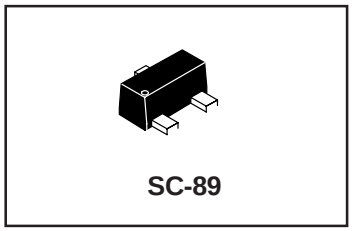
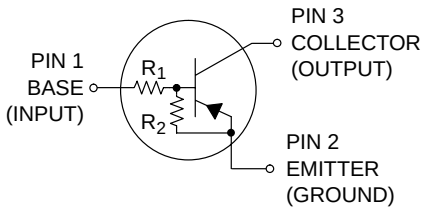
JXND ELECTRONICS CO.,LTD

Bias Resistor Transistor PNP Silicon
DTA114EET1G Series



This new series of digital transistors is designed to replace a single device and its external resistor bias network. The BRT (Bias Resistor Transistor) contains a single transistor with a monolithic bias network consisting of two resistors; a series base resistor and a base-emitter resistor. The BRT eliminates these individual components by integrating them into a single device. The use of a BRT can reduce both system cost and board space. The device is housed in the SC-89 package which is designed for low power surface mount applications.

- Simplifies Circuit Design
- Reduces Board Space
- Reduces Component Count
- The SC-89 package can be soldered using wave or reflow. The modified gull-winged leads absorb thermal stress during soldering eliminating the possibility of damage to the die.
- We declare that the material of product compliance with RoHS requirements.



MAXIMUM RATINGS (T_A = 25°C unless otherwise noted)

Rating	Symbol	Value	Unit
Collector-Base Voltage	V_{CBO}	50	Vdc
Collector-Emitter Voltage	V_{CEO}	50	Vdc
Collector Current	I_C	100	mAdc

THERMAL CHARACTERISTICS

Rating	Symbol	Value	Unit
Total Device Dissipation, FR−4 Board (Note 1) @ T_A = 25°C Derate above 25°C	P_D	200 1.6	mW mW/°C
Thermal Resistance, Junction−to−Ambient (Note 1)	$R_{\theta JA}$	600	°C/W
Total Device Dissipation, FR−4 Board (Note 2) @ T_A = 25°C Derate above 25°C	P_D	300 2.4	mW mW/°C
Thermal Resistance, Junction−to−Ambient (Note 2)	$R_{\theta JA}$	400	°C/W
Junction and Storage Temperature Range	T_J, T_{stg}	−55 to +150	°C

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

1. FR−4 @ Minimum Pad.
2. FR−4 @ 1.0 × 1.0 Inch Pad.

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DTA114EET1G Series

ORDERING INFORMATION AND RESISTOR VALUES

Device	Marking	R1 (K)	R2 (K)	Package	Shipping†
DTA114EET1G	6A	10	10	SC−89	3000 Tape & Reel
DTA124EET1G	6B	22	22	SC−89	3000 Tape & Reel
DTA144EET1G	6C	47	47	SC−89	3000 Tape & Reel
DTA114YET1G	6D	10	47	SC−89	3000 Tape & Reel
DTA114TET1G	6E	10	∞	SC−89	3000 Tape & Reel
DTA143TET1G	6F	4.7	∞	SC−89	3000 Tape & Reel
DTA123EET1G	6H	2.2	2.2	SC−89	3000 Tape & Reel
DTA143EET1G	43	4.7	4.7	SC−89	3000 Tape & Reel
DTA143ZET1G	6K	4.7	47	SC−89	3000 Tape & Reel
DTA124XET1G	6L	22	47	SC−89	3000 Tape & Reel
DTA123JET1G	6M	2.2	47	SC−89	3000 Tape & Reel
DTA115EET1G	6N	100	100	SC−89	3000 Tape & Reel
DTA144WET1G	6P	47	22	SC−89	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.

ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted)

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 (V_{EB} = 6.0 V, I_C = 0)	DTA114EET1G	I_{EBO}	−	−	0.5	mAdc
	DTA124EET1G		−	−	0.2	
	DTA144EET1G		−	−	0.1	
	DTA114YET1G		−	−	0.2	
	DTA114TET1G		−	−	0.9	
	DTA143TET1G		−	−	1.9	
	DTA123EET1G		−	−	2.3	
	DTA143EET1G		−	−	1.5	
	DTA143ZET1G		−	−	0.18	
	DTA124XET1G		−	−	0.13	
	DTA123JET1G		−	−	0.2	
	DTA115EET1G		−	−	0.05	
	DTA144WET1G		−	−	0.13	
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)

Characteristic		Symbol	Min	Typ	Max	Unit
ON CHARACTERISTICS (Note 4)						
DC Current Gain	DTA114EET1G	h_{FE}	35	60	–	–
(V_{CE} = 10 V, I_C = 5.0 mA)	DTA124EET1G		60	100	–	
	DTA144EET1G		80	140	–	
	DTA114YET1G		80	140	–	
	DTA114TET1G		160	250	–	
	DTA143TET1G		160	250	–	
	DTA123EET1G		8.0	15	–	
	DTA143EET1G		15	27	–	
	DTA143ZET1G		80	140	–	
	DTA124XET1G		80	130	–	
	DTA123JET1G		80	140	–	
	DTA115EET1G		80	150	–	
	DTA144WET1G		80	140	–	
Collector−Emitter Saturation Voltage (I_C = 10 mA, I_E = 0.3 mA)		$V_{CE(sat)}$	–	–	0.25	Vdc
(I_C = 10 mA, I_B = 5 mA)	DTA123EET1G DTA114TET1G/					
(I_C = 10 mA, I_B = 1 mA)	DTA143TET1G					
	DTA143ZET1G/DTA124XET1G					
	DTA143EET1G					
Output Voltage (on)		V_{OL}				Vdc
(V_{CC} = 5.0 V, V_B = 2.5 V, R_L = 1.0 kΩ)	DTA114EET1G		–	–	0.2	
	DTA124EET1G		–	–	0.2	
	DTA114YET1G		–	–	0.2	
	DTA114TET1G		–	–	0.2	
	DTA143TET1G		–	–	0.2	
	DTA123EET1G		–	–	0.2	
	DTA143EET1G		–	–	0.2	
	DTA143ZET1G		–	–	0.2	
	DTA124XET1G		–	–	0.2	
	DTA123JET1G		–	–	0.2	
(V_{CC} = 5.0 V, V_B = 3.5 V, R_L = 1.0 kΩ)	DTA144EET1G		–	–	0.2	
(V_{CC} = 5.0 V, V_B = 5.5 V, R_L = 1.0 kΩ)	DTA115EET1G		–	–	0.2	
(V_{CC} = 5.0 V, V_B = 4.0 V, R_L = 1.0 kΩ)	DTA144WET1G		–	–	0.2	
Output Voltage (off) (V_{CC} = 5.0 V, V_B = 0.5 V, R_L = 1.0 kΩ)		V_{OH}	4.9	–	–	Vdc
(V_{CC} = 5.0 V, V_B = 0.25 V, R_L = 1.0 kΩ)	DTA114TET1G					
	DTA143TET1G					
	DTA123EET1G					
	DTA143EET1G					
Input Resistor	DTA114EET1G	R1	7.0	10	13	kΩ
	DTA124EET1G		15.4	22	28.6	
	DTA144EET1G		32.9	47	61.1	
	DTA114YET1G		7.0	10	13	
	DTA114TET1G		7.0	10	13	
	DTA143TET1G		3.3	4.7	6.1	
	DTA123EET1G		1.5	2.2	2.9	
	DTA143EET1G		3.3	4.7	6.1	
	DTA143ZET1G		3.3	4.7	6.1	
	DTA124XET1G		15.4	22	28.6	
	DTA123JET1G		1.54	2.2	2.86	
	DTA115EET1G		70	100	130	
	DTA144WET1G		32.9	47	61.1	
Resistor Ratio		R_1/R_2				–
	DTA114EET1G/DTA124EET1G					
	DTA144EET1G/DTA115EET1G		0.8	1.0	1.2	
	DTA114YET1G DTA114TET1G/		0.17	0.21	0.25	
	DTA143TET1G DTA123EET1G/		–	–	–	
	DTA143EET1G DTA143ZET1G		0.8	1.0	1.2	
	DTA124XET1G DTA123JET1G		0.055	0.1	0.185	
			0.38	0.47	0.56	
			0.038	0.047	0.056	
	DTA144WET1G		1.7	2.1	2.6	

