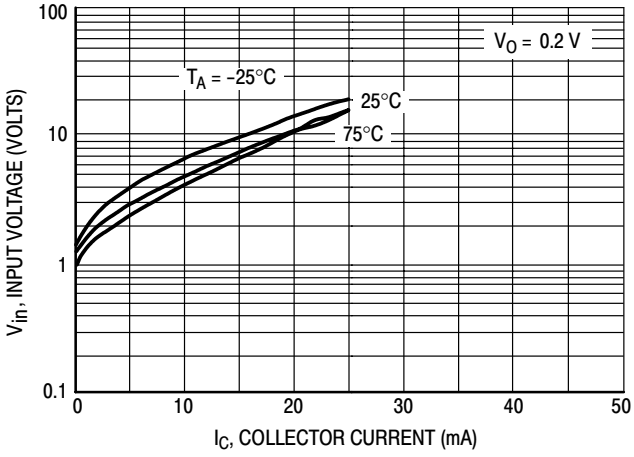


Figure 31. Input Voltage versus Output Current

TYPICAL ELECTRICAL CHARACTERISTICS – MUN5314DW1T1 NPN TRANSISTOR

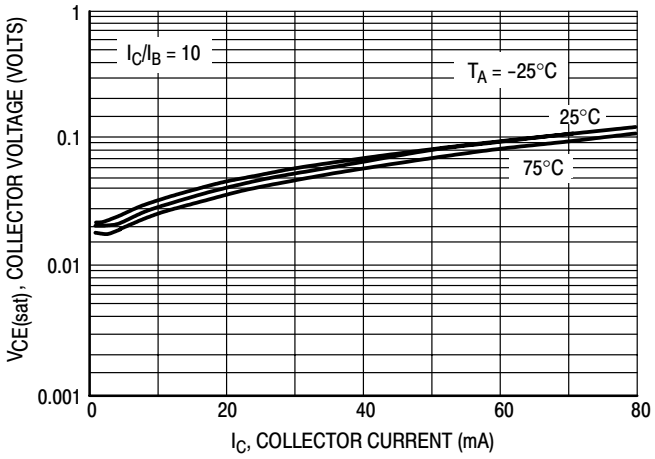


Figure 32. $V_{CE(sat)}$ versus I_C

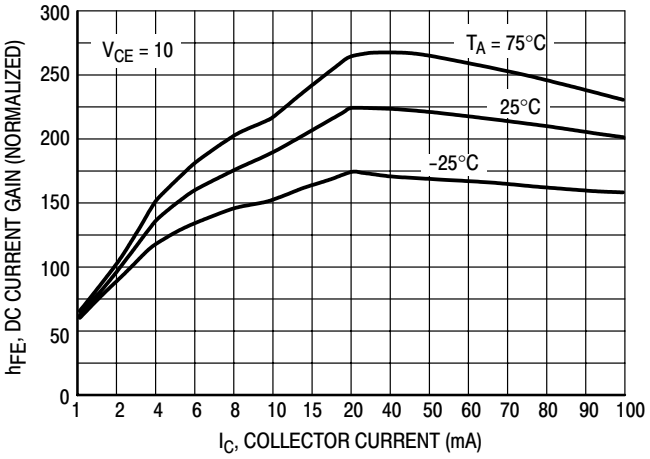


Figure 33. DC Current Gain

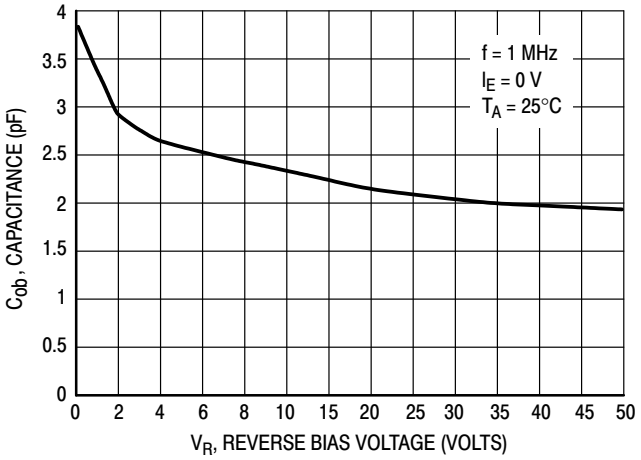


Figure 34. Output Capacitance

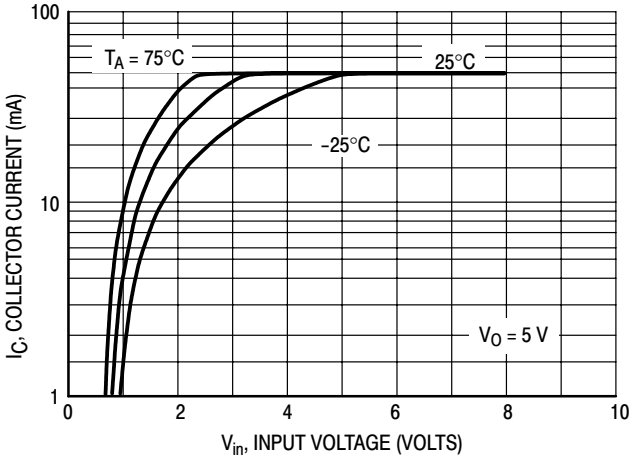


Figure 35. Output Current versus Input Voltage

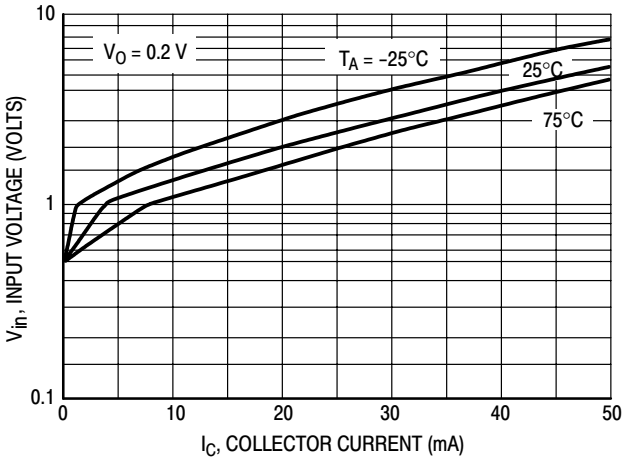


Figure 36. Input Voltage versus Output Current

TYPICAL ELECTRICAL CHARACTERISTICS – MUN5314DW1T1 PNP TRANSISTOR

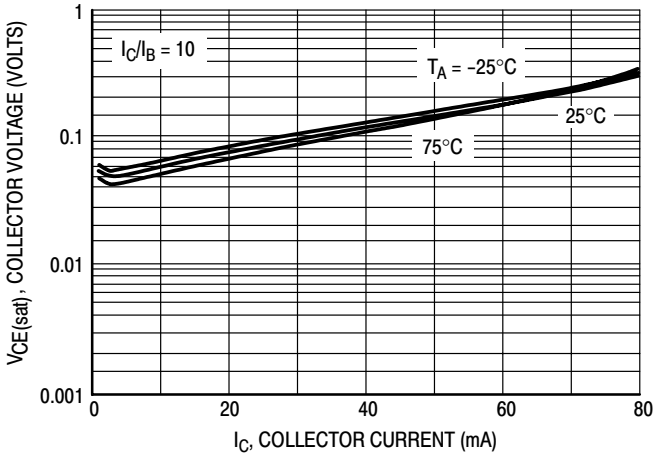


Figure 37. $V_{CE(sat)}$ versus I_C

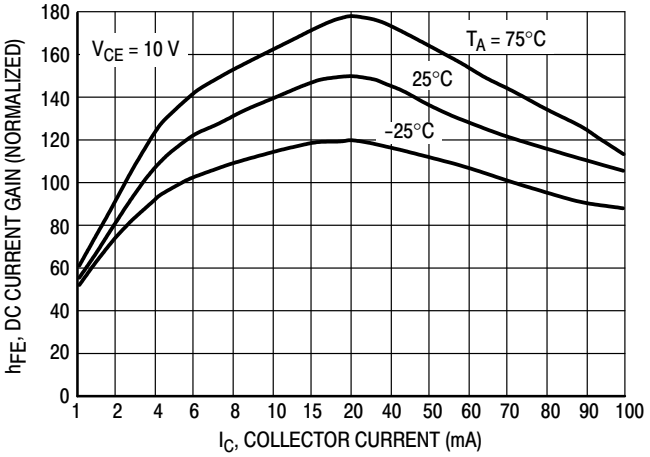


Figure 38. DC Current Gain

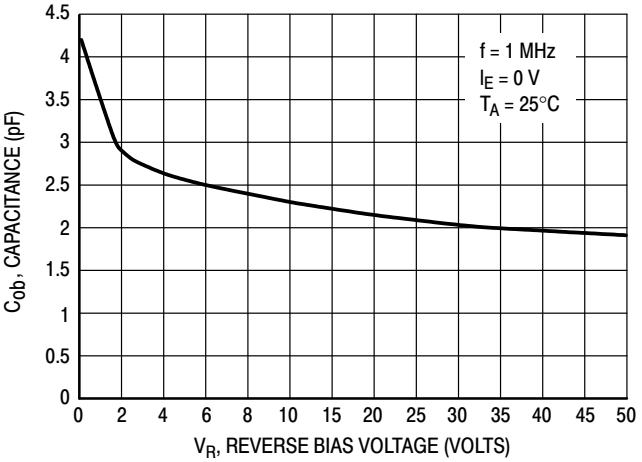


Figure 39. Output Capacitance

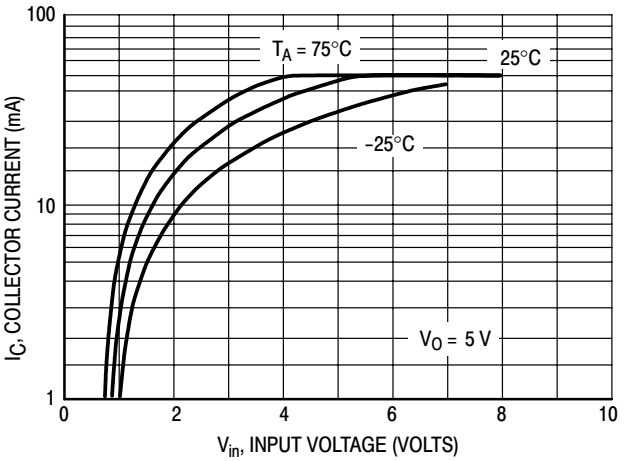


Figure 40. Output Current versus Input Voltage

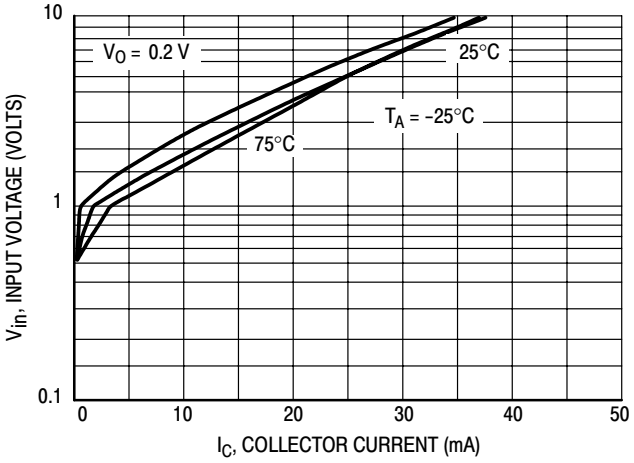


Figure 41. Input Voltage versus Output Current

TYPICAL ELECTRICAL CHARACTERISTICS — MUN5315DW1T1 NPN TRANSISTOR

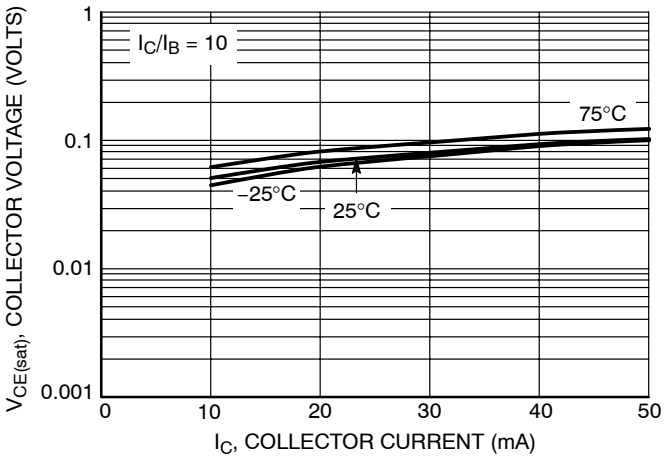


Figure 42. $V_{CE(sat)}$ versus I_C

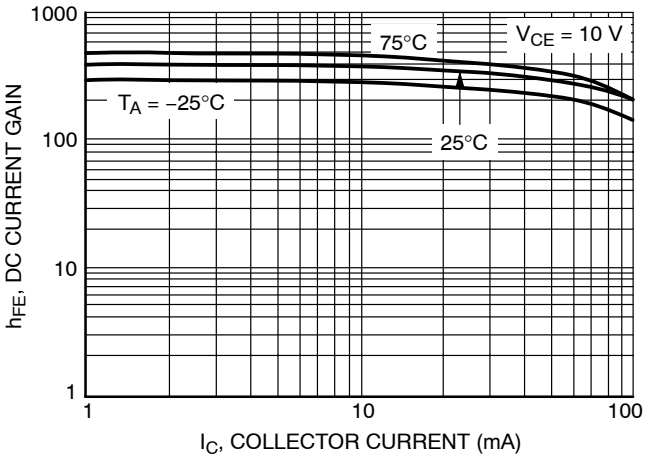


Figure 43. DC Current Gain

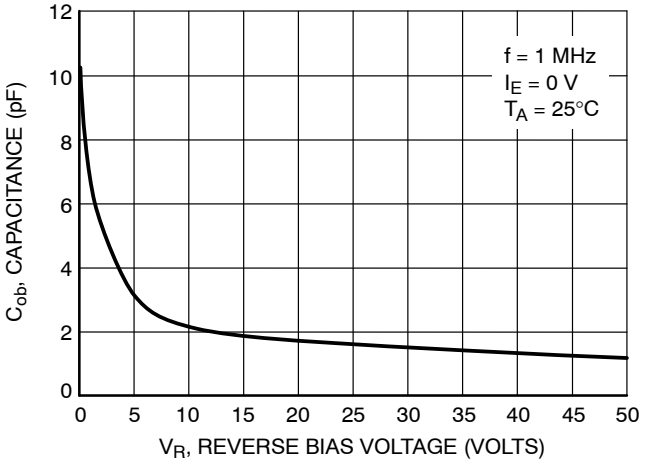


Figure 44. Output Capacitance

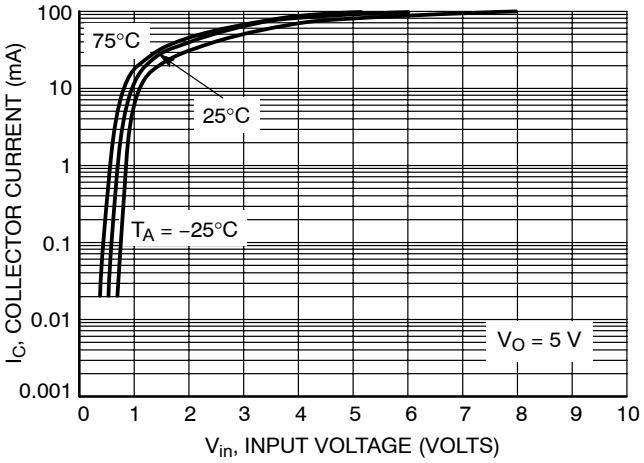


