DTA114E SERIES

Preferred Devices

Bias Resistor Transistor

PNP Silicon Surface Mount Transistor 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 TO–92 package which is designed for through hole applications.

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
Total Power Dissipation @ T_A = 25°C (1.) Derate above 25°C	P_D	 350 2.81	 mW mW/°C

THERMAL CHARACTERISTICS

Characteristic	Symbol	Value	Unit
Thermal Resistance, Junction to Ambient (surface mounted)	$R_{\theta JA}$	357	°C/W
Operating and Storage Temperature Range	T_J, T_{stg}	–55 to +150	°C
Maximum Temperature for Soldering Purposes, Time in Solder Bath	T_L	260 10	°C Sec

DEVICE MARKING AND RESISTOR VALUES

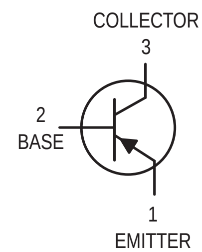
Device	Marking	R1 (K)	R2 (K)	Shipping
DTA114E	DTA114E	10	10	5000/Box
DTA124E	DTA124E	22	22	
DTA144E	DTA144E	47	47	
DTA114Y	DTA114Y	10	47	
DTA114T	DTA114T	10	∞	
DTA143T	DTA143T	4.7	∞	
DTB113E	DTB113E	1.0	1.0	
DTA123E	DTA123E	2.2	2.2	
DTA143E	DTA143E	4.7	4.7	
DTA143Z	DTA143Z	4.7	47	

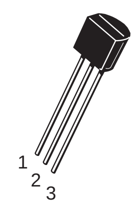
1. Device mounted on a FR–4 glass epoxy printed circuit board using the minimum recommended footprint.

ON Semiconductor

http://onsemi.com

PNP SILICON BIAS RESISTOR TRANSISTOR





CASE 29
TO–92 (TO–226)
STYLE 1

Preferred devices are recommended choices for future use and best overall value.

May, 2000 – Rev. 0

Publication Order Number:
DTA114E/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)	DTA114E	I_{EBO}	—	—	0.5	mAdc
	DTA124E		—	—	0.2	
	DTA144E		—	—	0.1	
	DTA114Y		—	—	0.2	
	DTA114T		—	—	0.9	
	DTA143T		—	—	1.9	
	DTB113E		—	—	4.3	
	DTA123E		—	—	2.3	
	DTA143E		—	—	1.5	
	DTA143Z		—	—	0.18	
Collector–Base Breakdown Voltage (I_C = 10 µA, I_E = 0)		$V_{(BR)CBO}$	50	—	—	Vdc
Collector–Emitter Breakdown Voltage [2.] (I_C = 2.0 mA, I_B = 0)		$V_{(BR)CEO}$	50	—	—	Vdc
ON CHARACTERISTICS [2.]						
DC Current Gain (V_{CE} = 10 V, I_C = 5.0 mA)	DTA114E	h_{FE}	35	60	—	
	DTA124E		60	100	—	
	DTA144E		80	140	—	
	DTA114Y		80	140	—	
	DTA114T		160	250	—	
	DTA143T		160	250	—	
	DTB113E		3.0	5.0	—	
	DTA123E		8.0	15	—	
	DTA143E		15	27	—	
	DTA143Z		80	140	—	
Collector–Emitter Saturation Voltage (I_C = 10 mA, I_E = 0.3 mA) DTA144E/DTA114Y DTB113E/DTA143E (I_C = 10 mA, I_B = 5 mA) DTA123E (I_C = 10 mA, I_B = 1 mA) DTA114T/DTA143T/ DTA143Z/DTA124E		$V_{CE(sat)}$	—	—	0.25	Vdc
Output Voltage (on)		V_{OL}				Vdc
(V_{CC} = 5.0 V, V_B = 2.5 V, R_L = 1.0 kΩ)	DTA114E		—	—	0.2	
	DTA124E		—	—	0.2	
	DTA114Y		—	—	0.2	
	DTA114T		—	—	0.2	
	DTA143T		—	—	0.2	
	DTB113E		—	—	0.2	
	DTA123E		—	—	0.2	
	DTA143E		—	—	0.2	
	DTA143Z		—	—	0.2	
(V_{CC} = 5.0 V, V_B = 3.5 V, R_L = 1.0 kΩ)	DTA144E		—	—	0.2	