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

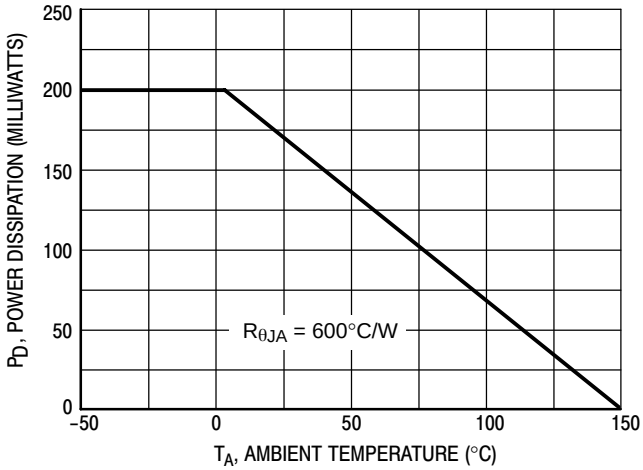


Figure 1. Derating Curve

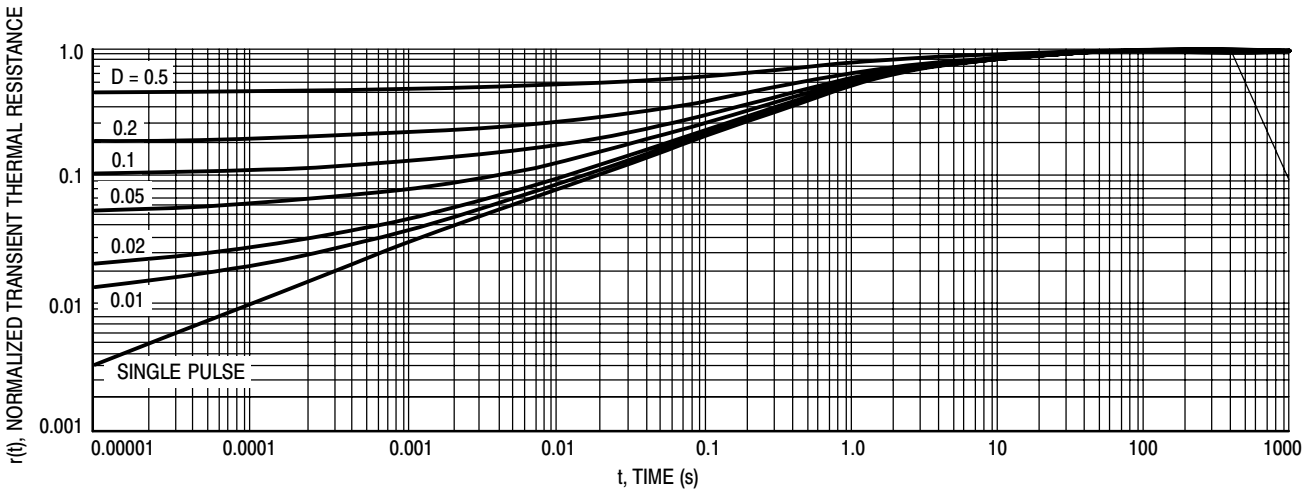


Figure 2. Normalized Thermal Response

TYPICAL ELECTRICAL CHARACTERISTICS − DTA114EET1G

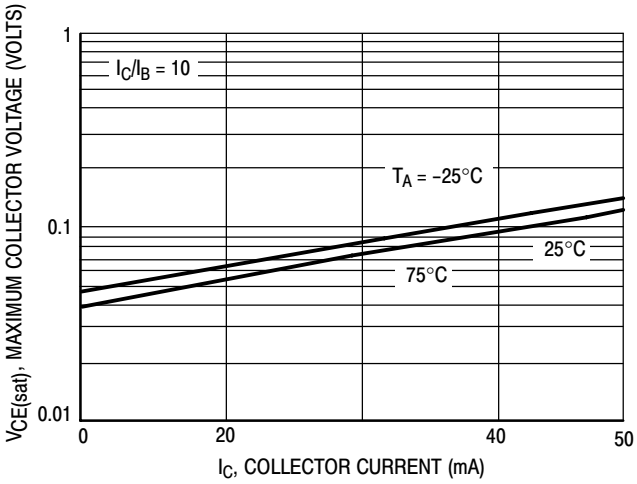


Figure 3. $V_{CE(sat)}$ versus I_C

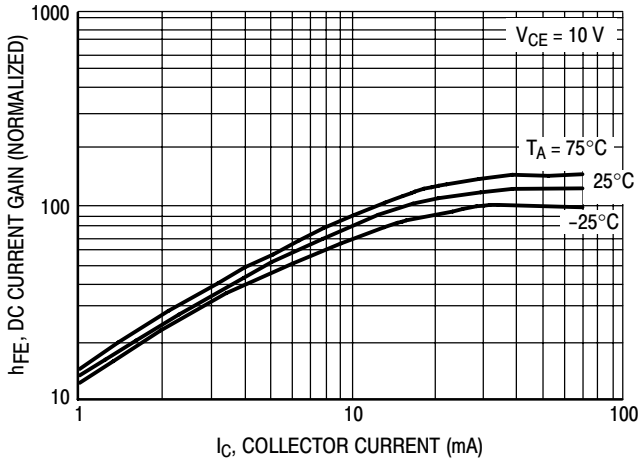


Figure 4. DC Current Gain

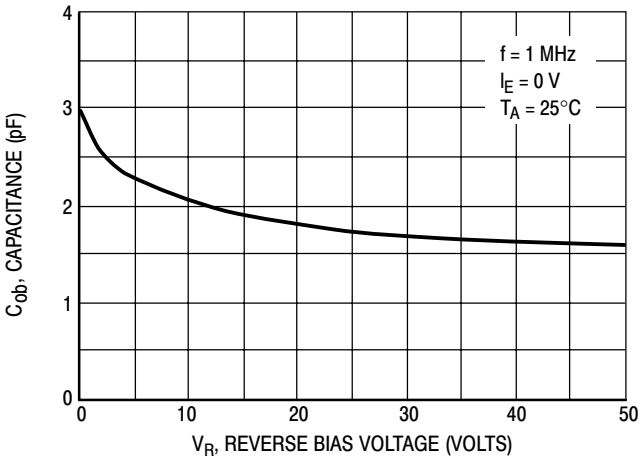


Figure 5. Output Capacitance

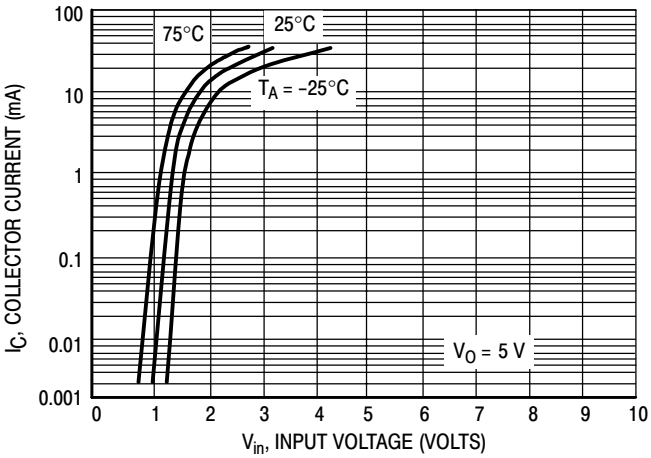


Figure 6. Output Current versus Input Voltage

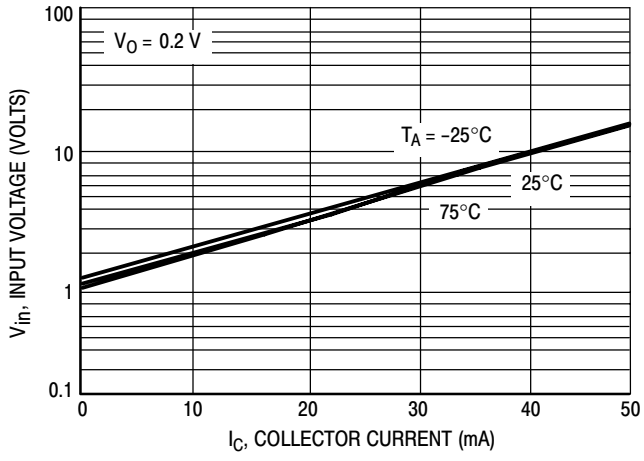


