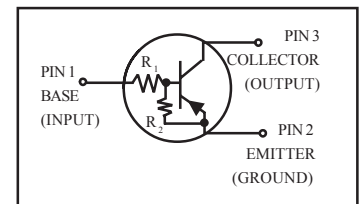
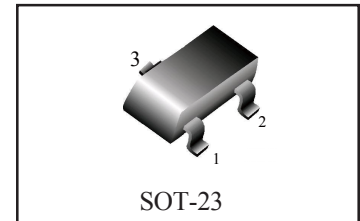


## Bias Resistor Transistors

### 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<sub>A</sub> = 25 °C unless otherwise noted)

Rating	Symbol	Value	Unit
Collector-Base Voltage	V <sub>CBO</sub>	50	Vdc
Collector-Emitter Voltage	V <sub>CEO</sub>	50	Vdc
Collector Current	I <sub>C</sub>	100	mAde

#### THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Total Device Dissipation T <sub>A</sub> = 25 °C Derate above 25 °C	P <sub>D</sub>	246 (Note 1.) 400 (Note 2.) 1.5 (Note 1.) 2.0 (Note 2.)	mW °C/W
Thermal Resistance – Junction-to-Ambient	R <sub>θJA</sub>	508 (Note 1.) 311 (Note 2.)	°C/W
Thermal Resistance – Junction-to-Lead	R <sub>θJL</sub>	174 (Note 1.) 208 (Note 2.)	°C/W
Junction and Storage Temperature Range	T <sub>J</sub> , T <sub>stg</sub>	-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<sub>A</sub> = 25°C unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
<b>OFF CHARACTERISTICS</b>					
Collector-Base Cutoff Current (V <sub>CB</sub> = 50 V, I <sub>E</sub> = 0)	I <sub>CBO</sub>	–	–	100	nAdc
Collector-Emitter Cutoff Current (V <sub>CE</sub> = 50 V, I <sub>B</sub> = 0)	I <sub>CEO</sub>	–	–	500	nAdc
Emitter-Base Cutoff Current (V <sub>EB</sub> = 6.0 V, I <sub>C</sub> = 0)	I <sub>EBO</sub>	–	–	1.5	mAdc
	DTA201	–	–	0.5	
	DTA202	–	–	0.2	
	DTA203	–	–	0.1	
	DTA204	–	–	0.18	
	DTA206	–	–	0.2	
	DTA207	–	–	0.13	
	DTA208	–	–	1.9	
	DTA210	–	–	0.9	
	DTA211	–	–	0.1	
	DTA214	–	–	2.3	
	DTA217	–	–	4.3	
	DTA223	–	–		
Collector-Base Breakdown Voltage (I <sub>C</sub> = 10μA, I <sub>E</sub> = 0)	V <sub>(BR)CBO</sub>	50	–	–	Vdc
Collector-Emitter Breakdown Voltage (Note 4.) (I <sub>C</sub> = 2.0 mA, I <sub>E</sub> = 0)	V <sub>(BR)CEO</sub>	50	–	–	Vdc