Figure 45. Output Current versus Input Voltage

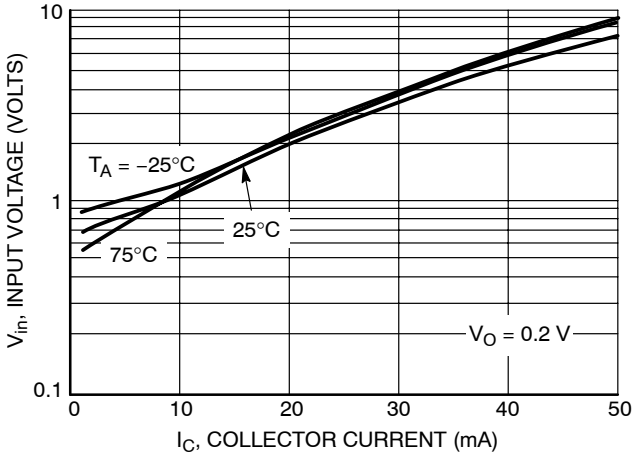


Figure 46. Input Voltage versus Output Current

TYPICAL ELECTRICAL CHARACTERISTICS — MUN5315DW1T1 PNP TRANSISTOR

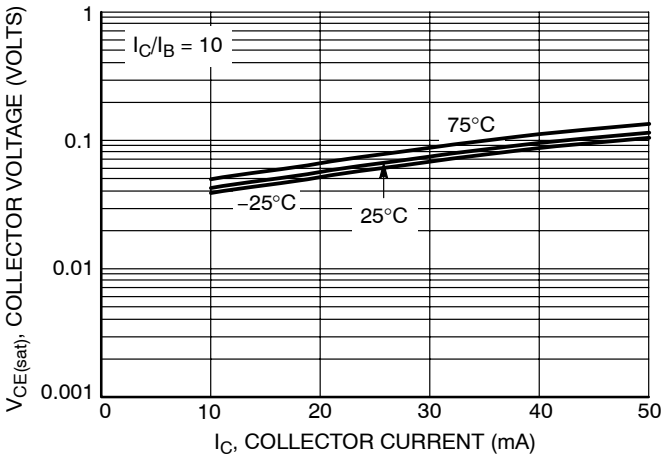


Figure 47. $V_{CE(sat)}$ versus I_C

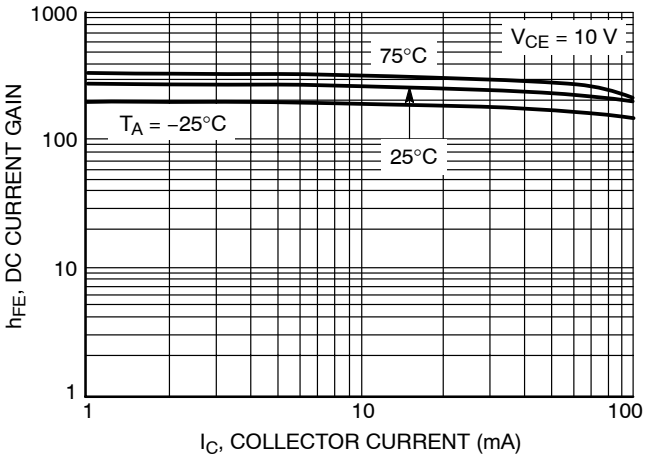


Figure 48. DC Current Gain

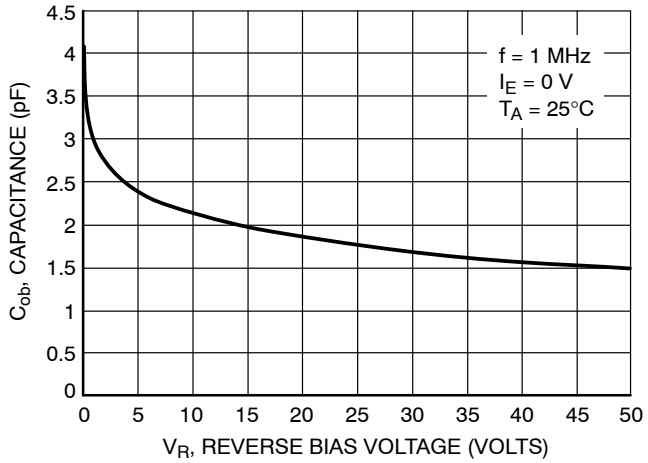


Figure 49. Output Capacitance

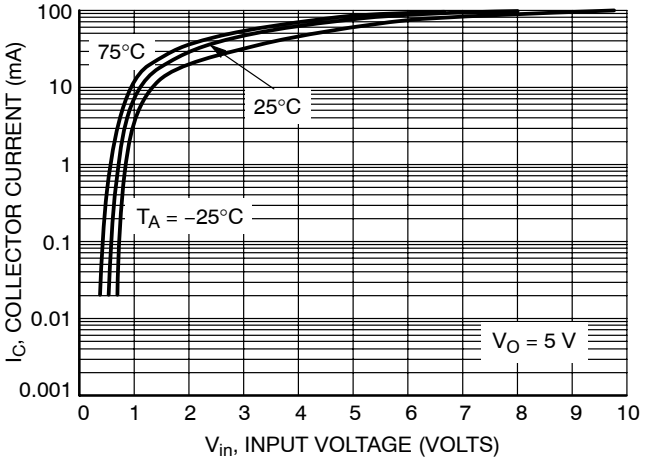


Figure 50. Output Current versus Input Voltage

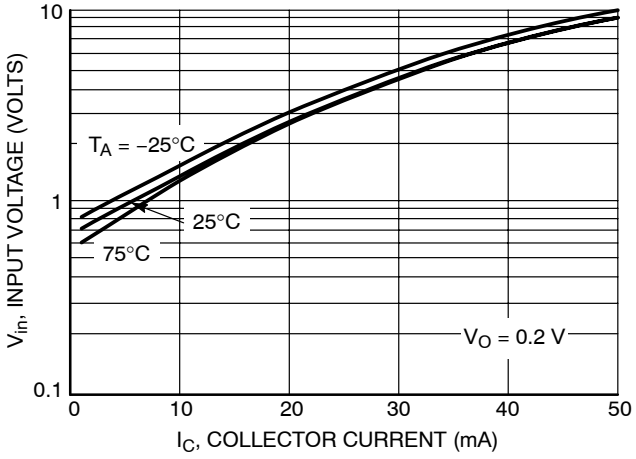


Figure 51. Input Voltage versus Output Current

TYPICAL ELECTRICAL CHARACTERISTICS — MUN5316DW1T1 NPN TRANSISTOR

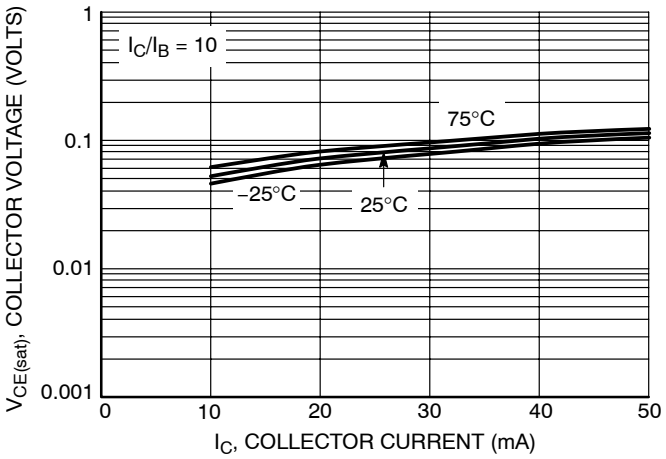


Figure 52. $V_{CE(sat)}$ versus I_C

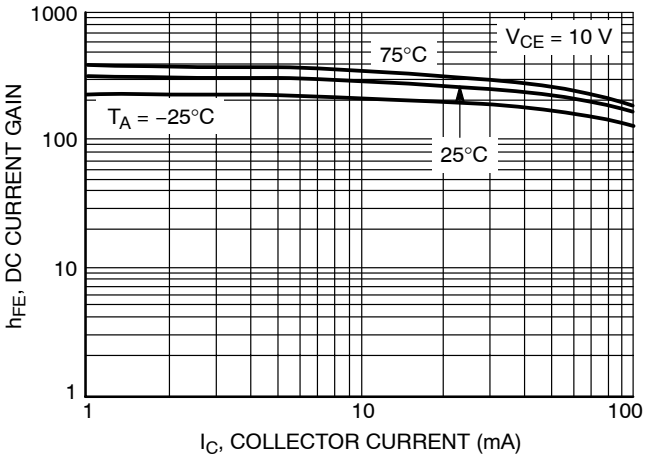


Figure 53. DC Current Gain

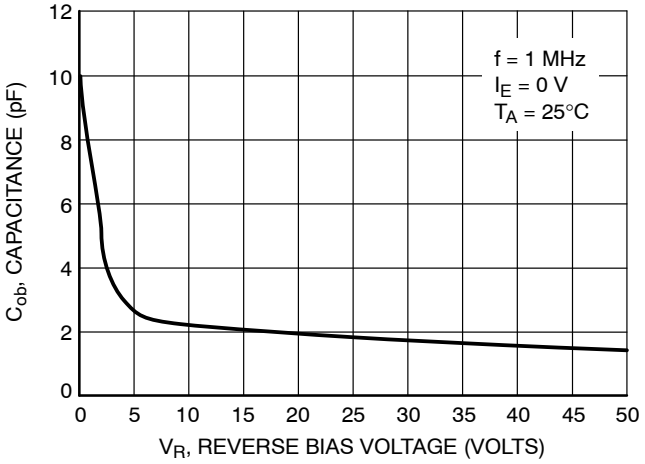


Figure 54. Output Capacitance

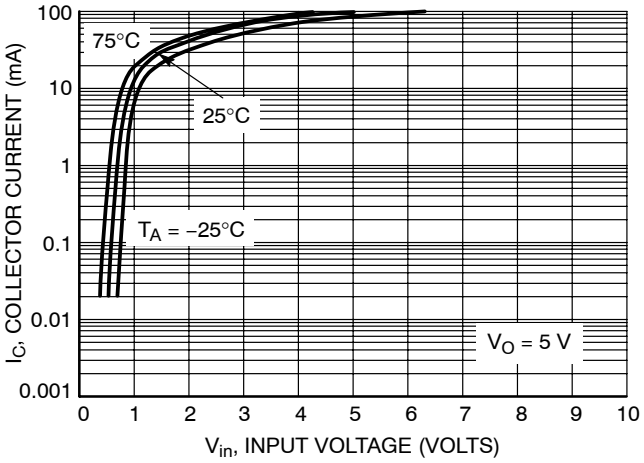


Figure 55. Output Current versus Input Voltage

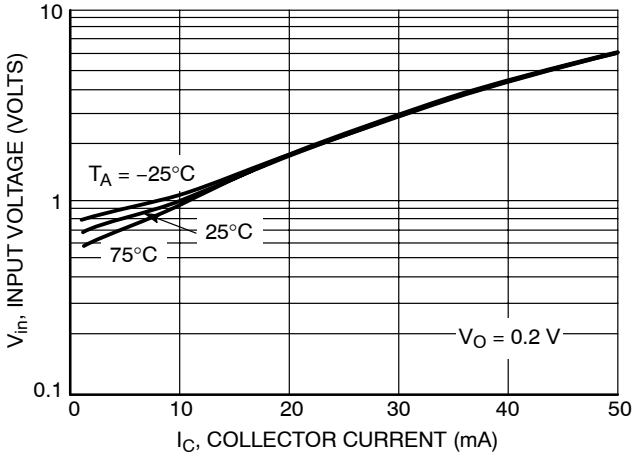


Figure 56. Input Voltage versus Output Current

TYPICAL ELECTRICAL CHARACTERISTICS — MUN5316DW1T1 PNP TRANSISTOR

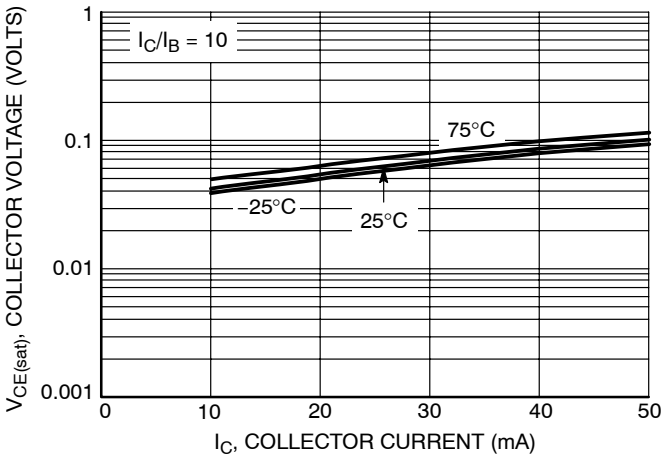


Figure 57. $V_{CE(sat)}$ versus I_C

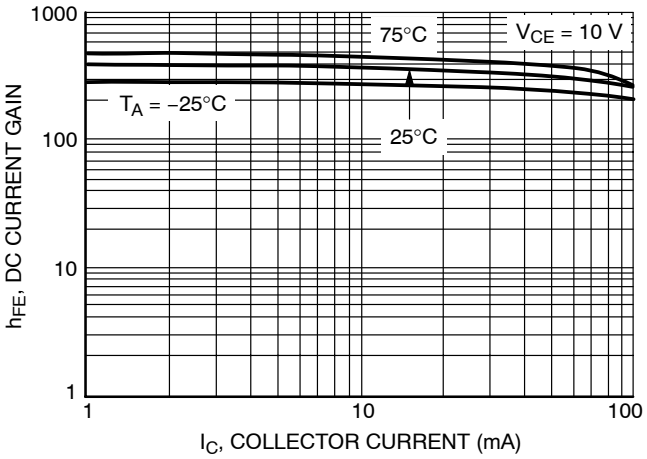


Figure 58. DC Current Gain

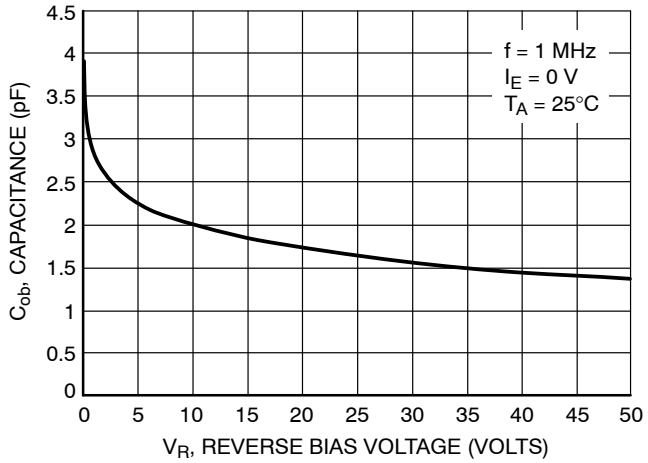


Figure 59. Output Capacitance

