

MMUN2111LT1 Series

DEVICE MARKING AND RESISTOR VALUES

Device*	Package	Marking	R1 (K)	R2 (K)	Shipping
MMUN2111LT1, G MMUN2111LT3, G	SOT-23	A6A	10	10	3000/Tape & Reel 10,000/Tape & Reel
MMUN2112LT1, G	SOT-23	A6B	22	22	3000/Tape & Reel
MMUN2113LT1, G MMUN2113LT3, G	SOT-23	A6C	47	47	3000/Tape & Reel 10,000/Tape & Reel
MMUN2114LT1, G MMUN2114LT3G	SOT-23	A6D	10	47	3000/Tape & Reel 10,000/Tape & Reel
MMUN2115LT1, G	SOT-23	A6E	10	∞	3000/Tape & Reel
MMUN2116LT1, G	SOT-23	A6F	4.7	∞	3000/Tape & Reel
MMUN2130LT1, G (Note 3)	SOT-23	A6G	1.0	1.0	3000/Tape & Reel
MMUN2131LT1, G (Note 3)	SOT-23	A6H	2.2	2.2	3000/Tape & Reel
MMUN2132LT1, G	SOT-23	A6J	4.7	4.7	3000/Tape & Reel
MMUN2133LT1, G	SOT-23	A6K	4.7	47	3000/Tape & Reel
MMUN2134LT1, G (Note 3)	SOT-23	A6L	22	47	3000/Tape & Reel

*The "G" suffix indicates Pb-Free package available.

3. New devices. Updated curves to follow in subsequent data sheets.

ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS					
Collector-Base Cutoff Current ($V_{CB} = 50\text{ V}$, $I_E = 0$)	I_{CBO}	–	–	100	nAdc
Collector-Emitter Cutoff Current ($V_{CE} = 50\text{ V}$, $I_B = 0$)	I_{CEO}	–	–	500	nAdc
Emitter-Base Cutoff Current ($V_{EB} = 6.0\text{ V}$, $I_C = 0$)	I_{EBO}	–	–	0.5	mAdc
MMUN2111LT1, G		–	–	0.2	
MMUN2112LT1, G		–	–	0.1	
MMUN2113LT1, G		–	–	0.2	
MMUN2114LT1, G		–	–	0.9	
MMUN2115LT1, G		–	–	1.9	
MMUN2116LT1, G		–	–	4.3	
MMUN2130LT1, G		–	–	2.3	
MMUN2131LT1, G		–	–	1.5	
MMUN2132LT1, G		–	–	0.18	
MMUN2133LT1, G		–	–	0.13	
MMUN2134LT1, G		–	–		
Collector-Base Breakdown Voltage ($I_C = 10\text{ }\mu\text{A}$, $I_E = 0$)	$V_{(BR)CBO}$	50	–	–	Vdc
Collector-Emitter Breakdown Voltage (Note 4) ($I_C = 2.0\text{ mA}$, $I_B = 0$)	$V_{(BR)CEO}$	50	–	–	Vdc

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

MMUN2111LT1 Series

ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ unless otherwise noted) (Continued)

Characteristic	Symbol	Min	Typ	Max	Unit	
ON CHARACTERISTICS (Note 5)						
DC Current Gain (V _{CE} = 10 V, I _C = 5.0 mA)	MMUN2111LT1, G MMUN2112LT1, G MMUN2113LT1, G MMUN2114LT1, G MMUN2115LT1, G MMUN2116LT1, G MMUN2130LT1, G MMUN2131LT1, G MMUN2132LT1, G MMUN2133LT1, G MMUN2134LT1, G	h _{FE}	35 60 80 80 160 160 3.0 8.0 15 80 80	60 100 140 140 250 250 5.0 15 27 140 130	– – – – – – – – – – –	
Collector-Emitter Saturation Voltage (I _C = 10 mA, I _B = 0.3 mA)	MMUN2111LT1, G MMUN2112LT1, G MMUN2113LT1, G MMUN2114LT1, G MMUN2133LT1, G	V _{CE(sat)}	– – – – –	– – – – –	0.25 0.25 0.25 0.25 0.25	Vdc
(I _C = 10 mA, I _B = 5 mA)	MMUN2130LT1, G MMUN2131LT1, G		– –	– –	0.25 0.25	
(I _C = 10 mA, I _B = 1 mA)	MMUN2115LT1, G MMUN2116LT1, G MMUN2132LT1, G MMUN2134LT1, G		– – – –	– – – –	0.25 0.25 0.25 0.25	
Output Voltage (on) (V _{CC} = 5.0 V, V _B = 2.5 V, R _L = 1.0 kΩ)	MMUN2111LT1, G MMUN2112LT1, G MMUN2114LT1, G MMUN2115LT1, G MMUN2116LT1, G MMUN2130LT1, G MMUN2131LT1, G MMUN2132LT1, G MMUN2133LT1, G MMUN2134LT1, G	V _{OL}	– – – – – – – – – –	– – – – – – – – – –	0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2	Vdc
(V _{CC} = 5.0 V, V _B = 3.5 V, R _L = 1.0 kΩ)	MMUN2113LT1, G		–	–	0.2	
Output Voltage (off) (V _{CC} = 5.0 V, V _B = 0.5 V, R _L = 1.0 kΩ)	MMUN2111LT1, G MMUN2112LT1, G MMUN2113LT1, G MMUN2114LT1, G MMUN2133LT1, G MMUN2134LT1, G	V _{OH}	4.9 4.9 4.9 4.9 4.9 4.9	– – – – – –	– – – – – –	Vdc
(V _{CC} = 5.0 V, V _B = 0.25 V, R _L = 1.0 kΩ)	MMUN2115LT1, G MMUN2116LT1, G MMUN2131LT1, G MMUN2132LT1, G		4.9 4.9 4.9 4.9	– – – –	– – – –	
(V _{CC} = 5.0 V, V _B = 0.050 V, R _L = 1.0 kΩ)	MMUN2130LT1, G		4.9	–	–	

MMUN2111LT1 Series

ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ unless otherwise noted) (Continued)