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

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



# DTA201 ~ DTA214 / DTA217 / DTA223

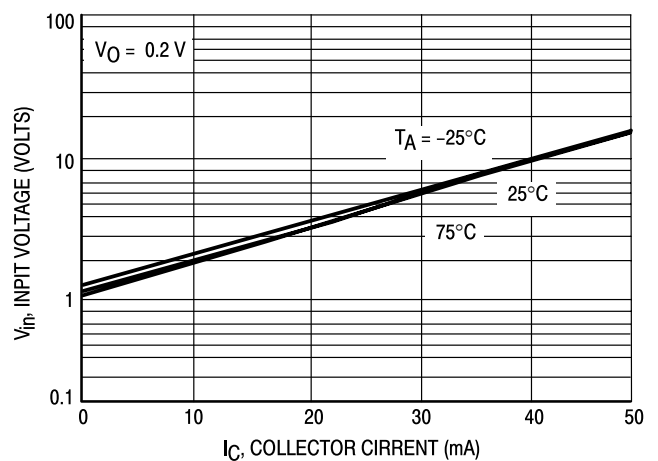
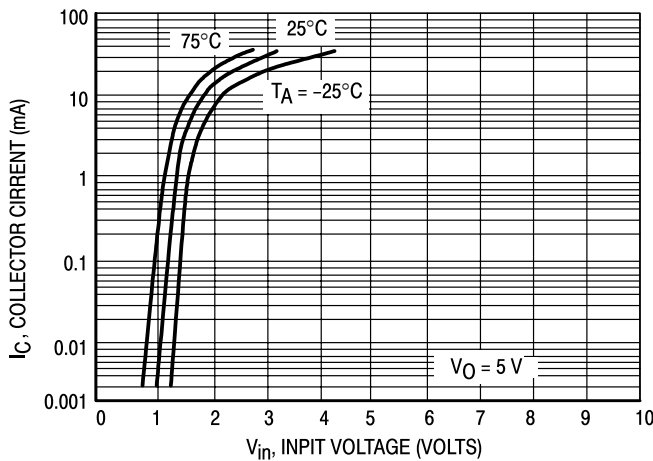
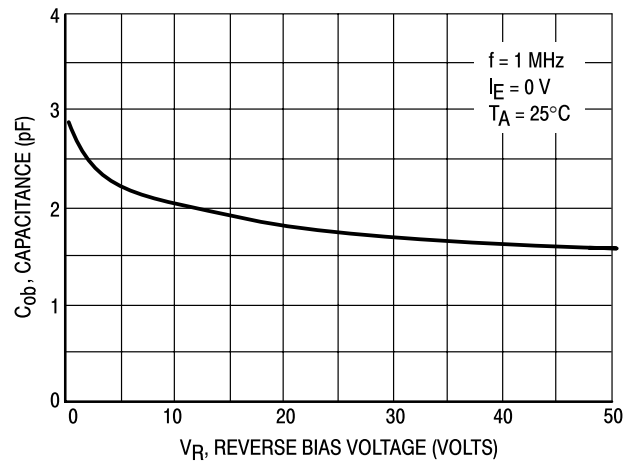
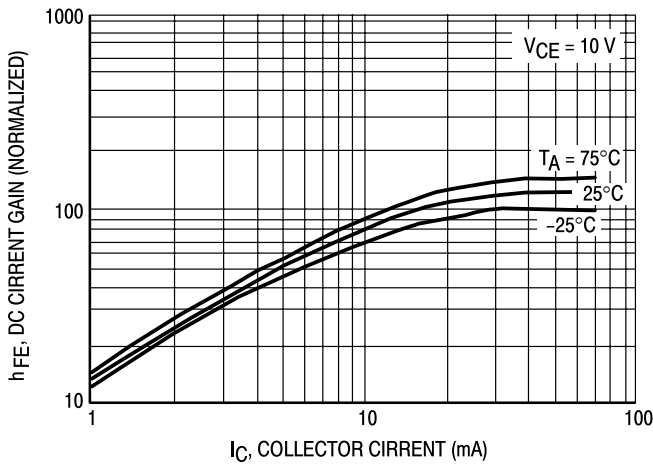
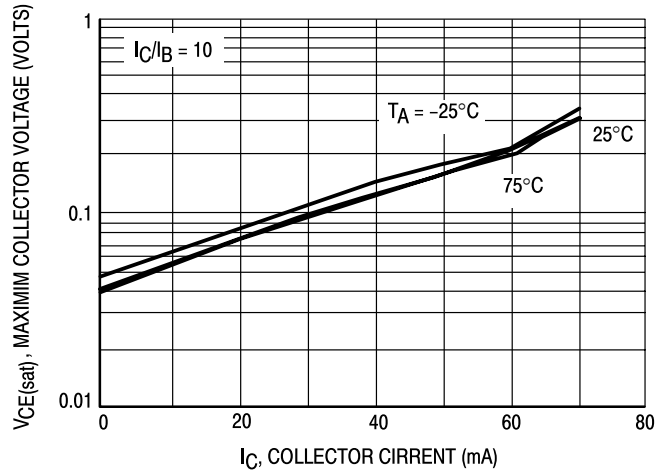
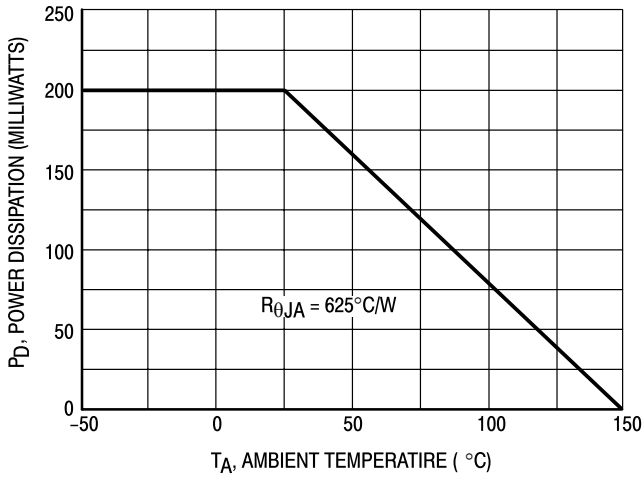
## ELECTRICAL CHARACTERISTICS