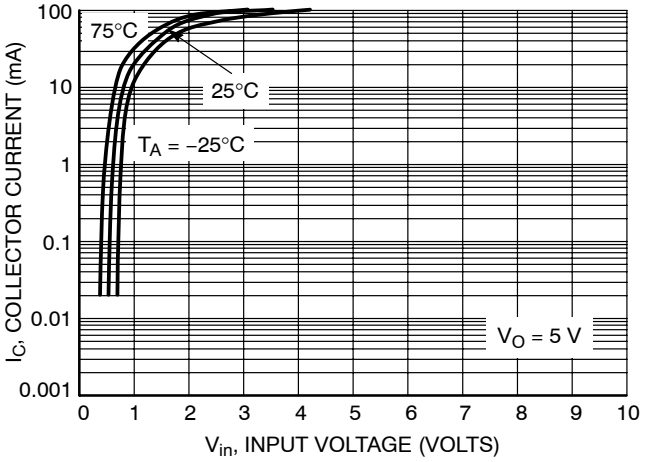


Figure 60. Output Current versus Input Voltage

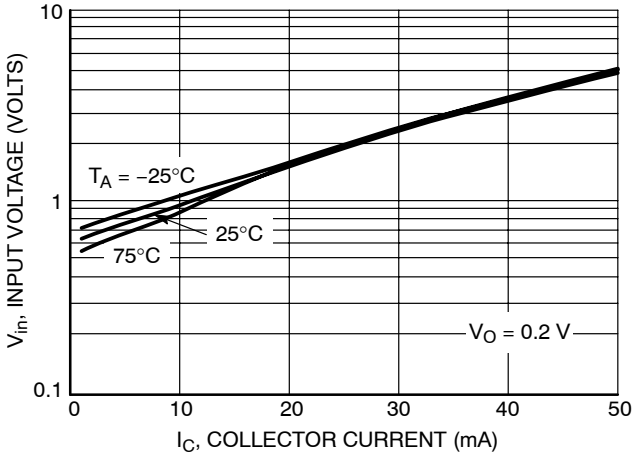


Figure 61. Input Voltage versus Output Current

TYPICAL ELECTRICAL CHARACTERISTICS — MUN5330DW1T1 NPN TRANSISTOR

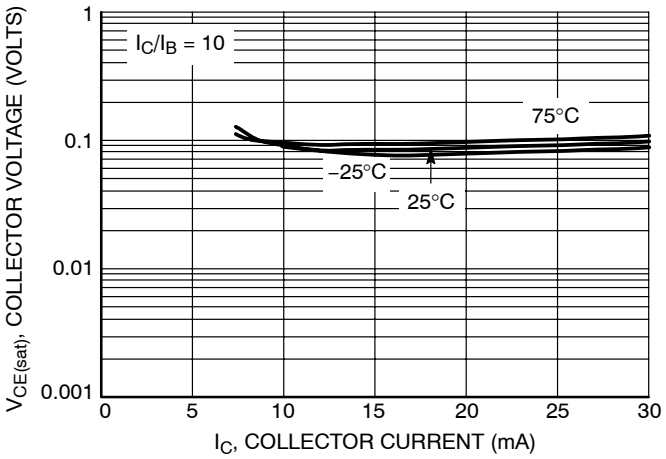


Figure 62. $V_{CE(sat)}$ versus I_C

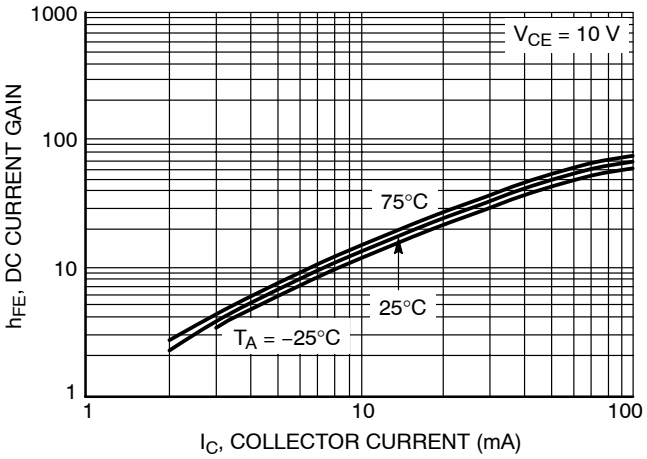


Figure 63. DC Current Gain

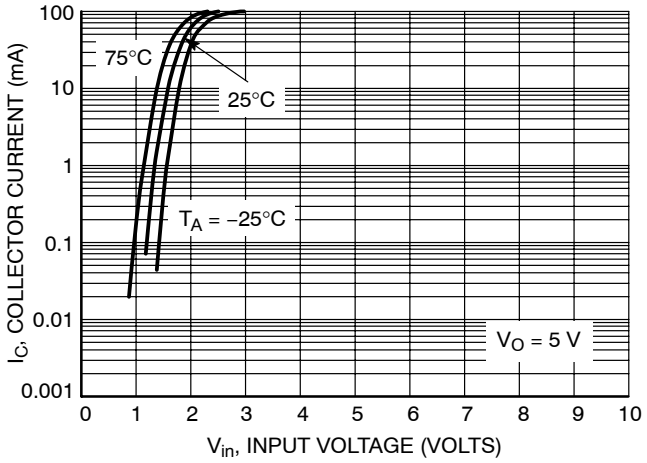


Figure 64. Output Current versus Input Voltage

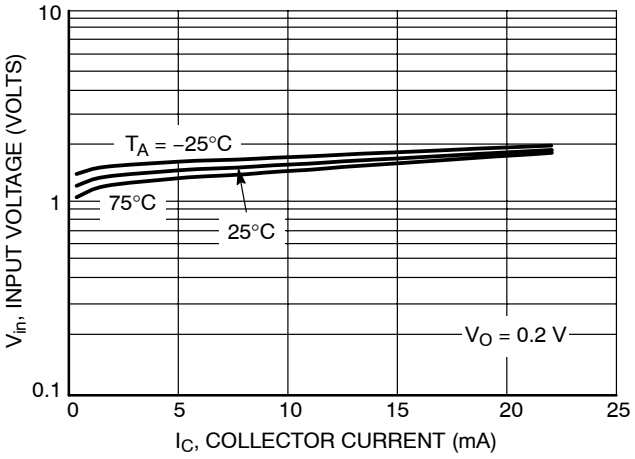


Figure 65. Input Voltage versus Output Current

TYPICAL ELECTRICAL CHARACTERISTICS — MUN5330DW1T1 PNP TRANSISTOR

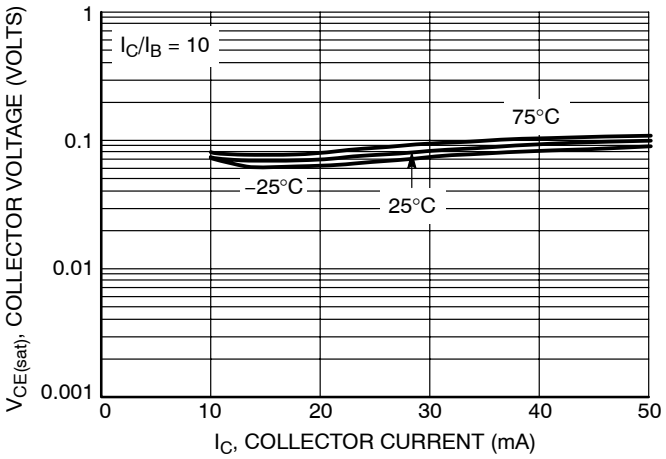


Figure 66. $V_{CE(sat)}$ versus I_C

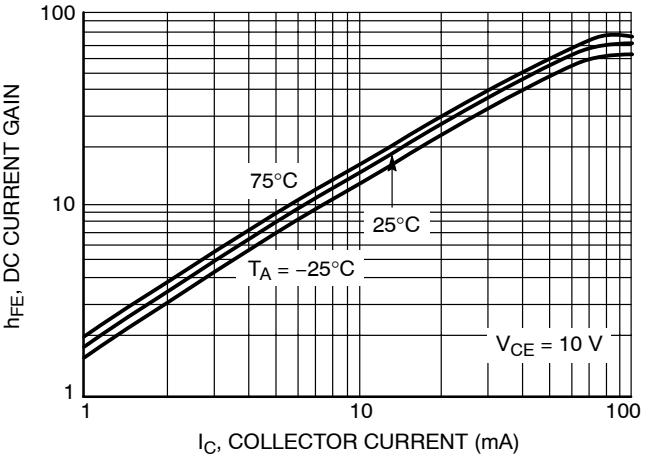


Figure 67. DC Current Gain

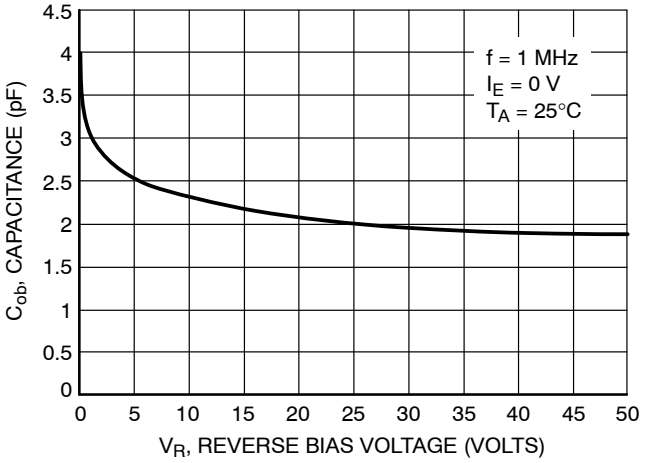


Figure 68. Output Capacitance

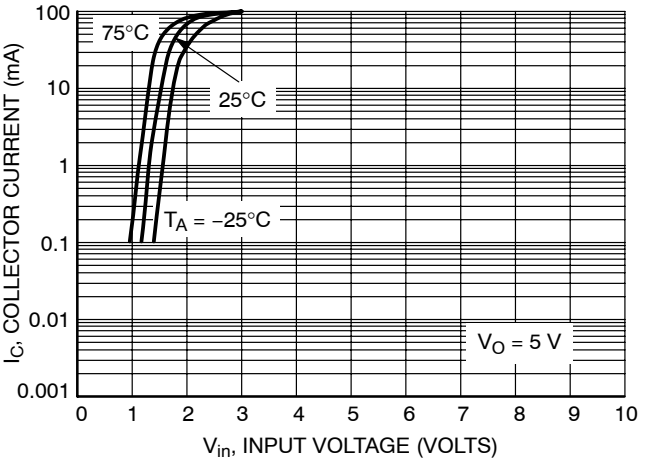


Figure 69. Output Current versus Input Voltage

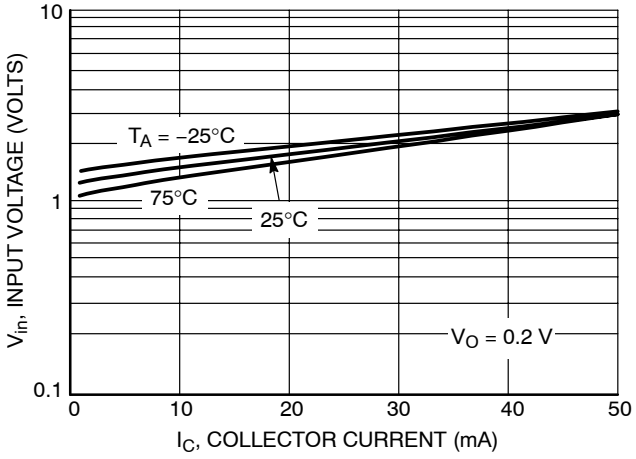


Figure 70. Input Voltage versus Output Current

TYPICAL ELECTRICAL CHARACTERISTICS — MUN5331DW1T1 NPN TRANSISTOR

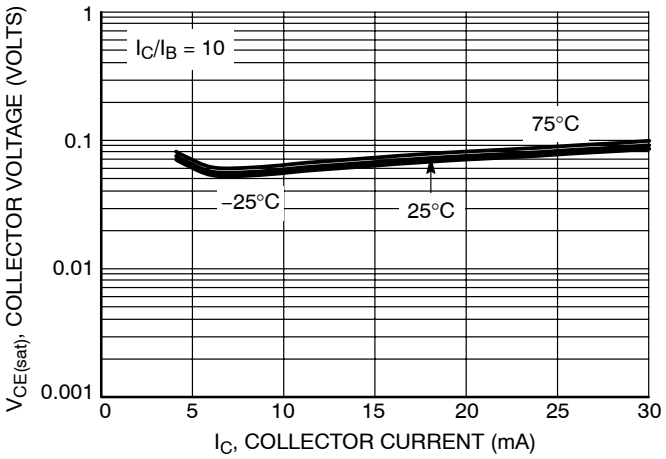


Figure 71. $V_{CE(sat)}$ versus I_C

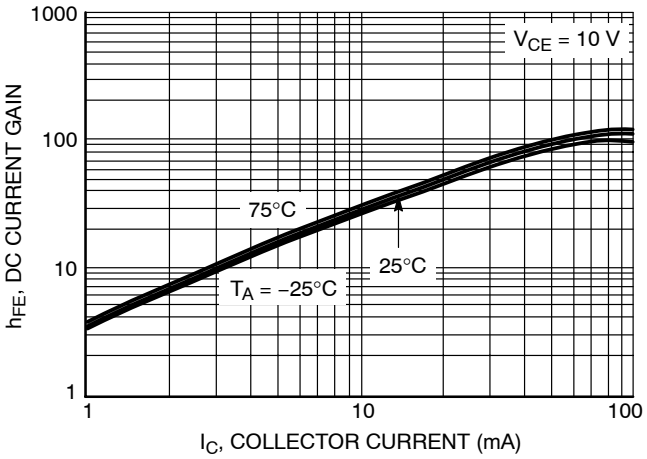


Figure 72. DC Current Gain

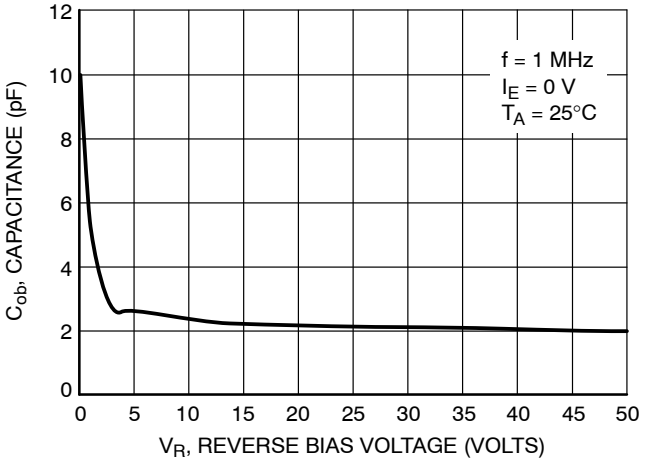


Figure 73. Output Capacitance

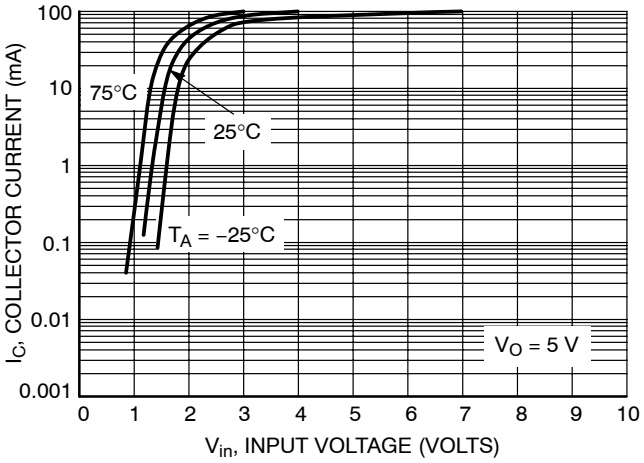


