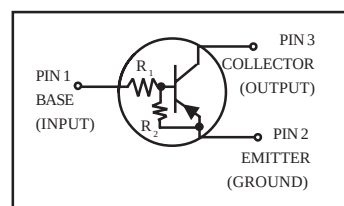


Bias Resistor Transistors

PNP Silicon Surface Mount Transistors with Monolithic Bias Resistor Network

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 SOT-23 package which is designed for low power surface mount applications.

- Simplifies Circuit Design
- Reduces Board Space
- Reduces Component Count
- The SOT-23 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.
- Available in 8 mm embossed tape and reel. Use the Device Number to order the 7 inch/3000 unit reel. Replace “T1” with “T3” in the Device Number to order the 13 inch/10,000 unit reel.
- 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

Characteristic	Symbol	Max	Unit
Total Device Dissipation T _A = 25 °C Derate above 25 °C	P _D	246 (Note 1.) 400 (Note 2.) 1.5 (Note 1.) 2.0 (Note 2.)	mW C/W
Thermal Resistance – Junction-to-Ambient	R _{θJA}	508 (Note 1.) 311 (Note 2.)	C/W
Thermal Resistance – Junction-to-Lead	R _{θJL}	174 (Note 1.) 208 (Note 2.)	C/W
Junction and Storage Temperature Range	T _J , T _{stg}	–55 to +150	°C

1. FR–4 @ Minimum Pad
2. FR–4 @ 1.0 x 1.0 inch Pad



DTA201 ~ DTA214 / DTA217 / DTA223

ORDERING INFORMATION (DEVICE MARKING AND RESISTOR VALUES)

Device	Package	Marking	R1 (K)	R2 (K)	Shipping
DTA201T1G DTA201T3G	SOT-23	A6J	4.7	4.7	3000/Tape & Reel 10,000/Tape & Reel
DTA202T1G DTA202T3G	SOT-23	A6A	10	10	3000/Tape & Reel 10,000/Tape & Reel
DTA203T1G DTA203T3G	SOT-23	A6B	22	22	3000/Tape & Reel 10,000/Tape & Reel
DTA204T1G DTA204T3G	SOT-23	A6C	47	47	3000/Tape & Reel 10,000/Tape & Reel
DTA206T1G DTA206T3G	SOT-23	A6K	4.7	47	3000/Tape & Reel 10,000/Tape & Reel
DTA207T1G (Note 3.) DTA207T3G	SOT-23	A6D	10	47	3000/Tape & Reel 10,000/Tape & Reel
DTA208T1G (Note 3.) DTA208T3G	SOT-23	A6L	22	47	3000/Tape & Reel 10,000/Tape & Reel
DTA210T1G (Note 3.) DTA210T3G	SOT-23	A6F	4.7	∞	3000/Tape & Reel 10,000/Tape & Reel
DTA211T1G (Note 3.) DTA211T3G	SOT-23	A6E	10	∞	3000/Tape & Reel 10,000/Tape & Reel
DTA214T1G (Note 3.) DTA214T3G	SOT-23	A6O	47	∞	3000/Tape & Reel 10,000/Tape & Reel
DTA217T1G (Note 3.) DTA217T3G	SOT-23	A6H	2.2	2.2	3000/Tape & Reel 10,000/Tape & Reel
DTA223T1G (Note 3.) DTA223T3G	SOT-23	A6G	1.0	1.0	3000/Tape & Reel 10,000/Tape & Reel

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}	–	–	1.5 0.5 0.2 0.1 0.18 0.2 0.13 1.9 0.9 0.1 2.3 4.3	mAdc
Collector-Base Breakdown Voltage ($I_C = 10\mu\text{A}$, $I_E = 0$)	$V_{(BR)CBO}$	50	–	–	Vdc
Collector-Emitter Breakdown Voltage (Note 4.) ($I_C = 2.0\text{ mA}$, $I = 0$)	$V_{(BR)CEO}$	50	–	–	Vdc