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

5. Pulse Test: Pulse Width < 300 $\mu$ s, Duty Cycle < 2.0%

## TYPICAL ELECTRICAL CHARACTERISTICS

### DTA202



## TYPICAL ELECTRICAL CHARACTERISTICS DTA203

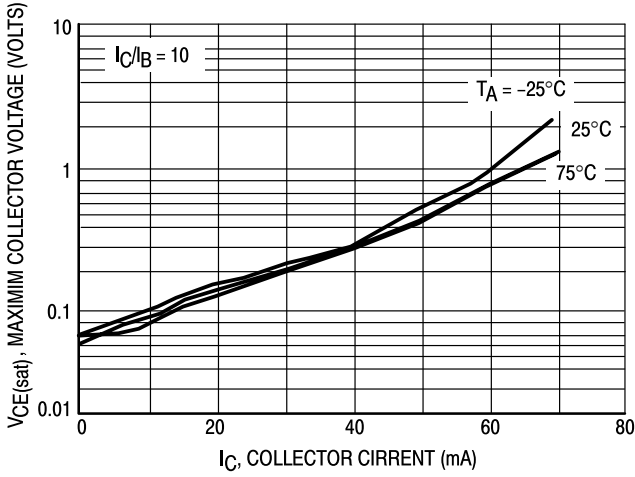


Figure 7.  $V_{CE(sat)}$  versus  $I_C$

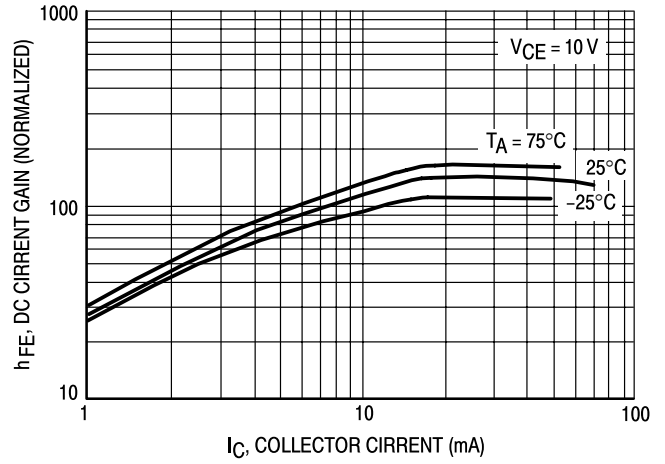


Figure 8. DC Current Gain

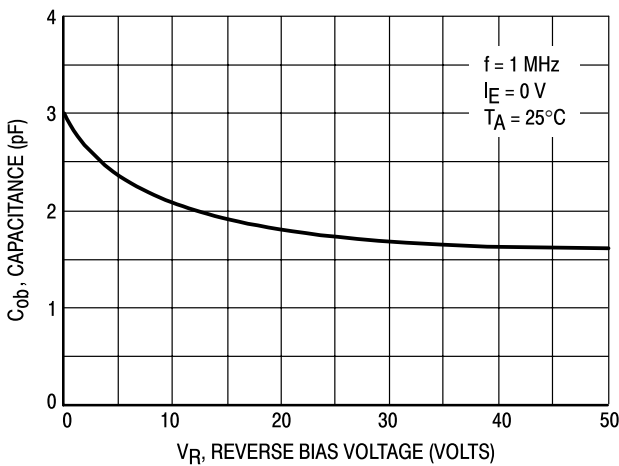


