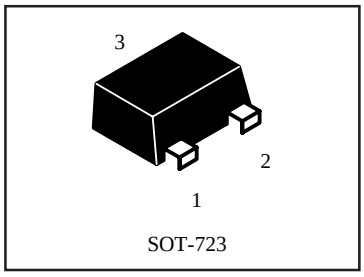
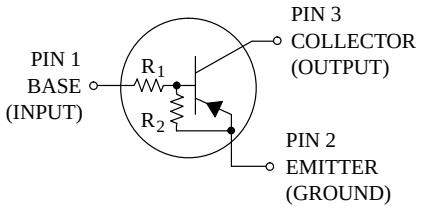
Bias Resistor Transistors

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-723 package which is designed for low power surface mount applications.

- Simplifies Circuit Design
- Reduces Board Space
- Reduces Component Count
- The SOT-723 Package can be Soldered using Wave or Reflow.
- Available in 4 mm, 8000 Unit Tape & Reel





MAXIMUM RATINGS (T_A =25℃ 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℃ Derate above 25℃	P_D	260 (Note 1) 600 (Note 2) 2.0 (Note 1) 4.8 (Note 2)	mW mW/℃
Thermal Resistance – Junction-to-Ambient	$R_{\theta JA}$	480 (Note 1) 205 (Note 2)	℃/W
Junction and Storage Temperature Range	T_J, T_{stg}	–55 to +150	℃

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

ORDERING INFORMATION, DEVICE MARKING AND RESISTOR VALUES

Device	Marking	R1 (K)	R2 (K)	Package	Shipping
DTA801	6J	4.7	4.7	SOT−723	8000/Tape & Reel
DTA802	6A	10	10		
DTA803	6B	22	22		
DTA804	16	47	47		
DTA805	6M	2.2	47		
DTA806	E13	4.7	47		
DTA807	6D	10	47		
DTA808	6L	22	47		
DTA809	6P	47	22		
DTA810	93	4.7	∞		
DTA811	6E	10	∞		
DTA817	6H	2.2	2.2		
DTA822	6N	100	100		

ELECTRICAL CHARACTERISTICS (T_A = 25℃ 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)	DTA801	I_{EBO}	−	−	1.5	mAdc
	DTA802		−	−	0.5	
	DTA803		−	−	0.2	
	DTA804		−	−	0.1	
	DTA805		−	−	0.2	
	DTA806		−	−	0.18	
	DTA807		−	−	0.2	
	DTA808		−	−	0.13	
	DTA809		−	−	0.13	
	DTA810		−	−	1.9	
	DTA811		−	−	0.9	
	DTA817		−	−	2.3	
	DTA822		−	−	0.05	
Collector−Base Breakdown Voltage (I_C = 10uA, 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
ON CHARACTERISTICS (Note 3.)						
DC Current Gain (V_{CE} = 10 V, I_C = 5.0 mA)	DTA801	h_{FE}	15	27	−	
	DTA802		35	60	−	
	DTA803		60	100	−	
	DTA804		80	140	−	
	DTA805		80	140	−	
	DTA806		80	140	−	
	DTA807		80	140	−	
	DTA808		80	130	−	
	DTA809		80	140	−	
	DTA810		160	250	−	
	DTA811		160	250	−	
	DTA817		8.0	15	−	
	DTA822		80	150	−	
Collector−Emitter Saturation Voltage (I_C = 10 mA, I_E = 0.3 mA) (I_C = 10 mA, I_B =1 mA) DTA801 / DTA806 / DTA808 DTA810 / DTA811 (I_C = 10 mA, I_B =5 mA) DTA817		$V_{CE(sat)}$	−	−	0.25	Vdc
Output Voltage (on)		V_{OL}				Vdc
(V_{CC} = 5.0 V, V_B = 2 5 V, R_L = 1.0 k Ω)	DTA801		−	−	0.2	
	DTA802		−	−	0.2	
	DTA803		−	−	0.2	
	DTA805		−	−	0.2	
	DTA806		−	−	0.2	
	DTA807		−	−	0.2	
	DTA808		−	−	0.2	
	DTA810		−	−	0.2	
	DTA811		−	−	0.2	
	DTA817		−	−	0.2	
(V_{CC} = 5.0 V, V_B = 3 5 V, R_L = 1.0 k Ω)	DTA804		−	−	0.2	
(V_{CC} = 5.0 V, V_B = 4.0 V, R_L = 1.0 k Ω)	DTA809		−	−	0.2	
(V_{CC} = 5.0 V, V_B = 5 5 V, R_L = 1.0 k Ω)	DTA822		−	−	0.2	
Output Voltage (off) (V_{CC} = 5.0 V, V_B = 0.5 V, R_L = 1.0 kΩ) (V_{CC} = 5.0 V, V_B = 0 25 V, R_L = 1.0 k Ω)	DTA801 DTA805 DTA810 DTA811	V_{OH}	4.9	−	−	Vdc

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

ELECTRICAL CHARACTERISTICS (T_A = 25℃ unless otherwise noted) (Continued)

