DTA114E SERIES

Preferred Devices

Bias Resistor Transistor

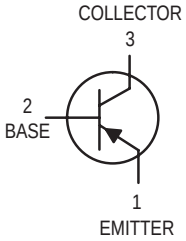
PNP Silicon Surface Mount Transistor with Monolithic Bias Resistor Network

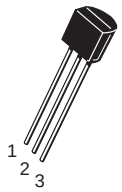
This new series of digital transistors is designed to replace a single device and its external resistor bias network. The BRT (Bias Resistor Transistor) contains a single transistor with a monolithic bias network consisting of two resistors; a series base resistor and a base–emitter resistor. The BRT 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.

ON Semiconductor

http://onsemi.com

PNP SILICON BIAS RESISTOR TRANSISTOR





CASE 29
TO–92 (TO–226)
STYLE 1

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.

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

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	DTA114E	I_{EBO}	—	—	0.5	mAdc
(V_{EB} = 6.0 V, I_C = 0)	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	DTA114E	h_{FE}	35	60	—	
(V_{CE} = 10 V, I_C = 5.0 mA)	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		$V_{CE(sat)}$	—	—	0.25	Vdc
(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						
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

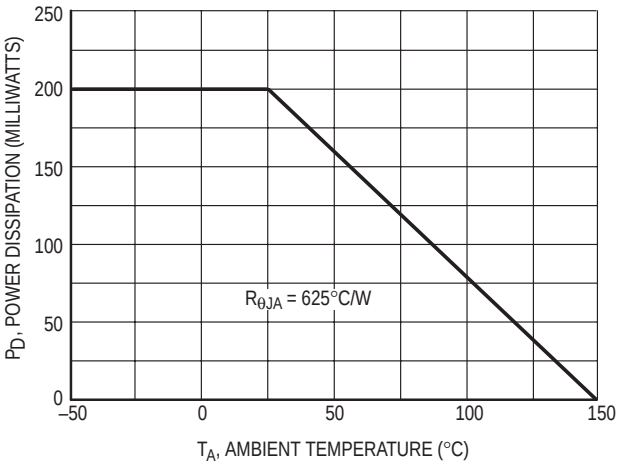


Figure 1. Derating Curve

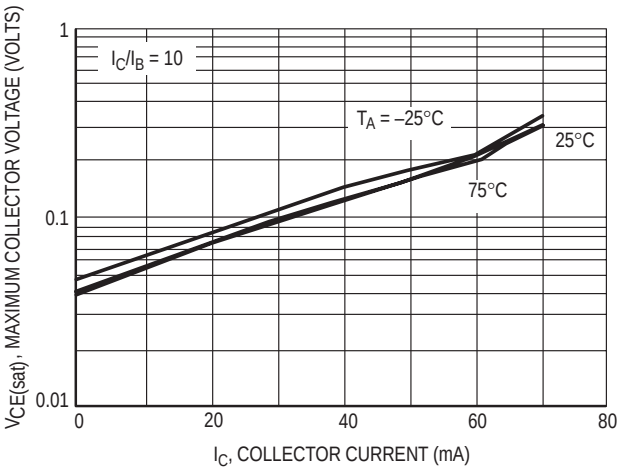


Figure 2. $V_{CE(sat)}$ versus I_C

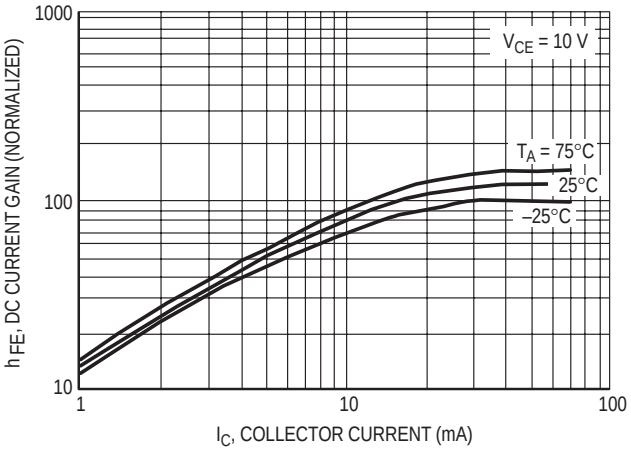


Figure 3. DC Current Gain

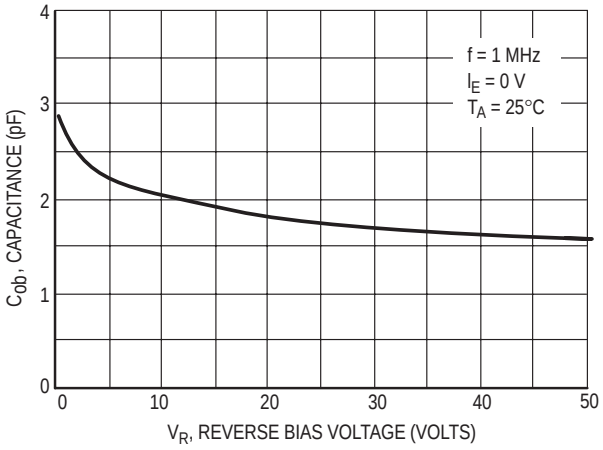


Figure 4. Output Capacitance

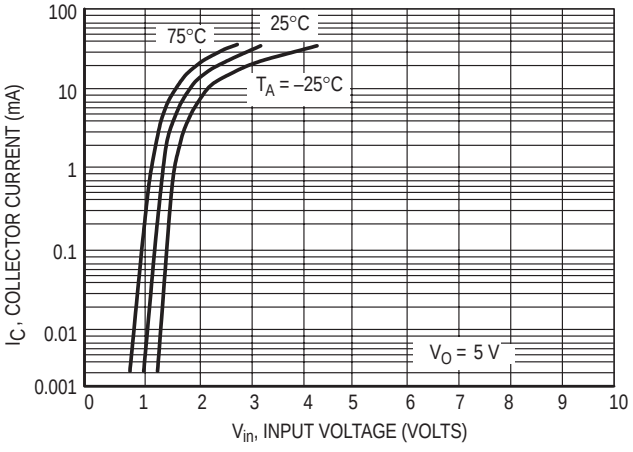


Figure 5. Output Current versus Input Voltage