Characteristic		Symbol	Min	Typ	Max	Unit
ON CHARACTERISTICS (Note 5)						
Input Resistor	MMUN2111LT1, G	R1	7.0	10	13	k Ω
	MMUN2112LT1, G		15.4	22	28.6	
	MMUN2113LT1, G		32.9	47	61.1	
	MMUN2114LT1, G		7.0	10	13	
	MMUN2115LT1, G		7.0	10	13	
	MMUN2116LT1, G		3.3	4.7	6.1	
	MMUN2130LT1, G		0.7	1.0	1.3	
	MMUN2131LT1, G		1.5	2.2	2.9	
	MMUN2132LT1, G		3.3	4.7	6.1	
	MMUN2133LT1, G		3.3	4.7	6.1	
	MMUN2134LT1, G		15.4	22	28.6	
Resistor Ratio	MMUN2111LT1, G	R ₁ /R ₂	0.8	1.0	1.2	
	MMUN2112LT1, G		0.8	1.0	1.2	
	MMUN2113LT1, G		0.8	1.0	1.2	
	MMUN2114LT1, G		0.17	0.21	0.25	
	MMUN2115LT1, G		–	–	–	
	MMUN2116LT1, G		–	–	–	
	MMUN2130LT1, G		0.8	1.0	1.2	
	MMUN2131LT1, G		0.8	1.0	1.2	
	MMUN2132LT1, G		0.8	1.0	1.2	
	MMUN2133LT1, G		0.055	0.1	0.185	
	MMUN2134LT1, G		0.38	0.47	0.56	