Figure 7. Input Voltage versus Output Current

TYPICAL ELECTRICAL CHARACTERISTICS − DTA123EET1G

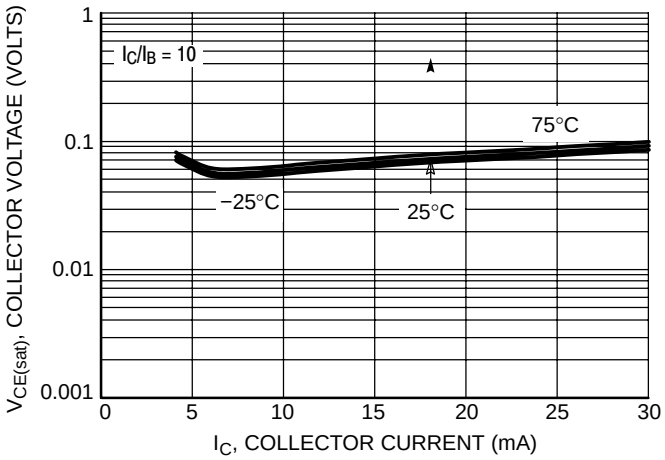


Figure 8. $V_{CE(sat)}$ versus I_C

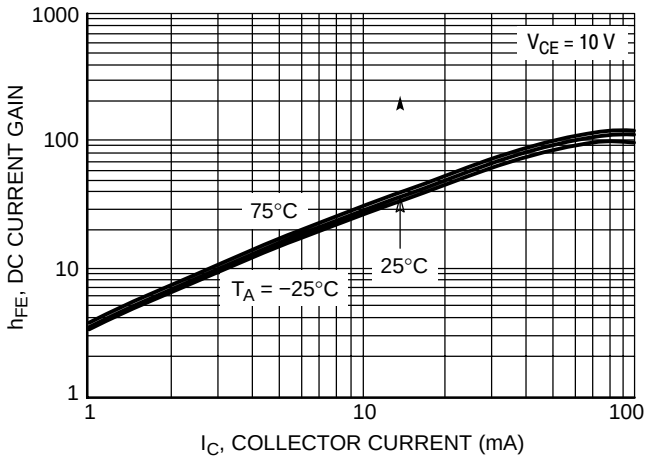


Figure 9. DC Current Gain

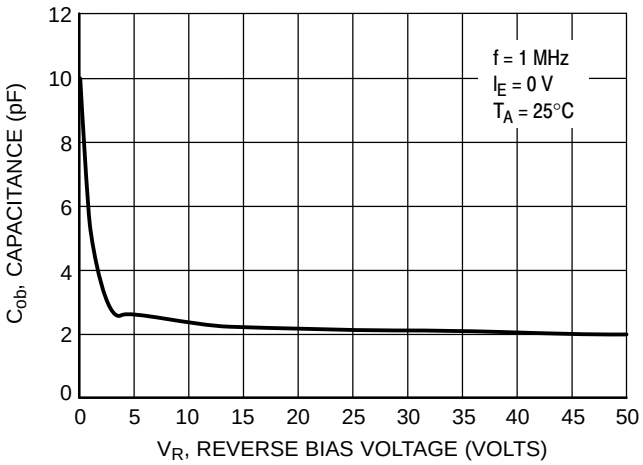


Figure 10. Output Capacitance

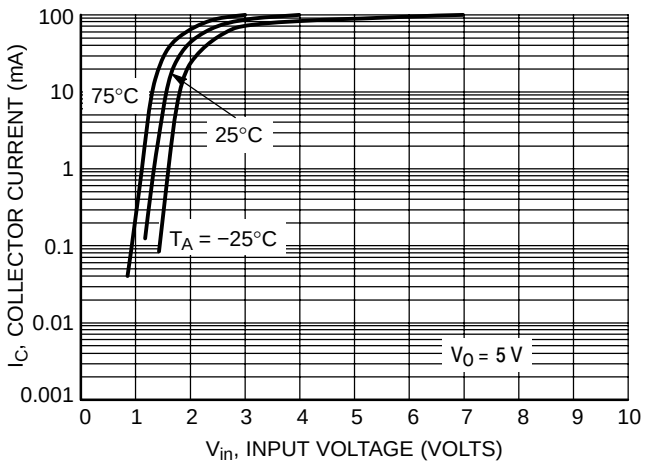


Figure 11. Output Current versus Input Voltage

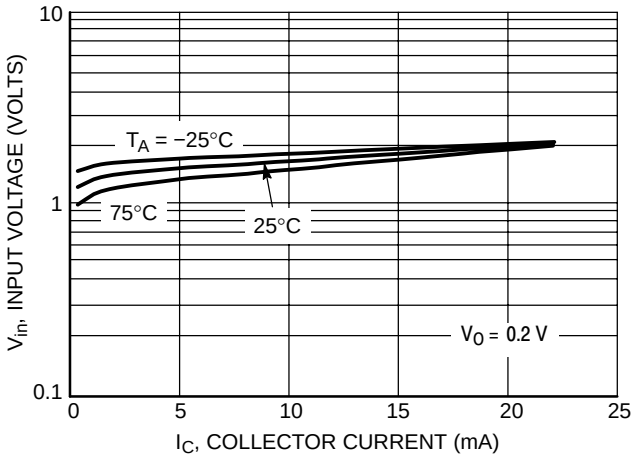


Figure 12. Input Voltage versus Output Current

TYPICAL ELECTRICAL CHARACTERISTICS − DTA124EET1G

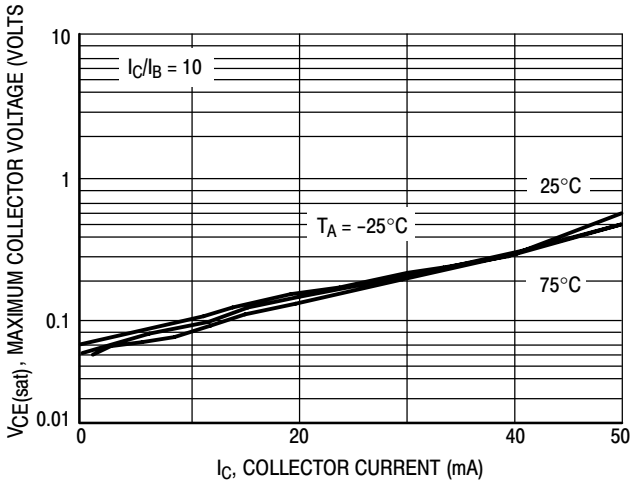


Figure 13. $V_{CE(sat)}$ versus I_C