Characteristic		Symbol	Min	Typ	Max	Unit
Input Resistor	DTA801	R1	3.3	4.7	6.1	kΩ
	DTA802		7.0	10	13	
	DTA803		15.4	22	28.6	
	DTA804		32.9	47	61.1	
	DTA805		1.54	2.2	2.86	
	DTA806		3.3	4.7	6.1	
	DTA807		7.0	10	13	
	DTA808		15.4	22	28.6	
	DTA809		32.9	47	61.1	
	DTA810		3.3	4.7	6.1	
	DTA811		7.0	10	13	
	DTA817		1.5	2.2	2.9	
	DTA822		70	100	130	
Resistor Ratio		R_1/R_2				
	DTA801 / DTA817		0.8	1.0	1.2	
	DTA802 / DTA803 / DTA804 / DTA822		0.8	1.0	1.2	
	DTA805		0.038	0.047	0.056	
	DTA806		0.055	0.1	0.185	
	DTA807		0.17	0.21	0.25	
	DTA808		0.38	0.47	0.56	
	DTA809		1.7	2.1	2.6	
	DTA810 / DTA811		–	–	–	

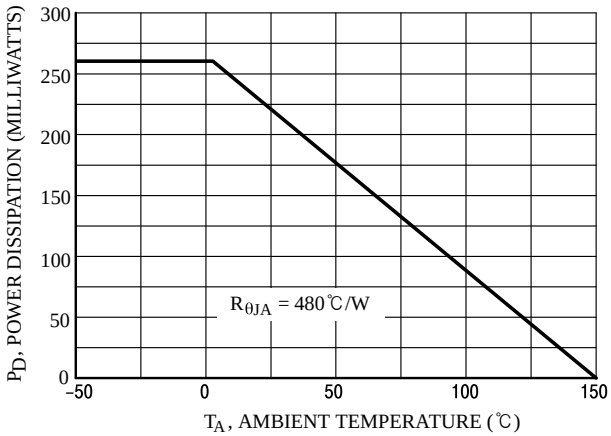


Figure 1. Derating Curve

TYPICAL ELECTRICAL CHARACTERISTICS − DTA802

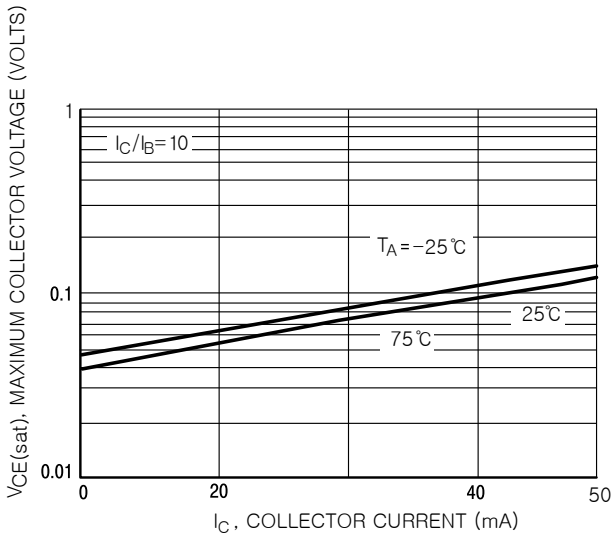


Figure 2. $V_{CE(sat)}$ versus I_C

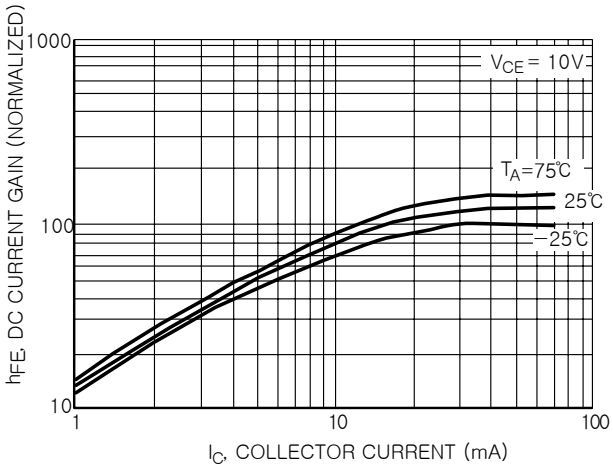


Figure 3. DC Current Gain

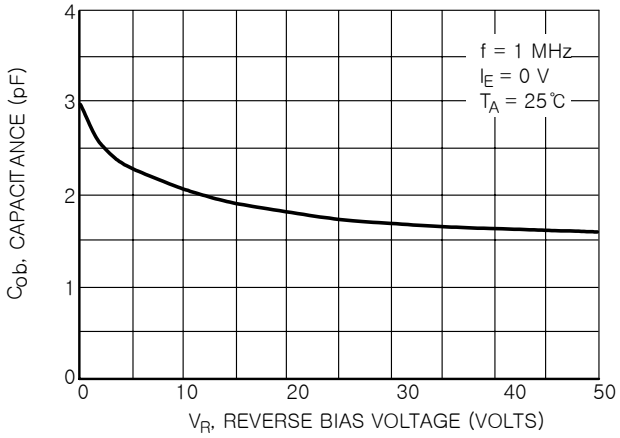


Figure 4. Output Capacitance

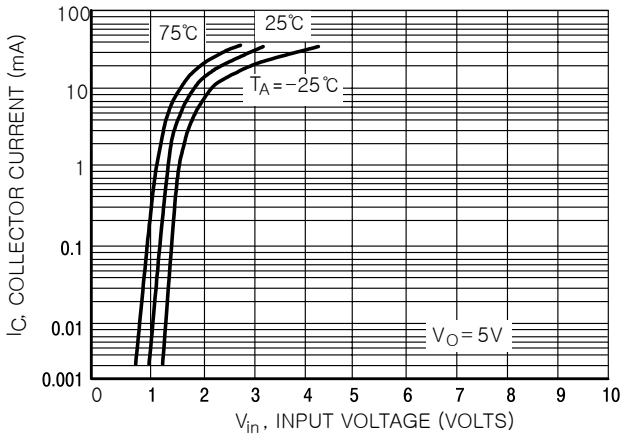


Figure 5. Output Current versus Input Voltage

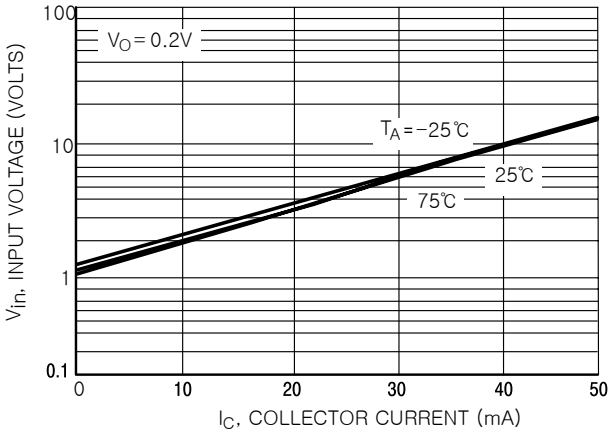


Figure 6. Input Voltage versus Output Current

TYPICAL ELECTRICAL CHARACTERISTICS − DTA803

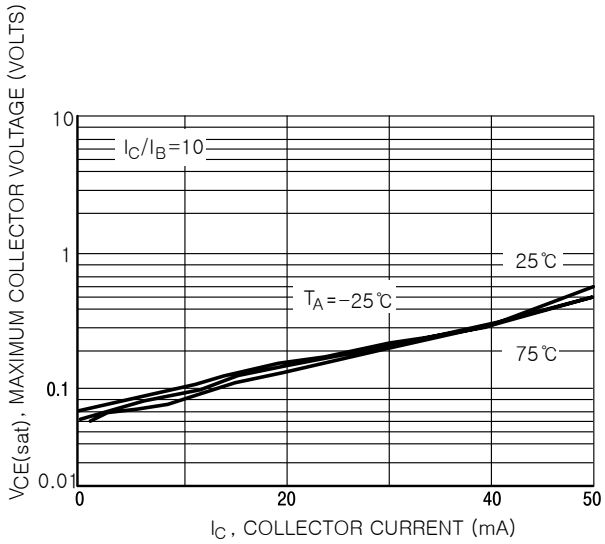


Figure 7. $V_{CE(sat)}$ versus I_C