Figure 74. Output Current versus Input Voltage

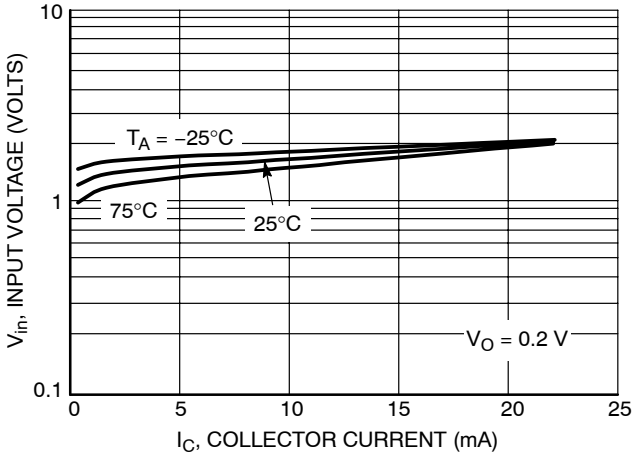


Figure 75. Input Voltage versus Output Current

TYPICAL ELECTRICAL CHARACTERISTICS — MUN5331DW1T1 PNP TRANSISTOR

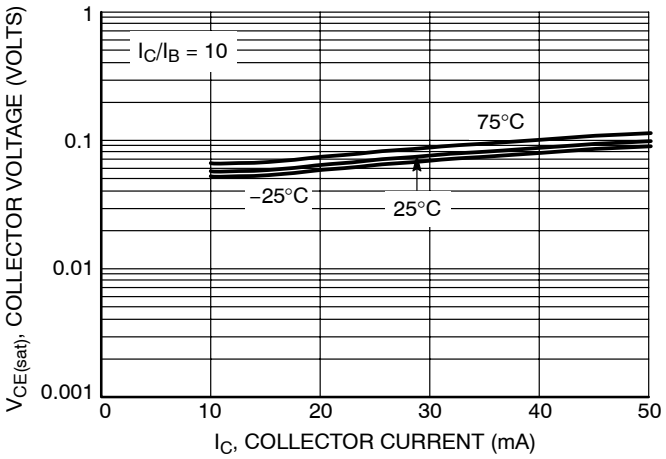


Figure 76. $V_{CE(sat)}$ versus I_C

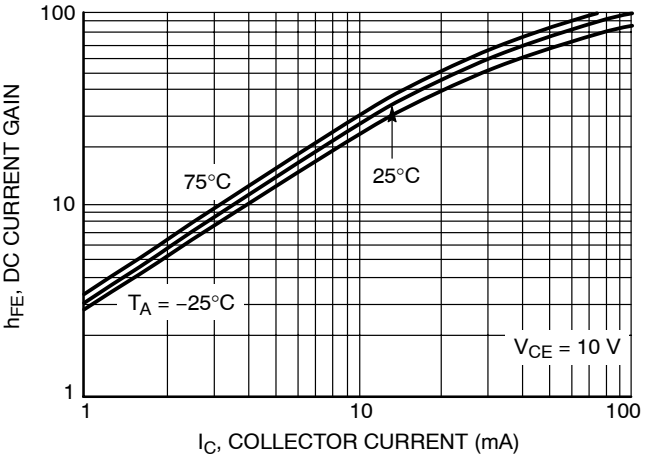


Figure 77. DC Current Gain

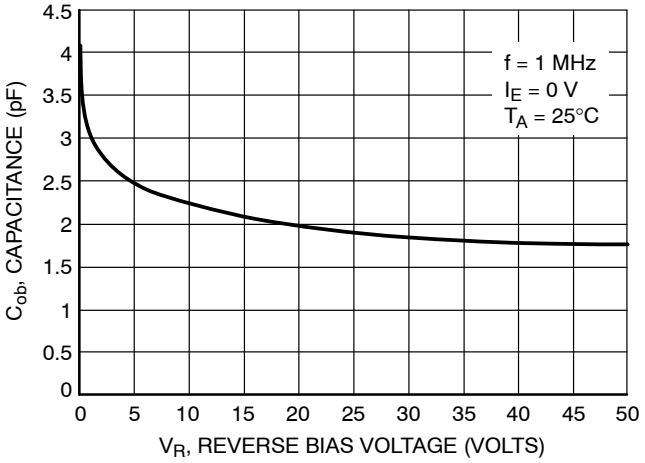


Figure 78. Output Capacitance

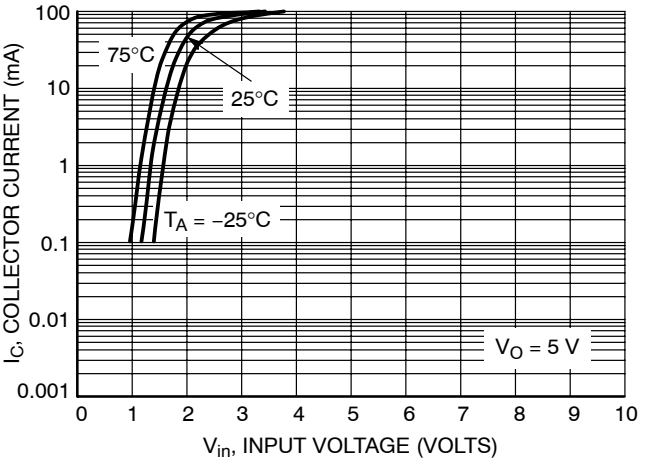


Figure 79. Output Current versus Input Voltage

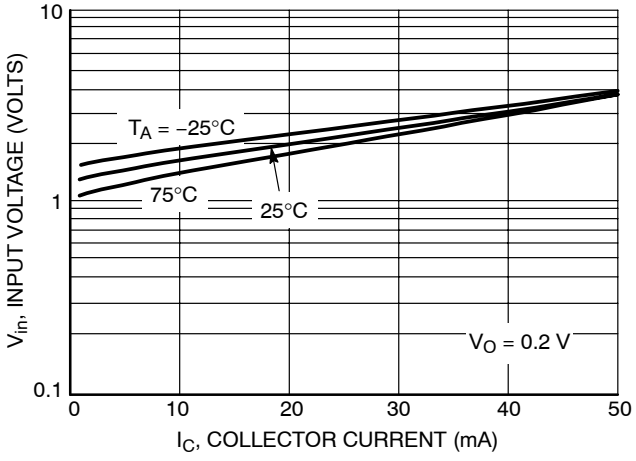


Figure 80. Input Voltage versus Output Current

TYPICAL ELECTRICAL CHARACTERISTICS — MUN5332DW1T1 NPN TRANSISTOR

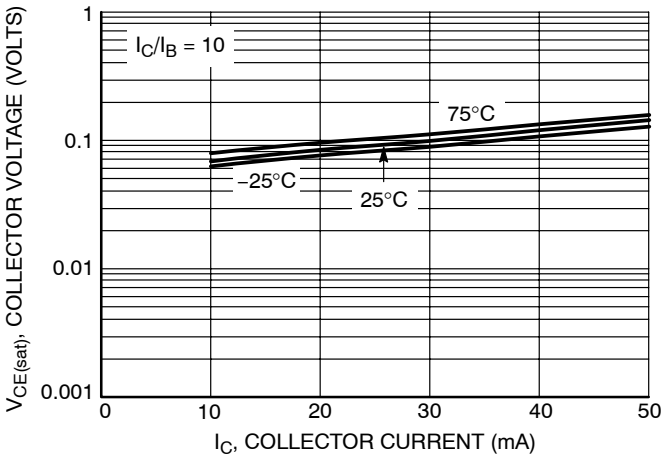


Figure 81. $V_{CE(sat)}$ versus I_C

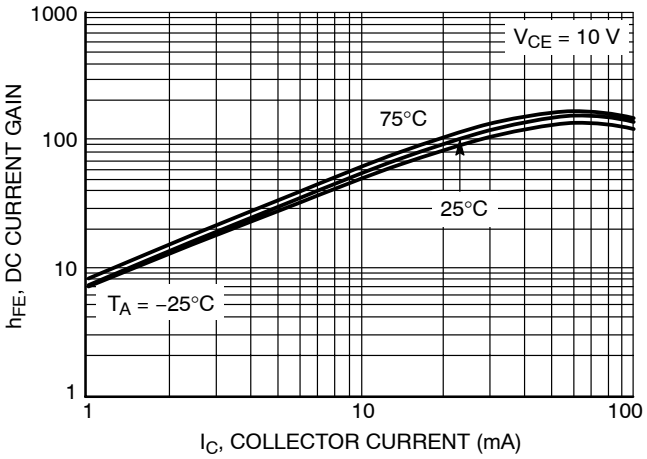


Figure 82. DC Current Gain

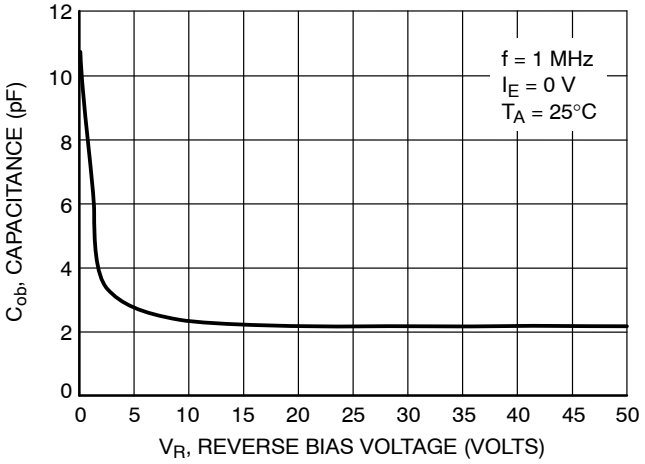


Figure 83. Output Capacitance

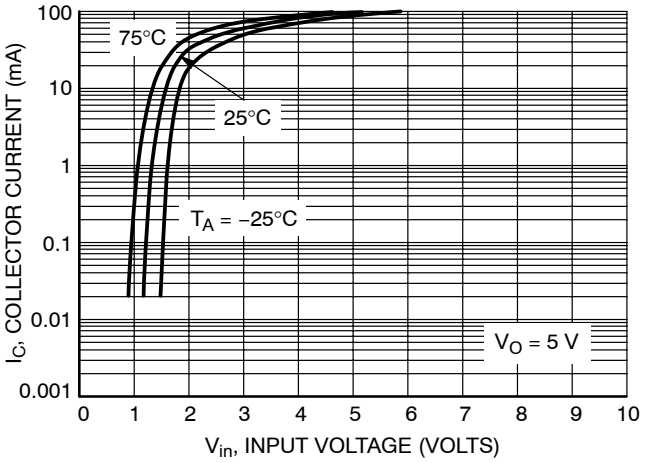


Figure 84. Output Current versus Input Voltage

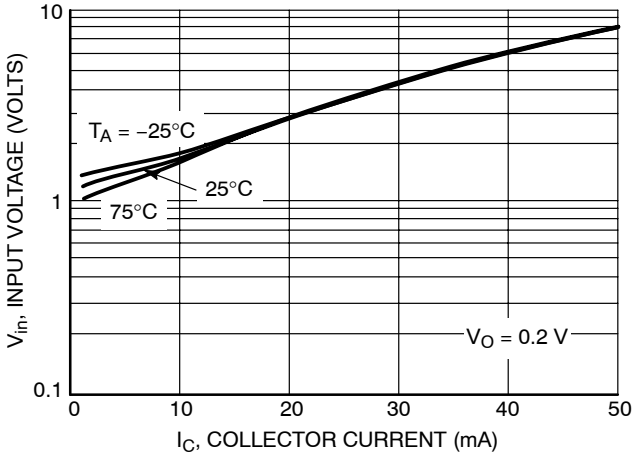


Figure 85. Input Voltage versus Output Current

TYPICAL ELECTRICAL CHARACTERISTICS — MUN5332DW1T1 PNP TRANSISTOR

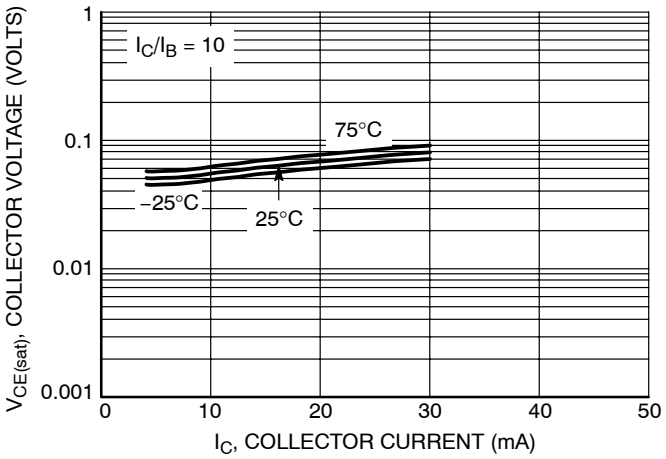


Figure 86. $V_{CE(sat)}$ versus I_C

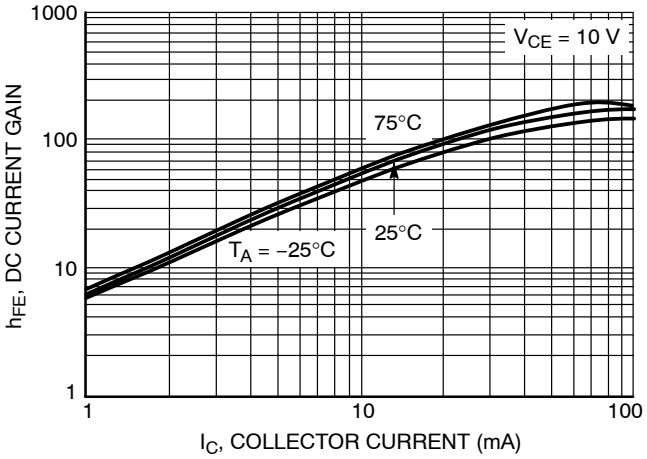


Figure 87. DC Current Gain

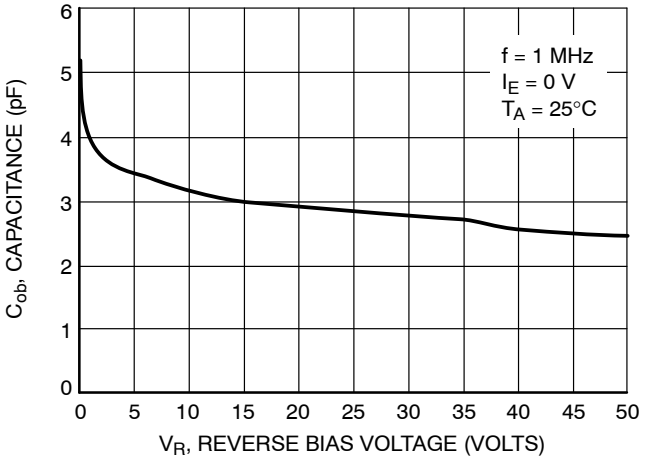