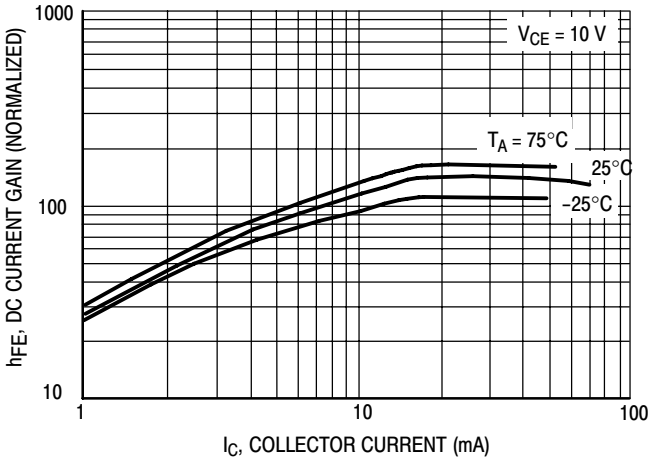


Figure 14. DC Current Gain

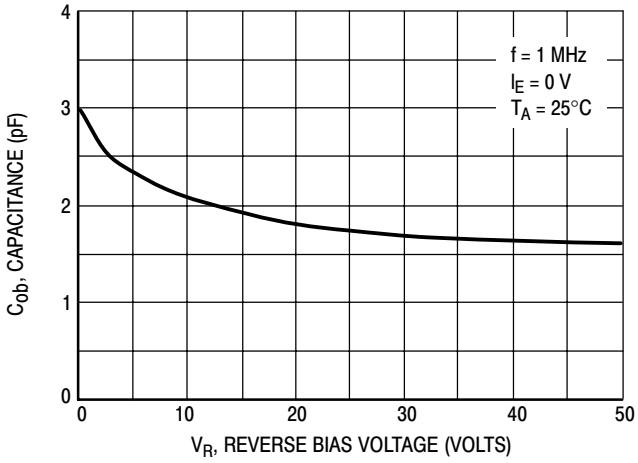


Figure 15. Output Capacitance

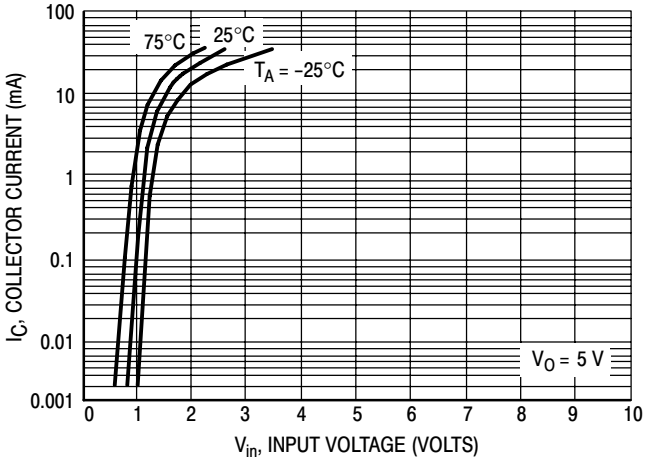


Figure 16. Output Current versus Input Voltage

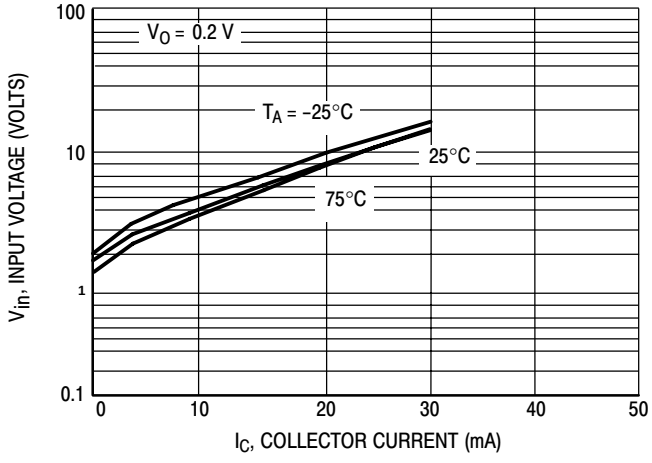


Figure 17. Input Voltage versus Output Current

TYPICAL ELECTRICAL CHARACTERISTICS − DTA144EET1G

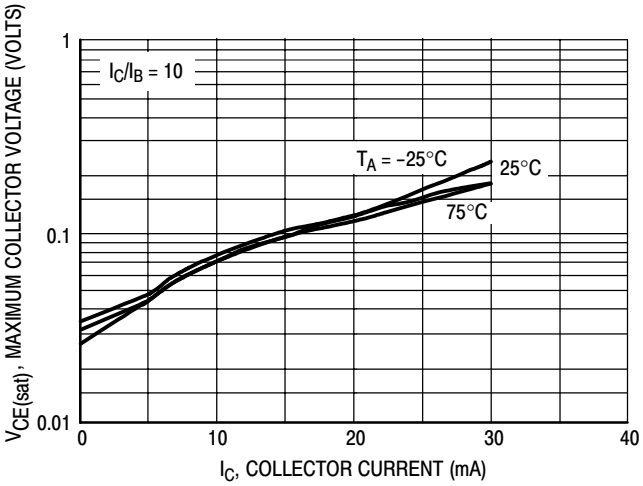


Figure 18. $V_{CE(sat)}$ versus I_C

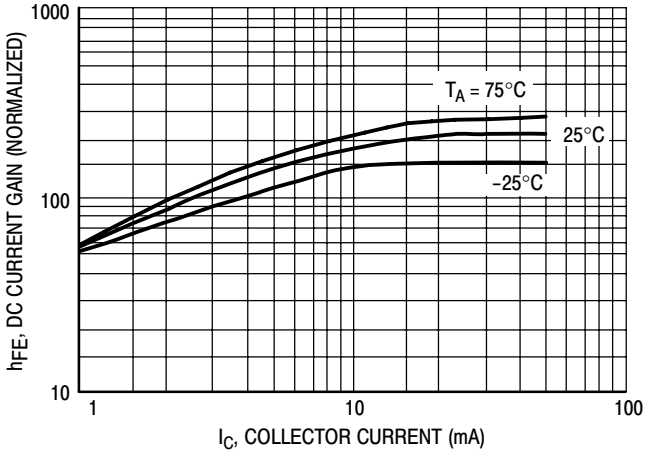


Figure 19. DC Current Gain

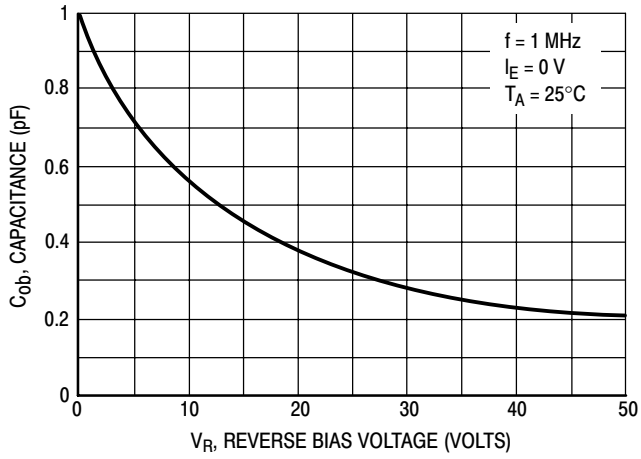


Figure 20. Output Capacitance

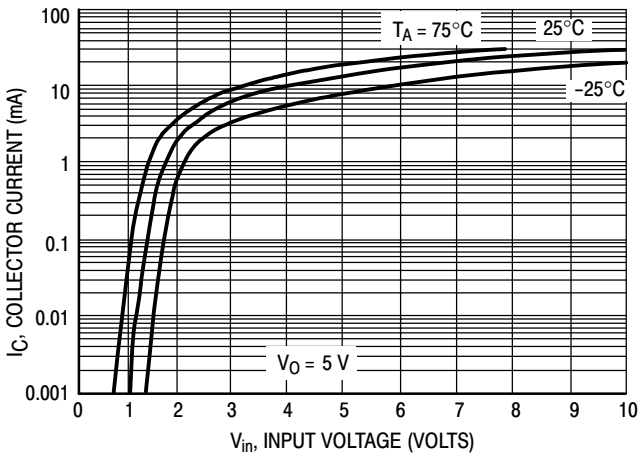