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

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



DTA201 ~ DTA214 / DTA217 / DTA223

ELECTRICAL CHARACTERISTICS

Characteristic		Symbol	Min	Typ	Max	Unit
ON CHARACTERISTICS (Note 5.)						
DC Current Gain ($V_{CE} = 10\text{ V}$, $I_C = 5.0\text{ mA}$)	DTA201	h_{FE}	15	27	—	
	DTA202		35	60	—	
	DTA203		60	100	—	
	DTA204		80	140	—	
	DTA206		80	140	—	
	DTA207		80	140	—	
	DTA208		80	130	—	
	DTA210		160	250	—	
	DTA211		160	250	—	
	DTA214		80	140	—	
	DTA217		8.0	15	—	
	DTA223		3.0	5.0	—	
Collector-Emitter Saturation Voltage ($I_C = 10\text{ mA}$, $I_B = 0.3\text{ mA}$) ($I_C = 10\text{ mA}$, $I_B = 5\text{ mA}$) DTA217 / DTA223 ($I_C = 10\text{ mA}$, $I_B = 1\text{ mA}$) DTA201 / DTA206 / DTA208 / DTA210 / DTA211			—	—	0.25	Vdc
Output Voltage (on) ($V_{CC} = 5.0\text{ V}$, $V_B = 2.5\text{ V}$, $R_L = 1.0\text{ k}\Omega$) ($V_{CC} = 5.0\text{ V}$, $V_B = 3.5\text{ V}$, $R_L = 1.0\text{ k}\Omega$)	DTA201	V_{OL}	—	—	0.2	Vdc
	DTA202		—	—	0.2	
	DTA203		—	—	0.2	
	DTA206		—	—	0.2	
	DTA207		—	—	0.2	
	DTA208		—	—	0.2	
	DTA210		—	—	0.2	
	DTA211		—	—	0.2	
	DTA214		—	—	0.2	
	DTA217		—	—	0.2	
	DTA223		—	—	0.2	
	DTA204		—	—	0.2	
Output Voltage (off) ($V_{CC} = 5.0\text{ V}$, $V_B = 0.5\text{ V}$, $R_L = 1.0\text{ k}\Omega$) ($V_{CC} = 5.0\text{ V}$, $V_B = 0.25\text{ V}$, $R_L = 1.0\text{ k}\Omega$) ($V_{CC} = 5.0\text{ V}$, $V_B = 0.050\text{ V}$, $R_L = 1.0\text{ k}\Omega$)	DTA201	V_{OH}	4.9	—	—	Vdc
	DTA210					
	DTA211					
	DTA217					
	DTA223					
	DTA223					
Input Resistor	DTA201	R_1	3.3	4.7	6.1	k Ω
	DTA202		7.0	10	13	
	DTA203		15.4	22	28.6	
	DTA204		32.9	47	61.1	
	DTA206		3.3	4.7	6.1	
	DTA207		7.0	10	13	
	DTA208		15.4	22	28.6	
	DTA210		3.3	4.7	6.1	
	DTA211		7.0	10	13	
	DTA214		32.9	47	61.1	
	DTA217		1.5	2.2	2.9	
	DTA223		0.7	1.0	1.3	
Resistor Ratio	DTA201 / DTA217 / DTA223	R_1/R_2	0.8	1.0	1.2	
	DTA202 / DTA203 / DTA204		0.8	1.0	1.2	
	DTA206		0.055	0.1	0.185	
	DTA207		0.17	0.21	0.25	
	DTA210 / DTA211 / DTA214		—	—	—	