Figure 88. Output Capacitance

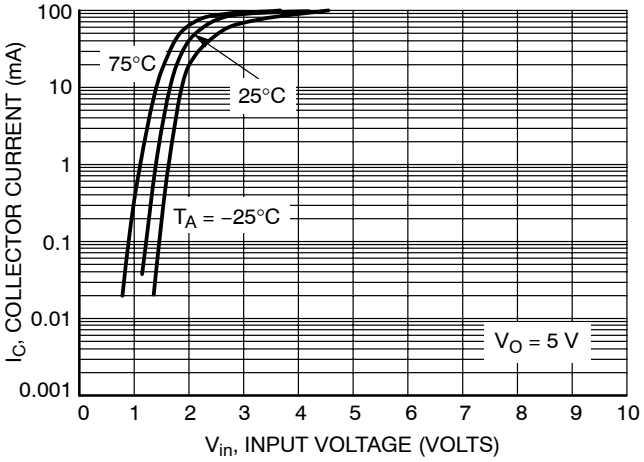


Figure 89. Output Current versus Input Voltage

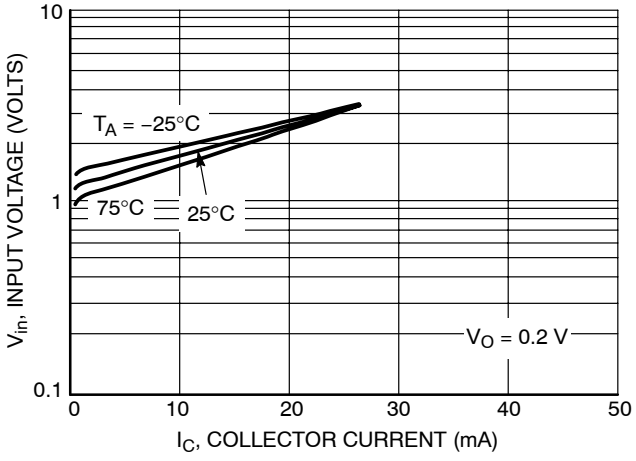


Figure 90. Input Voltage versus Output Current

TYPICAL ELECTRICAL CHARACTERISTICS — MUN5333DW1T1 NPN TRANSISTOR

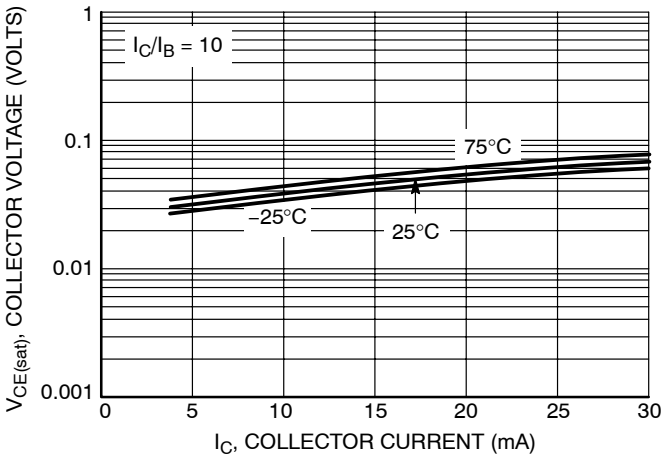


Figure 91. $V_{CE(sat)}$ versus I_C

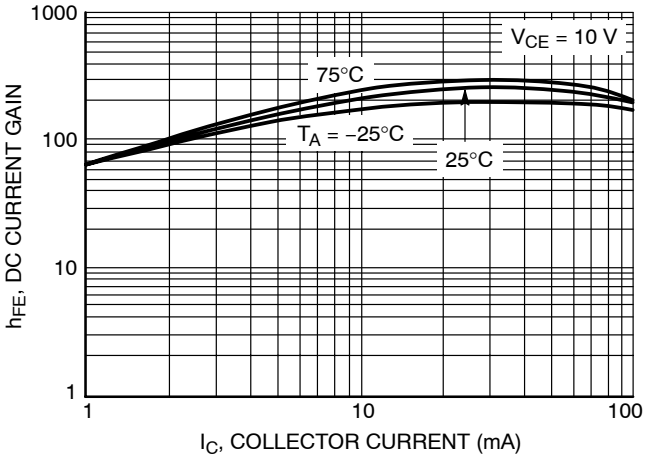


Figure 92. DC Current Gain

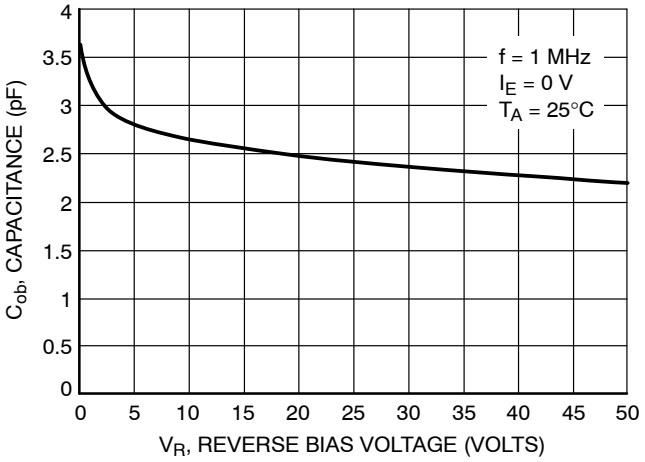


Figure 93. Output Capacitance

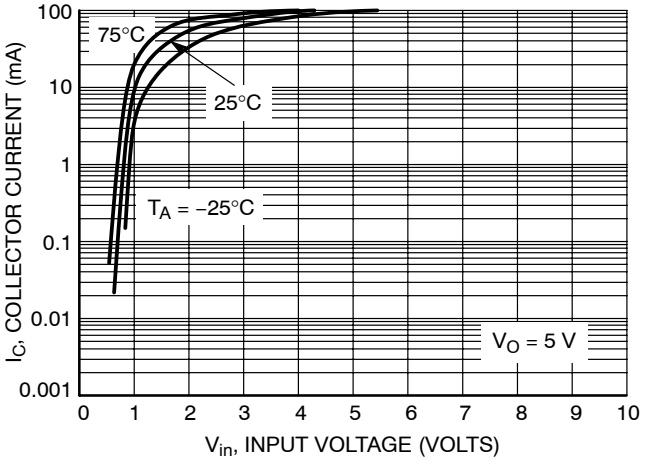


Figure 94. Output Current versus Input Voltage

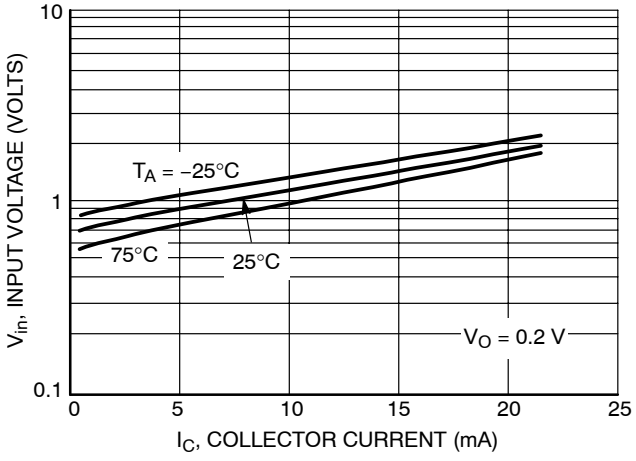


Figure 95. Input Voltage versus Output Current

TYPICAL ELECTRICAL CHARACTERISTICS — MUN5333DW1T1 PNP TRANSISTOR

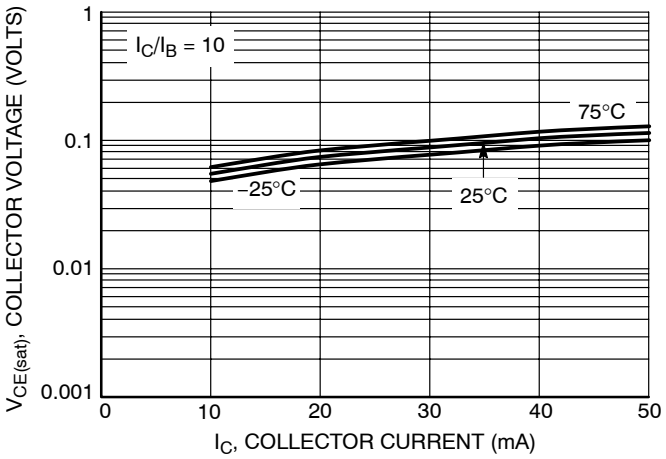


Figure 96. $V_{CE(sat)}$ versus I_C

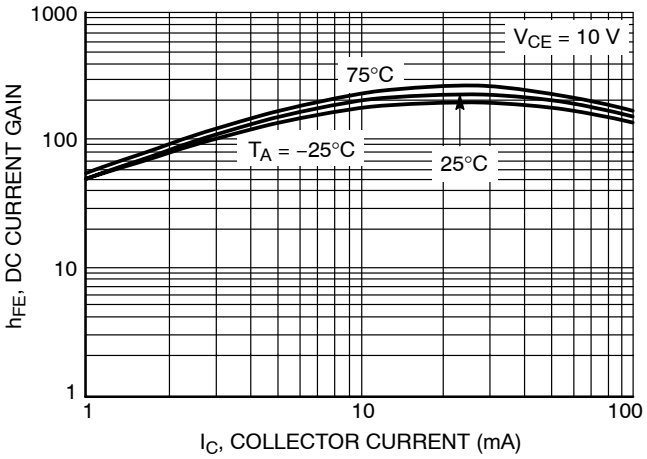


Figure 97. DC Current Gain

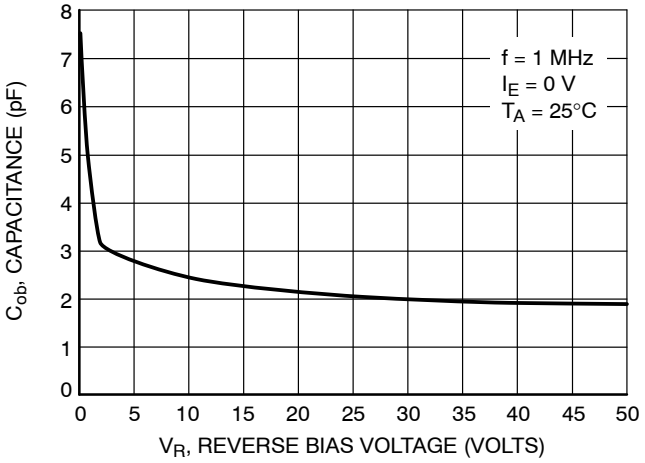


Figure 98. Output Capacitance

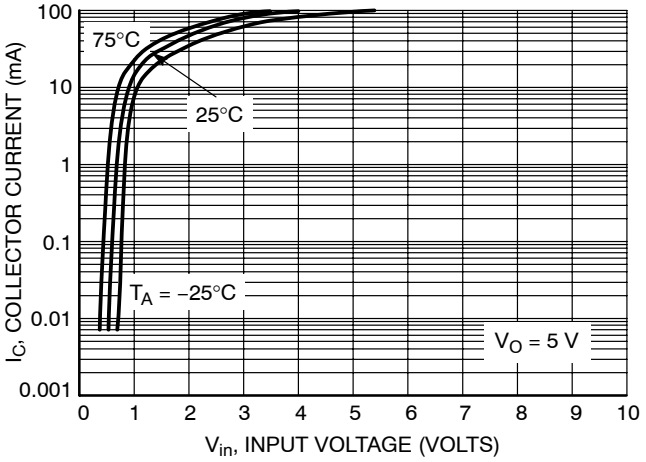


Figure 99. Output Current versus Input Voltage

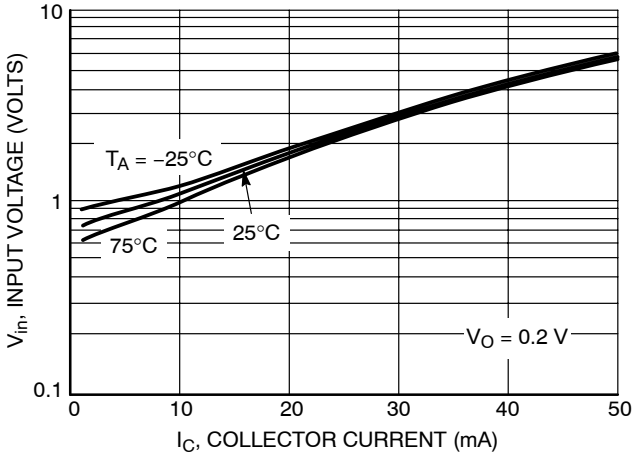


Figure 100. Input Voltage versus Output Current

TYPICAL ELECTRICAL CHARACTERISTICS — MUN5334DW1T1 NPN TRANSISTOR

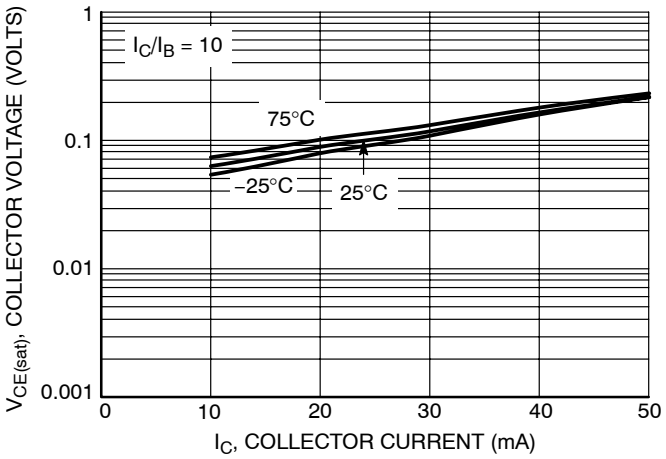


Figure 101. $V_{CE(sat)}$ versus I_C

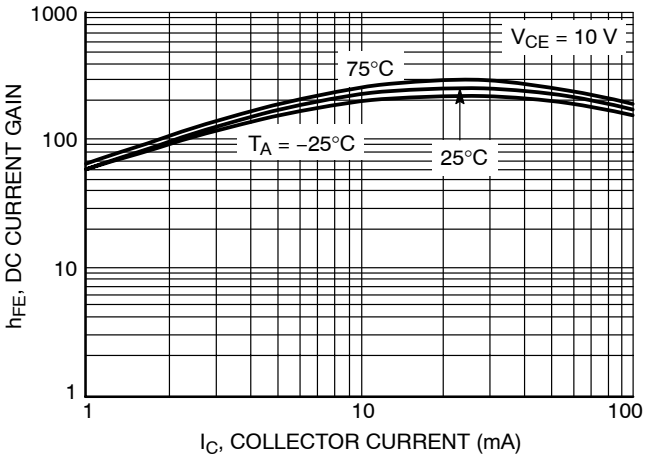


Figure 102. DC Current Gain