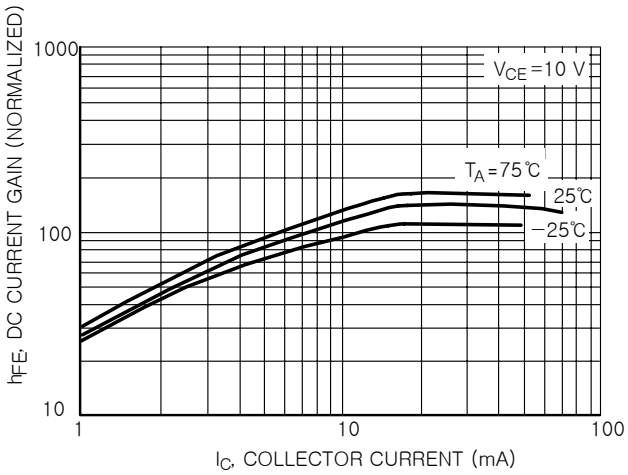


Figure 8. DC Current Gain

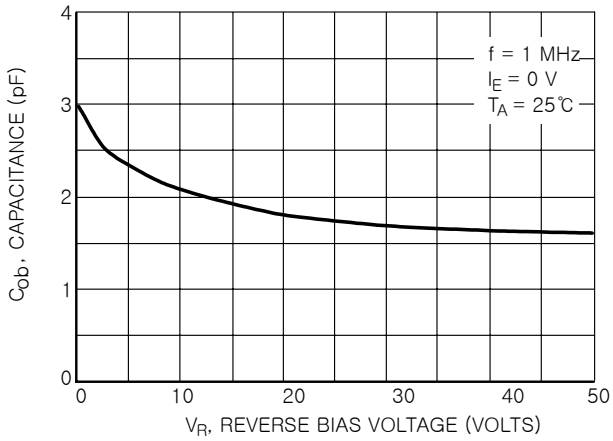


Figure 9. Output Capacitance

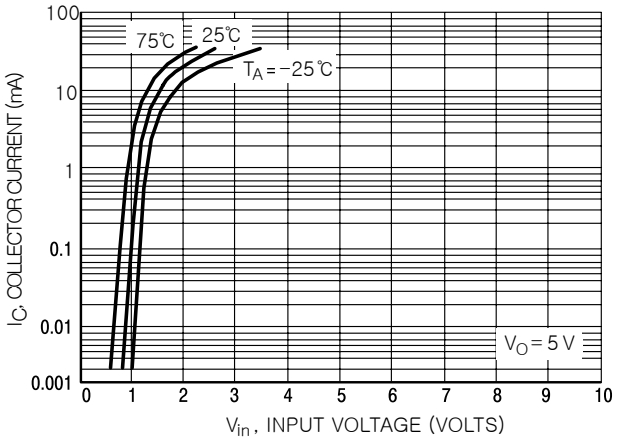


Figure 10. Output Current versus Input Voltage

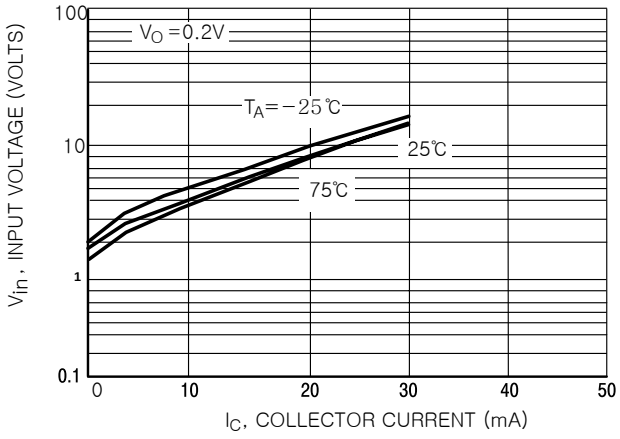


Figure 11. Input Voltage versus Output Current

TYPICAL ELECTRICAL CHARACTERISTICS − DTA804

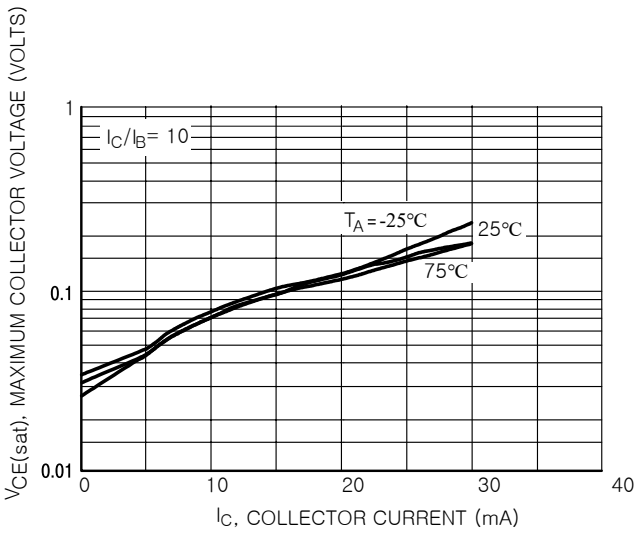


Figure 12. $V_{CE(sat)}$ versus I_C

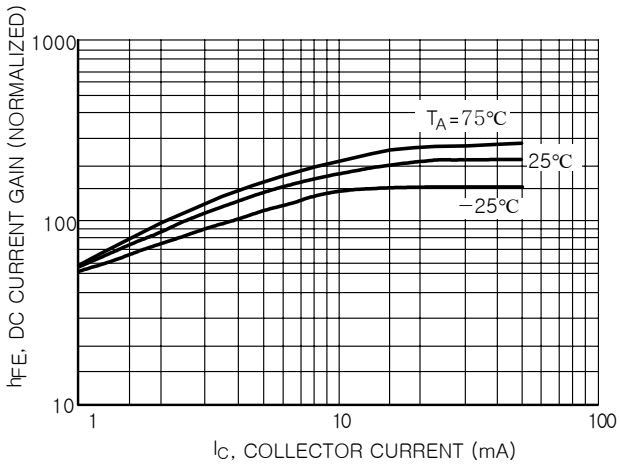


Figure 13. DC Current Gain

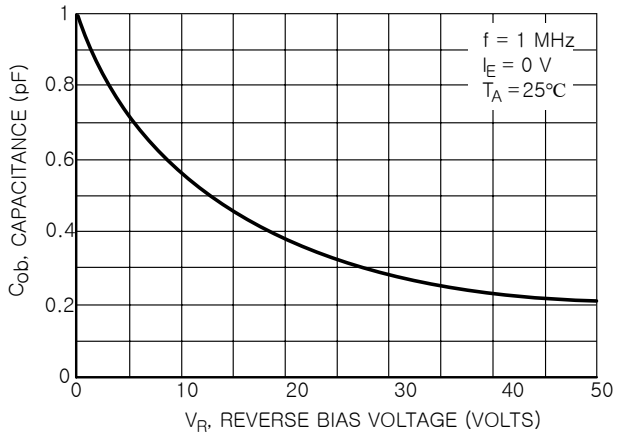


Figure 14. Output Capacitance