Figure 9. Output Capacitance

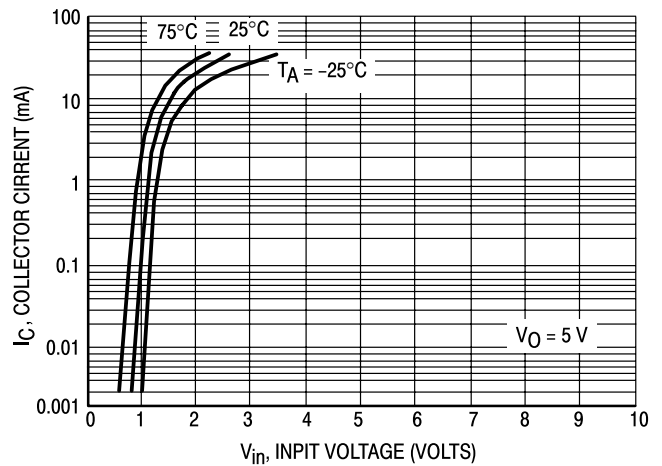


Figure 10. Output Current versus Input Voltage

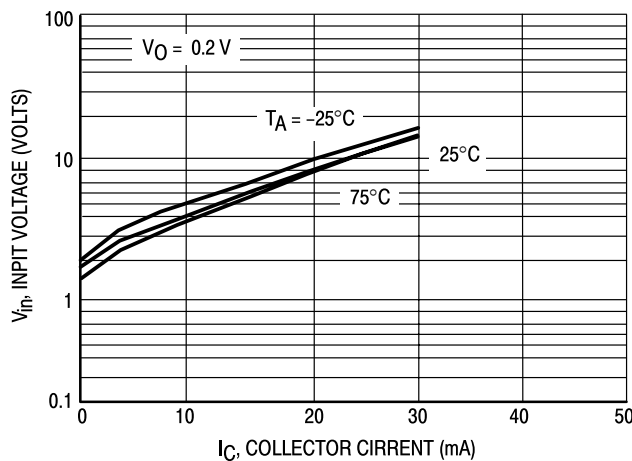


Figure 11. Input Voltage versus Output Current

## TYPICAL ELECTRICAL CHARACTERISTICS DTA204

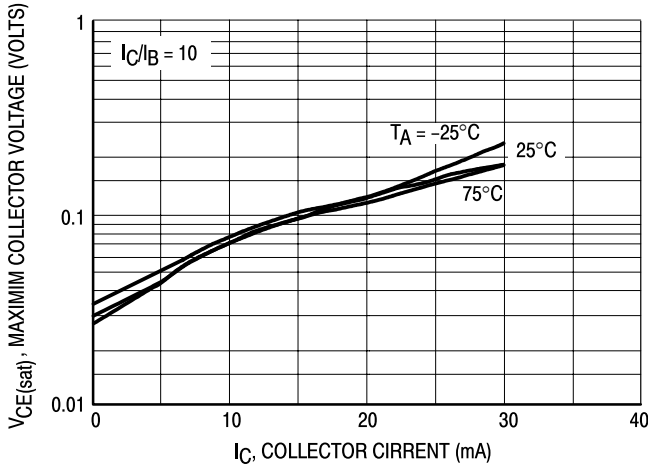


Figure 12.  $V_{CE(sat)}$  versus  $I_C$

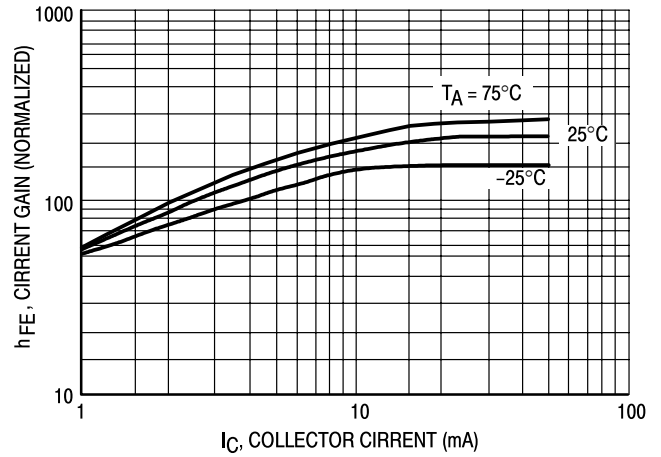