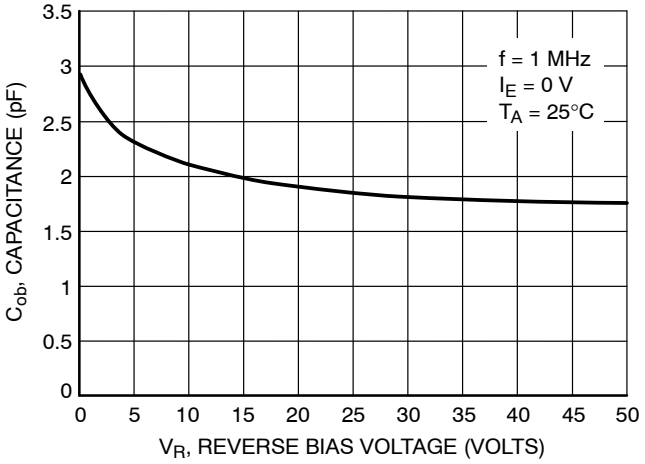


Figure 103. Output Capacitance

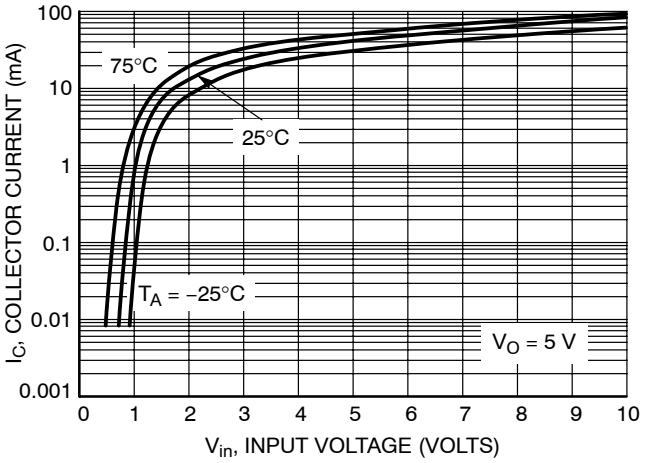


Figure 104. Output Current versus Input Voltage

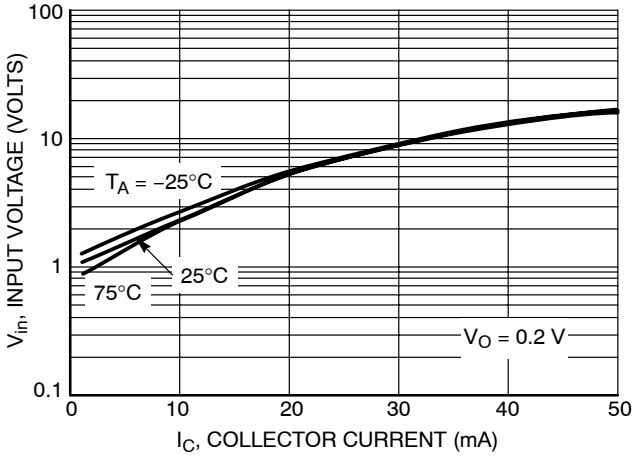


Figure 105. Input Voltage versus Output Current

TYPICAL ELECTRICAL CHARACTERISTICS — MUN5334DW1T1 PNP TRANSISTOR

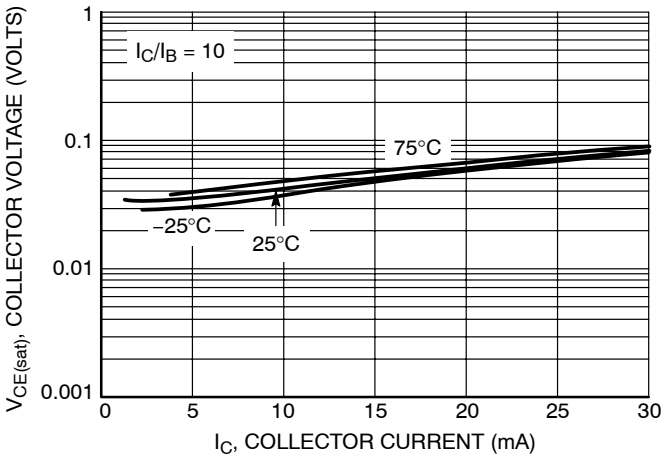


Figure 106. $V_{CE(sat)}$ versus I_C

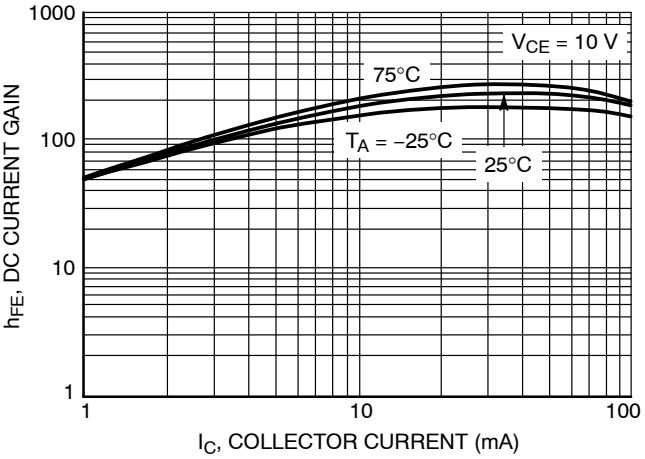


Figure 107. DC Current Gain

TYPICAL ELECTRICAL CHARACTERISTICS — MUN5335DW1T1 NPN TRANSISTOR

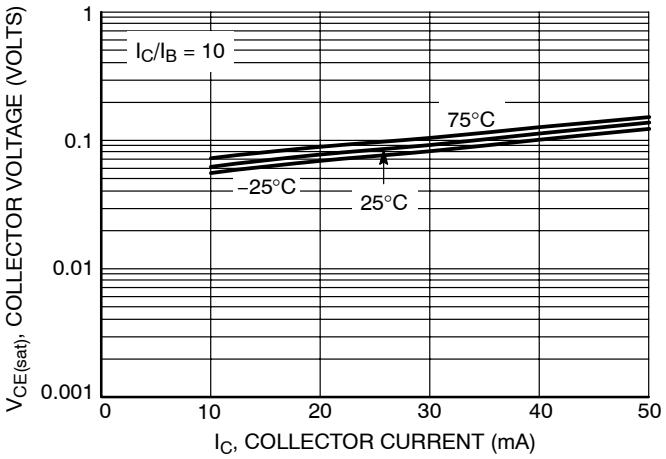


Figure 108. $V_{CE(sat)}$ versus I_C

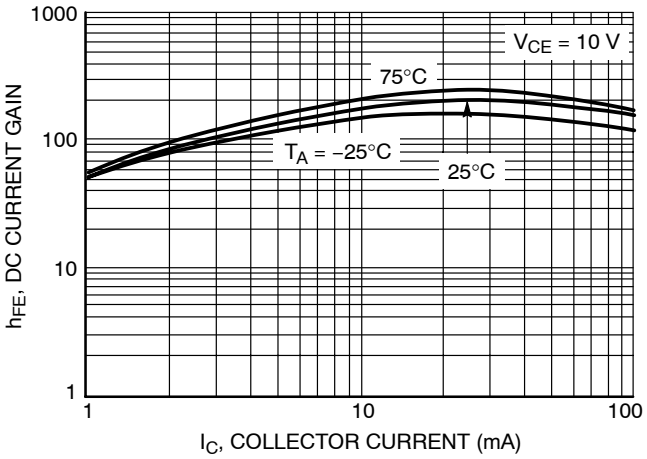


Figure 109. DC Current Gain

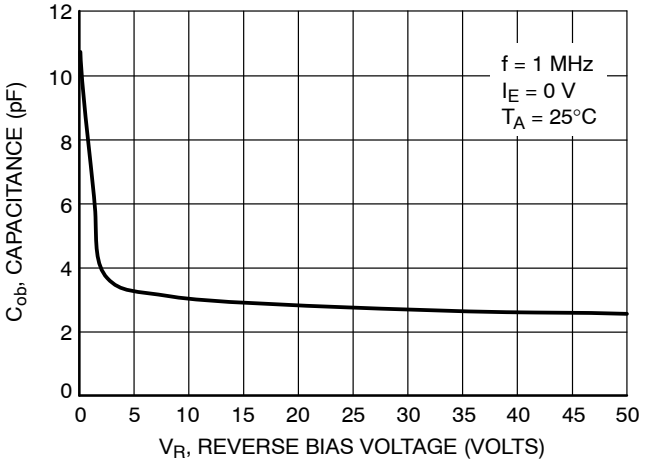


Figure 110. Output Capacitance

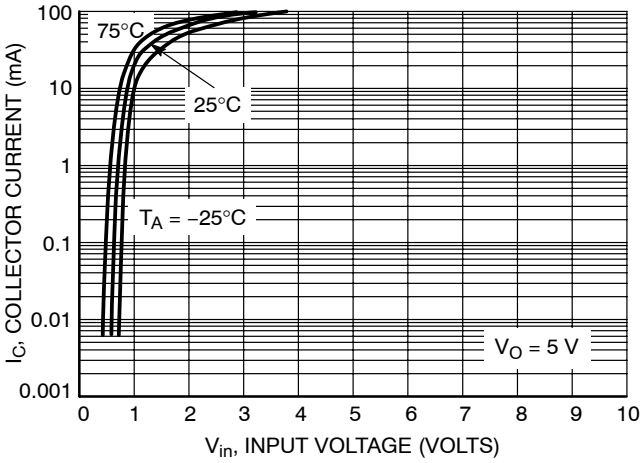


Figure 111. Output Current versus Input Voltage

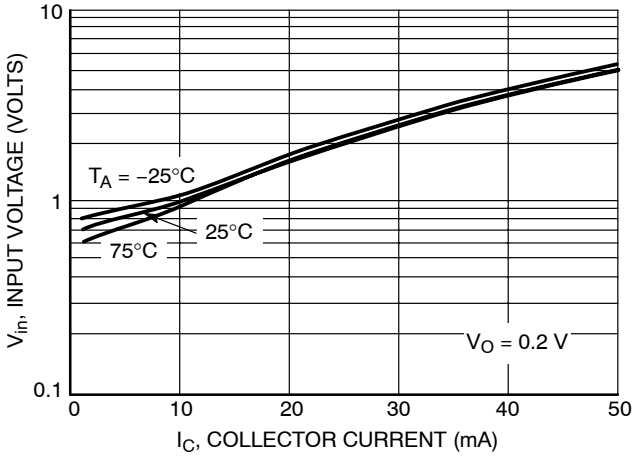


Figure 112. Input Voltage versus Output Current

TYPICAL ELECTRICAL CHARACTERISTICS — MUN5335DW1T1 PNP TRANSISTOR

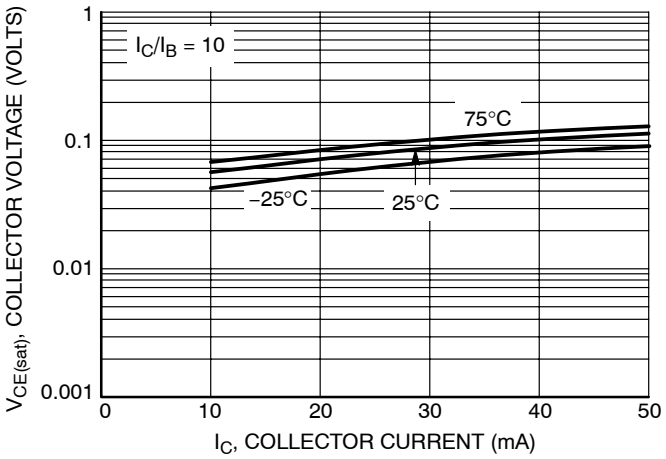


Figure 113. $V_{CE(sat)}$ versus I_C

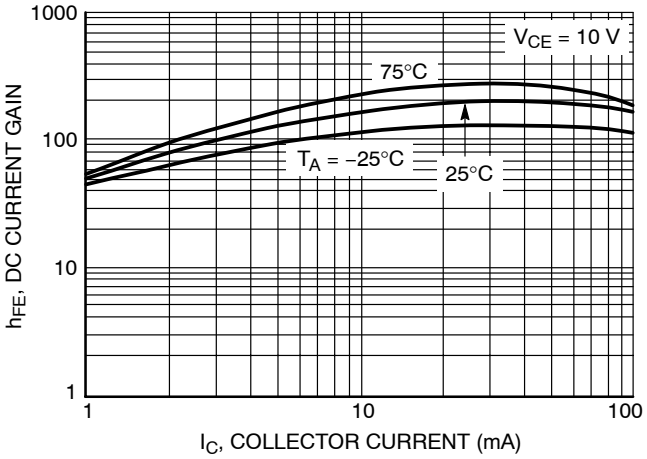


Figure 114. DC Current Gain

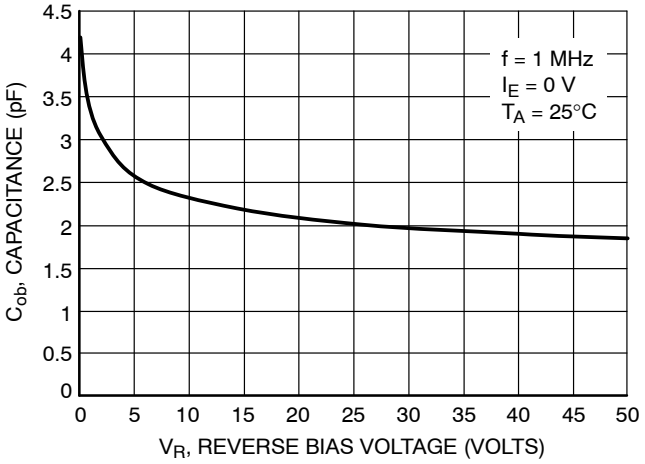


Figure 115. Output Capacitance

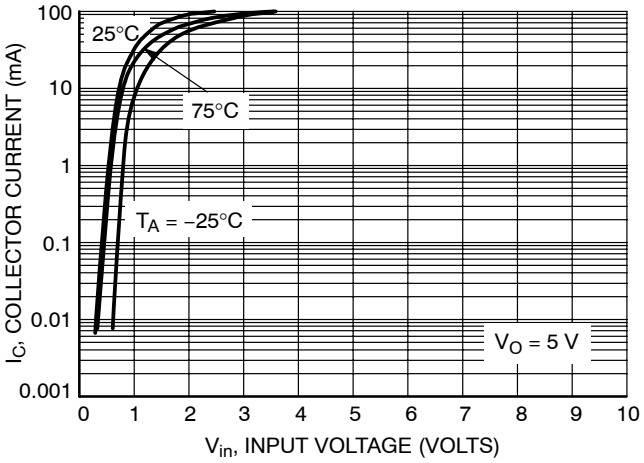


Figure 116. Output Current versus Input Voltage

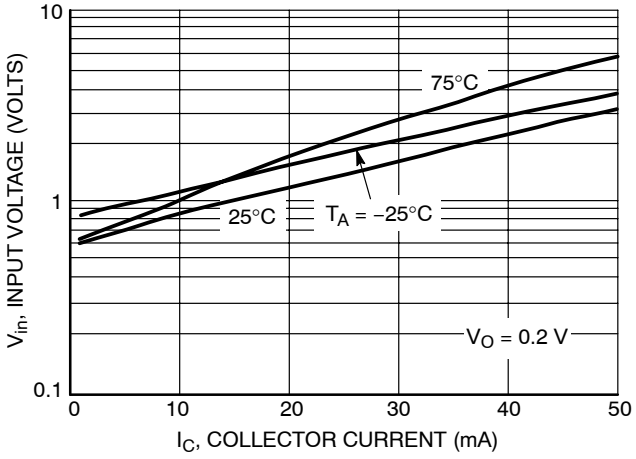