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

MMUN2111LT1 Series

TYPICAL ELECTRICAL CHARACTERISTICS MMUN2111LT1

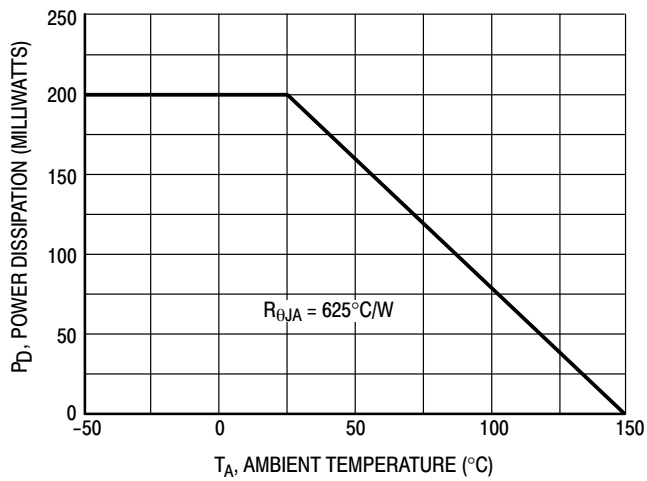


Figure 1. Derating Curve

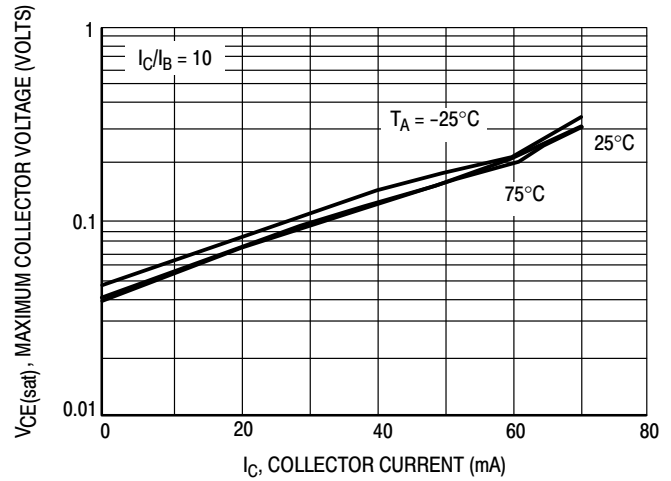


Figure 2. $V_{CE(sat)}$ versus I_C

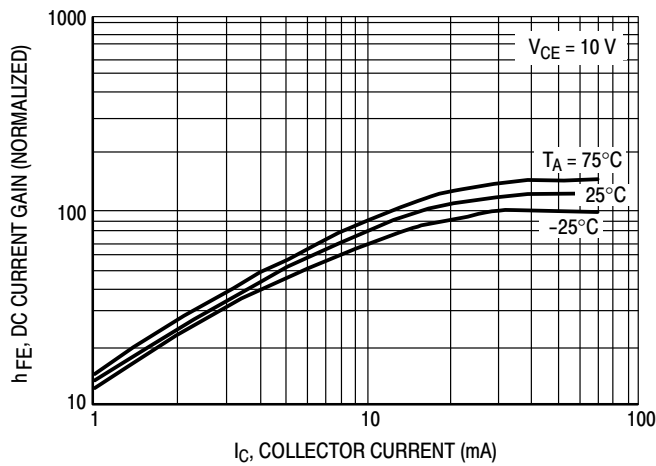


Figure 3. DC Current Gain

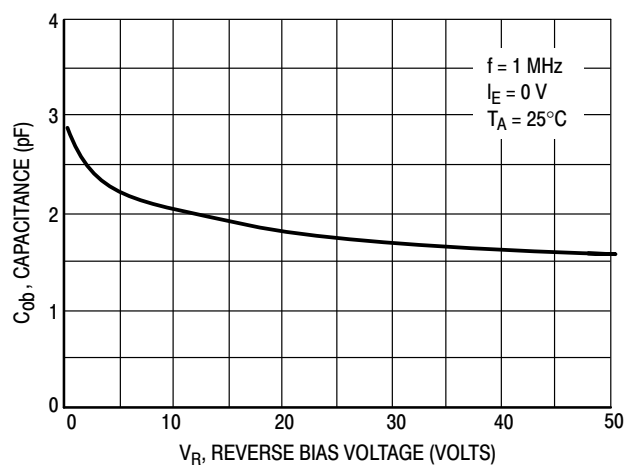


Figure 4. Output Capacitance

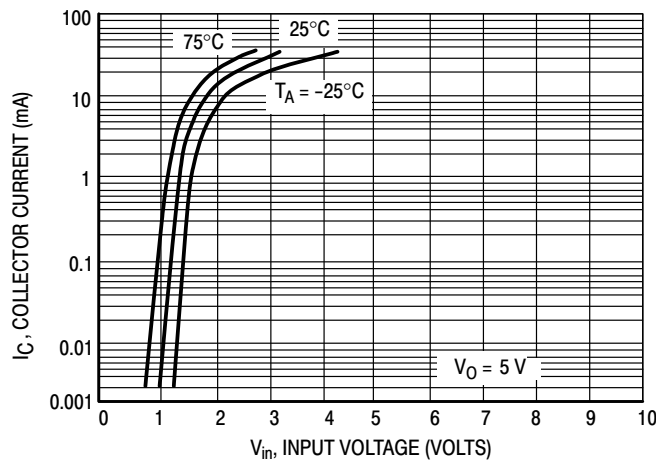


Figure 5. Output Current versus Input Voltage

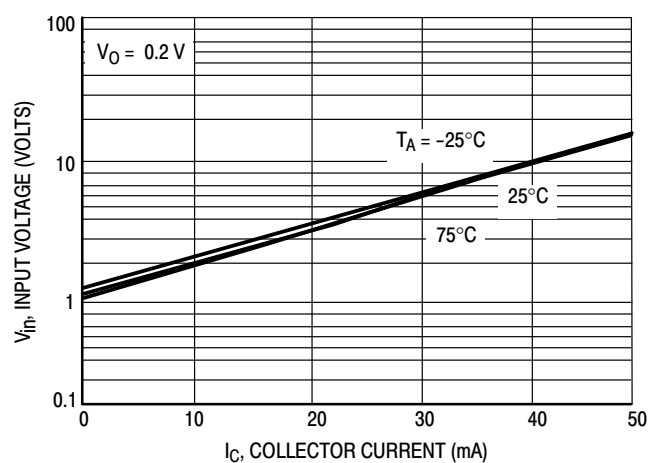


Figure 6. Input Voltage versus Output Current

MMUN2111LT1 Series

TYPICAL ELECTRICAL CHARACTERISTICS MMUN2112LT1