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

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

Characteristic		Symbol	Min	Typ	Max	Unit
Output Voltage (off)		V_{OH}	4.9	—	—	Vdc
(V_{CC} = 5.0 V, V_B = 0.5 V, R_L = 1.0 kΩ)	DTA114T DTA113T DTA144E DTA114Y DTA143Z					
(V_{CC} = 5.0 V, V_B = 0.05 V, R_L = 1.0 kΩ)	DTB113E					
(V_{CC} = 5.0 V, V_B = 0.25 V, R_L = 1.0 kΩ)	DTA114T DTA143T DTA123E DTA143E					
Input Resistor	DTA114E	R1	7.0	10	13	kΩ
	DTA124E		15.4	22	28.6	
	DTA144E		32.9	47	61.1	
	DTA114Y		7.0	10	13	
	DTA114T		7.0	10	13	
	DTA143T		3.3	4.7	6.1	
	DTB113E		0.7	1.0	1.3	
	DTA123E		1.5	2.2	2.9	
	DTA143E		3.3	4.7	6.1	
	DTA143Z		3.3	4.7	6.1	
Resistor Ratio	DTA114E/DTA124E/DTA144E	R_1/R_2	0.8	1.0	1.2	
	DTA114Y		0.17	0.21	0.25	
	DTA114T/DTA143T		—	—	—	
	DTB113E/DTA123E/DTA143E		0.8	1.0	1.2	
	DTA143Z		0.055	0.1	0.185	