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

TYPICAL ELECTRICAL CHARACTERISTICS

DTA202

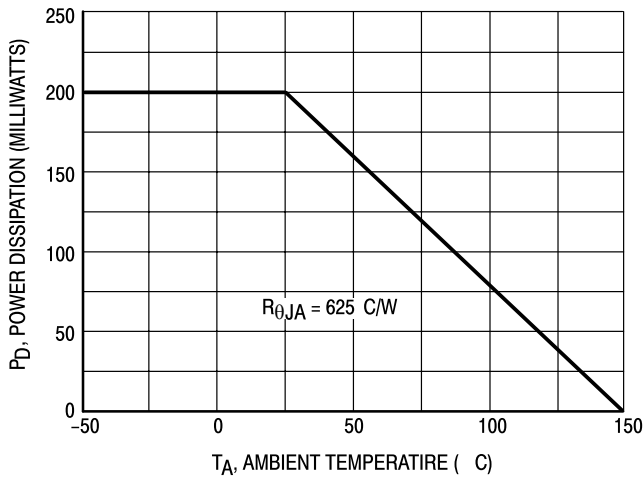


Figure 1. Derating Curve

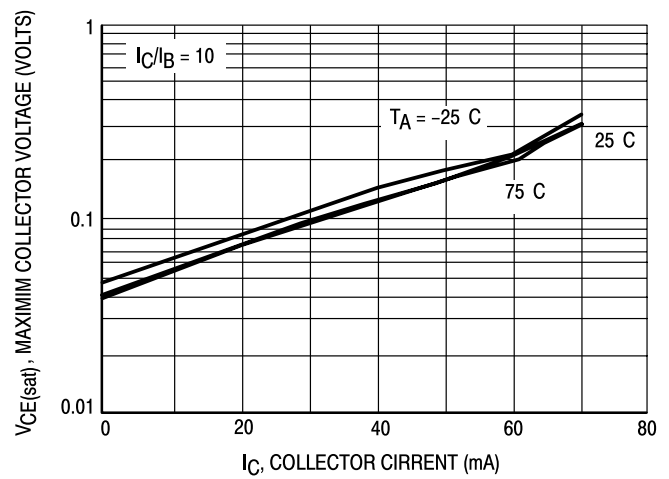


Figure 2. $V_{CE(sat)}$ versus I_C

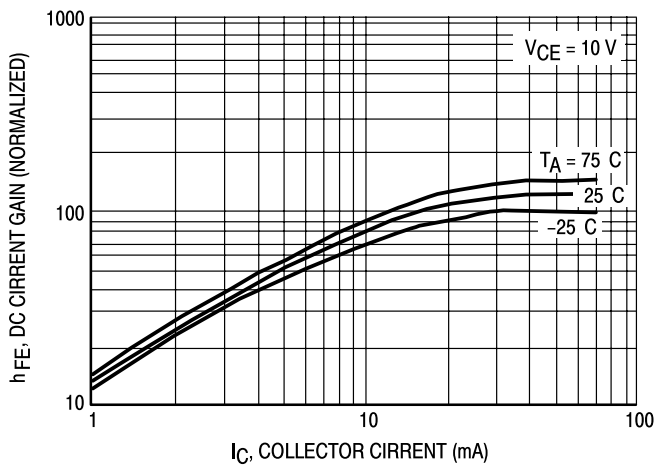


Figure 3. DC Current Gain

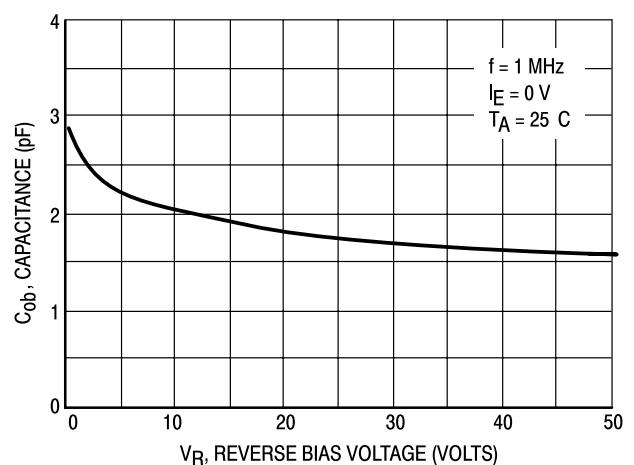


Figure 4. Output Capacitance

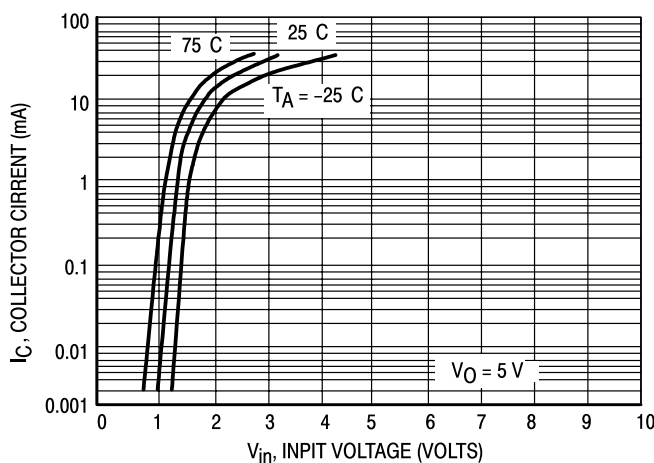


Figure 5. Output Current versus Input Voltage

