

# 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.



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### PNP SILICON BIAS RESISTOR TRANSISTOR

#### MAXIMUM RATINGS ( $T_A = 25^\circ\text{C}$ 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 @ $T_A = 25^\circ\text{C}$ (1.) Derate above $25^\circ\text{C}$	$P_D$	350 2.81	mW mW/°C

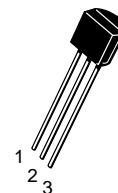
#### THERMAL CHARACTERISTICS

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

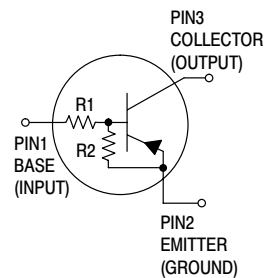
#### DEVICE MARKING AND RESISTOR VALUES

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	$\infty$	
DTA143T	DTA143T	4.7	$\infty$	
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.



CASE 29  
TO-92 (TO-226)  
STYLE 1



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

# DTA114E SERIES

## ELECTRICAL CHARACTERISTICS ( $T_A = 25^\circ\text{C}$ unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
<b>OFF CHARACTERISTICS</b>					
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 ( $V_{EB} = 6.0\text{ V}$ , $I_C = 0$ )	$I_{EBO}$	—	—	0.5	mAdc
DTA114E		—	—	0.2	
DTA124E		—	—	0.1	
DTA144E		—	—	0.2	
DTA114Y		—	—	0.9	
DTA114T		—	—	1.9	
DTA143T		—	—	4.3	
DTB113E		—	—	2.3	
DTA123E		—	—	1.5	
DTA143E		—	—	0.18	
DTA143Z		—	—		
Collector–Base Breakdown Voltage ( $I_C = 10\ \mu\text{A}$ , $I_E = 0$ )	$V_{(BR)CBO}$	50	—	—	Vdc
Collector–Emitter Breakdown Voltage <sup>(2.)</sup> ( $I_C = 2.0\text{ mA}$ , $I_B = 0$ )	$V_{(BR)CEO}$	50	—	—	Vdc
<b>ON CHARACTERISTICS <sup>(2.)</sup></b>					
DC Current Gain ( $V_{CE} = 10\text{ V}$ , $I_C = 5.0\text{ mA}$ )	$h_{FE}$	35	60	—	
DTA114E		60	100	—	
DTA124E		80	140	—	
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 ( $I_C = 10\text{ mA}$ , $I_E = 0.3\text{ mA}$ ) DTA144E/DTA114Y DTB113E/DTA143E ( $I_C = 10\text{ mA}$ , $I_B = 5\text{ mA}$ ) DTA123E ( $I_C = 10\text{ mA}$ , $I_B = 1\text{ mA}$ ) DTA114T/DTA143T/ DTA143Z/DTA124E	$V_{CE(sat)}$	—	—	0.25	Vdc
Output Voltage (on) ( $V_{CC} = 5.0\text{ V}$ , $V_B = 2.5\text{ V}$ , $R_L = 1.0\text{ k}\Omega$ )	$V_{OL}$	—	—	0.2	Vdc
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	
DTA144E		—	—	0.2	
( $V_{CC} = 5.0\text{ V}$ , $V_B = 3.5\text{ V}$ , $R_L = 1.0\text{ k}\Omega$ )		—	—	0.2	

2. Pulse Test: Pulse Width < 300  $\mu\text{s}$ , Duty Cycle < 2.0%

# DTA114E SERIES

## ELECTRICAL CHARACTERISTICS (T<sub>A</sub> = 25°C unless otherwise noted) (Continued)

Characteristic	Symbol	Min	Typ	Max	Unit	
Output Voltage (off) (V <sub>CC</sub> = 5.0 V, V <sub>B</sub> = 0.5 V, R <sub>L</sub> = 1.0 kΩ)  (V <sub>CC</sub> = 5.0 V, V <sub>B</sub> = 0.05 V, R <sub>L</sub> = 1.0 kΩ) (V <sub>CC</sub> = 5.0 V, V <sub>B</sub> = 0.25 V, R <sub>L</sub> = 1.0 kΩ)	DTA114T DTA113T DTA144E DTA114Y DTA143Z DTB113E DTA114T DTA143T DTA123E DTA143E	V <sub>OH</sub>	4.9	—	—	Vdc
Input Resistor	DTA114E DTA124E DTA144E DTA114Y DTA114T DTA143T DTB113E DTA123E DTA143E DTA143Z	R <sub>1</sub>	7.0 15.4 32.9 7.0 7.0 3.3 0.7 1.5 3.3 3.3	10 22 47 10 10 4.7 1.0 2.2 4.7 4.7	13 28.6 61.1 13 13 6.1 1.3 2.9 6.1 6.1	kΩ
Resistor Ratio	DTA114E/DTA124E/DTA144E DTA114Y DTA114T/DTA143T DTB113E/DTA123E/DTA143E DTA143Z	R <sub>1</sub> /R <sub>2</sub>	0.8 0.17 — 0.8 0.055	1.0 0.21 — 1.0 0.1	1.2 0.25 — 1.2 0.185	