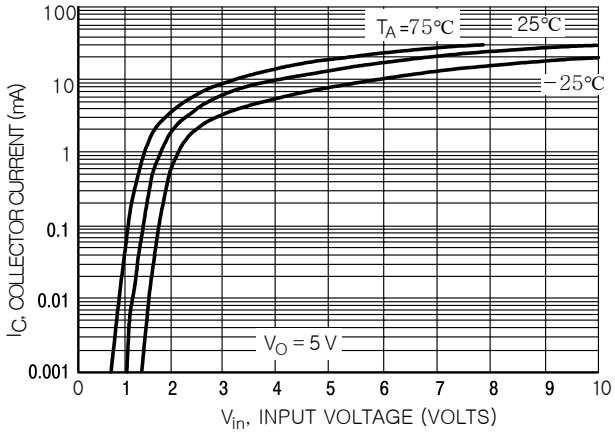


Figure 15. Output Current versus Input Voltage

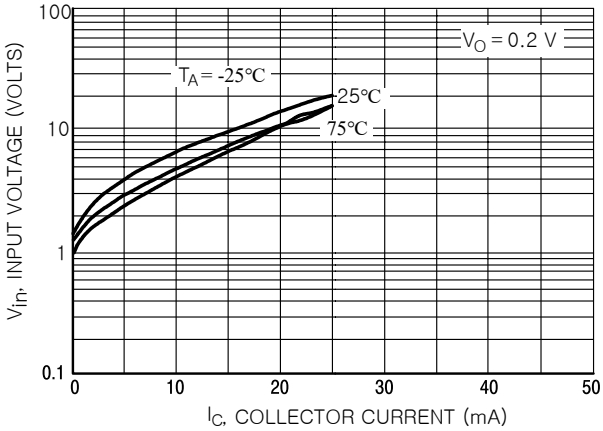


Figure 16. Input Voltage versus Output Current

TYPICAL ELECTRICAL CHARACTERISTICS − DTA807

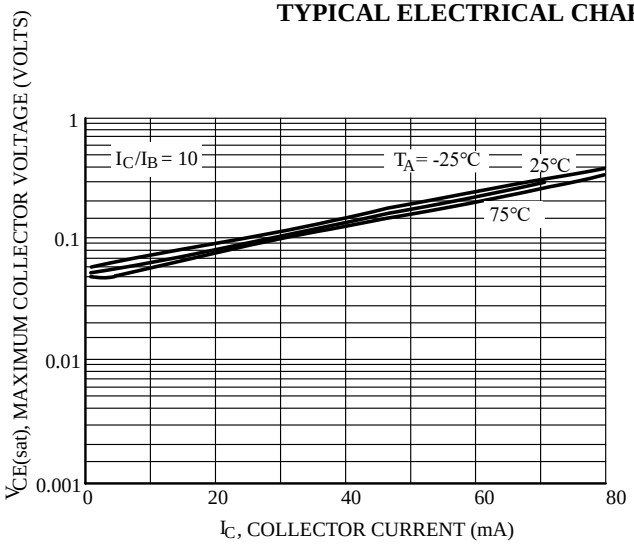


Figure 17. $V_{CE(sat)}$ versus I_C

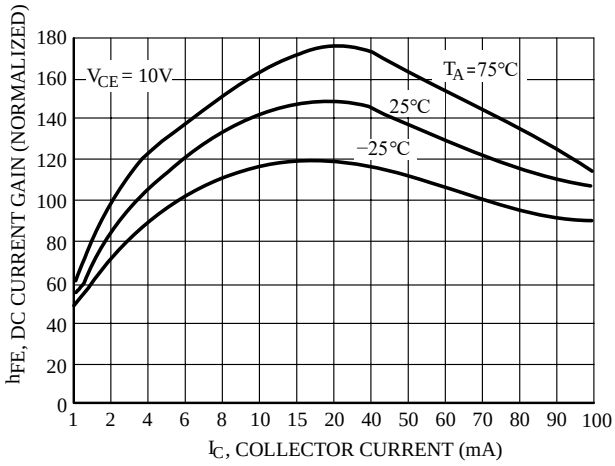


Figure 18. DC Current Gain

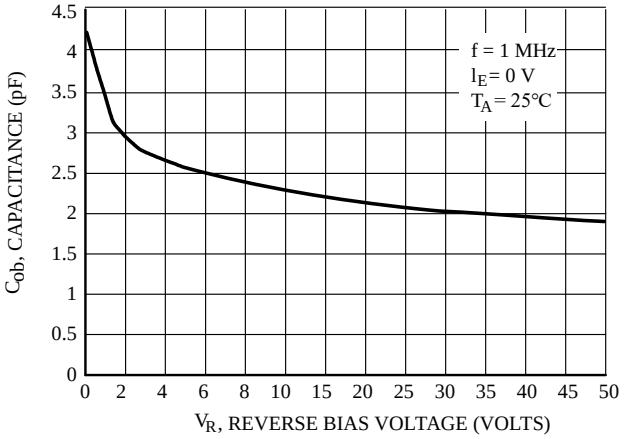


Figure 19. Output Capacitance

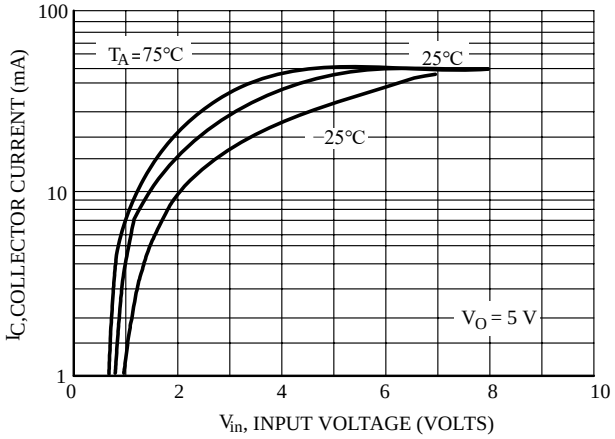


Figure 20. Output Current versus Input Voltage

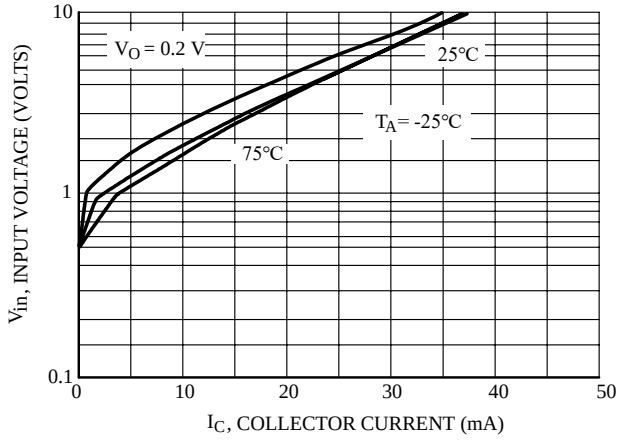


Figure 21. Input Voltage versus Output Current