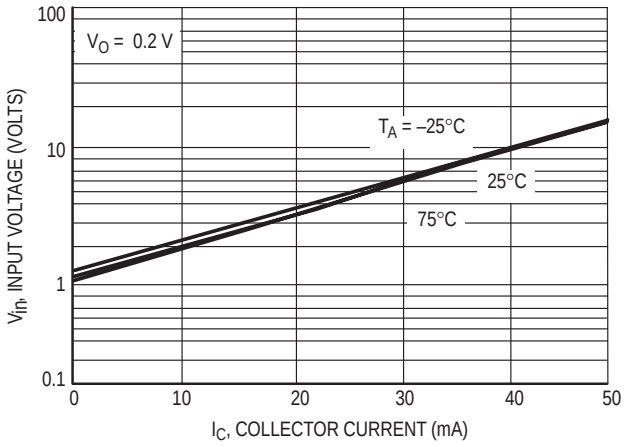


Figure 6. Input Voltage versus Output Current

TYPICAL ELECTRICAL CHARACTERISTICS
DTA124E

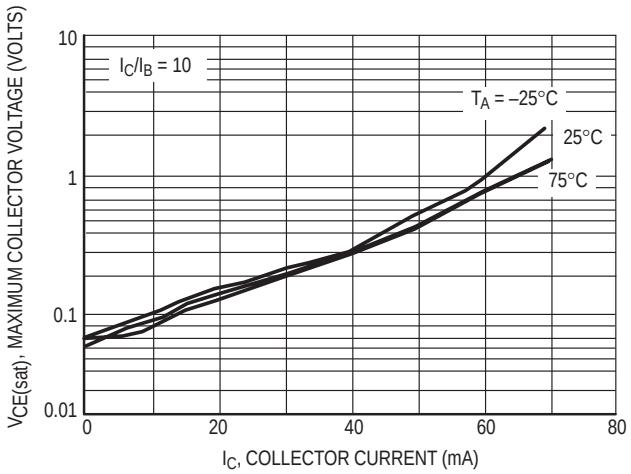


Figure 7. $V_{CE(sat)}$ versus I_C

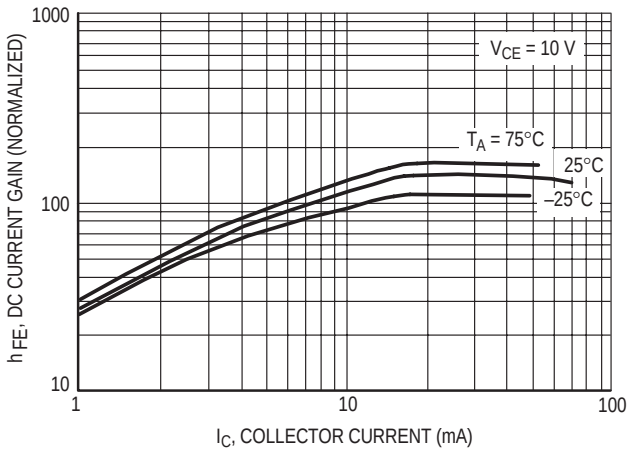


Figure 8. DC Current Gain

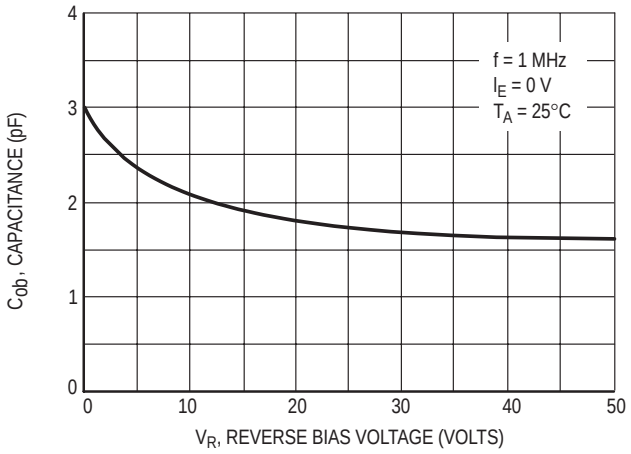


Figure 9. Output Capacitance

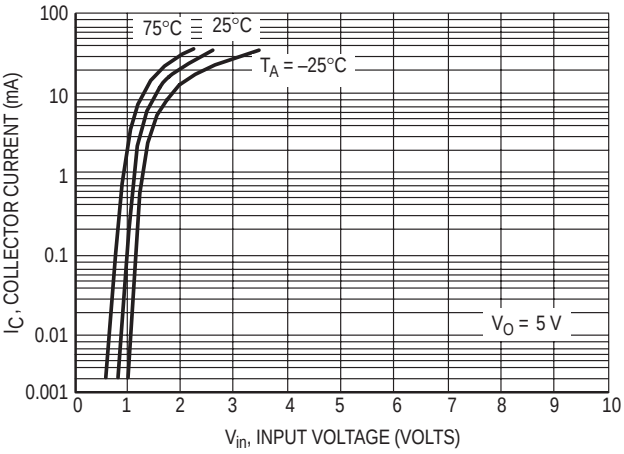


Figure 10. Output Current versus Input Voltage

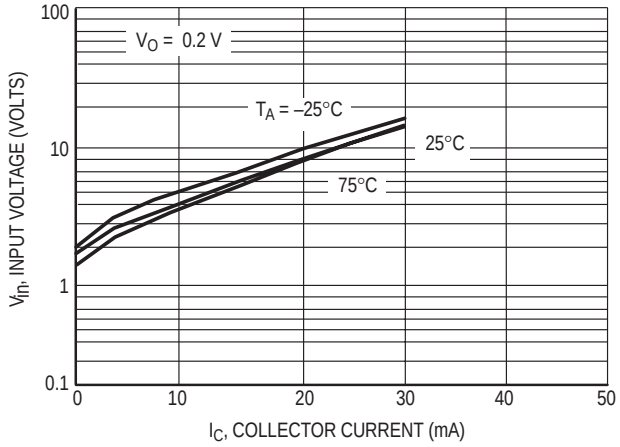


Figure 11. Input Voltage versus Output Current

TYPICAL ELECTRICAL CHARACTERISTICS
DTA144E

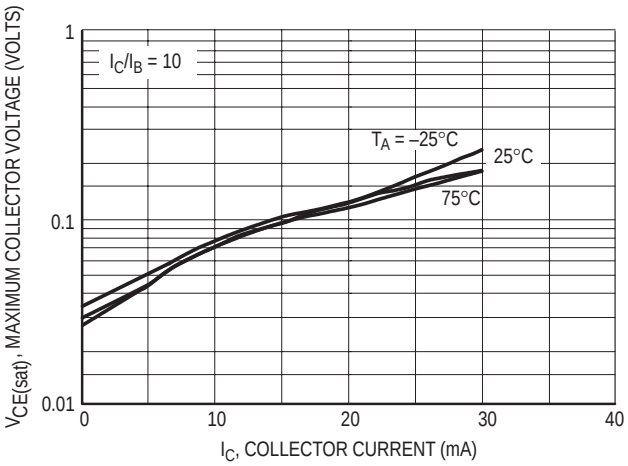


Figure 12. $V_{CE(sat)}$ versus I_C

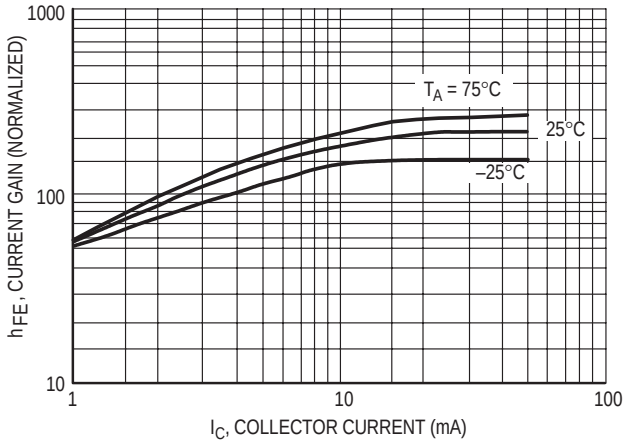


Figure 13. DC Current Gain

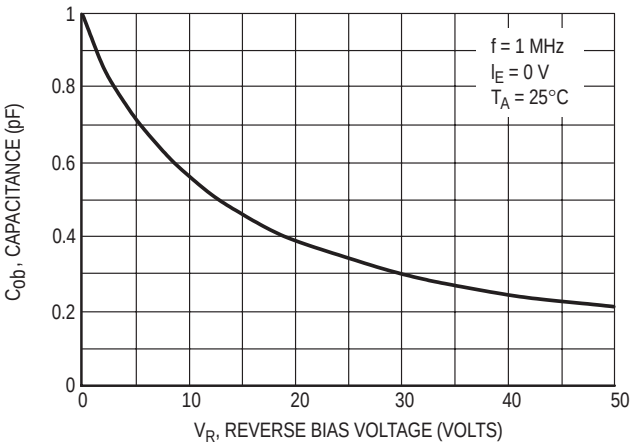


Figure 14. Output Capacitance