# DTA114E SERIES

## TYPICAL ELECTRICAL CHARACTERISTICS DTA114E

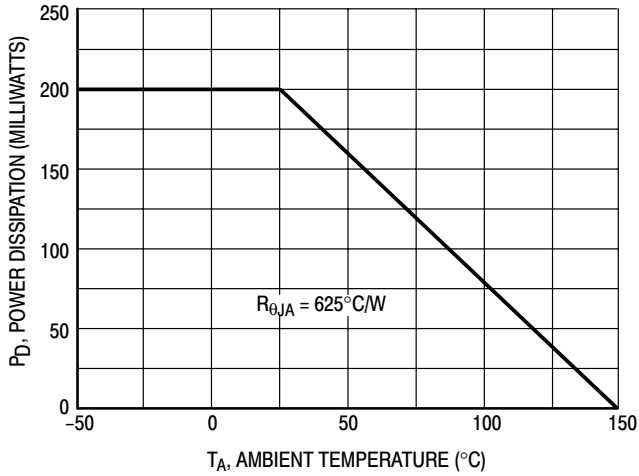


Figure 1. Derating Curve

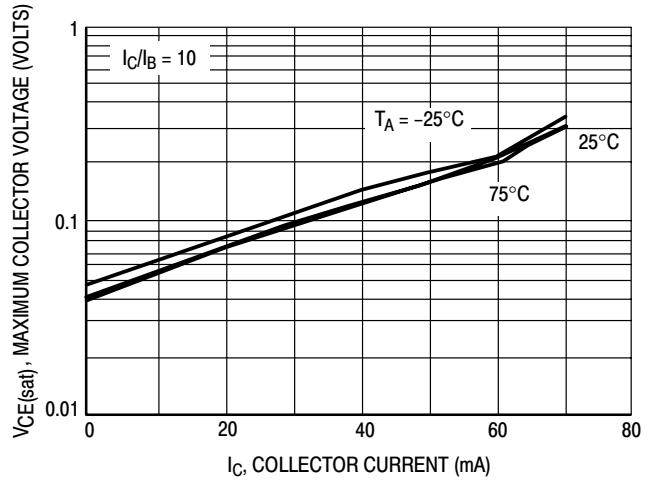


Figure 2.  $V_{CE(sat)}$  versus  $I_C$

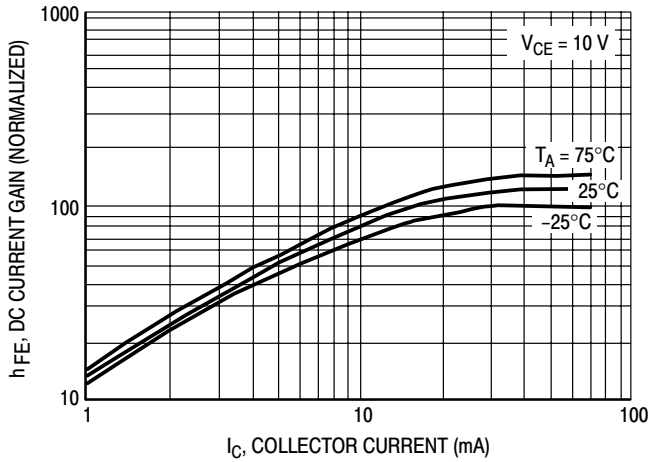


Figure 3. DC Current Gain

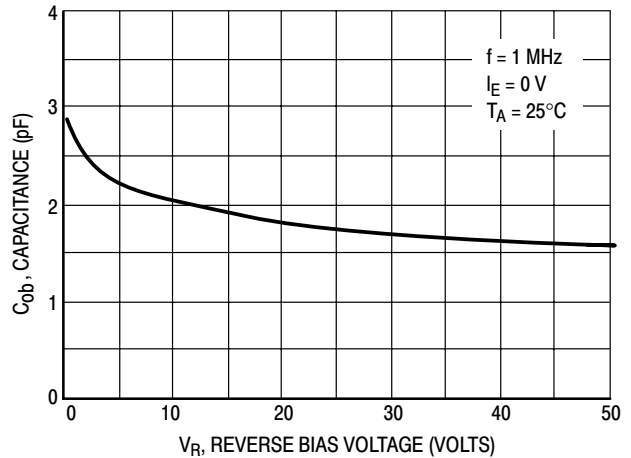


Figure 4. Output Capacitance

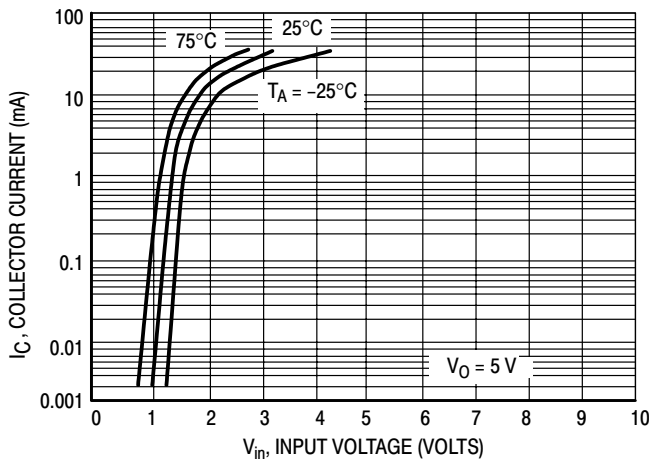


Figure 5. Output Current versus Input Voltage

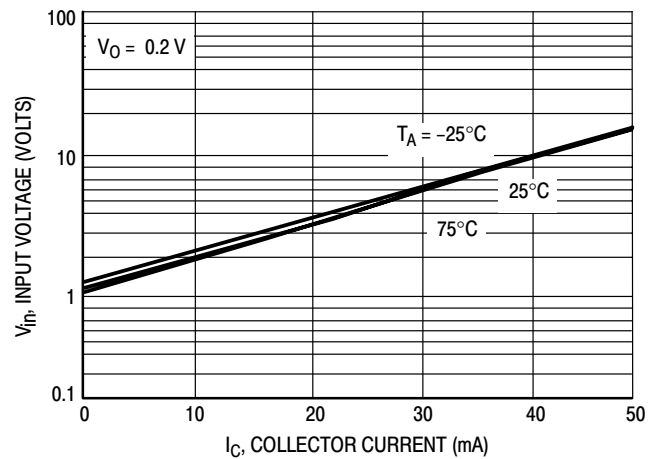


Figure 6. Input Voltage versus Output Current

# DTA114E SERIES

## TYPICAL ELECTRICAL CHARACTERISTICS DTA124E

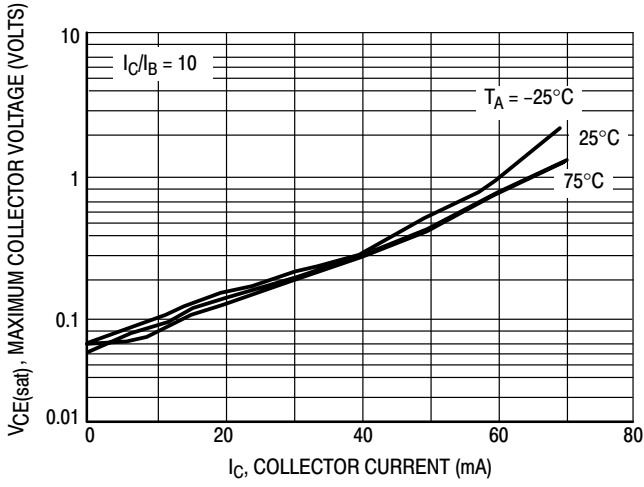