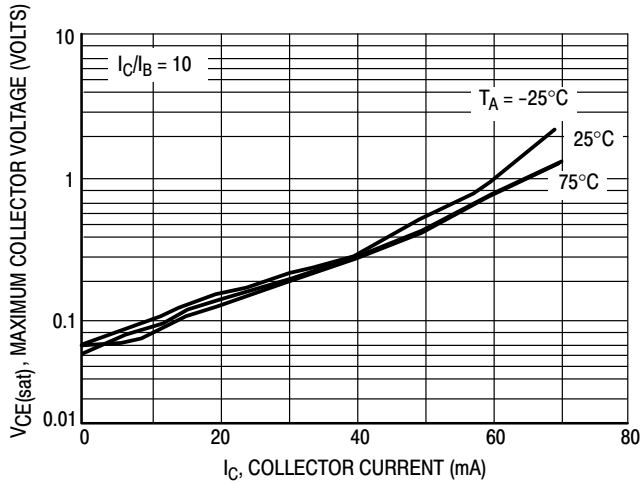


Figure 7. $V_{CE(sat)}$ versus I_C

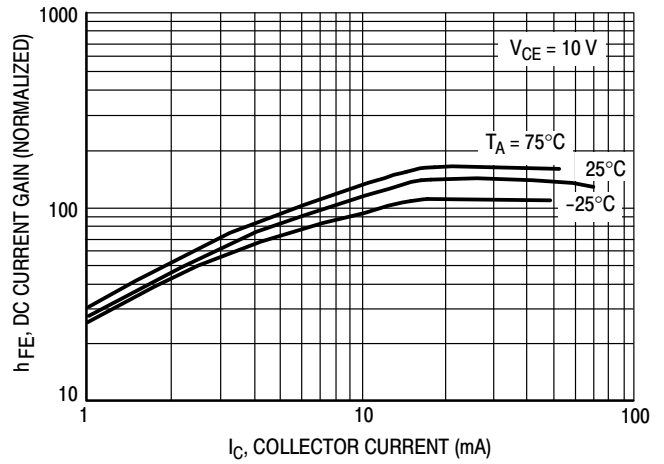


Figure 8. DC Current Gain

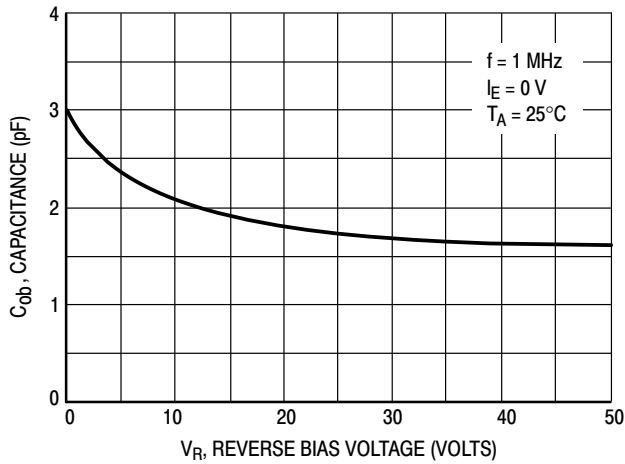


Figure 9. Output Capacitance

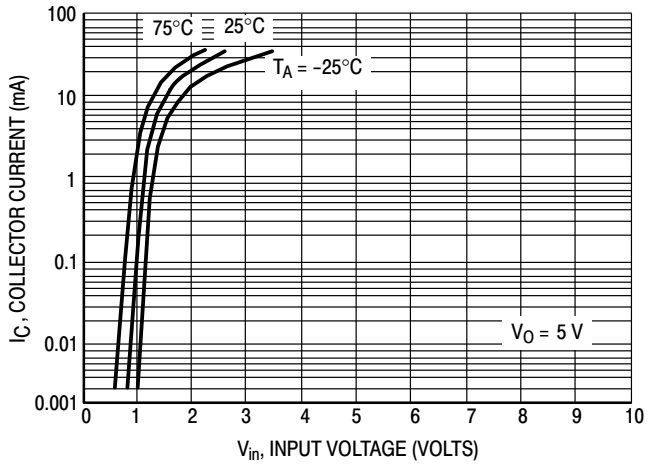


Figure 10. Output Current versus Input Voltage

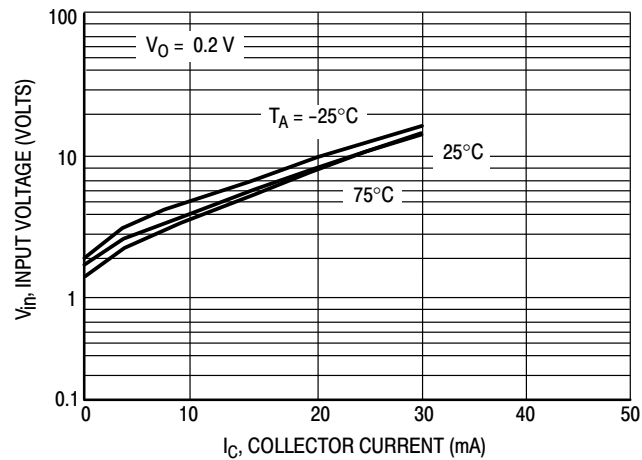


Figure 11. Input Voltage versus Output Current

MMUN2111LT1 Series

TYPICAL ELECTRICAL CHARACTERISTICS MMUN2113LT1

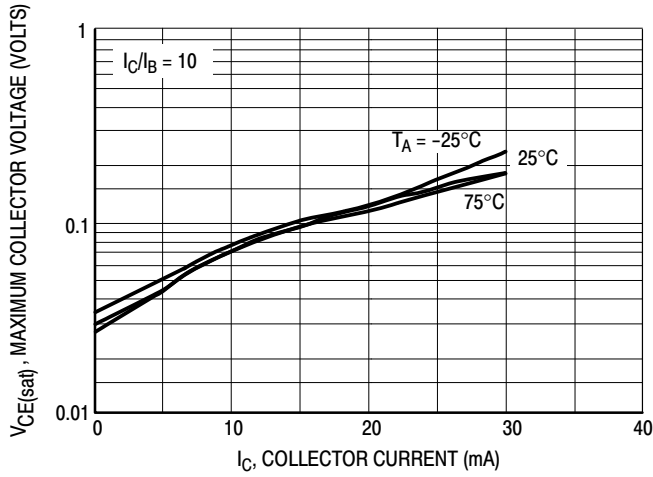


Figure 12. $V_{CE(sat)}$ versus I_C

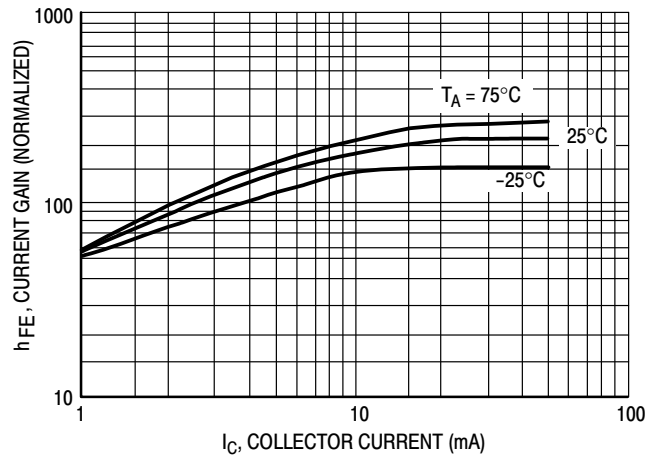


Figure 13. DC Current Gain

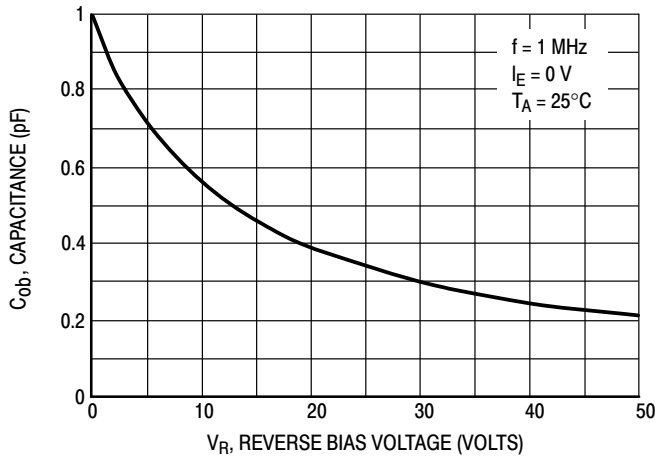