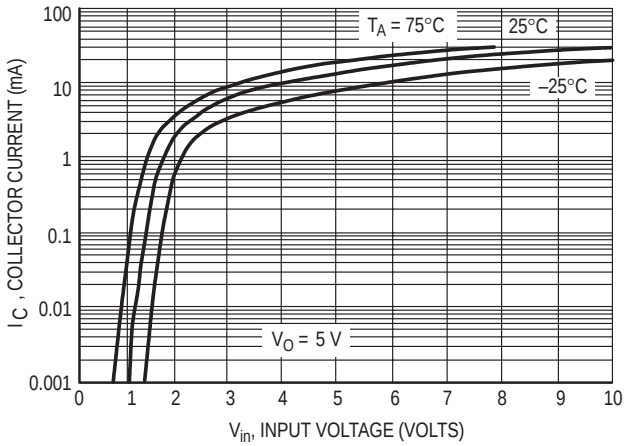


Figure 15. Output Current versus Input Voltage

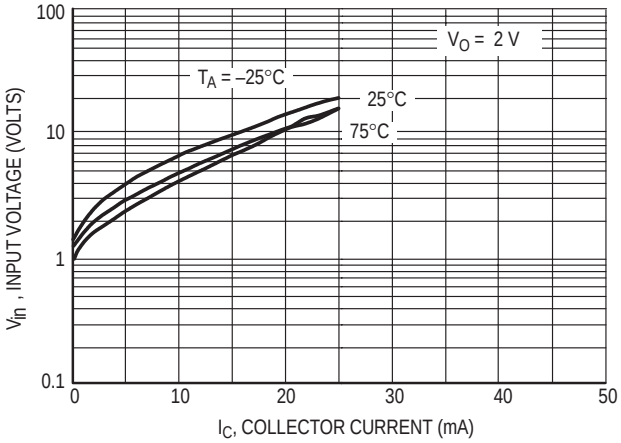


Figure 16. Input Voltage versus Output Current

TYPICAL ELECTRICAL CHARACTERISTICS
DTA114Y

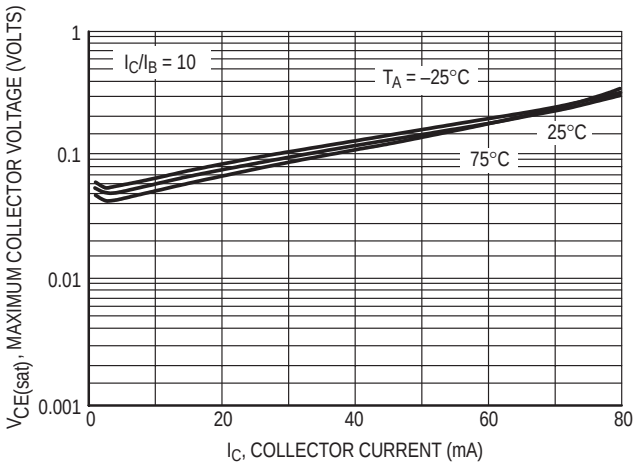


Figure 17. $V_{CE(sat)}$ versus I_C

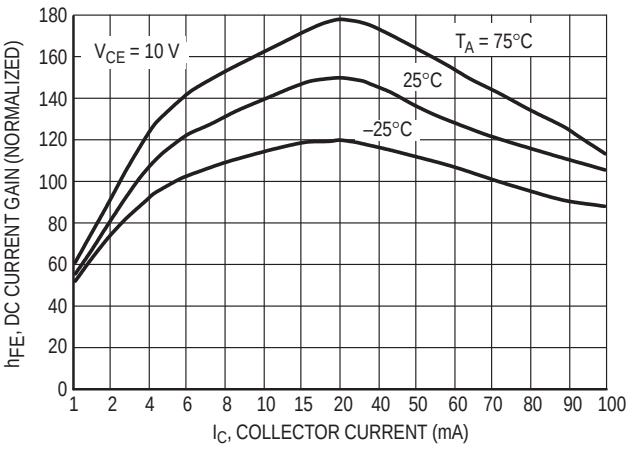


Figure 18. DC Current Gain

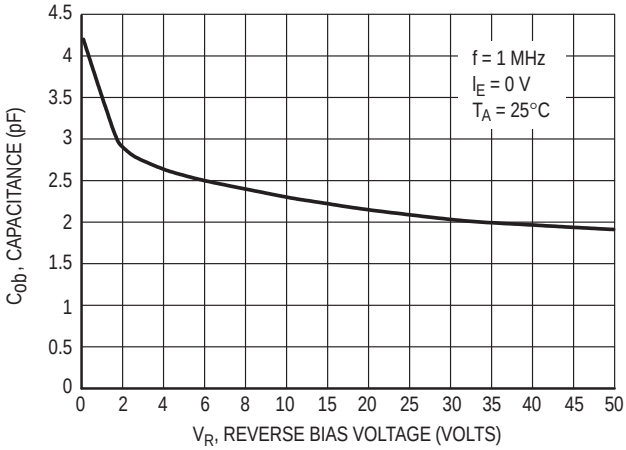


Figure 19. Output Capacitance

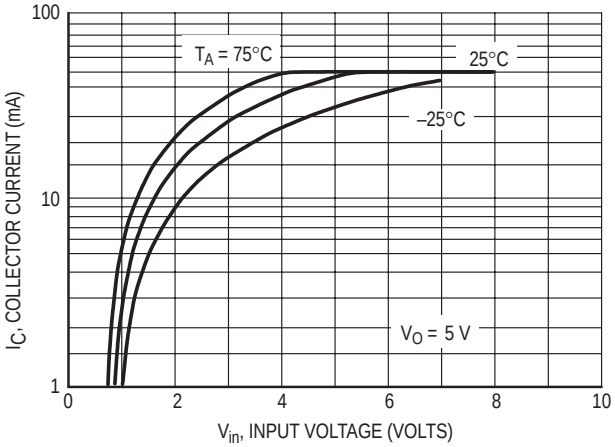


Figure 20. Output Current versus Input Voltage

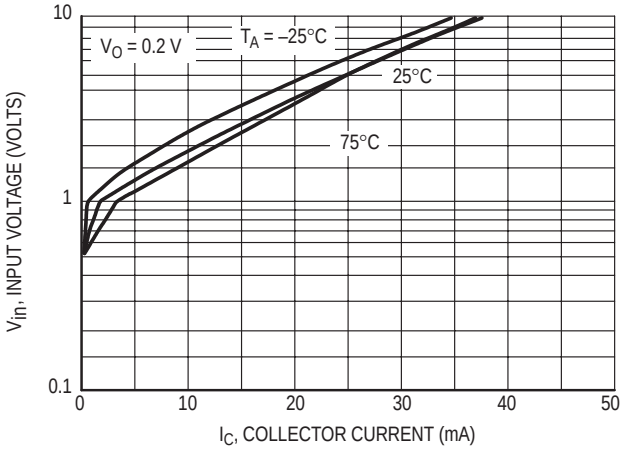


Figure 21. Input Voltage versus Output Current

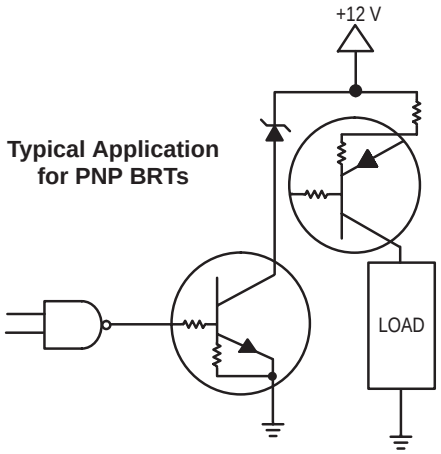
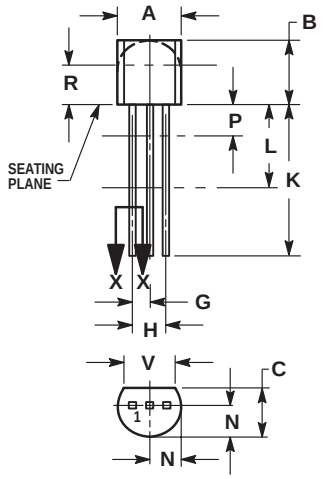


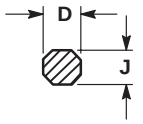
Figure 22. Inexpensive, Unregulated Current Source

DTA114E SERIES