Figure 7.  $V_{CE(sat)}$  versus  $I_C$

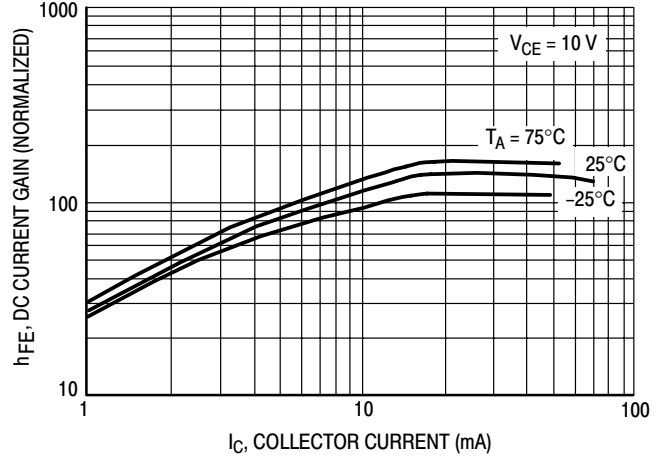


Figure 8. DC Current Gain

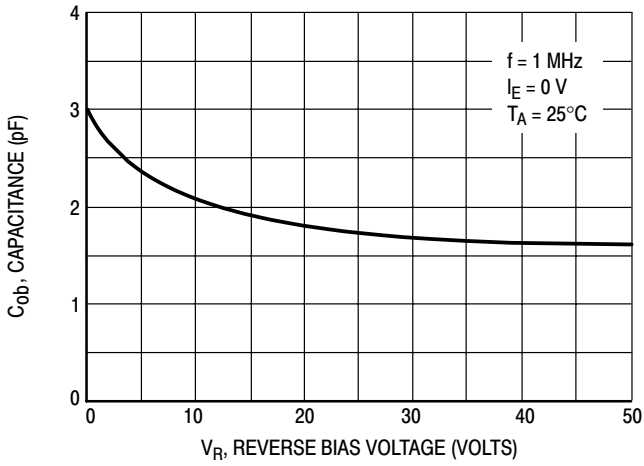


Figure 9. Output Capacitance

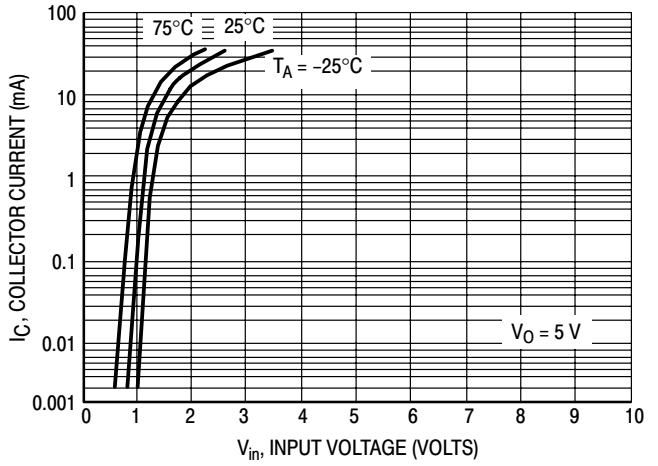


Figure 10. Output Current versus Input Voltage

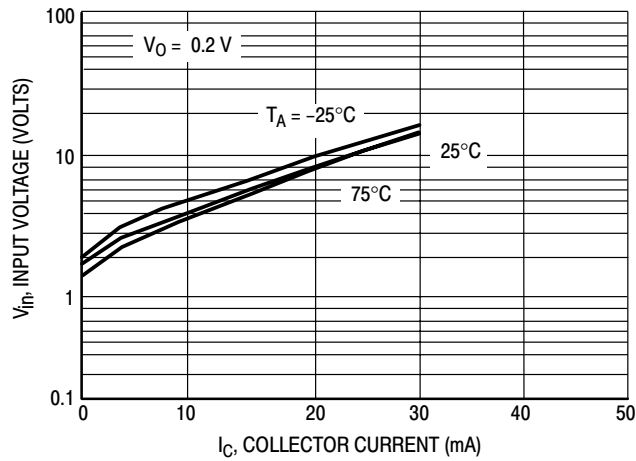


Figure 11. Input Voltage versus Output Current

# DTA114E SERIES

## TYPICAL ELECTRICAL CHARACTERISTICS DTA144E

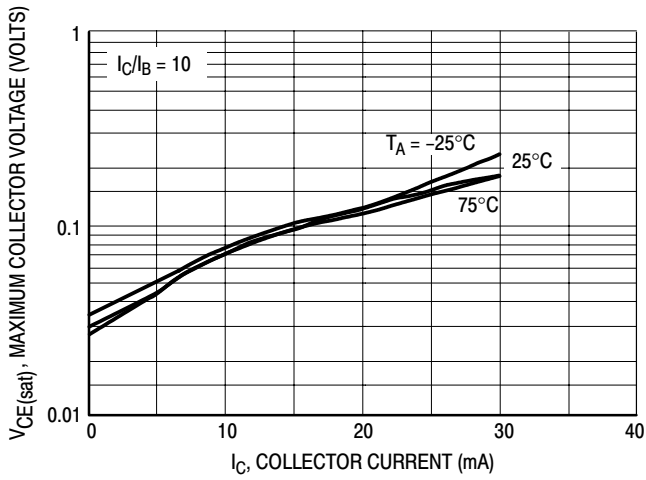


Figure 12.  $V_{CE(sat)}$  versus  $I_C$

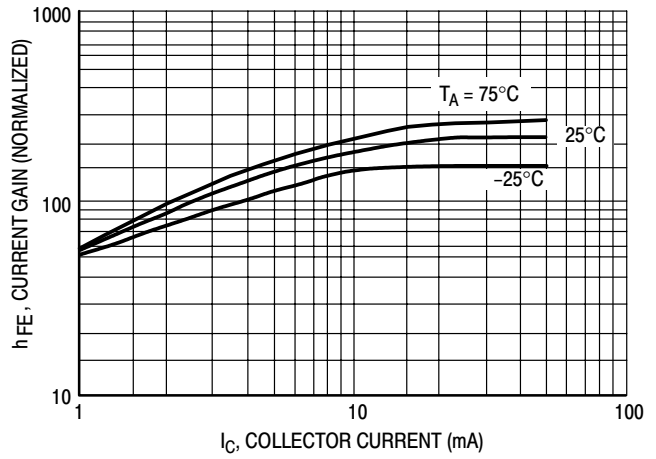


