

DTC114EET1 Series, SDTC114EET1 Series

ORDERING INFORMATION, DEVICE MARKING and RESISTOR VALUES

Device	Marking	R1 (K)	R2 (K)	Package	Shipping†
DTC114EET1	8A	10	10	SC-75/SOT-416	3000 Tape & Reel
DTC114EET1G				SC-75/SOT-416 (Pb-Free)	3000 Tape & Reel
SDTC114EET1G					
DTC124EET1	8B	22	22	SC-75/SOT-416	3000 Tape & Reel
DTC124EET1G				SC-75/SOT-416 (Pb-Free)	3000 Tape & Reel
SDTC124EET1G					
DTC144EET1	8C	47	47	SC-75/SOT-416	3000 Tape & Reel
DTC144EET1G				SC-75/SOT-416 (Pb-Free)	3000 Tape & Reel
DTC114YET1	8D	10	47	SC-75/SOT-416	3000 Tape & Reel
DTC114YET1G				SC-75/SOT-416 (Pb-Free)	3000 Tape & Reel
SDTC114YET1G					
DTC114TET1	94	10	∞	SC-75/SOT-416	3000 Tape & Reel
DTC114TET1G				SC-75/SOT-416 (Pb-Free)	3000 Tape & Reel
DTC143TET1	8F	4.7	∞	SC-75/SOT-416	3000 Tape & Reel
DTC143TET1G				SC-75/SOT-416 (Pb-Free)	3000 Tape & Reel
DTC123EET1	8H	2.2	2.2	SC-75/SOT-416	3000 Tape & Reel
DTC123EET1G				SC-75/SOT-416 (Pb-Free)	3000 Tape & Reel
DTC143EET1	8J	4.7	4.7	SC-75/SOT-416	3000 Tape & Reel
DTC143EET1G				SC-75/SOT-416 (Pb-Free)	3000 Tape & Reel
DTC143ZET1	8K	4.7	47	SC-75/SOT-416	3000 Tape & Reel
DTC143ZET1G				SC-75/SOT-416 (Pb-Free)	3000 Tape & Reel
DTC124XET1	8L	22	47	SC-75/SOT-416	3000 Tape & Reel
DTC124XET1G				SC-75/SOT-416 (Pb-Free)	3000 Tape & Reel
DTC123JET1	8M	2.2	47	SC-75/SOT-416	3000 Tape & Reel
DTC123JET1G				SC-75/SOT-416 (Pb-Free)	3000 Tape & Reel
DTC115EET1	8N	100	100	SC-75/SOT-416	3000 Tape & Reel
DTC115EET1G				SC-75/SOT-416 (Pb-Free)	3000 Tape & Reel
DTC144WET1	8P	47	22	SC-75/SOT-416	3000 Tape & Reel
DTC144WET1G				SC-75/SOT-416	3000 Tape & Reel

†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.

DTC114EET1 Series, SDTC114EET1 Series

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
DTC114EET1, SDTC114EET1		–	–	0.2	
DTC124EET1, SDTC124EET1		–	–	0.1	
DTC144EET1		–	–	0.2	
DTC114YET1, SDTC114YET1		–	–	0.9	
DTC114TET1		–	–	1.9	
DTC143TET1		–	–	2.3	
DTC123EET1		–	–	1.5	
DTC143EET1		–	–	0.18	
DTC143ZET1		–	–	0.13	
DTC124XET1		–	–	0.2	
DTC123JET1		–	–	0.05	
DTC115EET1		–	–	0.13	
DTC144WET1		–	–		
Collector–Base Breakdown Voltage ($I_C = 10\ \mu\text{A}$, $I_E = 0$)	$V_{(BR)CBO}$	50	–	–	Vdc
Collector–Emitter Breakdown Voltage (Note 3) ($I_C = 2.0\text{ mA}$, $I_B = 0$)	$V_{(BR)CEO}$	50	–	–	Vdc
ON CHARACTERISTICS (Note 3)					
DC Current Gain ($V_{CE} = 10\text{ V}$, $I_C = 5.0\text{ mA}$)	h_{FE}	35	60	–	
DTC114EET1, SDTC114EET1		60	100	–	
DTC124EET1, SDTC124EET1		80	140	–	
DTC144EET1		80	140	–	
DTC114YET1, SDTC114YET1		80	140	–	
DTC114TET1		160	350	–	
DTC143TET1		160	350	–	
DTC123EET1		8.0	15	–	
DTC143EET1		15	30	–	
DTC143ZET1		80	200	–	
DTC124XET1		80	150	–	
DTC123JET1		80	140	–	
DTC115EET1		80	150	–	
DTC144WET1		80	140	–	
Collector–Emitter Saturation Voltage ($I_C = 10\text{ mA}$, $I_B = 0.3\text{ mA}$) ($I_C = 10\text{ mA}$, $I_B = 5\text{ mA}$) DTC123EET1 ($I_C = 10\text{ mA}$, $I_B = 1\text{ mA}$) DTC143TET1/DTC114TET1/ DTC143EET1/DTC143ZET1/DTC124XET1	$V_{CE(sat)}$	–	–	0.25	Vdc
Output Voltage (on) ($V_{CC} = 5.0\text{ V}$, $V_B = 2.5\text{ V}$, $R_L = 1.0\text{ k}\Omega$)	V_{OL}				Vdc
DTC114EET1, SDTC114EET1		–	–	0.2	
DTC124EET1, SDTC124EET1		–	–	0.2	
DTC114YET1, SDTC114YET1		–	–	0.2	
DTC114TET1		–	–	0.2	
DTC143TET1		–	–	0.2	
DTC123EET1		–	–	0.2	
DTC143EET1		–	–	0.2	
DTC143ZET1		–	–	0.2	
DTC124XET1		–	–	0.2	
DTC123JET1		–	–	0.2	
($V_{CC} = 5.0\text{ V}$, $V_B = 3.5\text{ V}$, $R_L = 1.0\text{ k}\Omega$)		–	–	0.2	
($V_{CC} = 5.0\text{ V}$, $V_B = 5.5\text{ V}$, $R_L = 1.0\text{ k}\Omega$)		–	–	0.2	
($V_{CC} = 5.0\text{ V}$, $V_B = 4.0\text{ V}$, $R_L = 1.0\text{ k}\Omega$)		–	–	0.2	
Output Voltage (off) ($V_{CC} = 5.0\text{ V}$, $V_B = 0.5\text{ V}$, $R_L = 1.0\text{ k}\Omega$) ($V_{CC} = 5.0\text{ V}$, $V_B = 0.25\text{ V}$, $R_L = 1.0\text{ k}\Omega$)	V_{OH}	4.9	–	–	Vdc
DTC143TET1					
DTC143ZET1					
DTC114TET1					