Figure 13. DC Current Gain

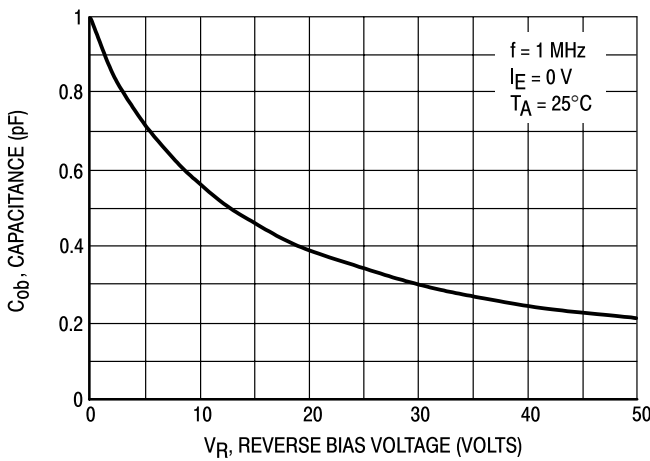


Figure 14. Output Capacitance

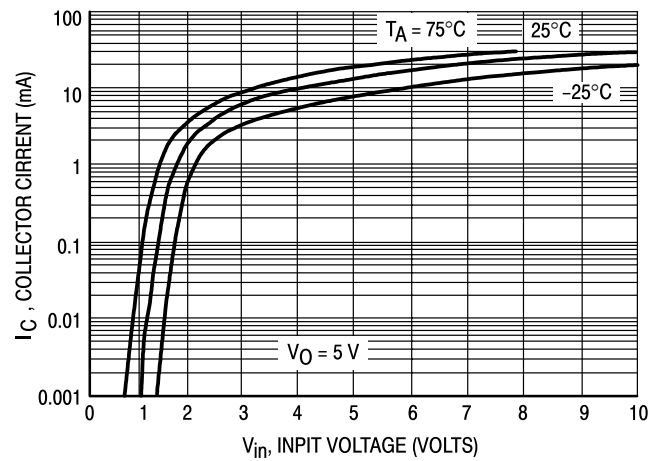


Figure 15. Output Current versus Input Voltage

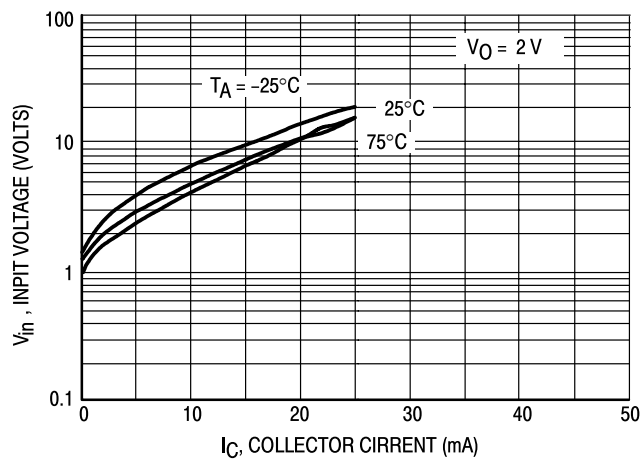
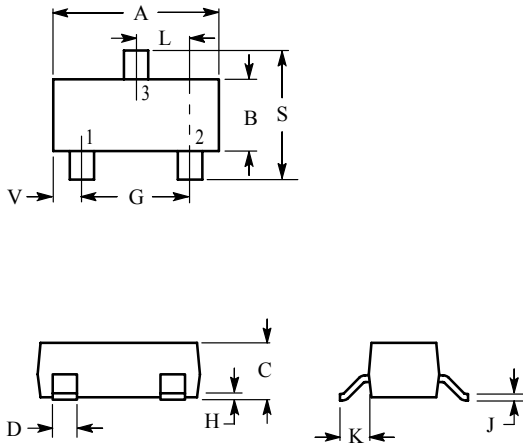


Figure 16. Input Voltage versus Output Current

## 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