TYPICAL ELECTRICAL CHARACTERISTICS
DTA114E

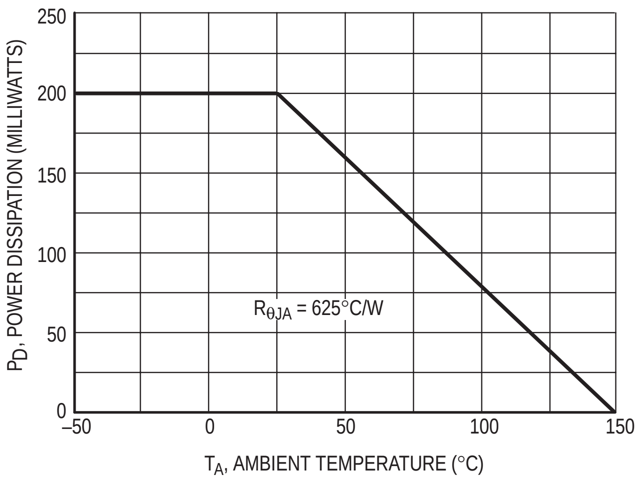


Figure 1. Derating Curve

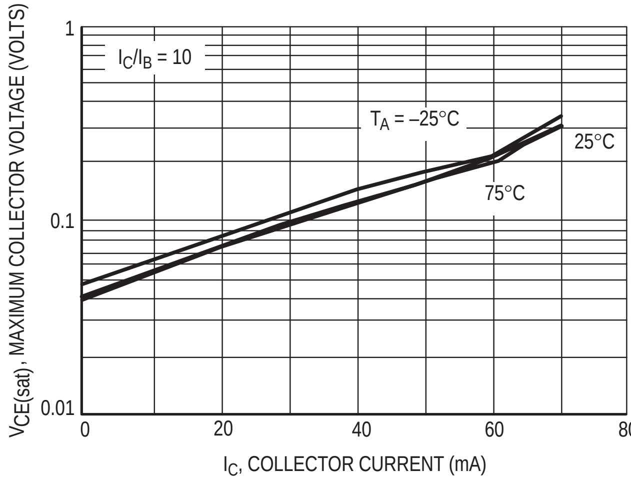


Figure 2. $V_{CE(sat)}$ versus I_C

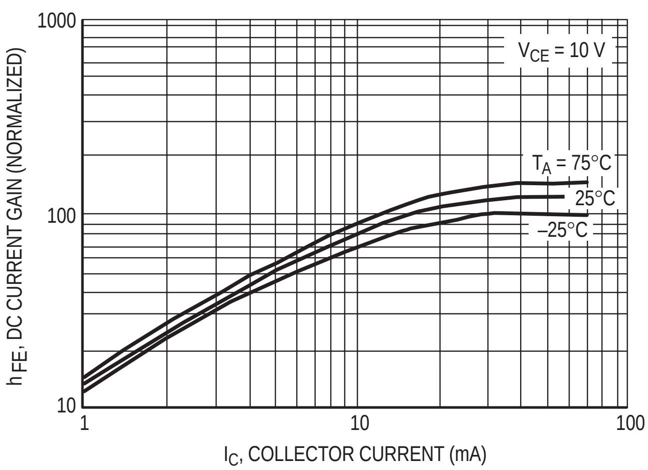


Figure 3. DC Current Gain

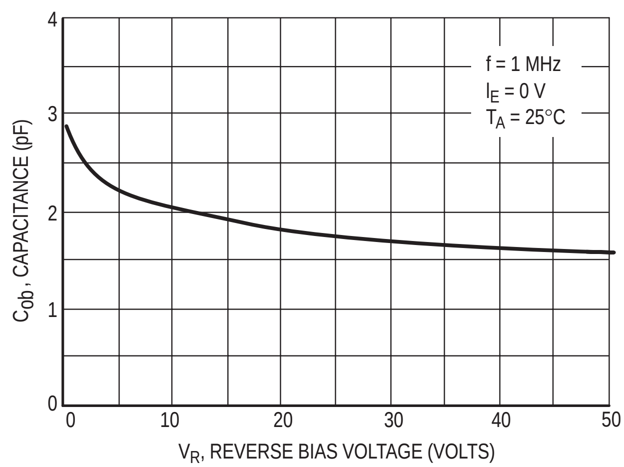


Figure 4. Output Capacitance

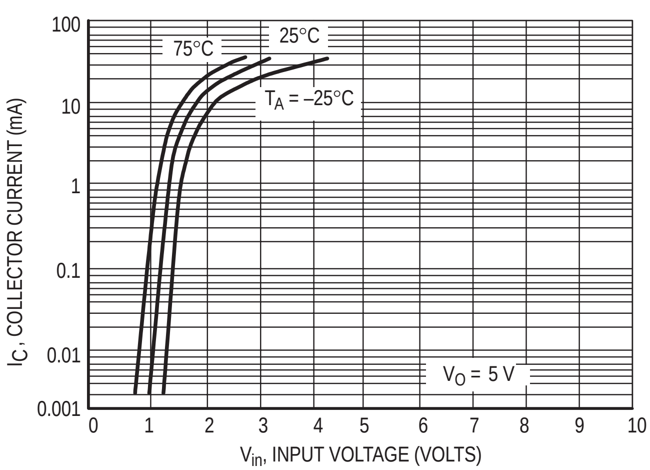


Figure 5. Output Current versus Input Voltage

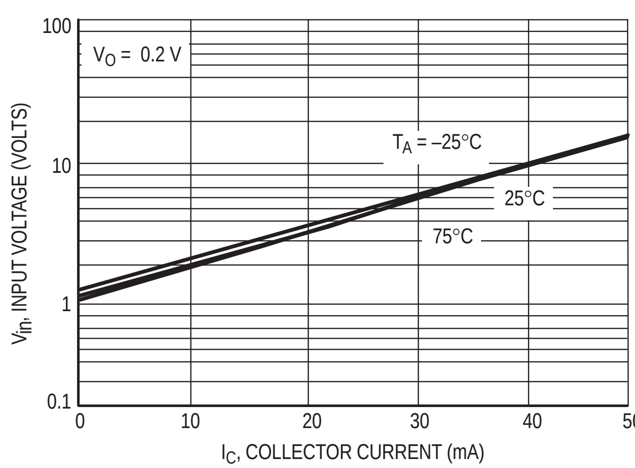


Figure 6. Input Voltage versus Output Current

TYPICAL ELECTRICAL CHARACTERISTICS
DTA124E