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

DTC114EET1 Series, SDTC114EET1 Series

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

Characteristic		Symbol	Min	Typ	Max	Unit
Input Resistor	SDTC114EET1, SDTC114ET1	R1	7.0	10	13	k Ω
	DTC124EET1, SDTC124EET1		15.4	22	28.6	
	DTC144EET1		32.9	47	61.1	
	DTC114YET1, SDTC114YET1		7.0	10	13	
	DTC114TET1		7.0	10	13	
	DTC143TET1		3.3	4.7	6.1	
	DTC123EET1		1.5	2.2	2.9	
	DTC143EET1		3.3	4.7	6.1	
	DTC143ZET1		3.3	4.7	6.1	
	DTC124XET1		15.4	22	28.6	
	DTC123JET1		1.54	2.2	2.86	
	DTC115EET1		70	100	130	
	DTC144WET1		32.9	47	61.1	
	Resistor Ratio		DTC114EET1/SDTC114EET1/DTC115EET1	R ₁ /R ₂	0.8	
DTC124EET1/SDTC124EET1/DTC144EET1		0.17	0.21		0.25	
DTC114YET1/SDTC114YET1		–	–		–	
DTC143TET1/DTC114TET1		0.8	1.0		1.2	
DTC123EET1/DTC143EET1		0.055	0.1		0.185	
DTC143ZET1		0.38	0.47		0.56	
DTC124XET1		0.038	0.047		0.056	
DTC123JET1		1.7	2.1		2.6	
DTC144WET1D						