Figure 21. Output Current versus Input Voltage

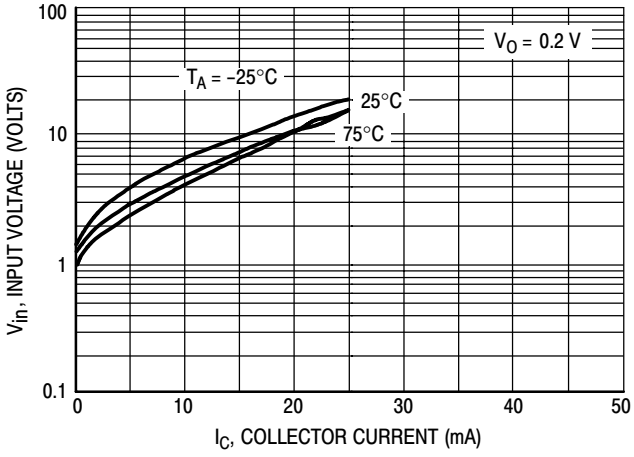


Figure 22. Input Voltage versus Output Current

TYPICAL ELECTRICAL CHARACTERISTICS − DTA114YET1G

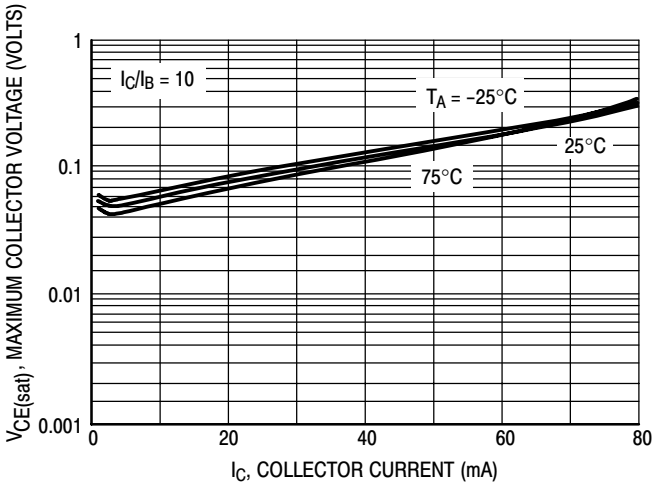


Figure 23. $V_{CE(sat)}$ versus I_C

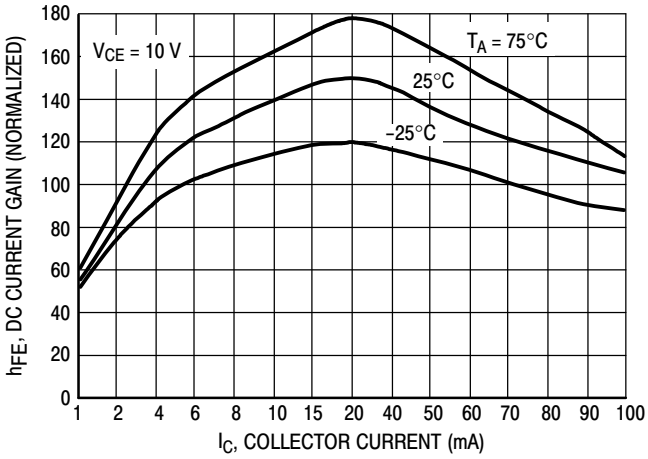


Figure 24. DC Current Gain

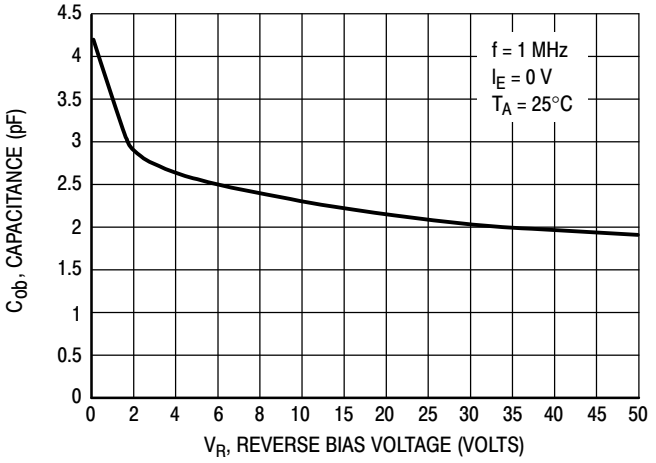


Figure 25. Output Capacitance

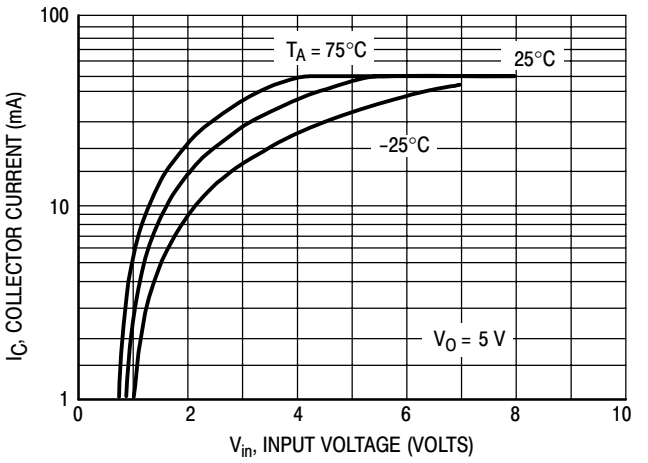


Figure 26. Output Current versus Input Voltage

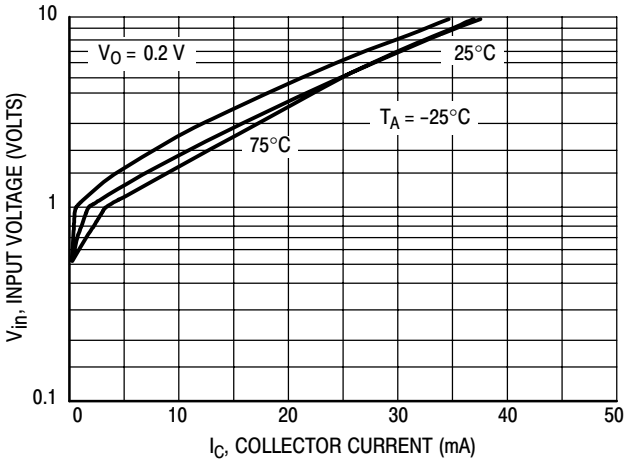


Figure 27. Input Voltage versus Output Current