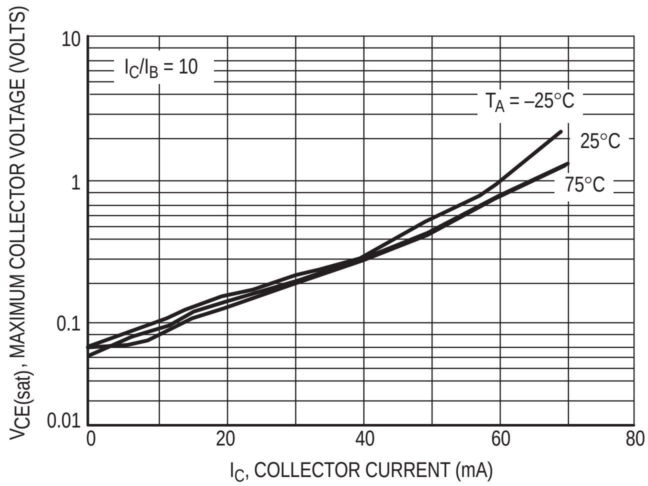


Figure 7. $V_{CE(sat)}$ versus I_C

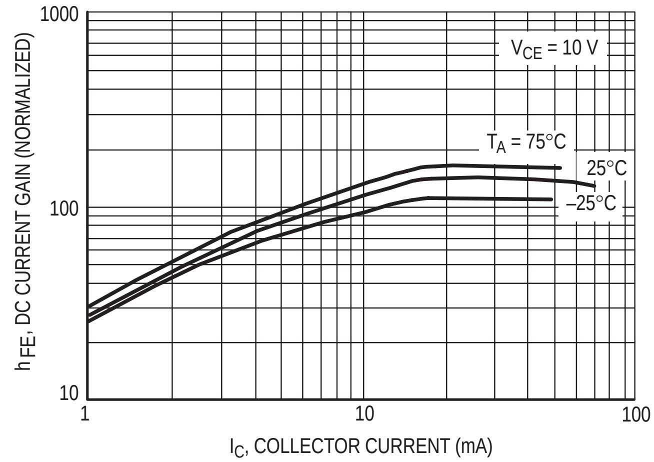


Figure 8. DC Current Gain

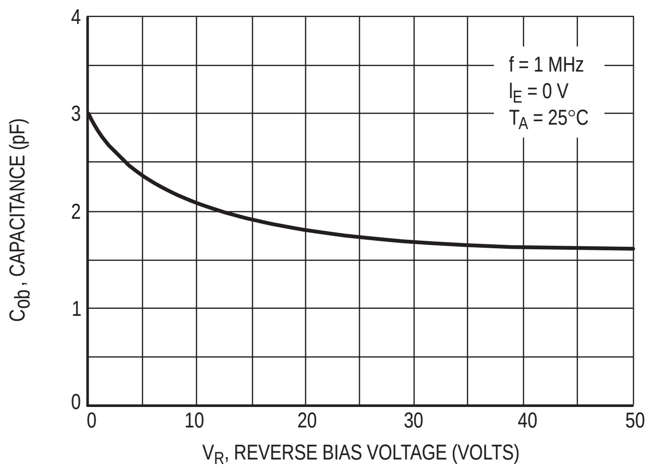


Figure 9. Output Capacitance

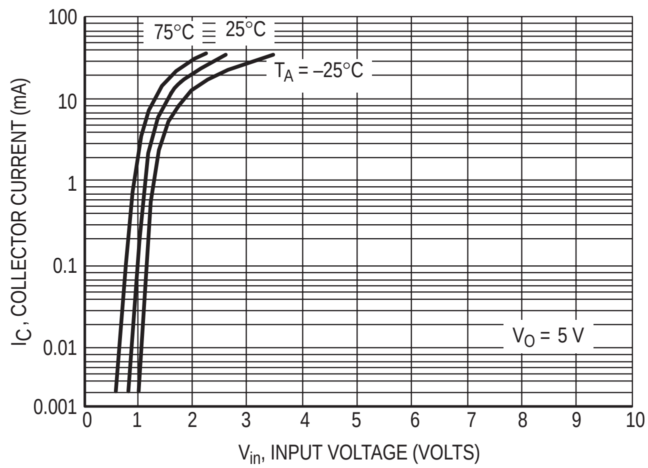


Figure 10. Output Current versus Input Voltage

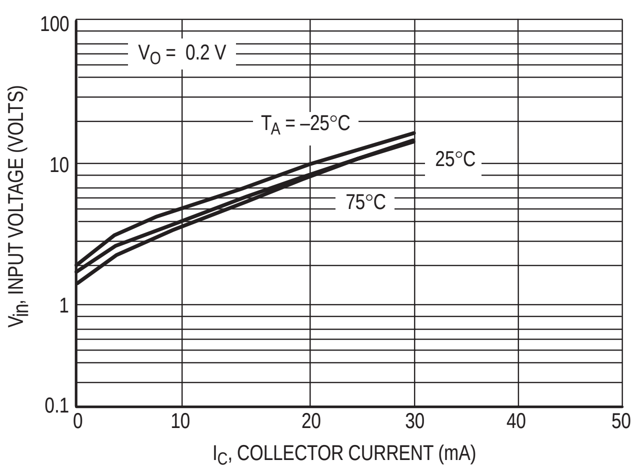


Figure 11. Input Voltage versus Output Current

TYPICAL ELECTRICAL CHARACTERISTICS DTA144E

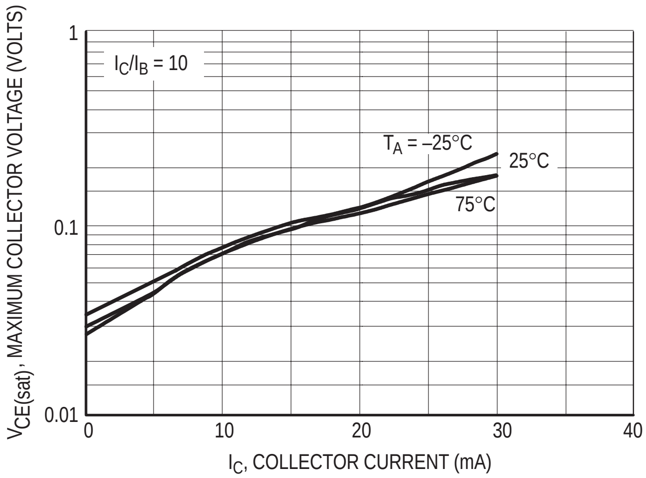


Figure 12. $V_{CE(sat)}$ versus I_C

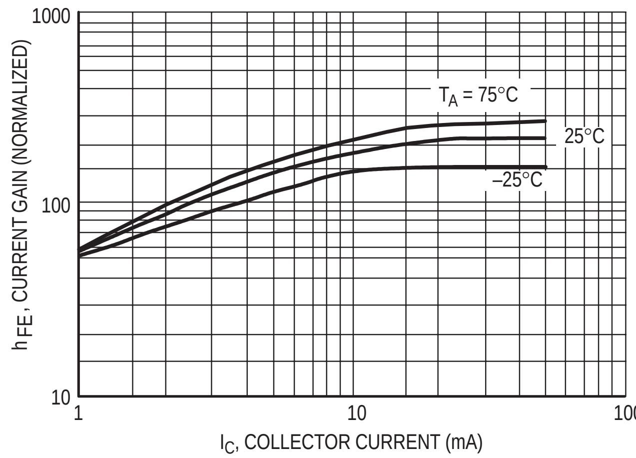