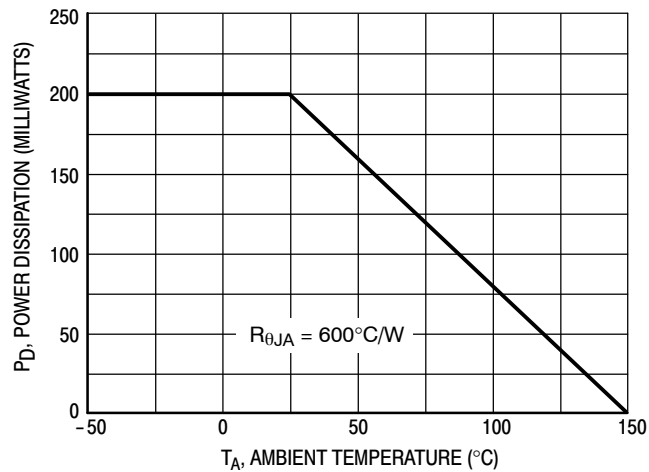


Figure 1. Derating Curve

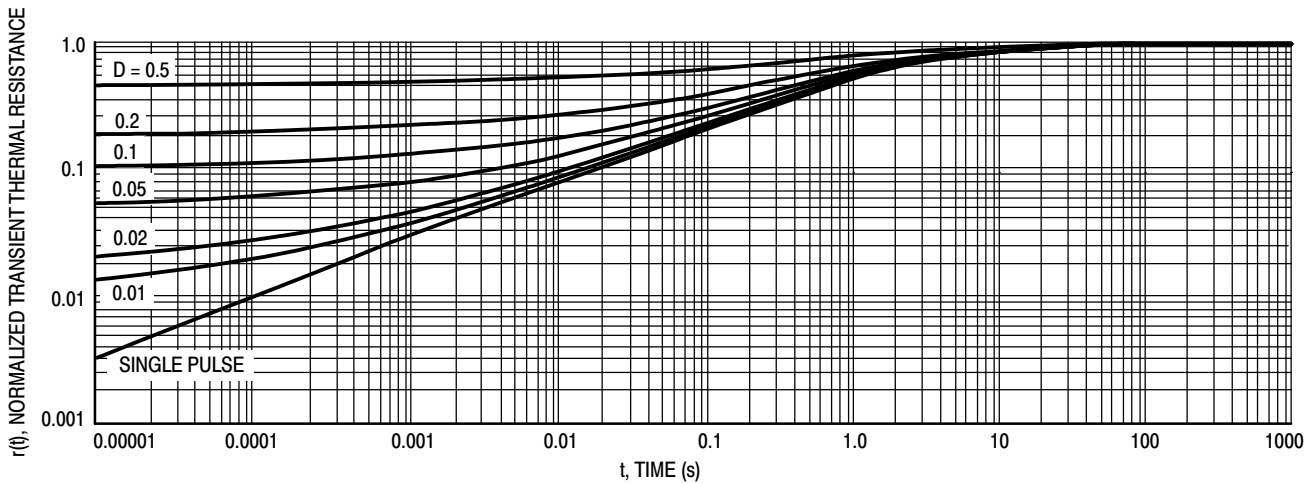


Figure 2. Normalized Thermal Response

DTC114EET1 Series, SDTC114EET1 Series

TYPICAL ELECTRICAL CHARACTERISTICS – DTC114EET1, SDTC114EET1

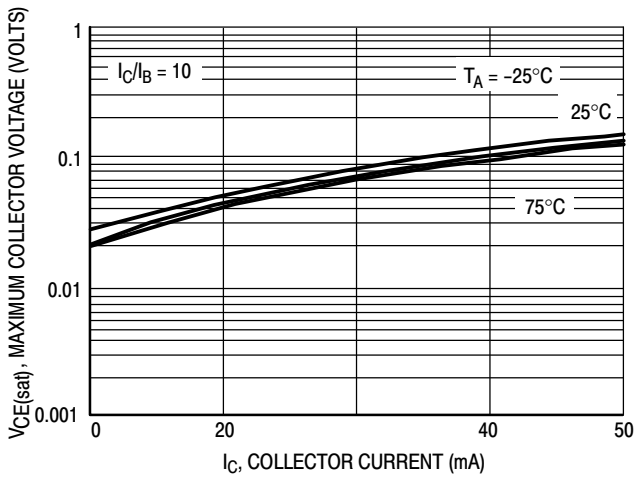


Figure 3. $V_{CE(sat)}$ versus I_C

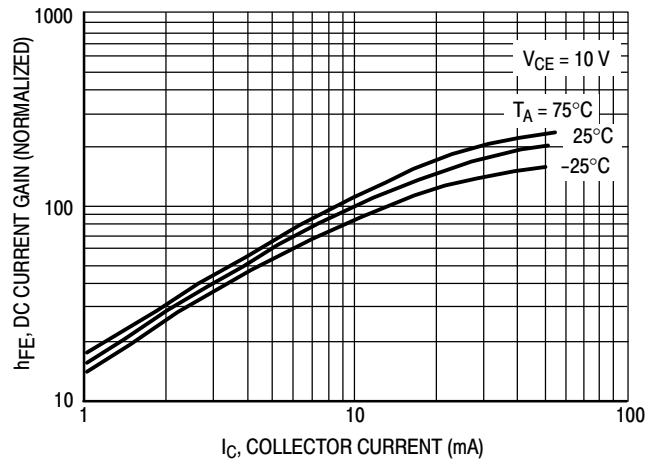


Figure 4. DC Current Gain

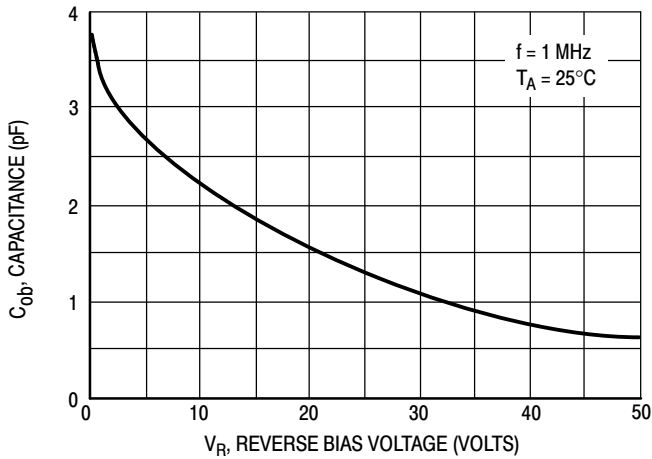


Figure 5. Output Capacitance

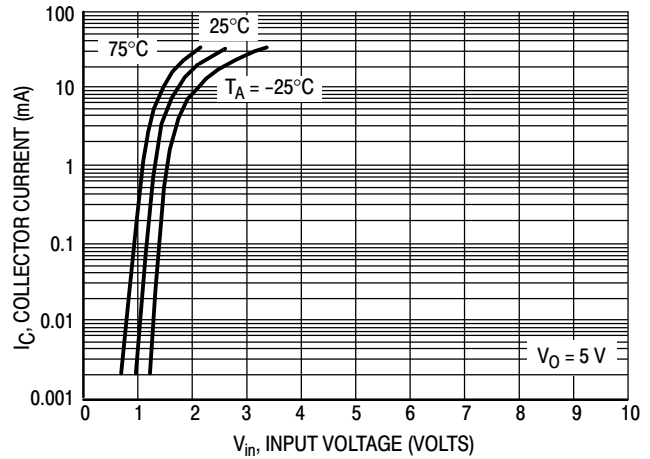


Figure 6. Output Current versus Input Voltage

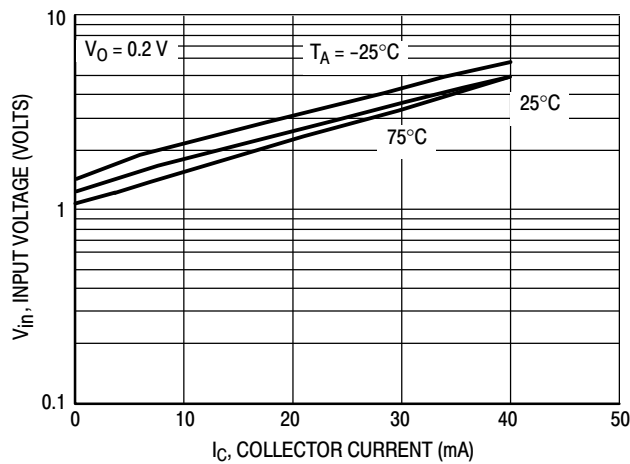


Figure 7. Input Voltage versus Output Current

DTC114EET1 Series, SDTC114EET1 Series

TYPICAL ELECTRICAL CHARACTERISTICS - DTC123EET1

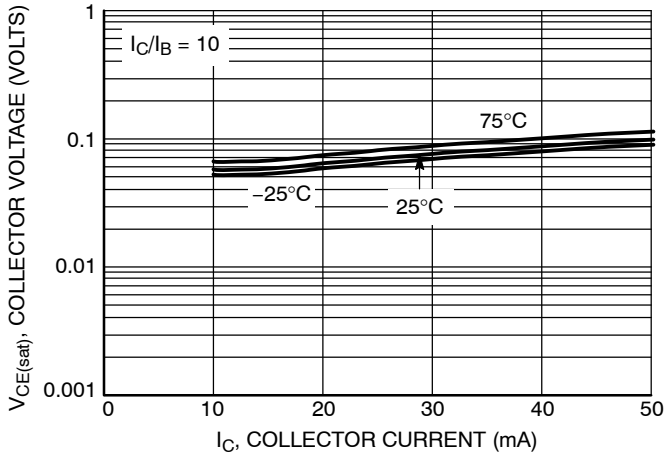