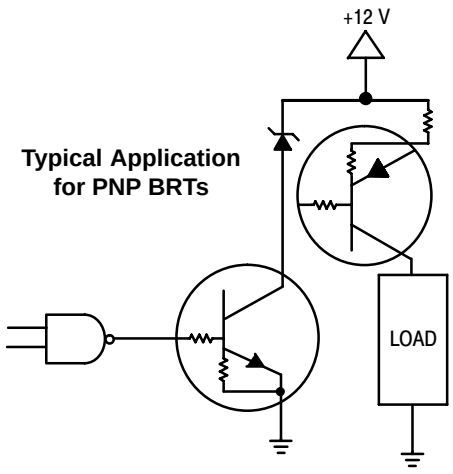


Figure 28. Inexpensive, Unregulated Current Source

TYPICAL ELECTRICAL CHARACTERISTICS — DTA115EET1G

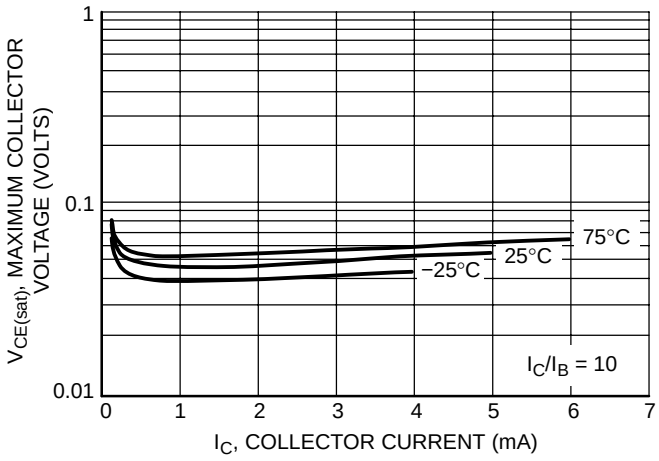


Figure 29. Maximum Collector Voltage versus Collector Current

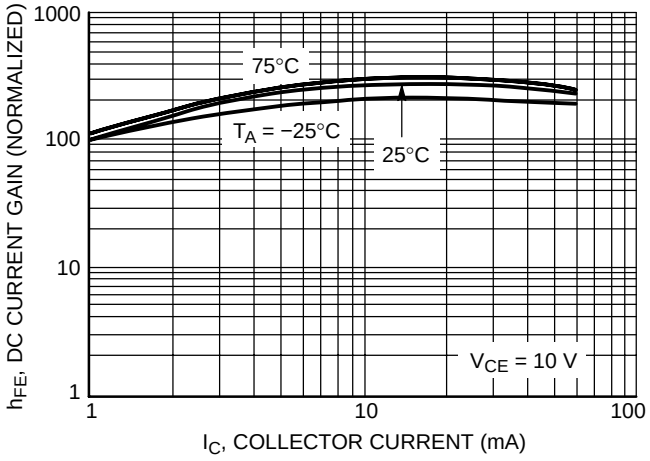


Figure 30. DC Current Gain

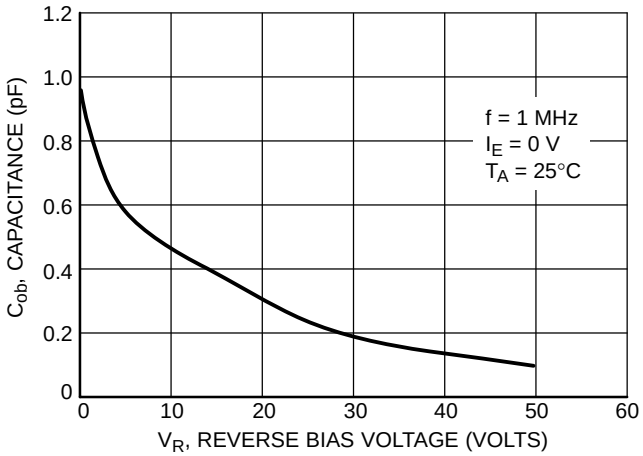


Figure 31. Output Capacitance

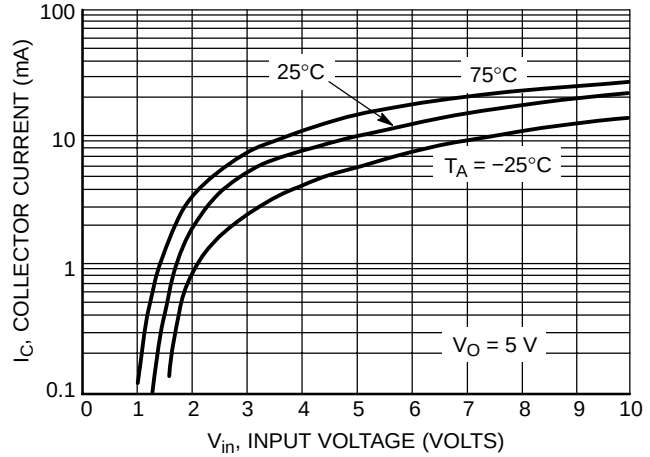


Figure 32. Output Current versus Input Voltage

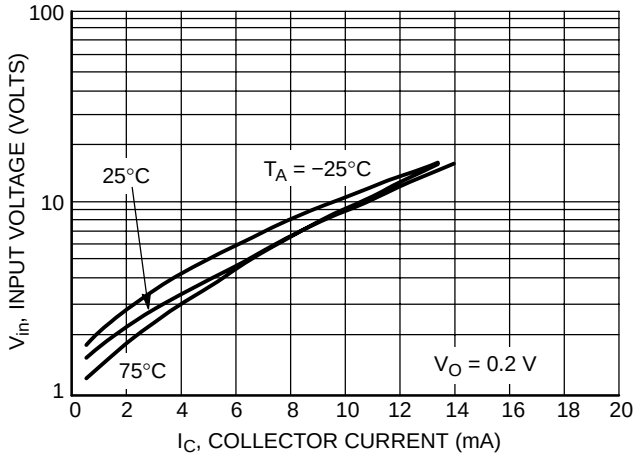


Figure 33. Input Voltage versus Output Current

TYPICAL ELECTRICAL CHARACTERISTICS — DTA144WET1G