Figure 13. DC Current Gain

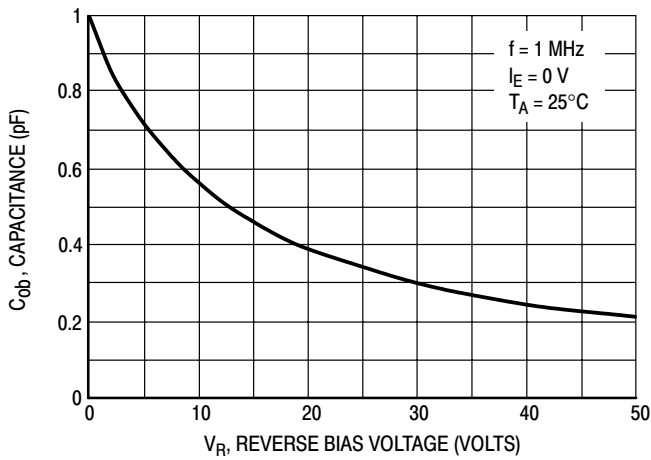


Figure 14. Output Capacitance

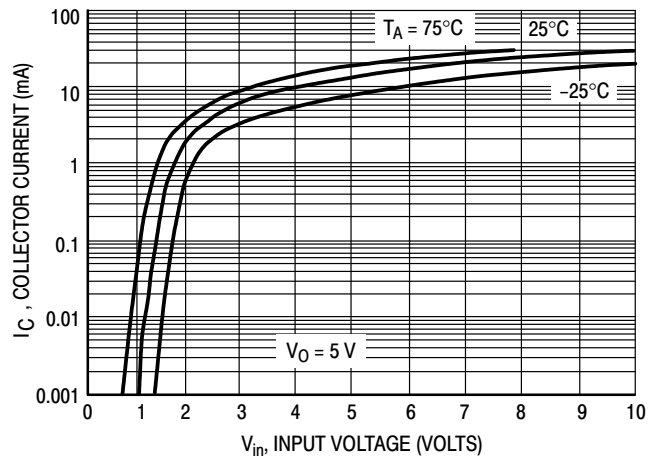


Figure 15. Output Current versus Input Voltage

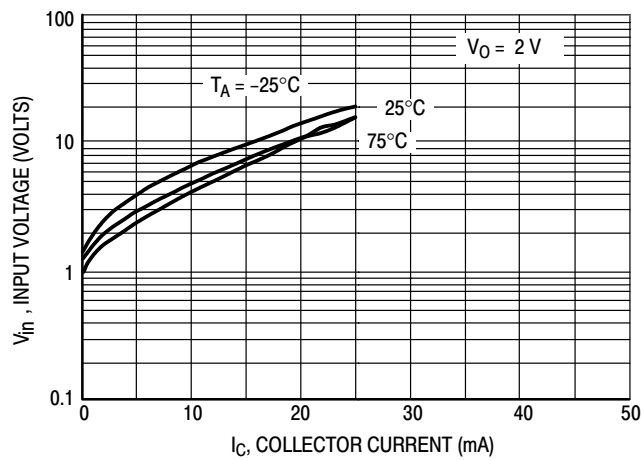


Figure 16. Input Voltage versus Output Current

# DTA114E SERIES

## TYPICAL ELECTRICAL CHARACTERISTICS DTA114Y

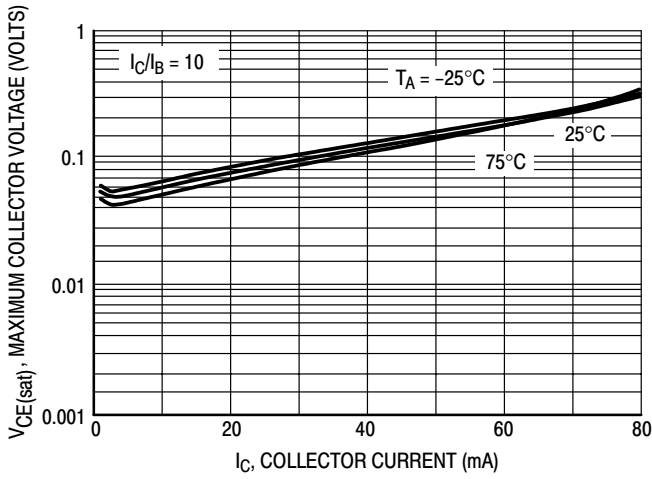


Figure 17.  $V_{CE(sat)}$  versus  $I_C$

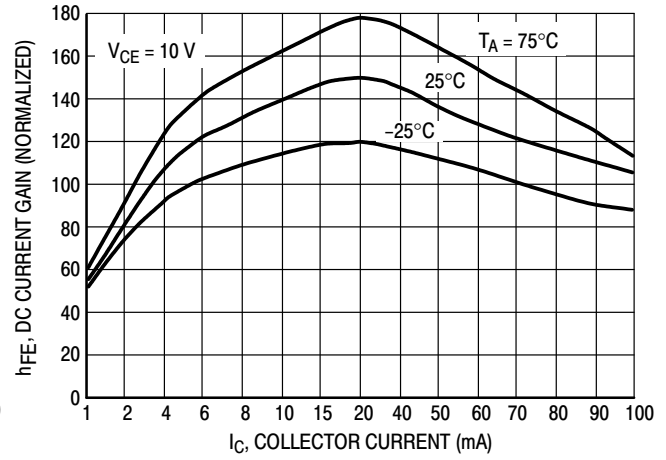


Figure 18. DC Current Gain

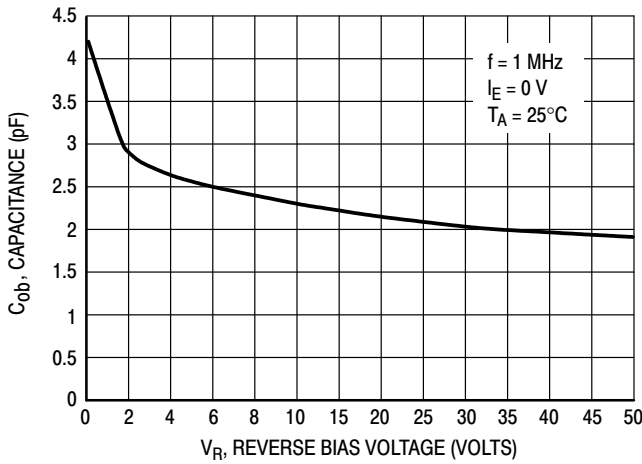


Figure 19. Output Capacitance

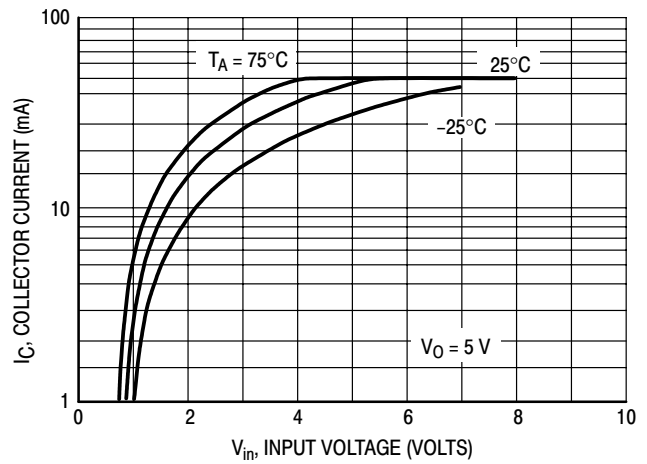