Figure 8. $V_{CE(sat)}$ versus I_C

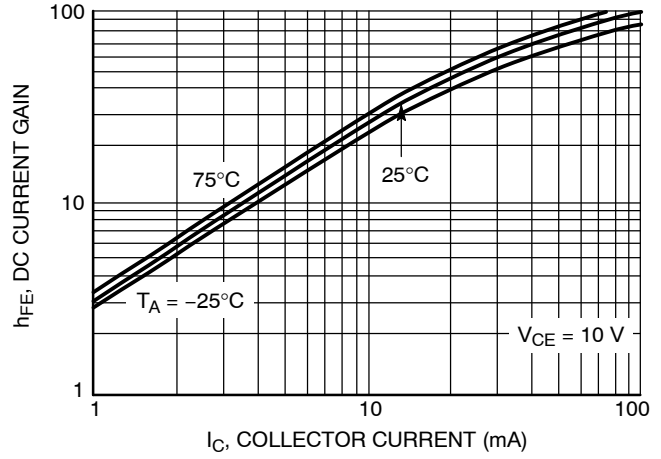


Figure 9. DC Current Gain

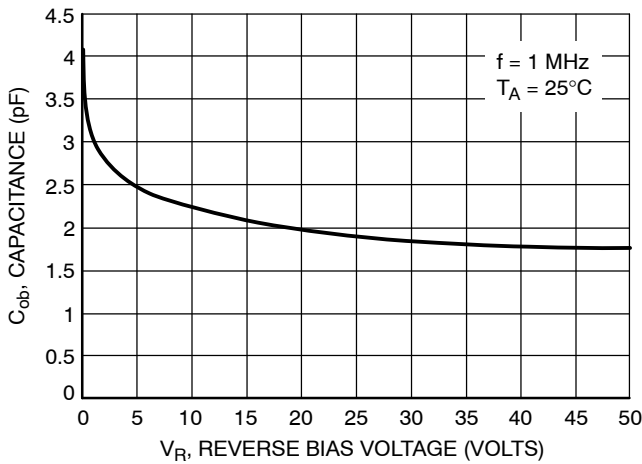


Figure 10. Output Capacitance

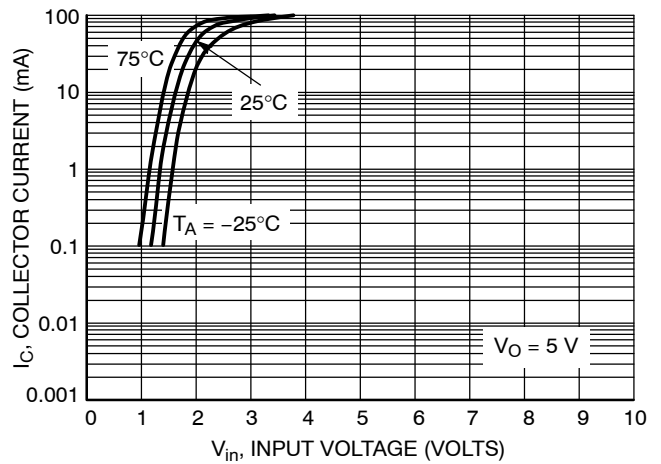


Figure 11. Output Current versus Input Voltage

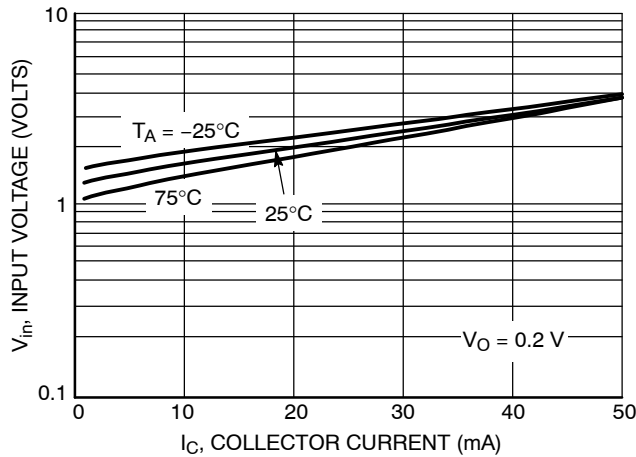


Figure 12. Input Voltage versus Output Current

DTC114EET1 Series, SDTC114EET1 Series

TYPICAL ELECTRICAL CHARACTERISTICS – DTC124EET1, SDTC124EET1

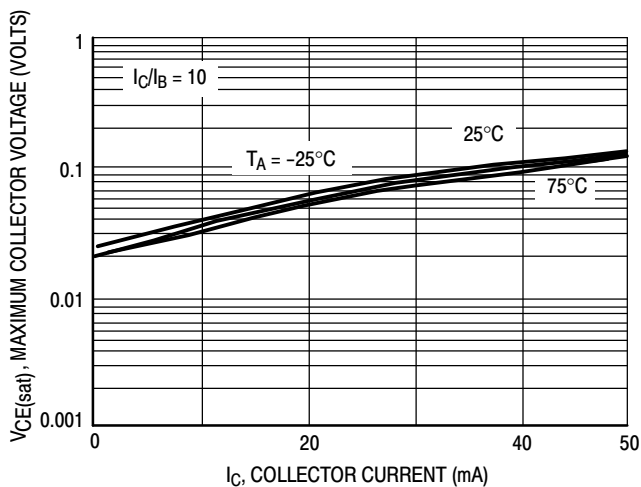


Figure 13. $V_{CE(sat)}$ versus I_C

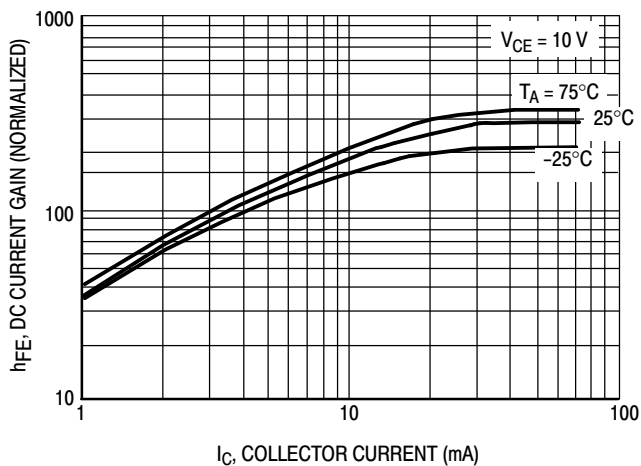


Figure 14. DC Current Gain

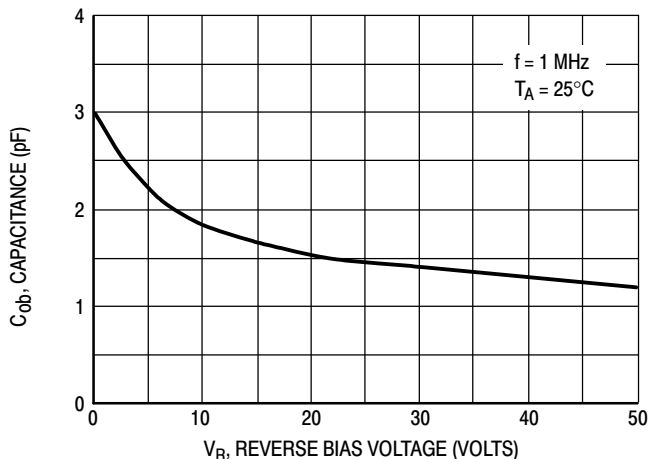


Figure 15. Output Capacitance

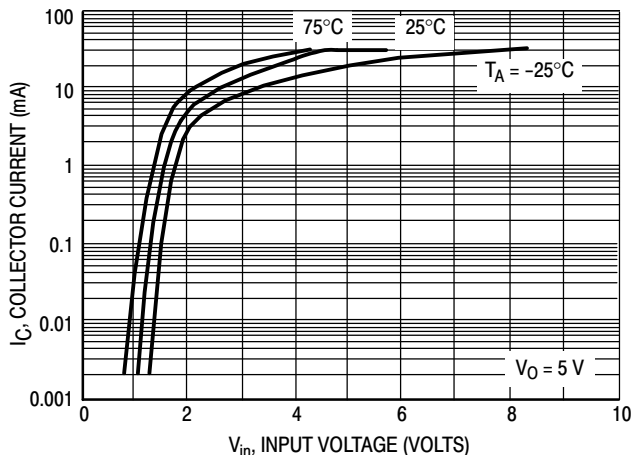


Figure 16. Output Current versus Input Voltage

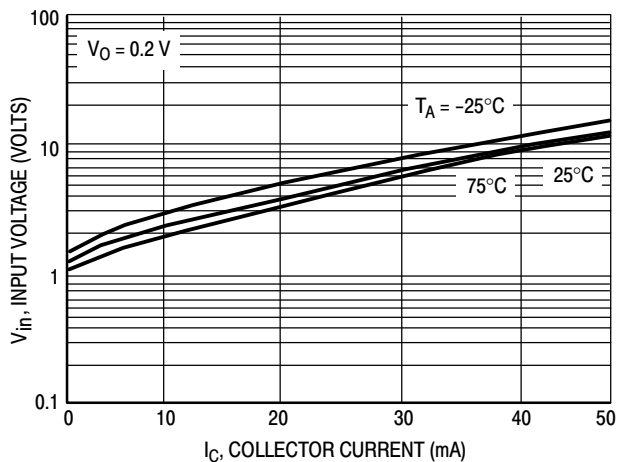