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

Thermal Clad is a trademark of the Bergquist Company

PUBLICATION ORDERING INFORMATION

NORTH AMERICA Literature Fulfillment:
Literature Distribution Center for ON Semiconductor
P.O. Box 5163, Denver, Colorado 80217 USA
Phone: 303–675–2175 or 800–344–3860 Toll Free USA/Canada
Fax: 303–675–2176 or 800–344–3867 Toll Free USA/Canada
Email: ONlit@hibbertco.com
Fax Response Line: 303–675–2167 or 800–344–3810 Toll Free USA/Canada

N. American Technical Support: 800–282–9855 Toll Free USA/Canada

EUROPE: LDC for ON Semiconductor – European Support
German Phone: (+1) 303–308–7140 (M–F 1:00pm to 5:00pm Munich Time)
Email: ONlit–german@hibbertco.com
French Phone: (+1) 303–308–7141 (M–F 1:00pm to 5:00pm Toulouse Time)
Email: ONlit–french@hibbertco.com
English Phone: (+1) 303–308–7142 (M–F 12:00pm to 5:00pm UK Time)
Email: ONlit@hibbertco.com

EUROPEAN TOLL–FREE ACCESS*: 00–800–4422–3781
*Available from Germany, France, Italy, England, Ireland

CENTRAL/SOUTH AMERICA:
Spanish Phone: 303–308–7143 (Mon–Fri 8:00am to 5:00pm MST)
Email: ONlit–spanish@hibbertco.com

ASIA/PACIFIC: LDC for ON Semiconductor – Asia Support
Phone: 303–675–2121 (Tue–Fri 9:00am to 1:00pm, Hong Kong Time)
Toll Free from Hong Kong & Singapore:
001–800–4422–3781
Email: ONlit–asia@hibbertco.com

JAPAN: ON Semiconductor, Japan Customer Focus Center
4–32–1 Nishi–Gotanda, Shinagawa–ku, Tokyo, Japan 141–0031
Phone: 81–3–5740–2745
Email: r14525@onsemi.com

ON Semiconductor Website: http://onsemi.com

For additional information, please contact your local Sales Representative.