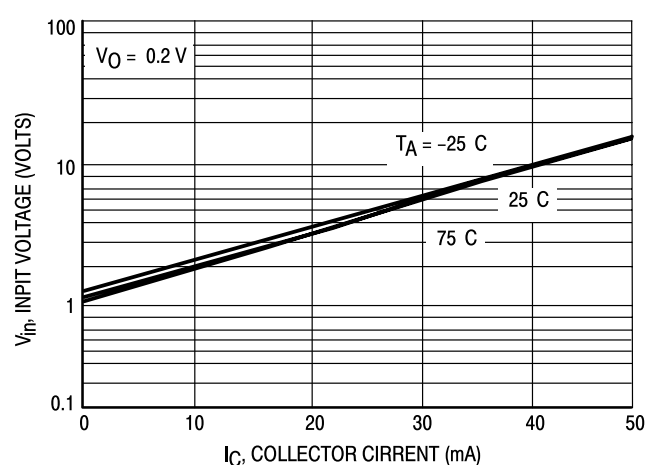


Figure 6. Input Voltage versus Output Current

TYPICAL ELECTRICAL CHARACTERISTICS

DTA203

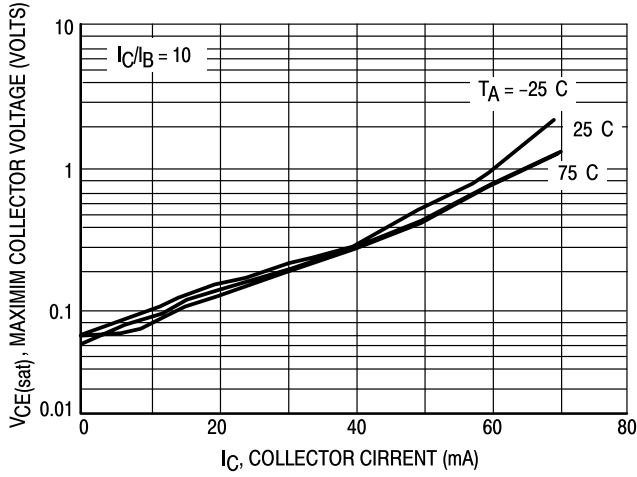


Figure 7. $V_{CE(sat)}$ versus I_C

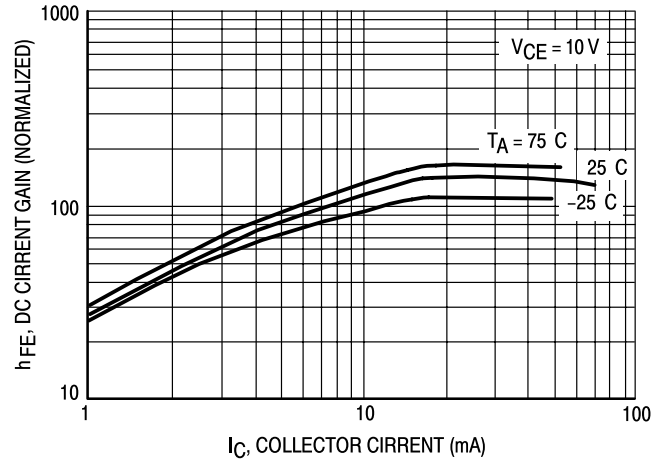


Figure 8. DC Current Gain

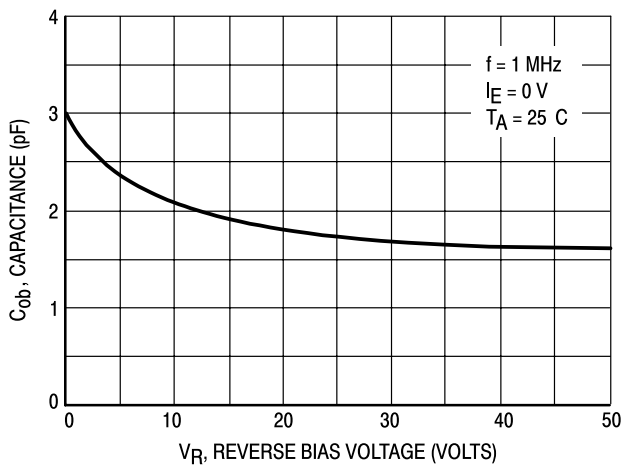


Figure 9. Output Capacitance

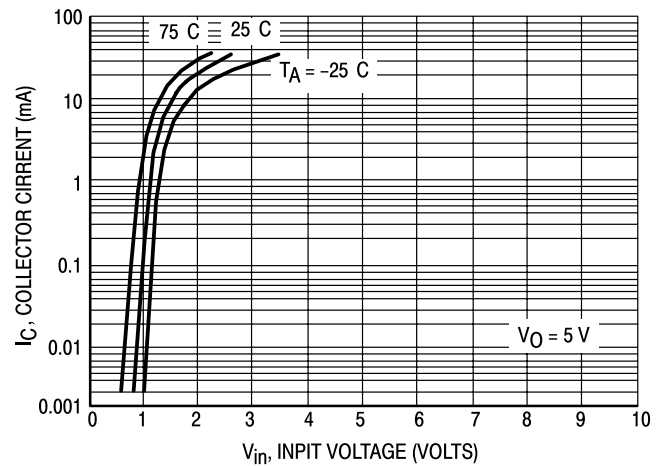


Figure 10. Output Current versus Input Voltage

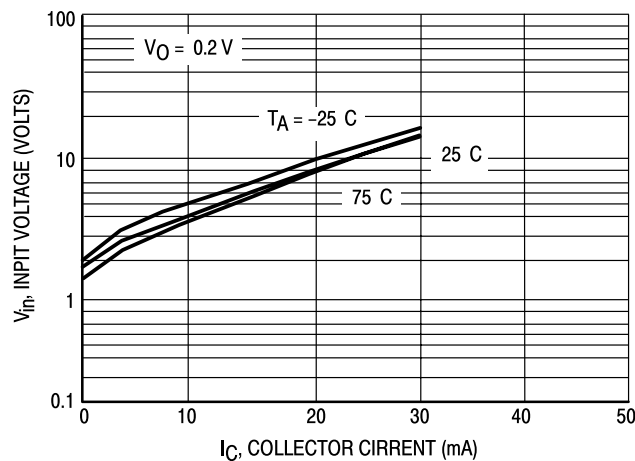