Figure 17. Input Voltage versus Output Current

DTC114EET1 Series, SDTC114EET1 Series

TYPICAL ELECTRICAL CHARACTERISTICS - DTC144EET1

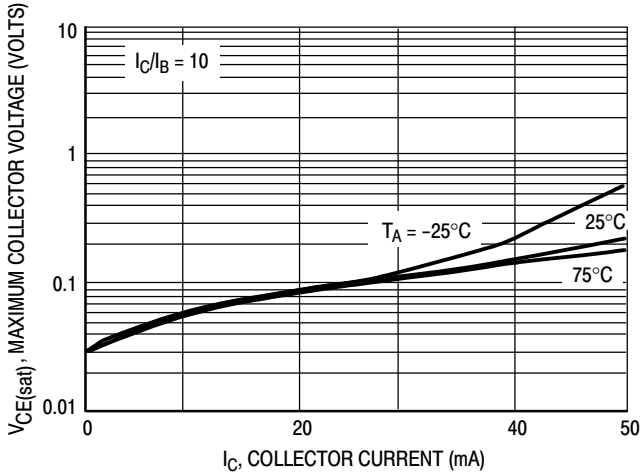


Figure 18. $V_{CE(sat)}$ versus I_C

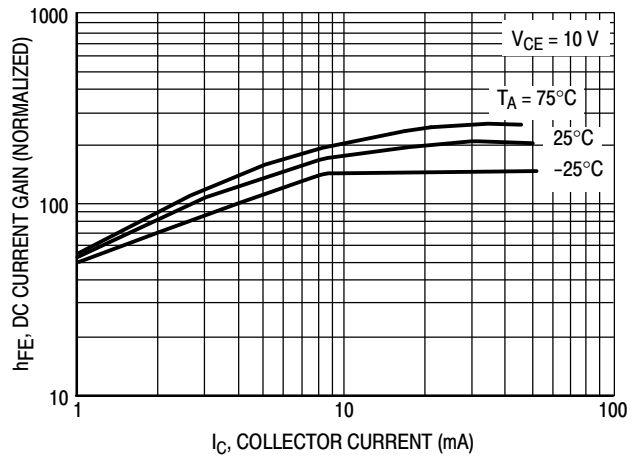


Figure 19. DC Current Gain

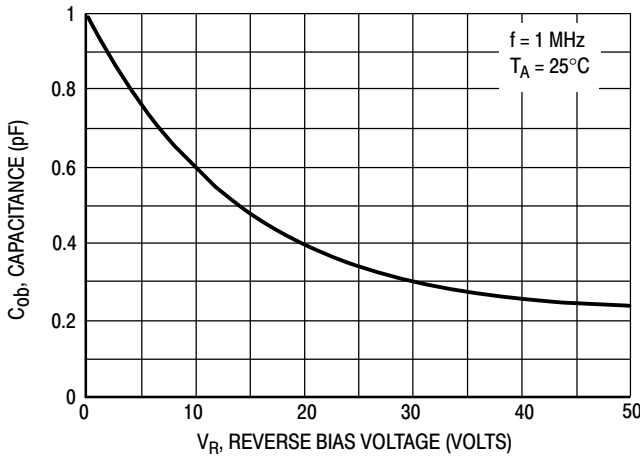


Figure 20. Output Capacitance

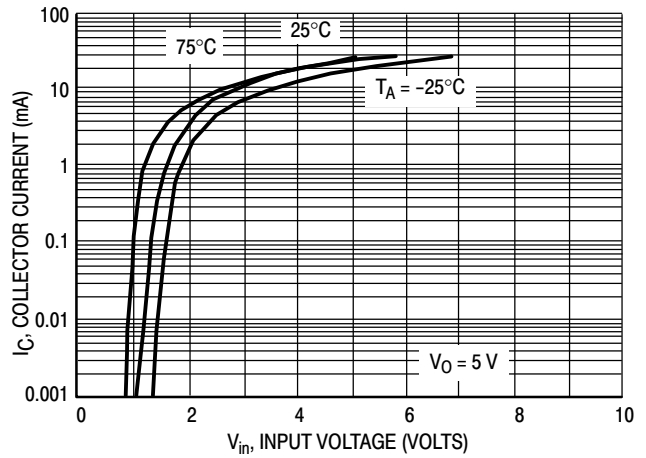


Figure 21. Output Current versus Input Voltage

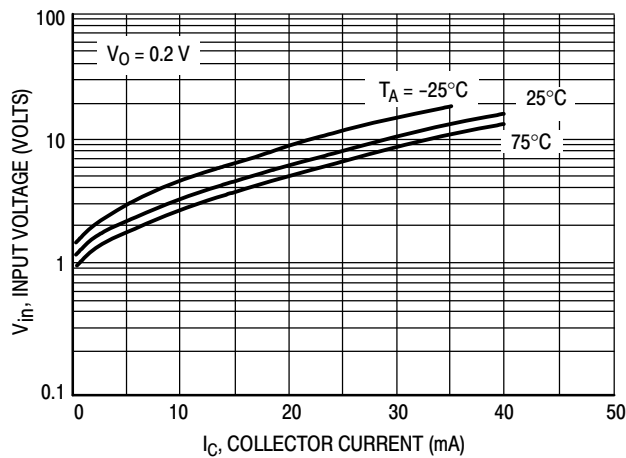


Figure 22. Input Voltage versus Output Current

DTC114EET1 Series, SDTC114EET1 Series

TYPICAL ELECTRICAL CHARACTERISTICS – DTC114YET1, SDTC114YET1

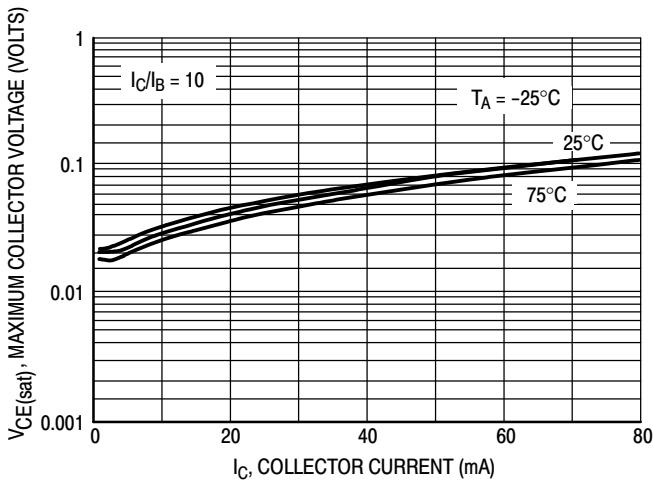


Figure 23. $V_{CE(sat)}$ versus I_C

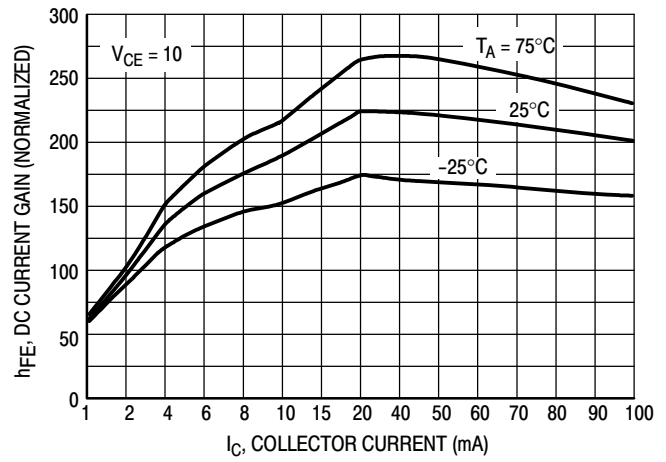


Figure 24. DC Current Gain