Figure 13. DC Current Gain

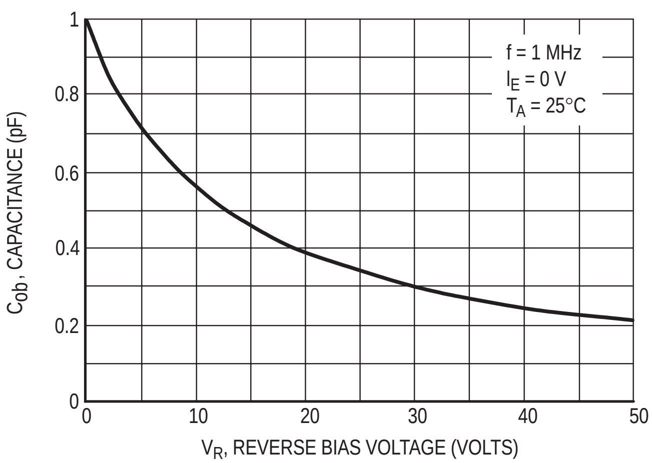


Figure 14. Output Capacitance

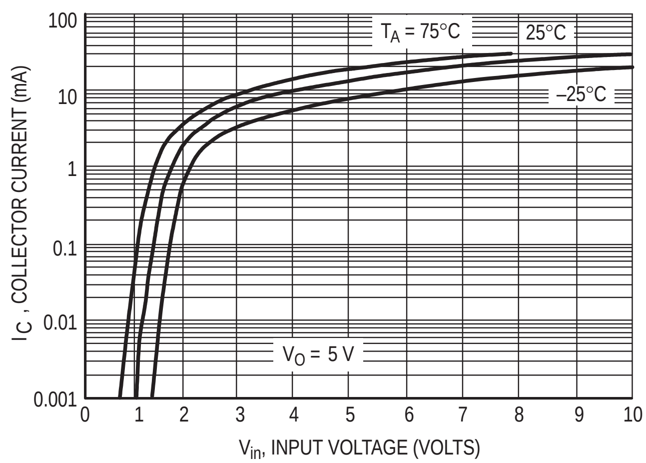


Figure 15. Output Current versus Input Voltage

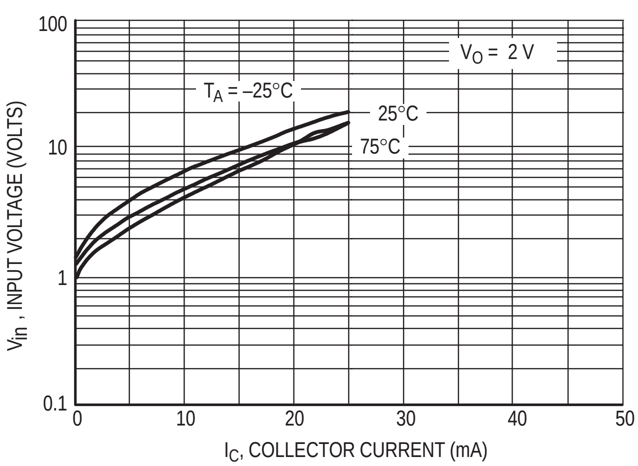


Figure 16. Input Voltage versus Output Current

TYPICAL ELECTRICAL CHARACTERISTICS
DTA114Y

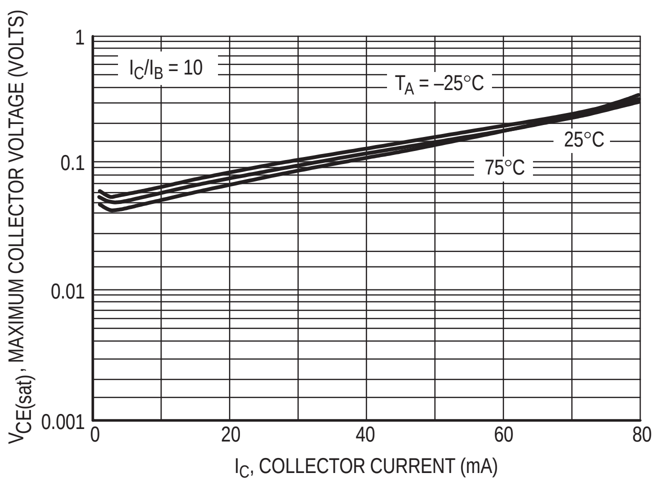


Figure 17. $V_{CE(sat)}$ versus I_C

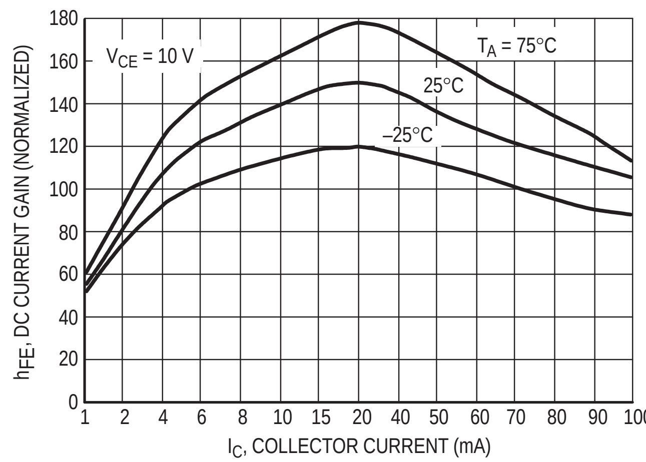


Figure 18. DC Current Gain

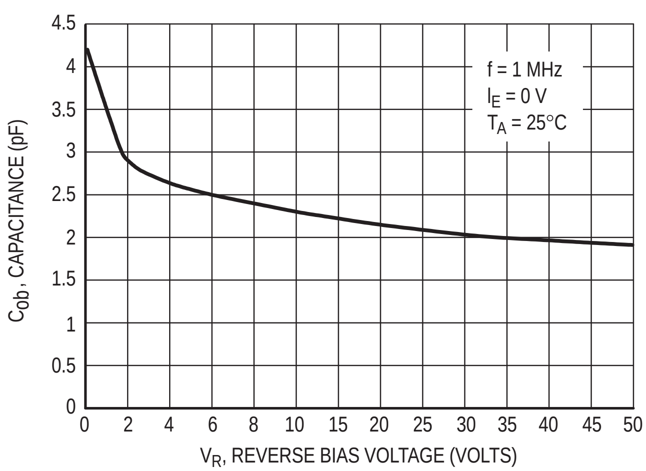


Figure 19. Output Capacitance

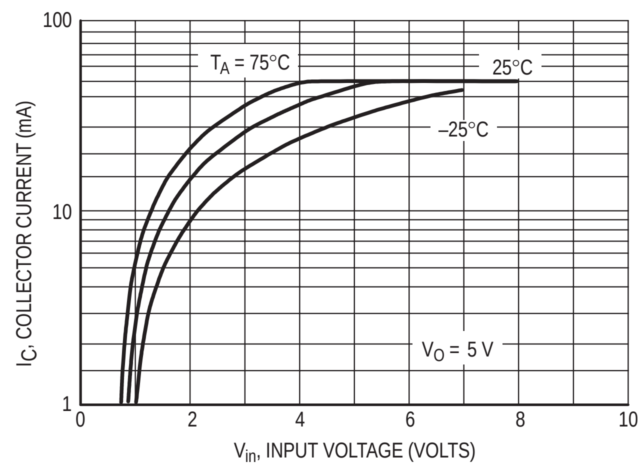