Figure 14. Output Capacitance

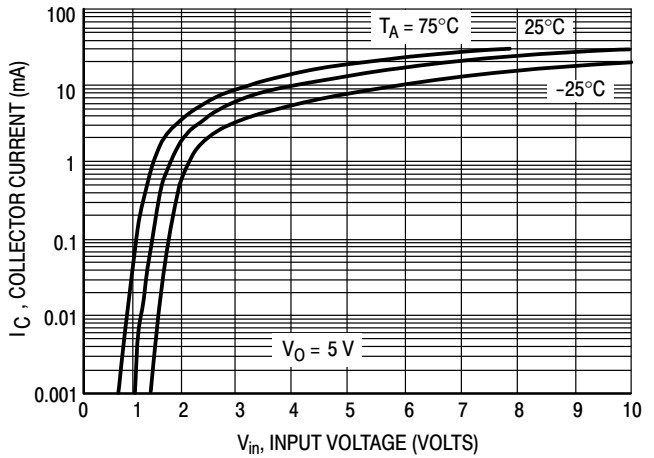


Figure 15. Output Current versus Input Voltage

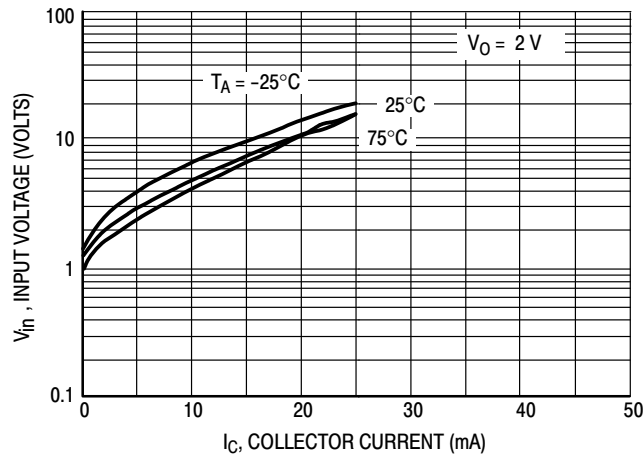


Figure 16. Input Voltage versus Output Current

TYPICAL ELECTRICAL CHARACTERISTICS
MMUN2114LT1

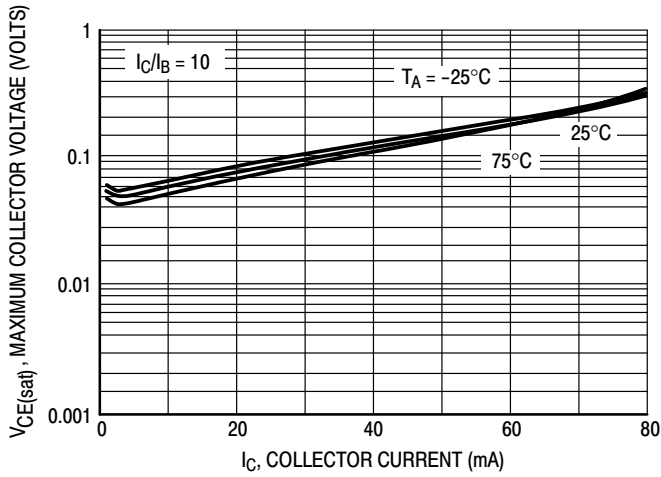


Figure 17. $V_{CE(sat)}$ versus I_C

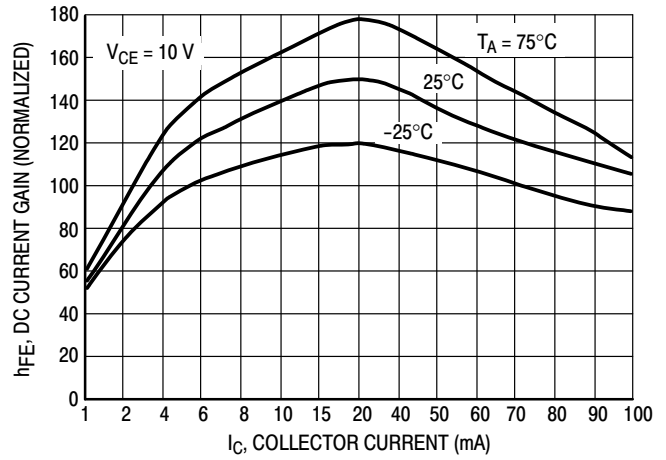


Figure 18. DC Current Gain

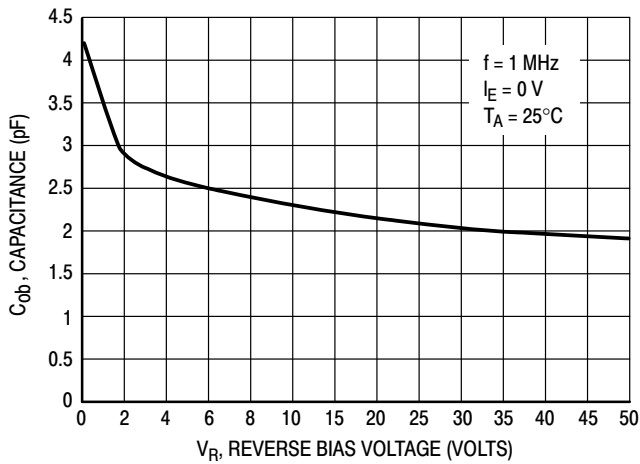


Figure 19. Output Capacitance

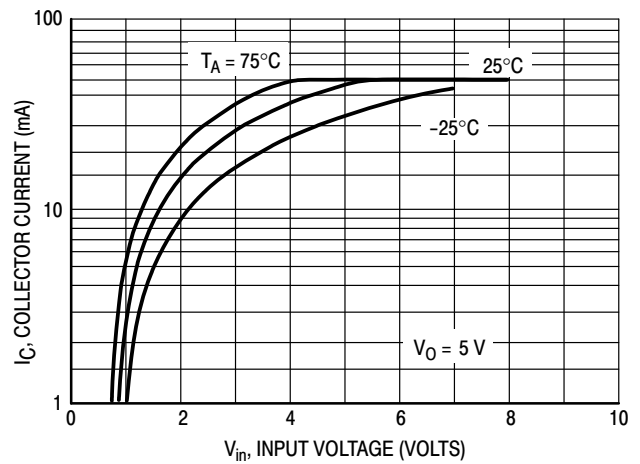


Figure 20. Output Current versus Input Voltage

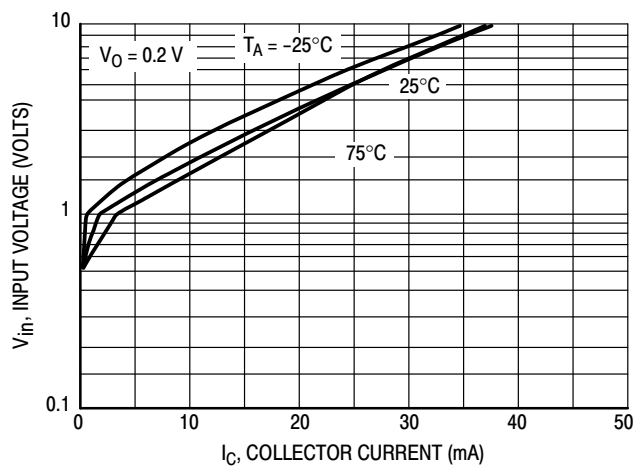