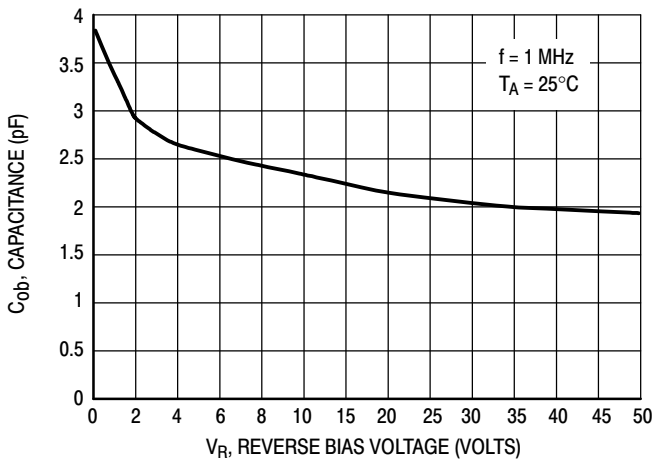


Figure 25. Output Capacitance

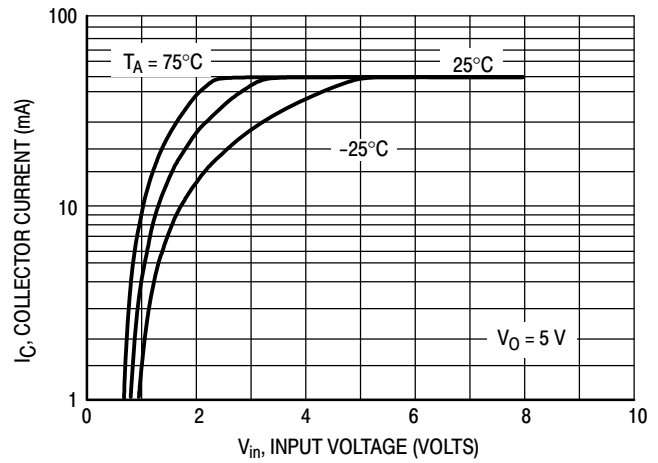


Figure 26. Output Current versus Input Voltage

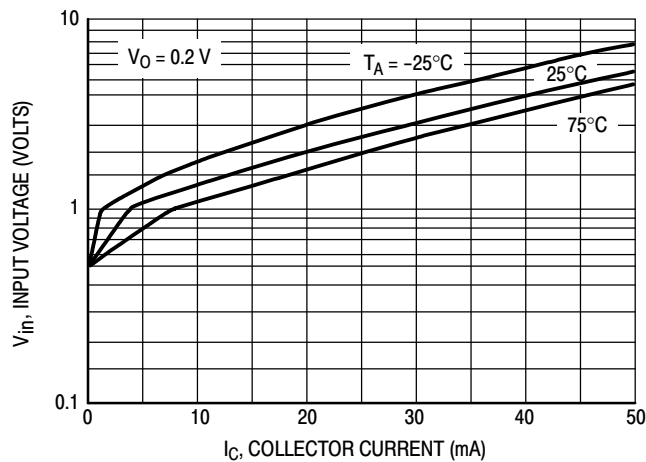


Figure 27. Input Voltage versus Output Current

TYPICAL ELECTRICAL CHARACTERISTICS – DTC123JET1G

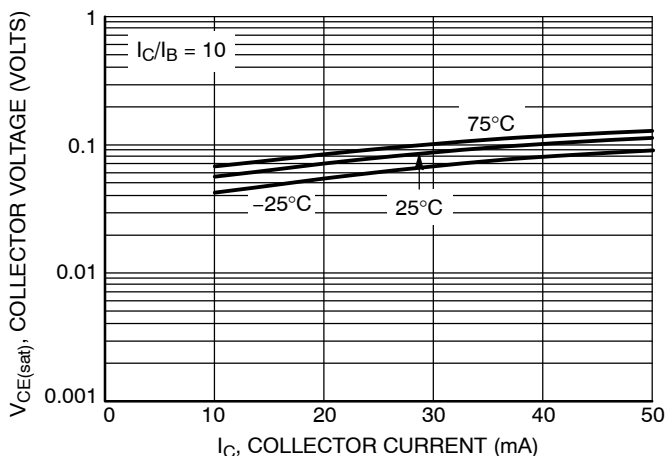


Figure 28. $V_{CE(sat)}$ versus I_C

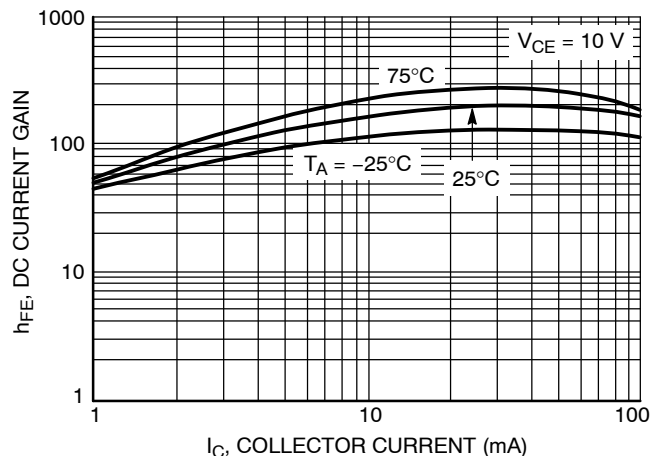


Figure 29. DC Current Gain

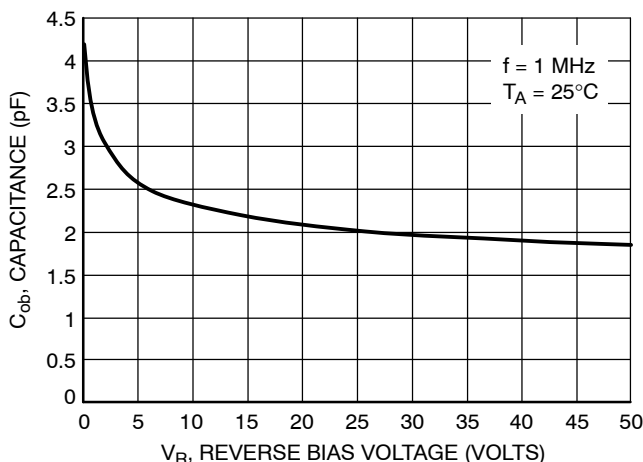


Figure 30. Output Capacitance

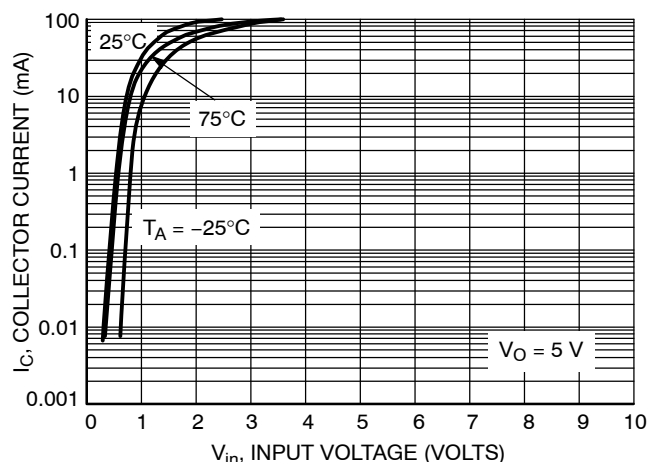


Figure 31. Output Current versus Input Voltage

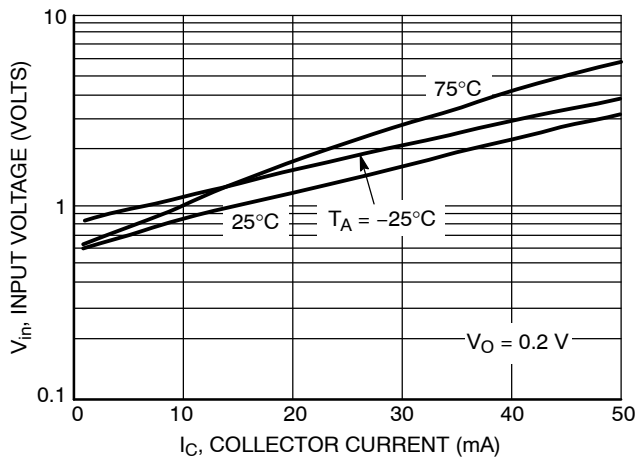


Figure 32. Input Voltage versus Output Current

DTC114EET1 Series, SDTC114EET1 Series

TYPICAL ELECTRICAL CHARACTERISTICS - DTC143ZET1