Figure 20. Output Current versus Input Voltage

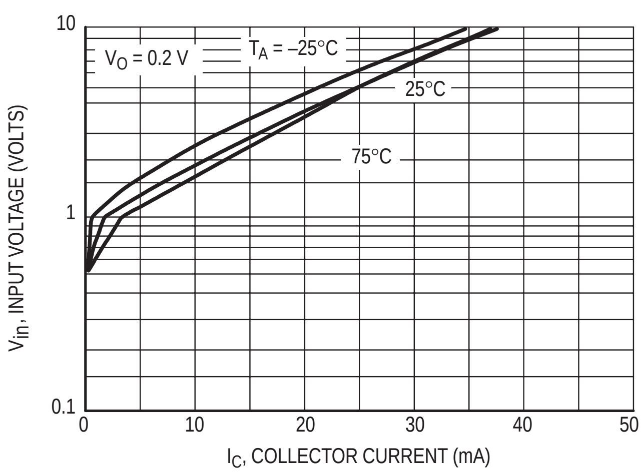


Figure 21. Input Voltage versus Output Current

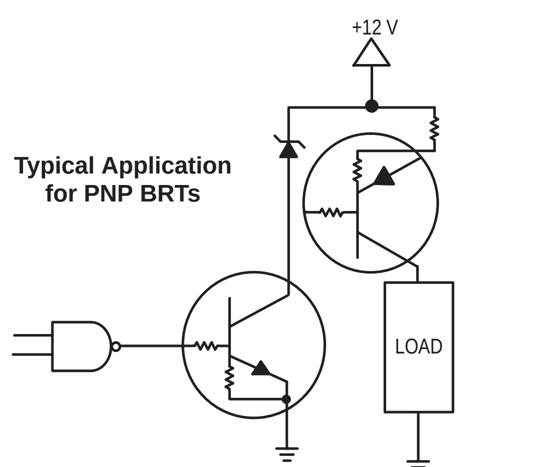
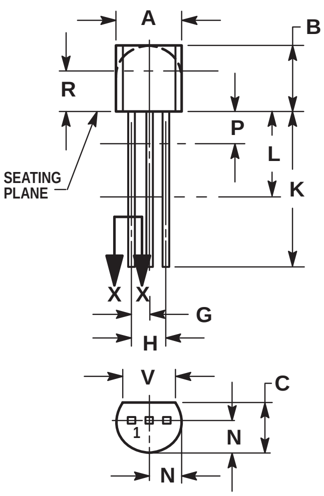
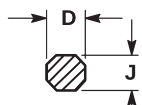


Figure 22. Inexpensive, Unregulated Current Source

PACKAGE DIMENSIONS

TO–92
(TO–226)
CASE 29–11
ISSUE AL





SECTION X–X

NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. CONTOUR OF PACKAGE BEYOND DIMENSION R IS UNCONTROLLED.
4. LEAD DIMENSION IS UNCONTROLLED IN P AND BEYOND DIMENSION K MINIMUM.