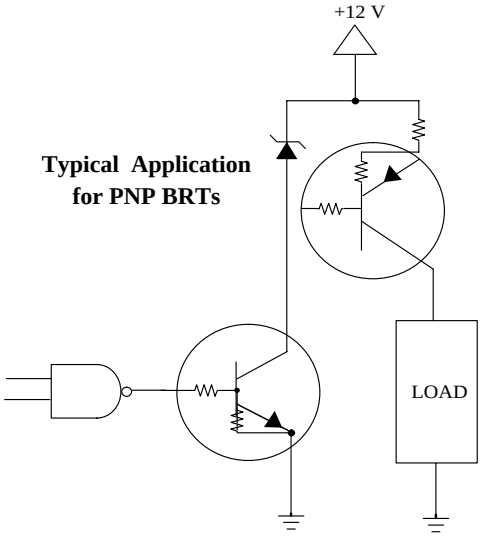


Figure 22. Inexpensive, Unregulated Current Source

TYPICAL ELECTRICAL CHARACTERISTICS − DTA809

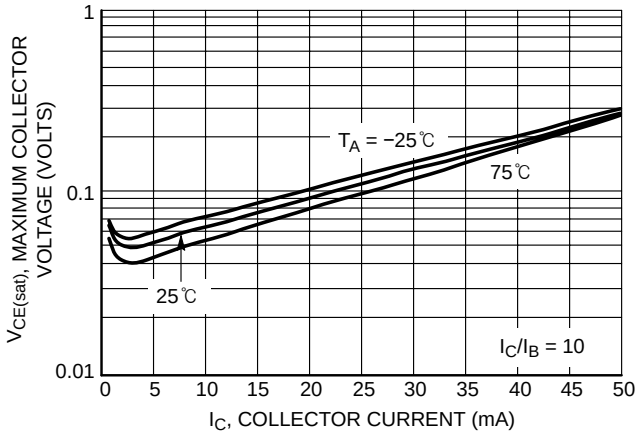


Figure 23. Maximum Collector Voltage versus Collector Current

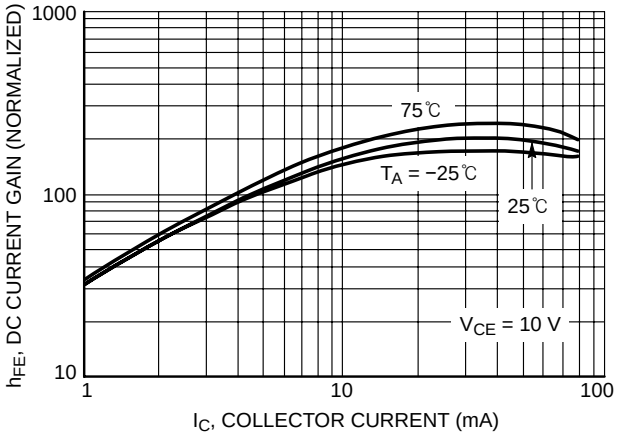


Figure 24. DC Current Gain

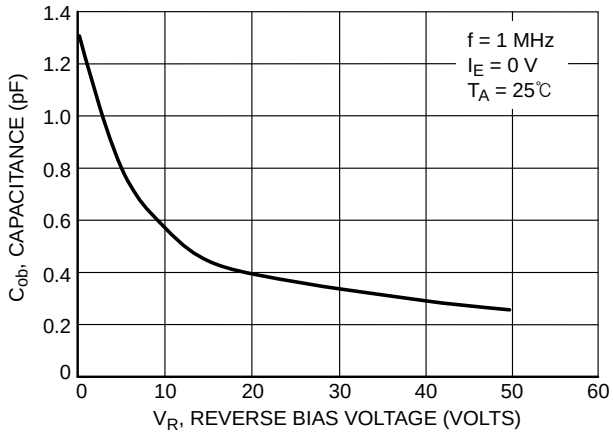


Figure 25. Output Capacitance

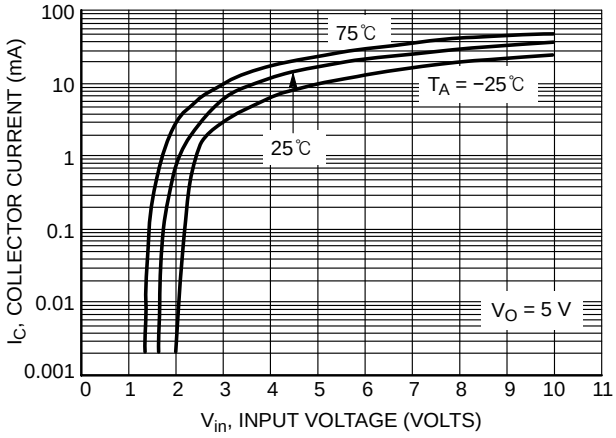


Figure 26. Output Current versus Input Voltage

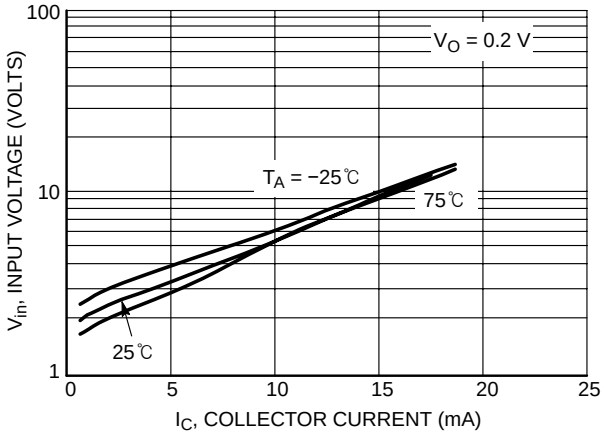


Figure 27. Input Voltage versus Output Current

TYPICAL ELECTRICAL CHARACTERISTICS − DTA822