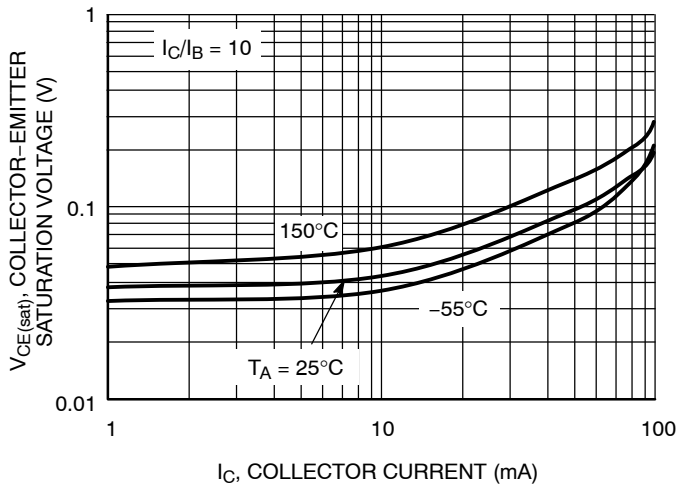


Figure 33. $V_{CE(sat)}$ versus I_C

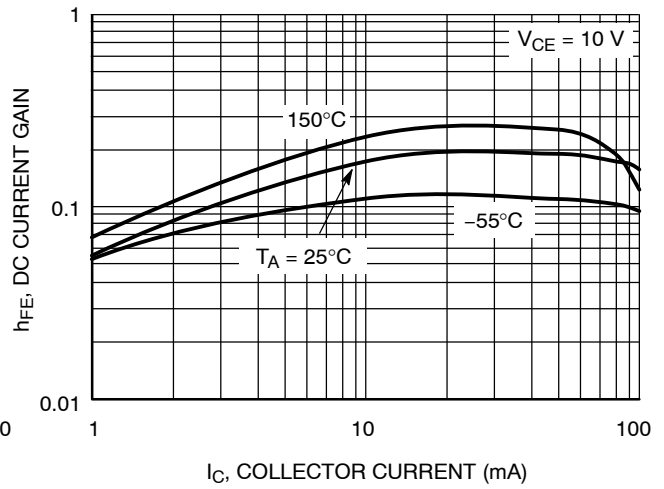


Figure 34. DC Current Gain

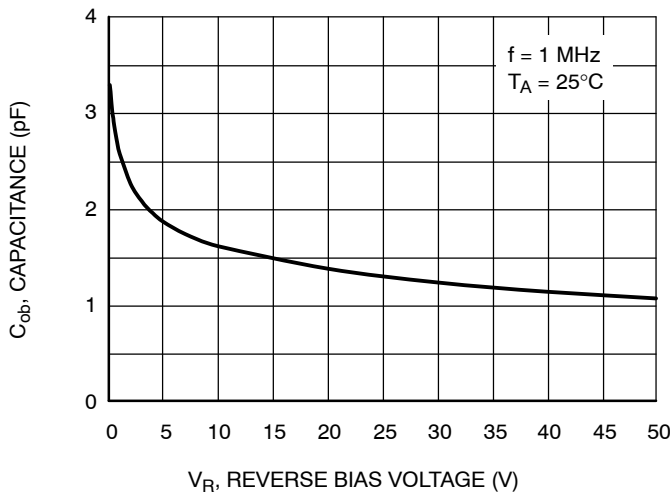


Figure 35. Output Capacitance

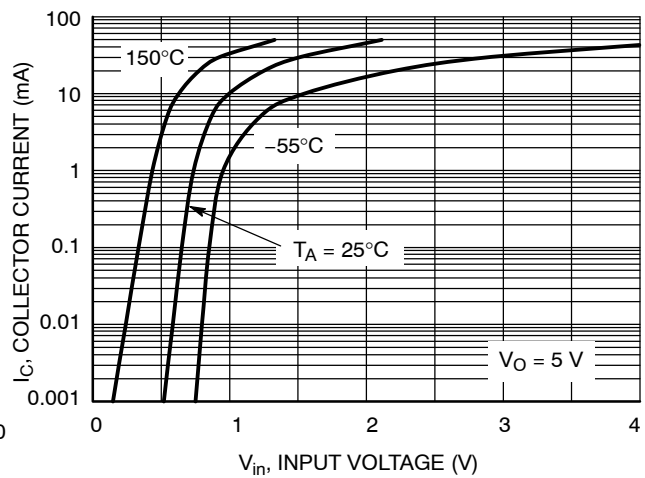


Figure 36. Output Current versus Input Voltage

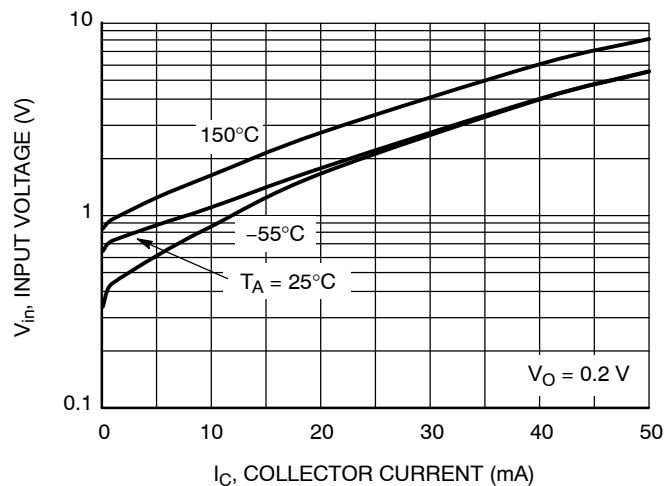


Figure 37. Input Voltage versus Output Current

DTC114EET1 Series, SDTC114EET1 Series

TYPICAL APPLICATIONS FOR NPN BRTs

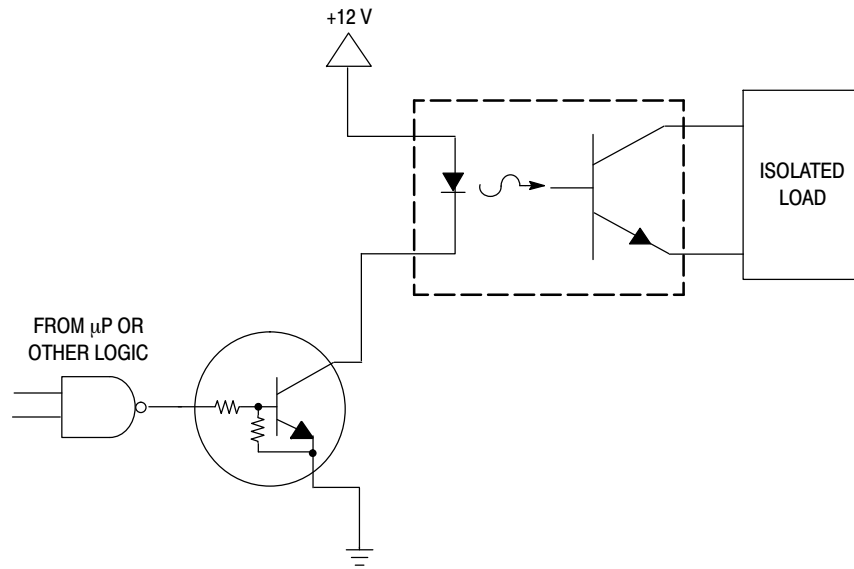


Figure 38. Level Shifter: Connects 12 or 24 Volt Circuits to Logic

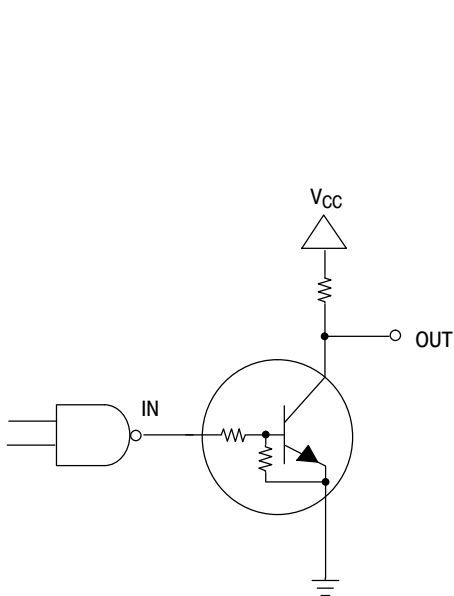


Figure 39. Open Collector Inverter: Inverts the Input Signal

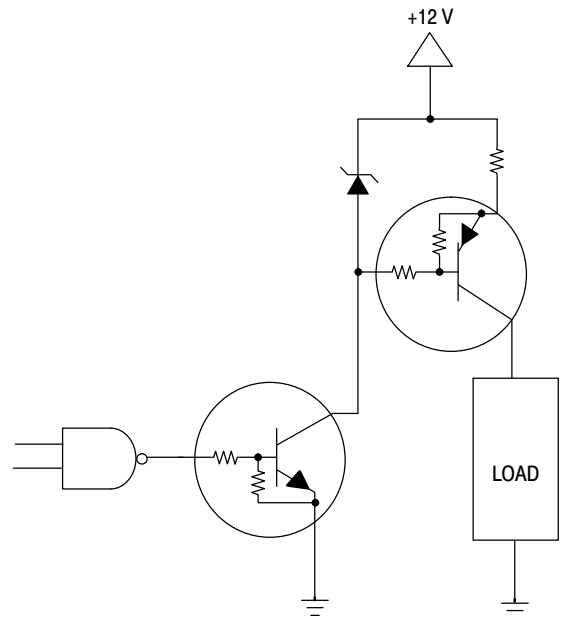
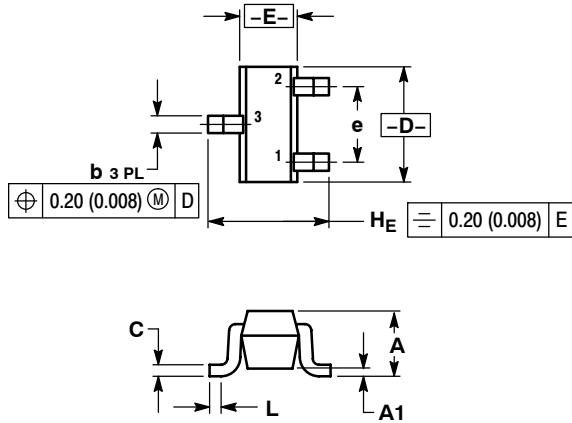