	INCHES		MILLIMETERS	
DIM	MIN	MAX	MIN	MAX
A	0.175	0.205	4.45	5.20
B	0.170	0.210	4.32	5.33
C	0.125	0.165	3.18	4.19
D	0.016	0.021	0.407	0.533
G	0.045	0.055	1.15	1.39
H	0.095	0.105	2.42	2.66
J	0.015	0.020	0.39	0.50
K	0.500	–––	12.70	–––
L	0.250	–––	6.35	–––
N	0.080	0.105	2.04	2.66
P	–––	0.100	–––	2.54
R	0.115	–––	2.93	–––
V	0.135	–––	3.43	–––

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

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

STYLE 3:
PIN 1. ANODE
2. ANODE
3. CATHODE

STYLE 4:
PIN 1. CATHODE
2. CATHODE
3. ANODE

STYLE 5:
PIN 1. DRAIN
2. SOURCE
3. GATE

STYLE 6:
PIN 1. GATE
2. SOURCE & SUBSTRATE
3. DRAIN

STYLE 7:
PIN 1. SOURCE
2. DRAIN
3. GATE

STYLE 8:
PIN 1. DRAIN
2. GATE
3. SOURCE & SUBSTRATE

STYLE 9:
PIN 1. BASE 1
2. EMITTER
3. BASE 2

STYLE 10:
PIN 1. CATHODE
2. GATE
3. ANODE

STYLE 11:
PIN 1. ANODE
2. CATHODE & ANODE
3. CATHODE

STYLE 12:
PIN 1. MAIN TERMINAL 1
2. GATE
3. MAIN TERMINAL 2

STYLE 13:
PIN 1. ANODE 1
2. GATE
3. CATHODE 2

STYLE 14:
PIN 1. EMITTER
2. COLLECTOR
3. BASE

STYLE 15:
PIN 1. ANODE 1
2. CATHODE
3. ANODE 2

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