Figure 20. Output Current versus Input Voltage

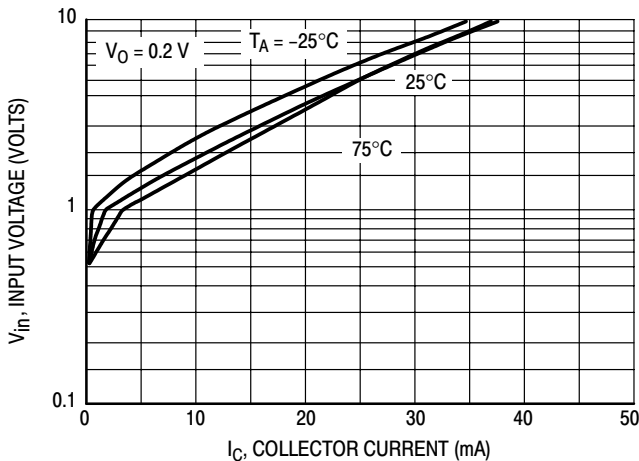


Figure 21. Input Voltage versus Output Current

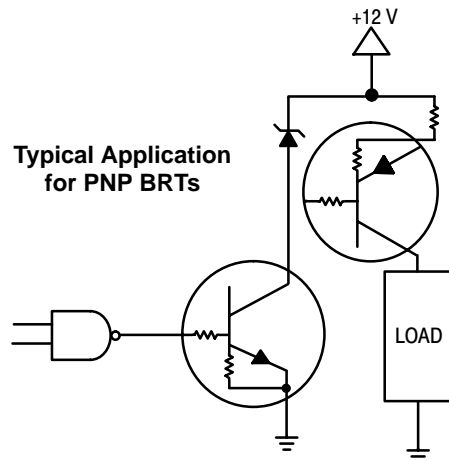
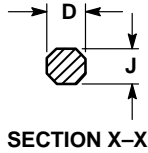
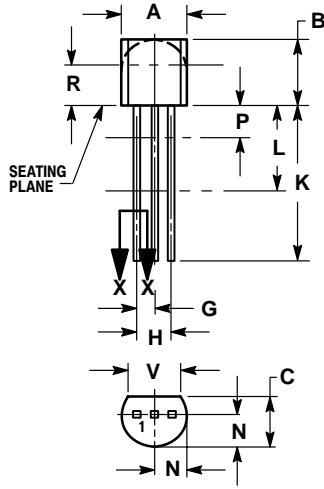


Figure 22. Inexpensive, Unregulated Current Source

# DTA114E SERIES

## PACKAGE DIMENSIONS

TO-92  
(TO-226)  
CASE 29-11  
ISSUE AL



**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.

DIM	INCHES		MILLIMETERS	
	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	---

- |  |   |   |   |  |
|--|---|---|---|--|