Figure 40. Inexpensive, Unregulated Current Source

DTC114EET1 Series, SDTC114EET1 Series

PACKAGE DIMENSIONS

SC-75/SOT-416
CASE 463
ISSUE F

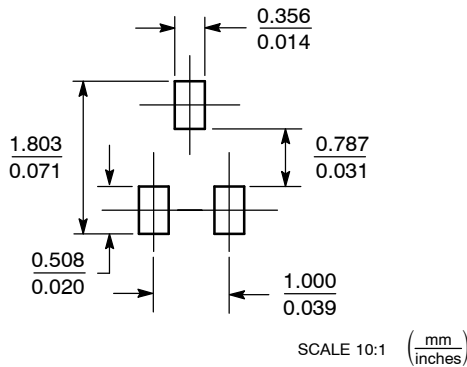


- NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER.

DIM	MILLIMETERS			INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.70	0.80	0.90	0.027	0.031	0.035
A1	0.00	0.05	0.10	0.000	0.002	0.004
b	0.15	0.20	0.30	0.006	0.008	0.012
C	0.10	0.15	0.25	0.004	0.006	0.010
D	1.55	1.60	1.65	0.059	0.063	0.067
E	0.70	0.80	0.90	0.027	0.031	0.035
e	1.00 BSC			0.04 BSC		
L	0.10	0.15	0.20	0.004	0.006	0.008
HE	1.50	1.60	1.70	0.061	0.063	0.065

- STYLE 1:
PIN 1. BASE
2. EMITTER
3. COLLECTOR

SOLDERING FOOTPRINT*



SCALE 10:1 (mm/inches)

*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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