Figure 117. Input Voltage versus Output Current

TYPICAL ELECTRICAL CHARACTERISTICS — MUN5336DW1T1 NPN TRANSISTOR

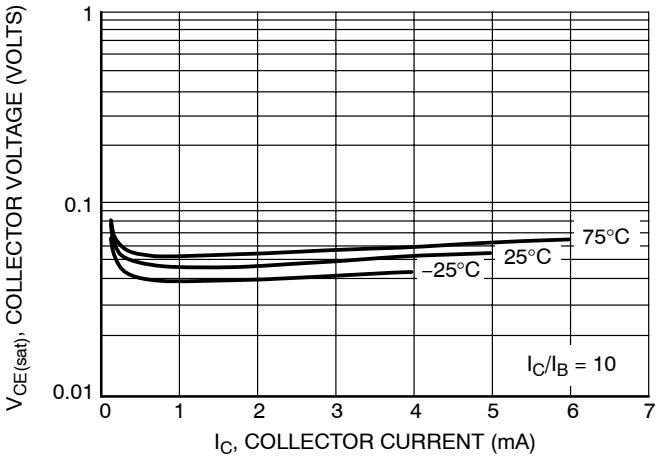


Figure 118. $V_{CE(sat)}$ versus I_C

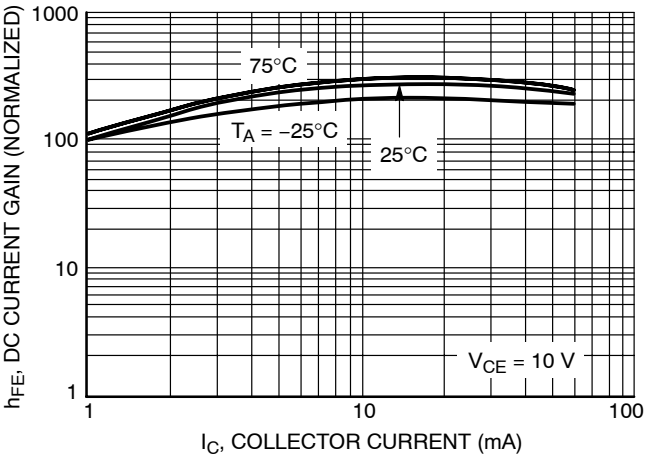


Figure 119. DC Current Gain

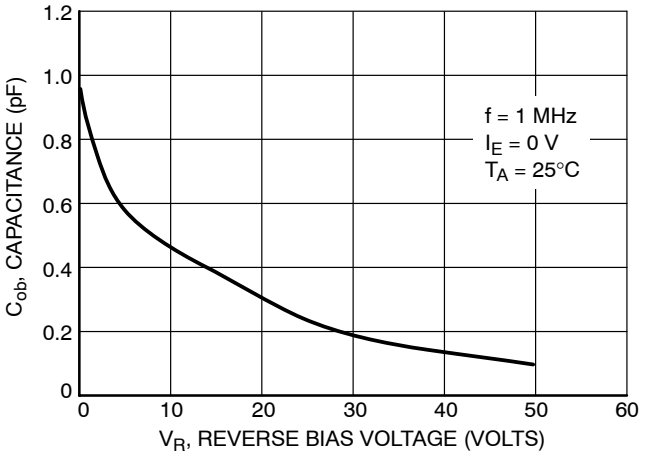


Figure 120. Output Capacitance

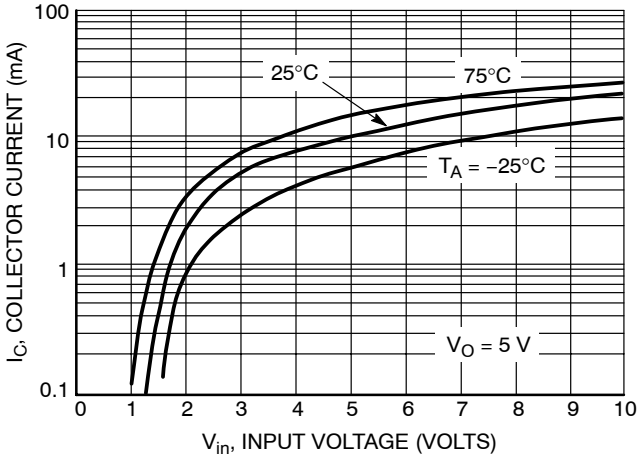


Figure 121. Output Current versus Input Voltage

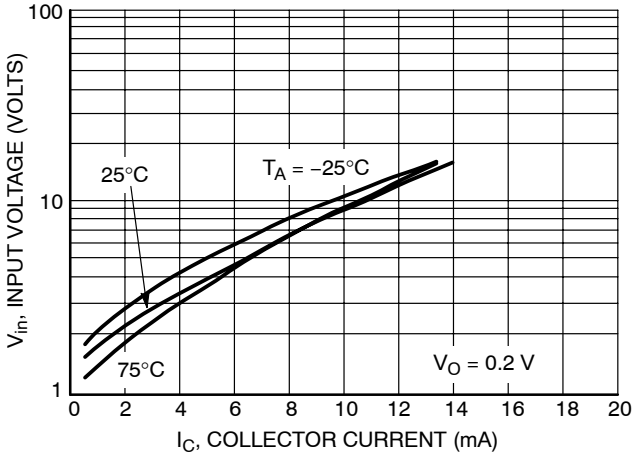


Figure 122. Input Voltage versus Output Current

TYPICAL ELECTRICAL CHARACTERISTICS — MUN5336DW1T1 PNP TRANSISTOR

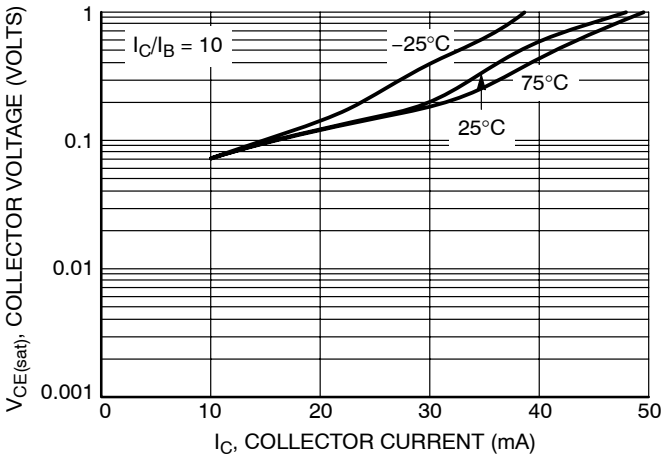


Figure 123. $V_{CE(sat)}$ versus I_C

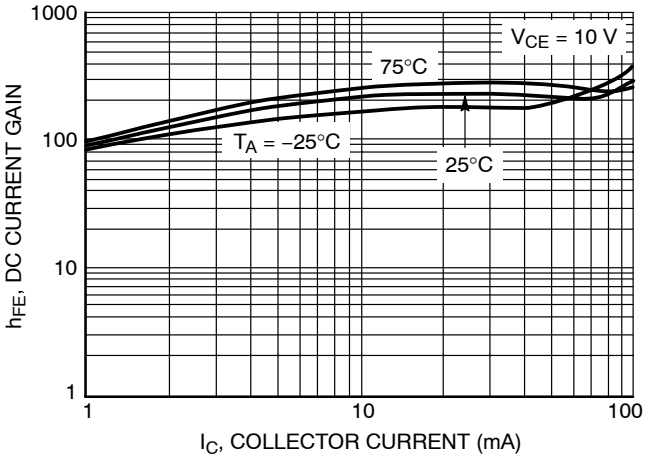


Figure 124. DC Current Gain

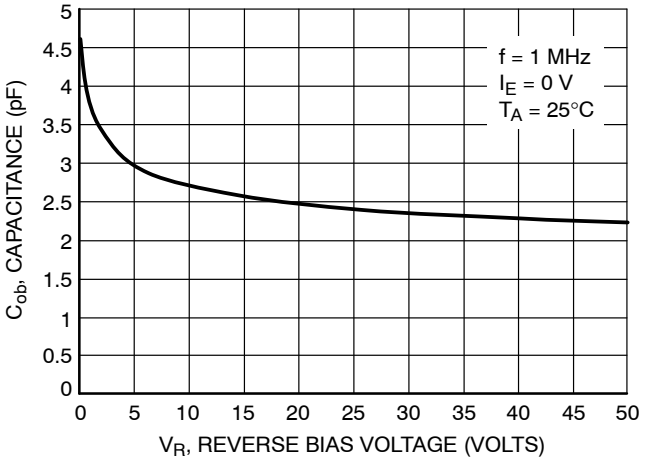


Figure 125. Output Capacitance

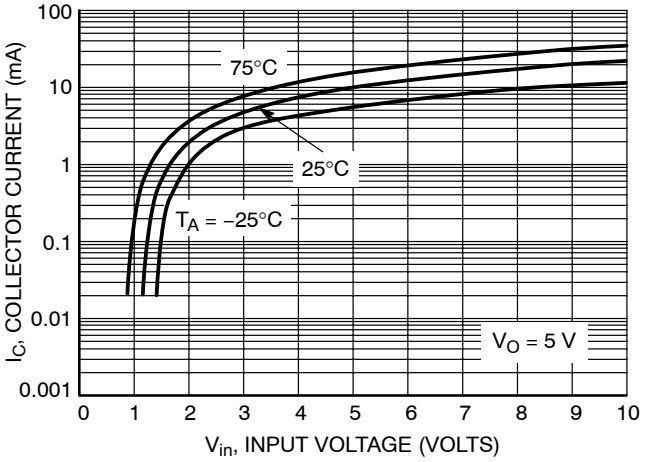


Figure 126. Output Current versus Input Voltage

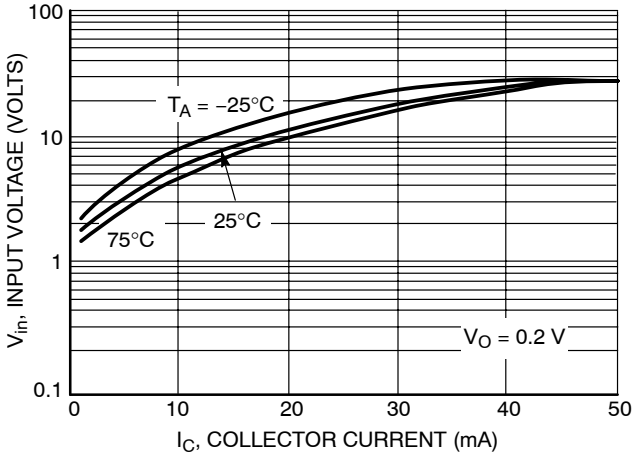


Figure 127. Input Voltage versus Output Current

TYPICAL ELECTRICAL CHARACTERISTICS — MUN5337DW1T1 NPN TRANSISTOR

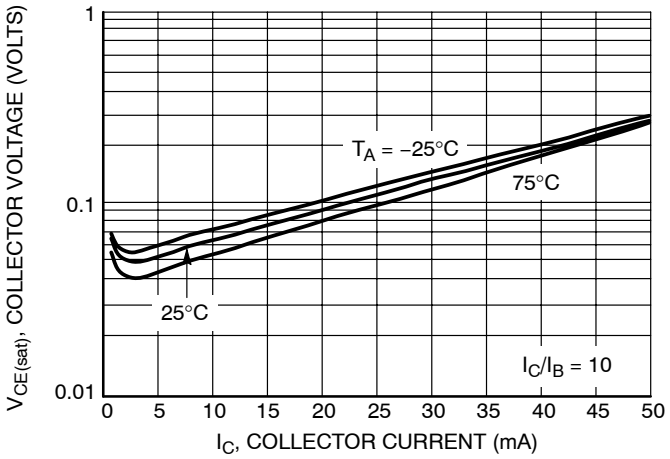


Figure 128. $V_{CE(sat)}$ versus I_C

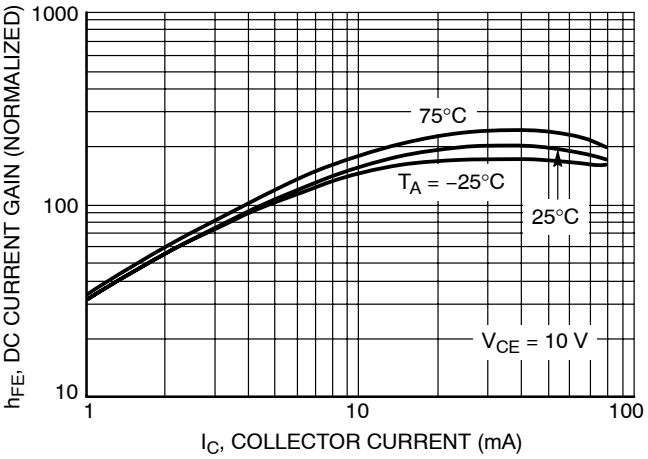


Figure 129. DC Current Gain

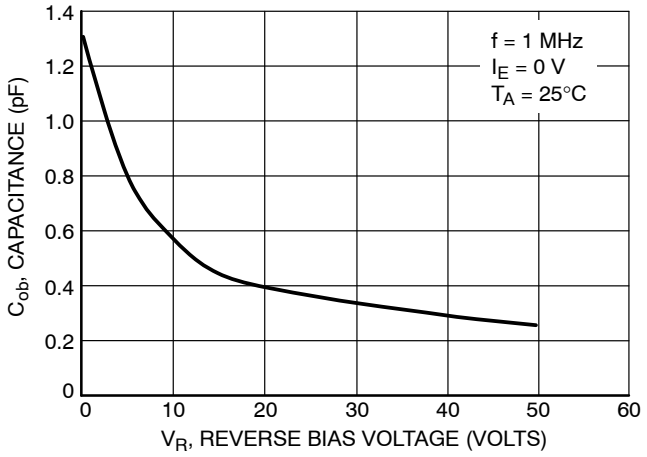


Figure 130. Output Capacitance

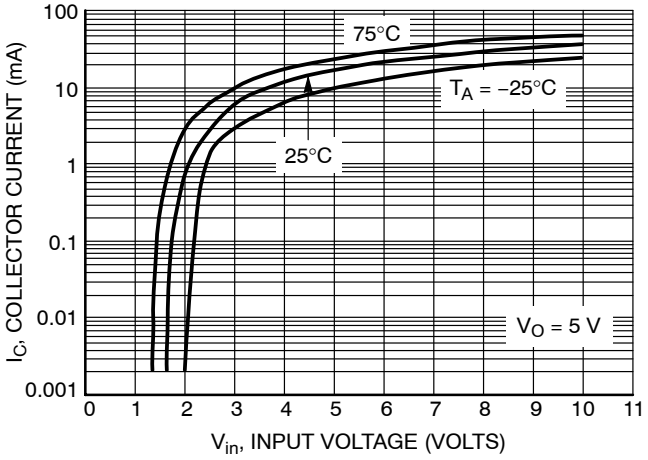