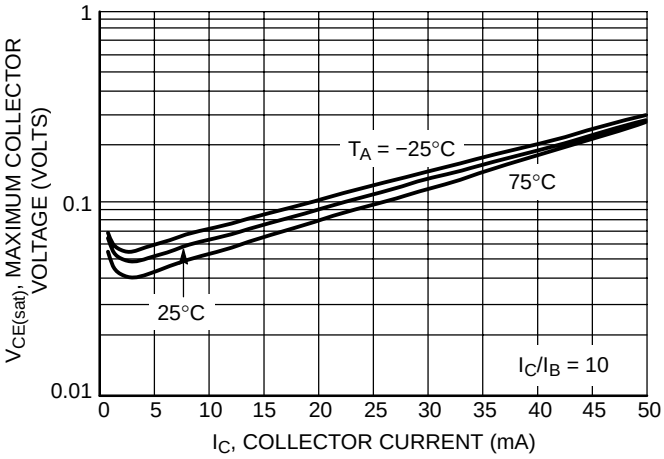


Figure 34. Maximum Collector Voltage versus Collector Current

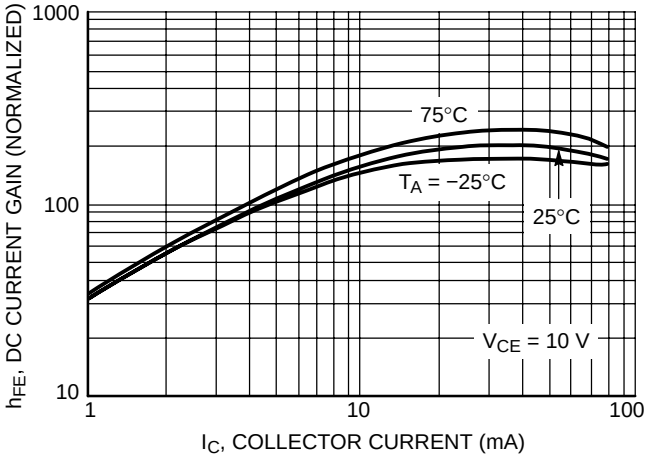


Figure 35. DC Current Gain

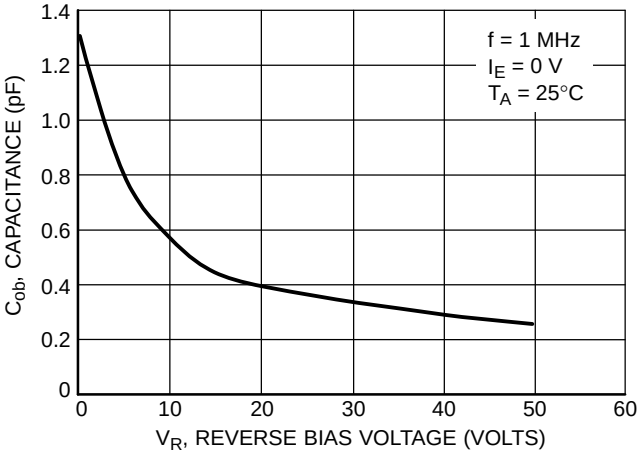


Figure 36. Output Capacitance

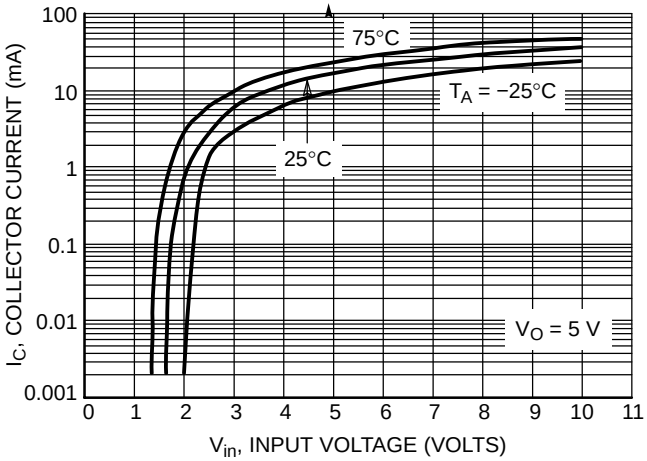


Figure 37. Output Current versus Input Voltage

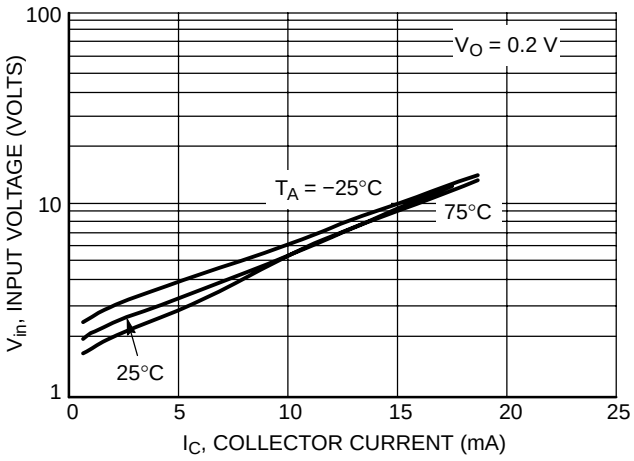
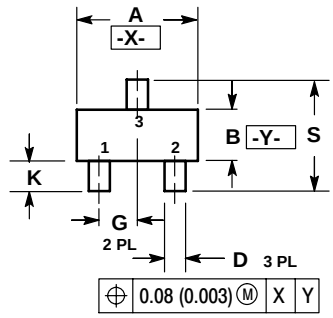
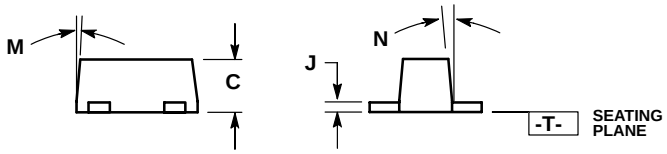


Figure 38. Input Voltage versus Output Current

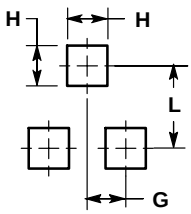
SC−89





NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETERS
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH THICKNESS. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.
4. 463C-01 OBSOLETE, NEW STANDARD 463C-02.

	MILLIMETERS			INCHES		
DIM	MIN	NOM	MAX	MIN	NOM	MAX
A	1.50	1.60	1.70	0.059	0.063	0.067
B	0.75	0.85	0.95	0.030	0.034	0.040
C	0.60	0.70	0.80	0.024	0.028	0.031
D	0.23	0.28	0.33	0.009	0.011	0.013
G		0.50 BSC			0.020 BSC	
H		0.53 REF			0.021 REF	
J	0.10	0.15	0.20	0.004	0.006	0.008
K	0.30	0.40	0.50	0.012	0.016	0.020
L		1.10 REF			0.043 REF	
M	---	---	10 °	---	---	10 °
N	---	---	10 °	---	---	10 °
S	1.50	1.60	1.70	0.059	0.063	0.067



RECOMMENDED PATTERN OF SOLDER PADS