| <p><b>STYLE 1:</b><br/>PIN 1. EMITTER<br/>2. BASE<br/>3. COLLECTOR</p>             | <p><b>STYLE 2:</b><br/>PIN 1. BASE<br/>2. EMITTER<br/>3. COLLECTOR</p>                | <p><b>STYLE 3:</b><br/>PIN 1. ANODE<br/>2. ANODE<br/>3. CATHODE</p>               | <p><b>STYLE 4:</b><br/>PIN 1. CATHODE<br/>2. CATHODE<br/>3. ANODE</p>   | <p><b>STYLE 5:</b><br/>PIN 1. DRAIN<br/>2. SOURCE<br/>3. GATE</p>        |
| <p><b>STYLE 6:</b><br/>PIN 1. GATE<br/>2. SOURCE &amp; SUBSTRATE<br/>3. DRAIN</p>  | <p><b>STYLE 7:</b><br/>PIN 1. SOURCE<br/>2. DRAIN<br/>3. GATE</p>                     | <p><b>STYLE 8:</b><br/>PIN 1. DRAIN<br/>2. GATE<br/>3. SOURCE &amp; SUBSTRATE</p> | <p><b>STYLE 9:</b><br/>PIN 1. BASE 1<br/>2. EMITTER<br/>3. BASE 2</p>   | <p><b>STYLE 10:</b><br/>PIN 1. CATHODE<br/>2. GATE<br/>3. ANODE</p>      |
| <p><b>STYLE 11:</b><br/>PIN 1. ANODE<br/>2. CATHODE &amp; ANODE<br/>3. CATHODE</p> | <p><b>STYLE 12:</b><br/>PIN 1. MAIN TERMINAL 1<br/>2. GATE<br/>3. MAIN TERMINAL 2</p> | <p><b>STYLE 13:</b><br/>PIN 1. ANODE 1<br/>2. GATE<br/>3. CATHODE 2</p>           | <p><b>STYLE 14:</b><br/>PIN 1. EMITTER<br/>2. COLLECTOR<br/>3. BASE</p> | <p><b>STYLE 15:</b><br/>PIN 1. ANODE 1<br/>2. CATHODE<br/>3. ANODE 2</p> |