Figure 131. Output Current versus Input Voltage

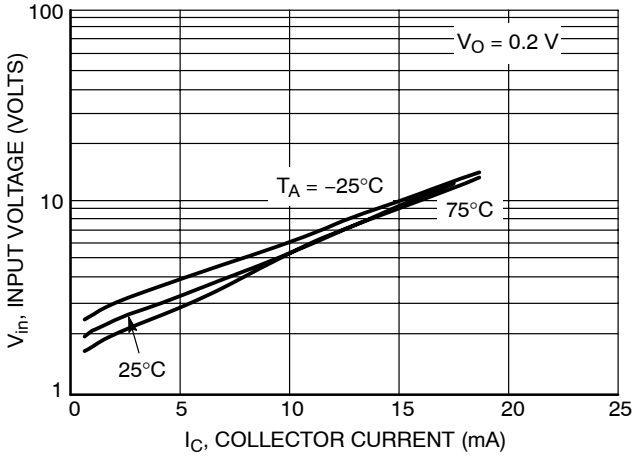


Figure 132. Input Voltage versus Output Current

TYPICAL ELECTRICAL CHARACTERISTICS — MUN5337DW1T1 PNP TRANSISTOR

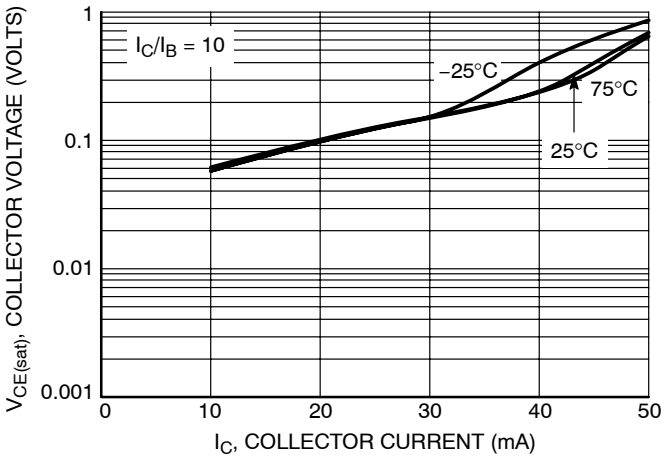


Figure 133. $V_{CE(sat)}$ versus I_C

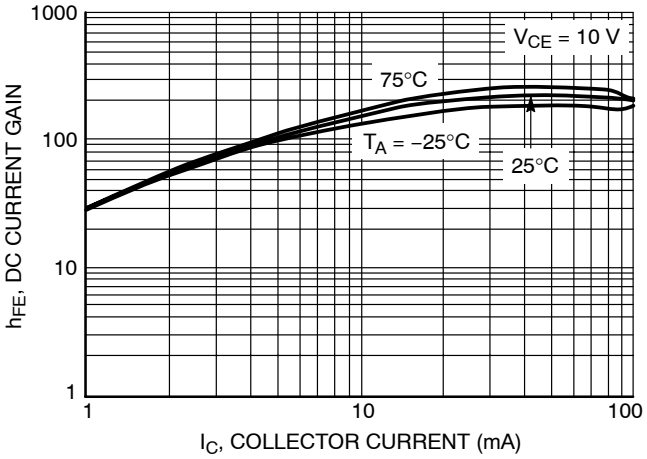


Figure 134. DC Current Gain

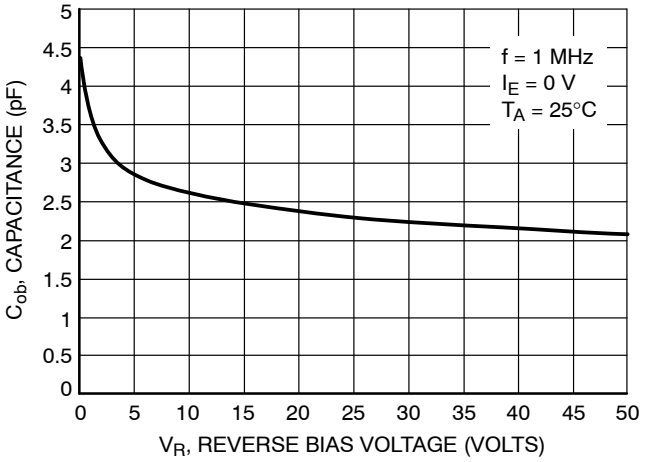


Figure 135. Output Capacitance

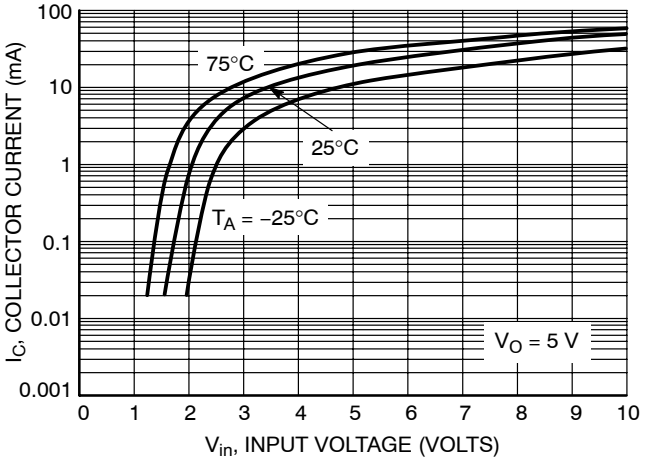


Figure 136. Output Current versus Input Voltage

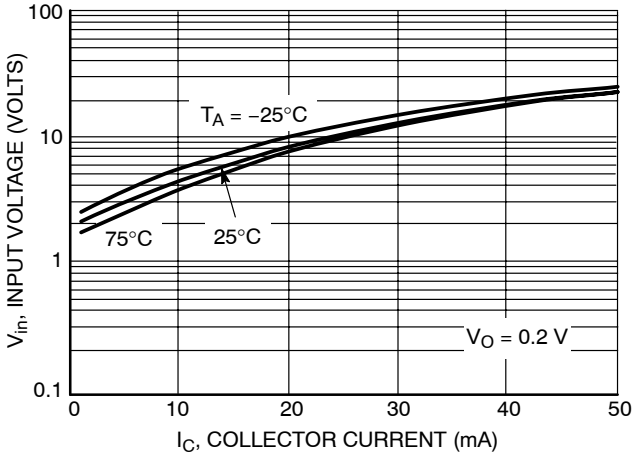
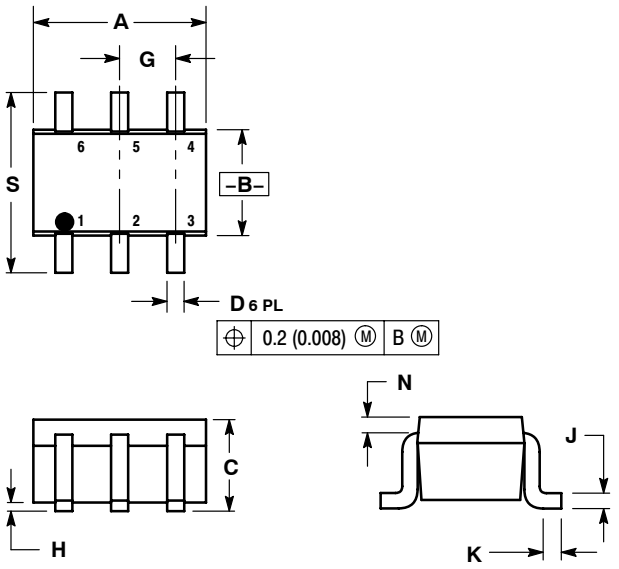


Figure 137. Input Voltage versus Output Current

PACKAGE DIMENSIONS

SOT−363
CASE 419B−02
ISSUE T

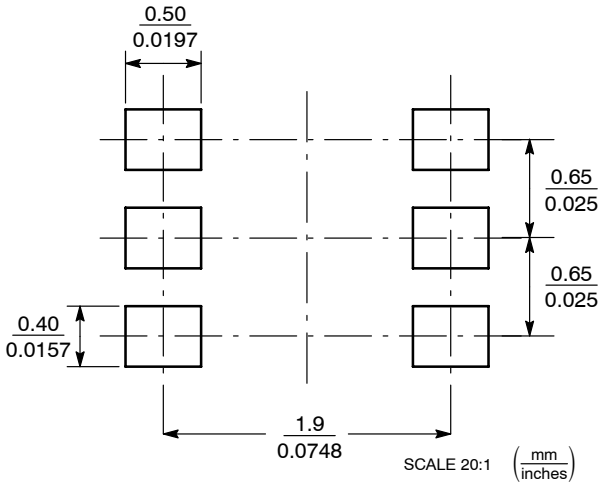


NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. 419B−01 OBSOLETE, NEW STANDARD 419B−02.

	INCHES		MILLIMETERS	
DIM	MIN	MAX	MIN	MAX
A	0.071	0.087	1.80	2.20
B	0.045	0.053	1.15	1.35
C	0.031	0.043	0.80	1.10
D	0.004	0.012	0.10	0.30
G	0.026 BSC		0.65 BSC	
H	−−−	0.004	−−−	0.10
J	0.004	0.010	0.10	0.25
K	0.004	0.012	0.10	0.30
N	0.008 REF		0.20 REF	
S	0.079	0.087	2.00	2.20

STYLE 1:
PIN 1. EMITTER 2
2. BASE 2
3. COLLECTOR 1
4. EMITTER 1
5. BASE 1
6. COLLECTOR 2

SOLDERING FOOTPRINT*



*For additional information on our Pb−Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

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