Figure 21. Input Voltage versus Output Current

TYPICAL ELECTRICAL CHARACTERISTICS
MMUN2115LT1

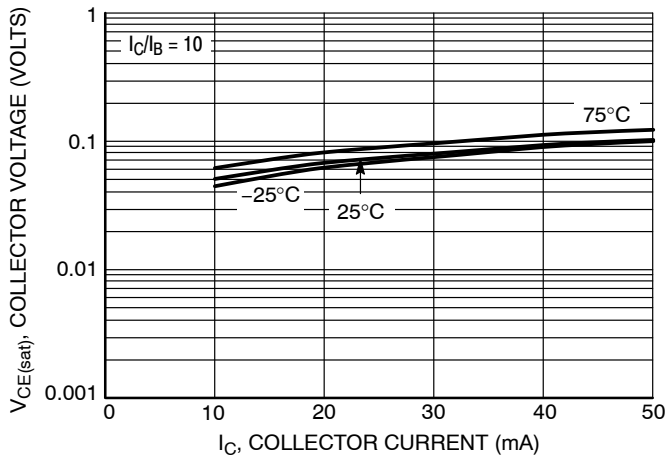


Figure 22. $V_{CE(sat)}$ versus I_C

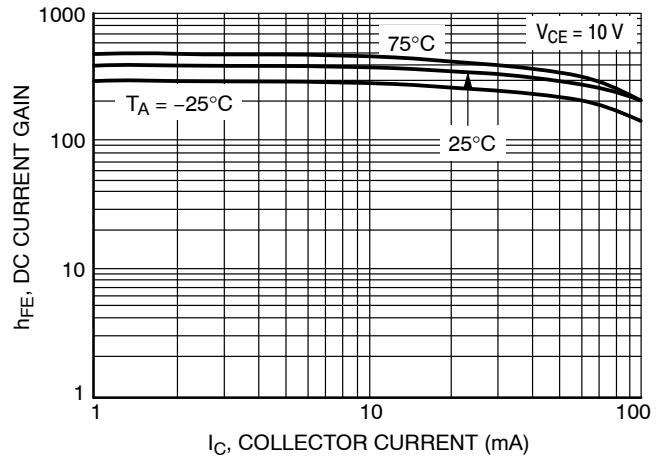


Figure 23. DC Current Gain

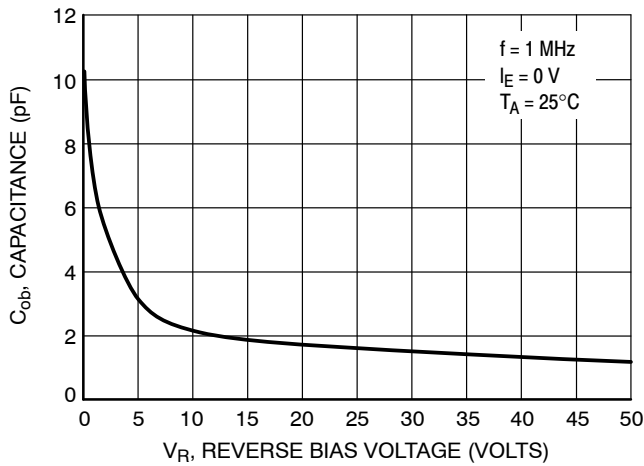


Figure 24. Output Capacitance

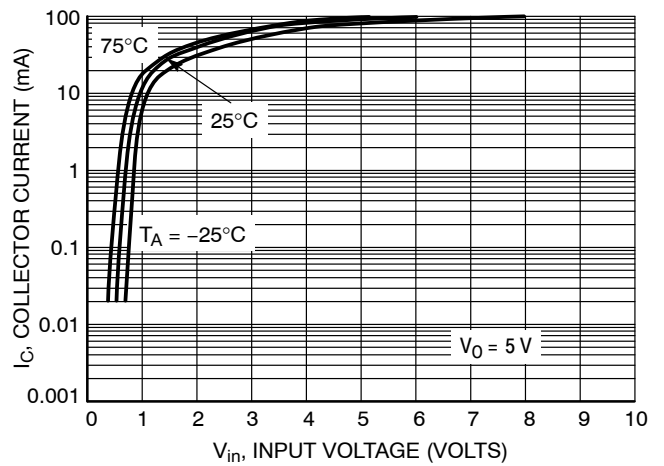


Figure 25. Output Current versus Input Voltage

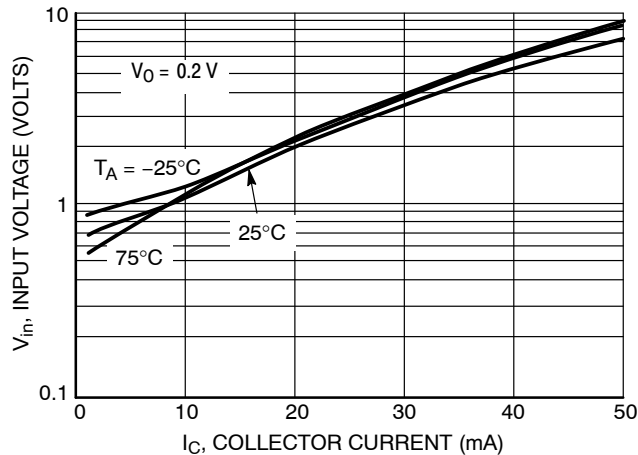


Figure 26. Input Voltage versus Output Current

MMUN2111LT1 Series

TYPICAL ELECTRICAL CHARACTERISTICS MMUN2116LT1

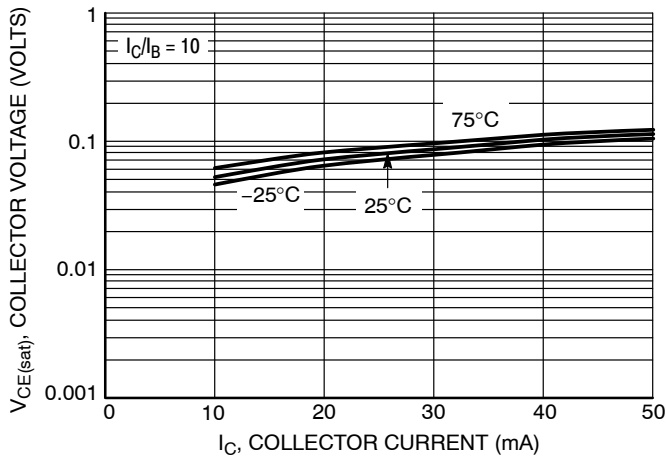


Figure 27. $V_{CE(sat)}$ versus I_C

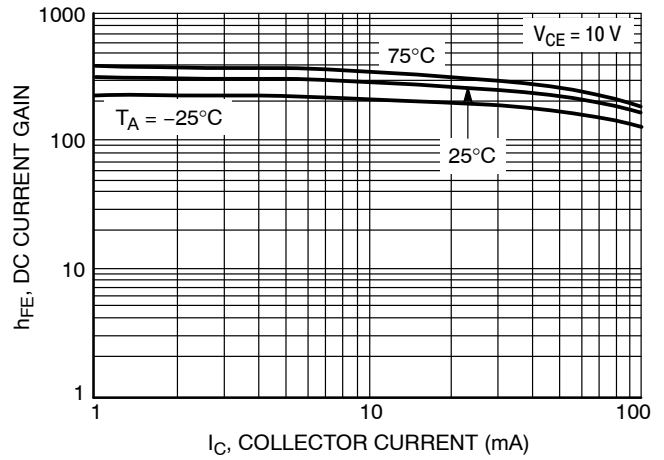