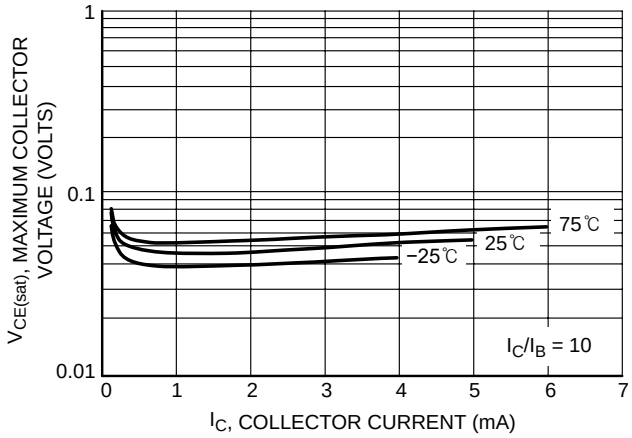


Figure 28. Maximum Collector Voltage versus Collector Current

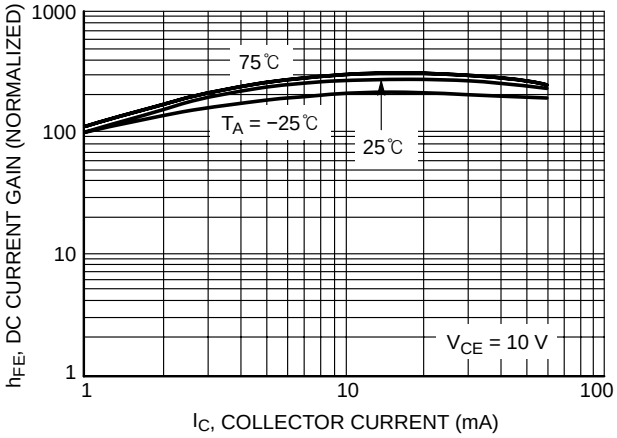


Figure 29. DC Current Gain

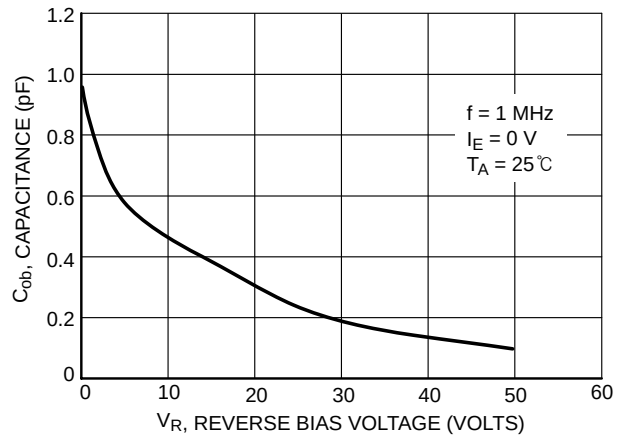


Figure 30. Output Capacitance

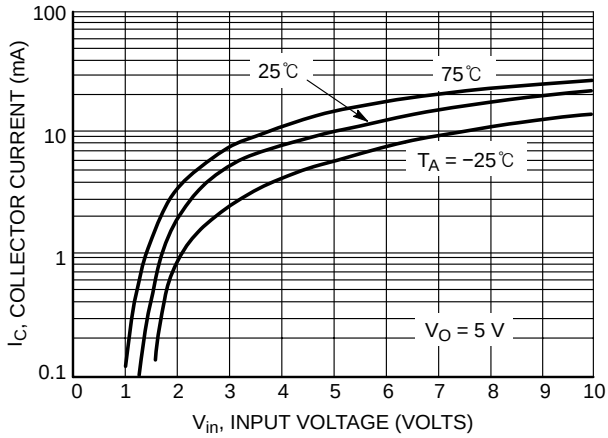


Figure 31. Output Current versus Input Voltage

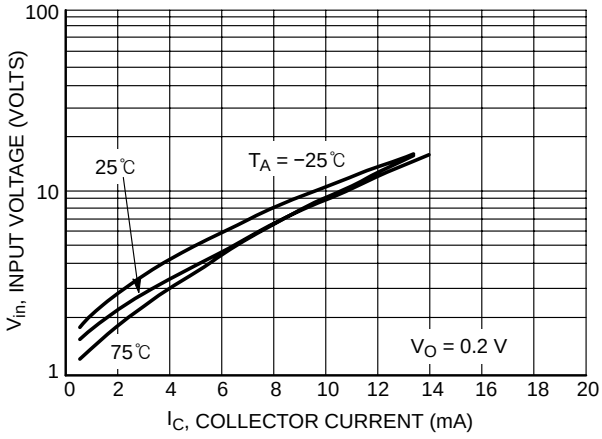
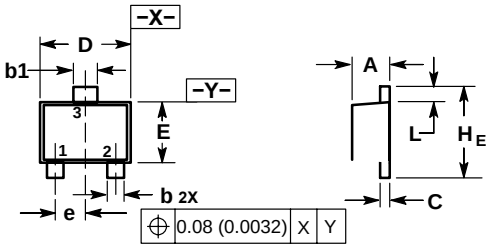


Figure 32. Input Voltage versus Output Current

PACKAGE DIMENSIONS

SOT−723

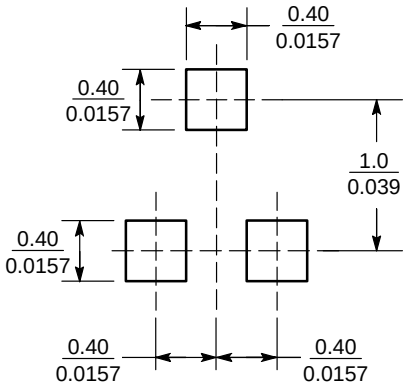


PIN 1. BASE
2. EMITTER
3. COLLECTOR

NOTES:
1 DIMENSIONING AND TOLERANCING PER ANSI Y14 5M, 1982
2 CONTROLLING DIMENSION: MILLIMETERS
3 MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL
4 DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURRS

	MILLIMETERS			INCHES		
DIM	MIN	NOM	MAX	MIN	NOM	MAX
A	0.45	0.50	0 55	0.018	0.020	0.022
b	0.15	0.20	0 27	0.0059	0.0079	0.0106
b1	0.25	0.30	0.35	0.010	0.012	0.014
C	0 07	0.12	0.17	0.0028	0.0047	0.0067
D	1.15	1.20	1 25	0.045	0.047	0.049
E	0.75	0.80	0.85	0 030	0.032	0.034
e	0.40 BSC			0 016 BSC		
H_E	1.15	1.20	1.25	0.045	0.047	0.049
L	0.15	0.20	0.25	0.0059	0.0079	0.0098

SOLDERING FOOTPRINT



(mm / inches)