Figure 11. Input Voltage versus Output Current

TYPICAL ELECTRICAL CHARACTERISTICS DTA204

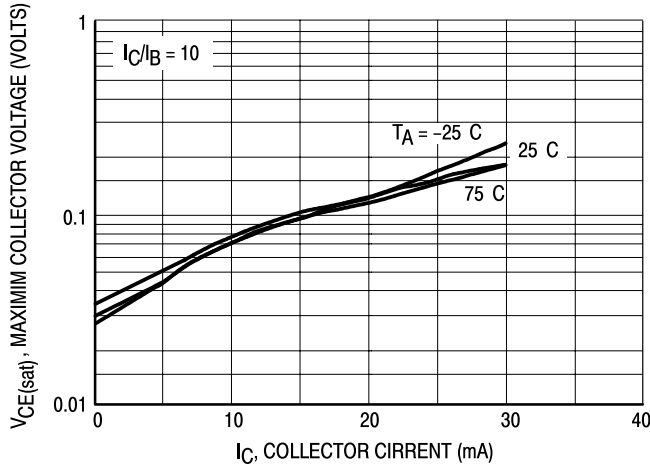


Figure 12. $V_{CE(sat)}$ versus I_C

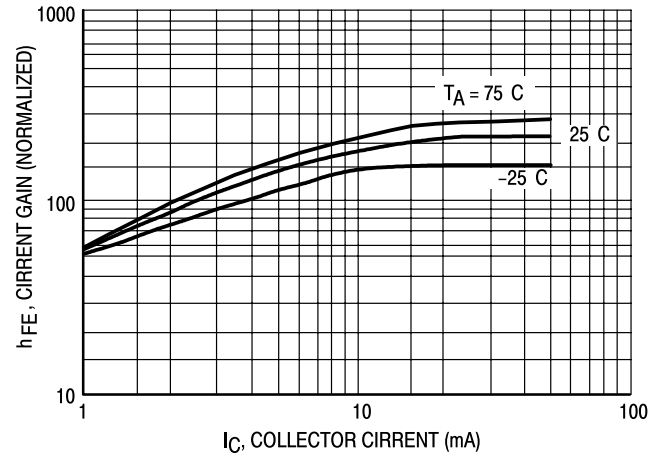


Figure 13. DC Current Gain

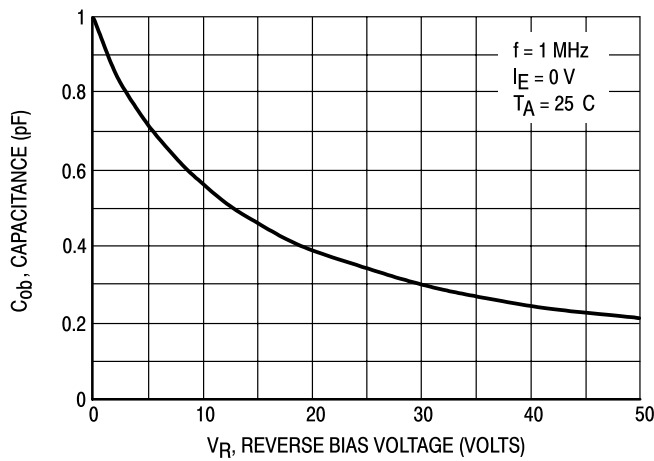


Figure 14. Output Capacitance

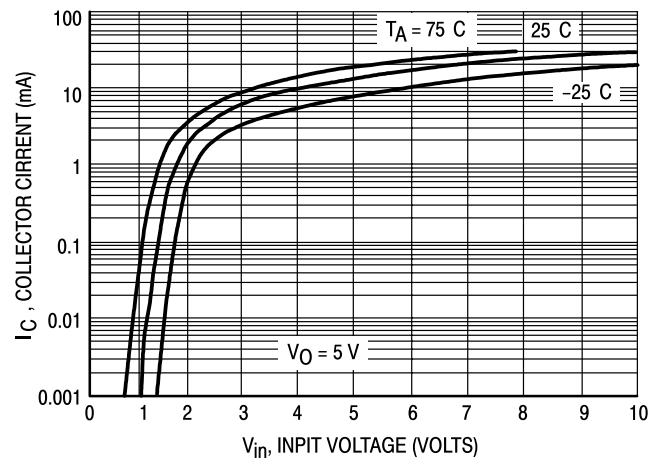


Figure 15. Output Current versus Input Voltage

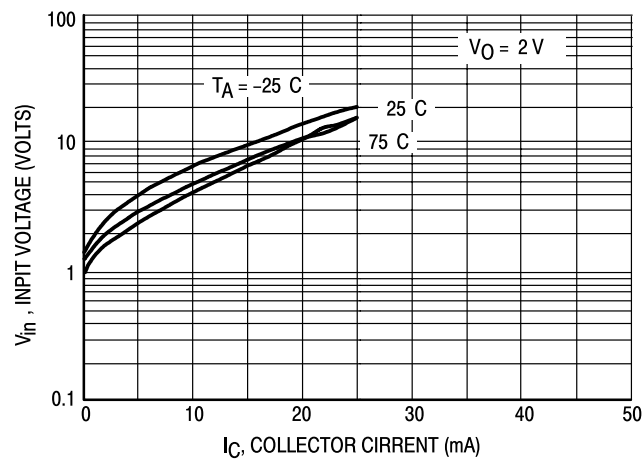
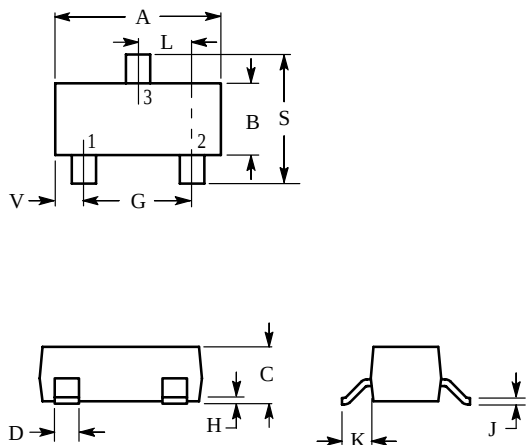


Figure 16. Input Voltage versus Output Current

SOT-23



NOTES:

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

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.1102	0.1197	2.80	3.04
B	0.0472	0.0551	1.20	1.40
C	0.0350	0.0440	0.89	1.11
D	0.0150	0.0200	0.37	0.50
G	0.0701	0.0807	1.78	2.04
H	0.0005	0.0040	0.013	0.100
J	0.0034	0.0070	0.085	0.177
K	0.0140	0.0285	0.35	0.69
L	0.0350	0.0401	0.89	1.02
S	0.0830	0.1039	2.10	2.64
V	0.0177	0.0236	0.45	0.60

PIN 1 BASE
2 EMITTER
3 COLLECTOR