Figure 28. DC Current Gain

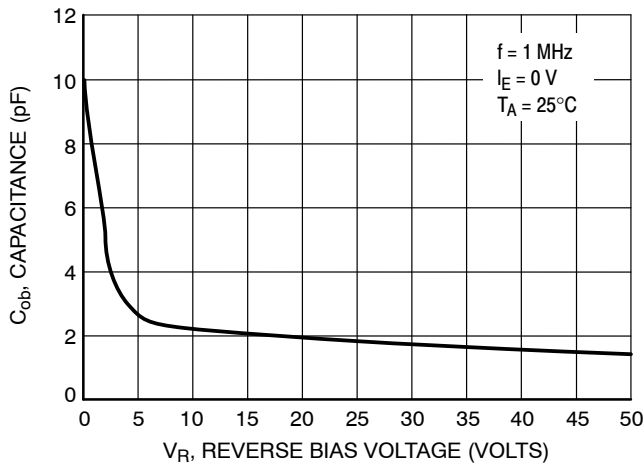


Figure 29. Output Capacitance

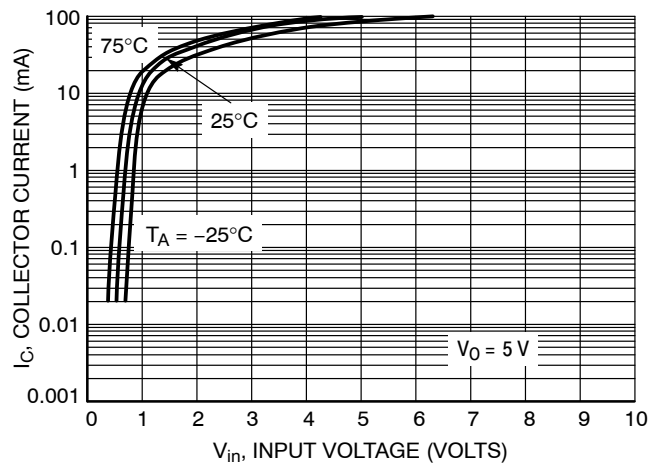


Figure 30. Output Current versus Input Voltage

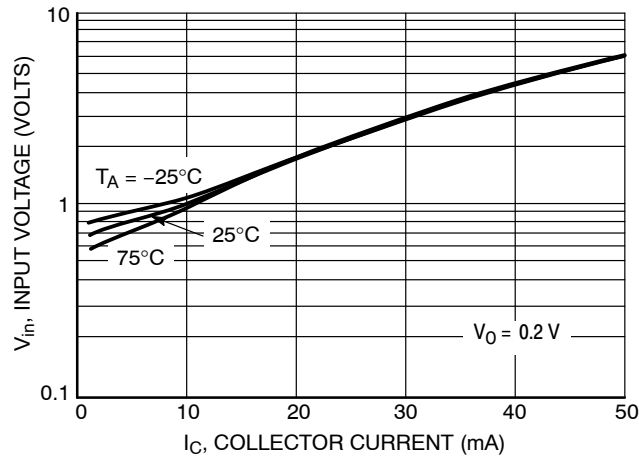


Figure 31. Input Voltage versus Output Current

TYPICAL ELECTRICAL CHARACTERISTICS
MMUN2132LT1

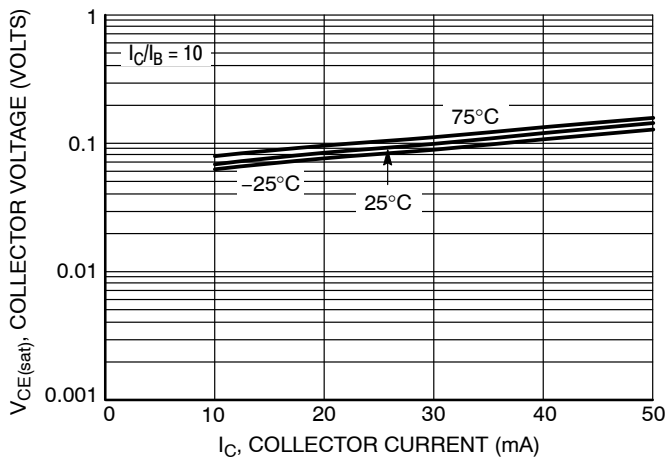


Figure 32. $V_{CE(sat)}$ versus I_C

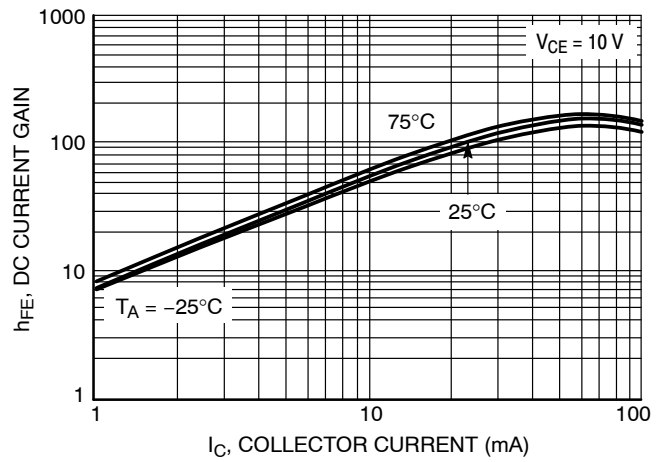


Figure 33. DC Current Gain

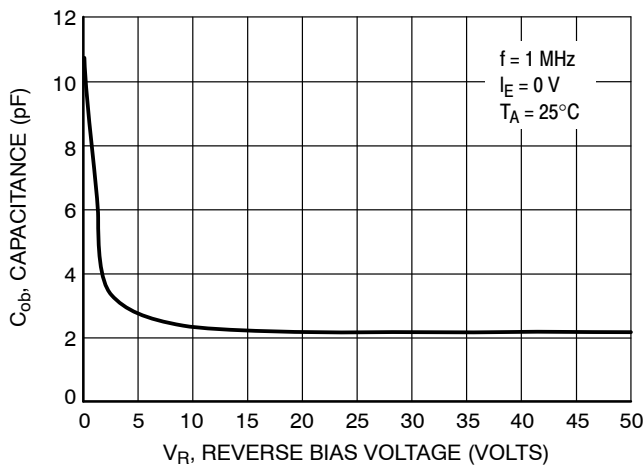


Figure 34. Output Capacitance

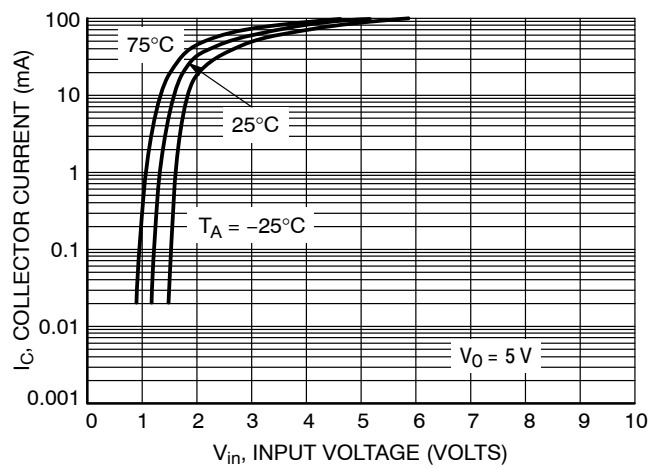


Figure 35. Output Current versus Input Voltage

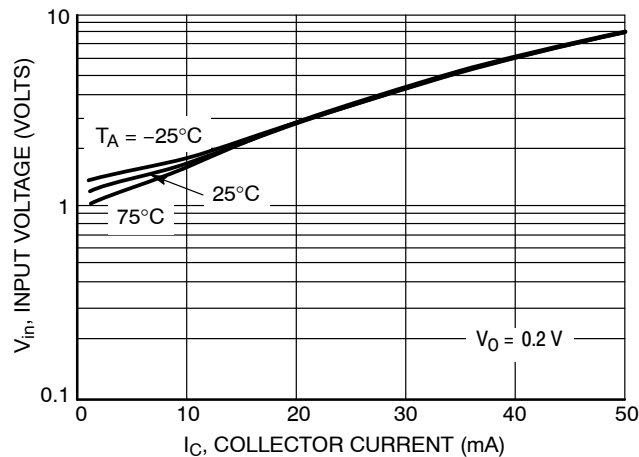


Figure 36. Input Voltage versus Output Current

TYPICAL ELECTRICAL CHARACTERISTICS
MMUN2133LT1

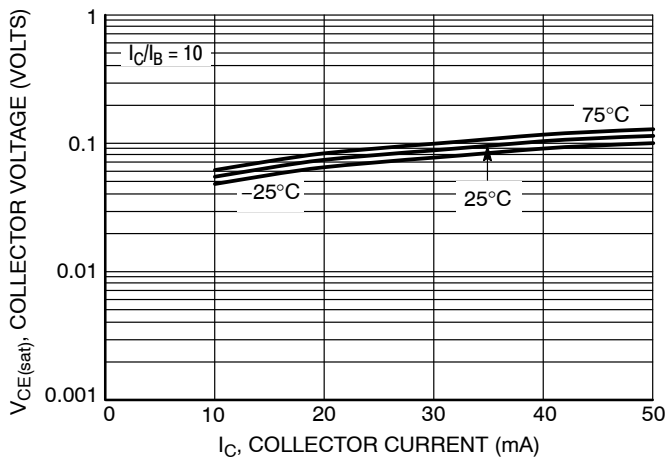


Figure 37. $V_{CE(sat)}$ versus I_C

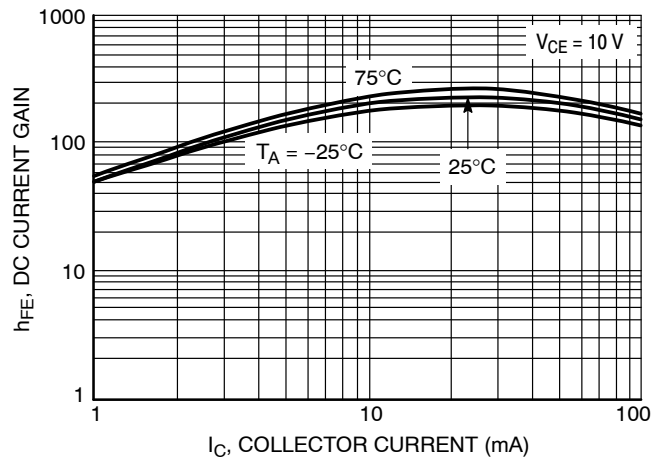


Figure 38. DC Current Gain

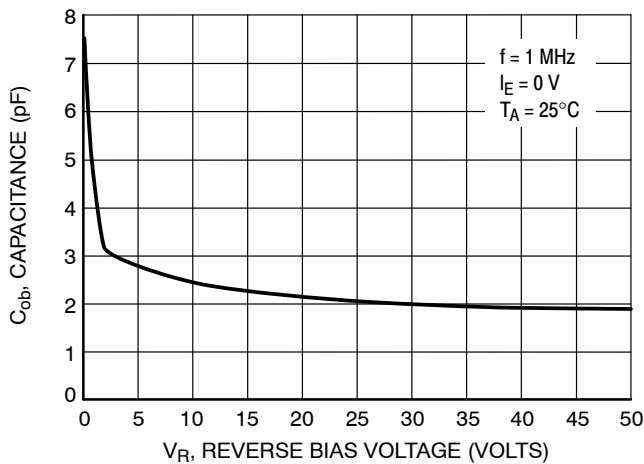


Figure 39. Output Capacitance

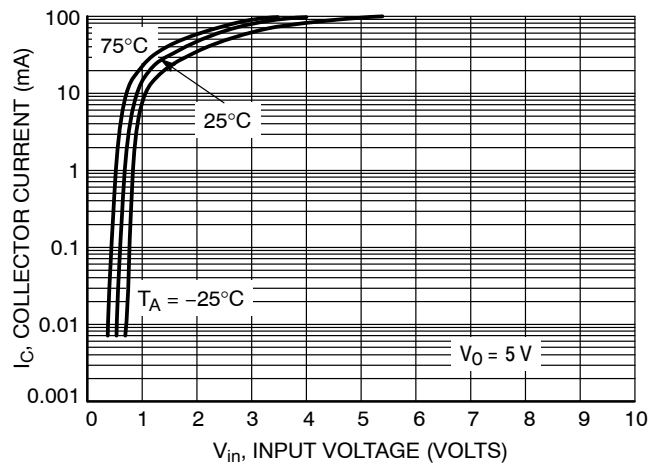


Figure 40. Output Current versus Input Voltage

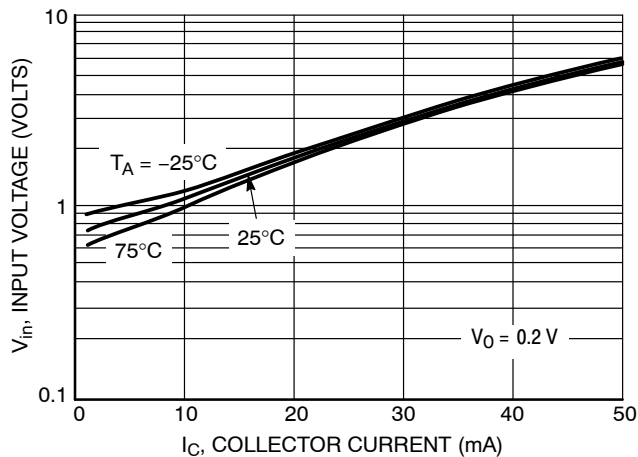


Figure 41. Input Voltage versus Output Current

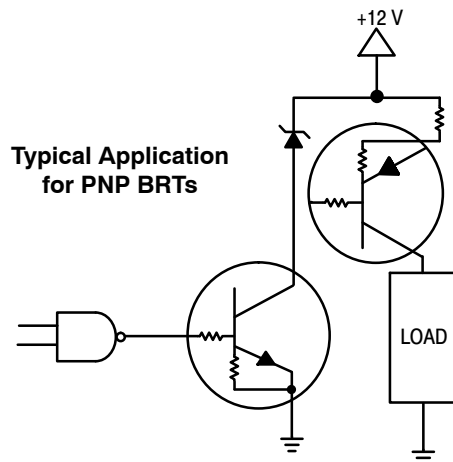


Figure 42. Inexpensive, Unregulated Current Source