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# Device DTA143Z

## Bias Resistor Transistor

[Data Sheet](#) DTA114E/D - 106.0 (kb)

[Models](#) | [Reference Manuals](#)

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.

### Orderable Devices

Action	Device	Package Type	Pins	Case Outline	Status	Budgetary Price/Unit	Qty.
<a href="#">Order Samples</a> <a href="#">Buy Now</a>	DTA143Z	Bulk	3	<a href="#">29-11</a>	Active	\$0.067	5,000
<a href="#">Order Samples</a>	DTA143ZRLRA	Tape and Reel	3	<a href="#">29-11</a>	Active	\$0.067	2,000
<a href="#">Order Samples</a>	DTA143ZRLRM	Tape and Ammunition Box	3	<a href="#">29-11</a>	Active	\$0.067	2,000
<a href="#">Order Samples</a>	DTA143ZRLRP	Tape and Ammunition Box	3	<a href="#">29-11</a>	Active	\$0.067	2,000

### Models

Document Title	Document ID	Rev
Discrete Model Library File - SPICE3	<a href="#">ONDISCRETES.SP3 - 216.0KB</a>	0
Discrete Model Library - PSpice	<a href="#">ONDISCRETES.LIB - 219.0KB</a>	0

### Reference Manuals

Document Title	Document ID	Rev
Tape & Reel and Packaging Specifications for Small-Signal Transistors, FETs and Diodes	<a href="#">DL126TRS/D - 96.0KB</a>	2



- [News Room](#)
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- [Samples FAQ](#)
- [Part Nomenclature](#)
- [Purchasing T's and C's](#)

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## Device DTA143T

### Bias Resistor Transistor

[Data Sheet](#) DTA114E/D - 106.0 (kb)

#### [Reference Manuals](#)

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#### Orderable Devices

Action	Device	Status	Package			Container		Budgetary Price/Unit
			Type	Pins	Case Outline	Type	Qty.	
<a href="#">Order</a> <a href="#">Samples</a> <a href="#">Buy Now</a>	DTA143T	Active	TO-92 (TO-226)	3	<a href="#">29-11</a>	Bulk	5,000	\$0.067
<a href="#">Order</a> <a href="#">Samples</a>	DTA143TRLRA	Active	TO-92 (TO-226)	3	<a href="#">29-11</a>	Tape and Reel	2,000	\$0.067
<a href="#">Order</a> <a href="#">Samples</a>	DTA143TRLRM	Active	TO-92 (TO-226)	3	<a href="#">29-11</a>	Tape and Ammunition Box	2,000	\$0.067
<a href="#">Order</a> <a href="#">Samples</a>	DTA143TRLRP	Active	TO-92 (TO-226)	3	<a href="#">29-11</a>	Tape and Ammunition Box	2,000	\$0.067

#### Reference Manuals

Document Title	Document ID	Rev
Tape & Reel and Packaging Specifications for Small-Signal Transistors, FETs and Diodes	<a href="#">DL126TRS/D - 96.0KB</a>	2

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## Device DTA144E

### Bias Resistor Transistor

[Data Sheet](#) DTA114E/D - 106.0 (kb)

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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.

#### Orderable Devices

Action	Device	Status	Package			Container		Budgetary Price/Unit
			Type	Pins	Case Outline	Type	Qty.	
<a href="#">Order</a> <a href="#">Samples</a> <a href="#">Buy Now</a>	DTA144E	Active	TO-92 (TO-226)	3	<a href="#">29-11</a>	Bulk	5,000	\$0.067
<a href="#">Order</a> <a href="#">Samples</a>	DTA144ERLRA	Active	TO-92 (TO-226)	3	<a href="#">29-11</a>	Tape and Reel	2,000	\$0.067
<a href="#">Order</a> <a href="#">Samples</a>	DTA144ERLRM	Active	TO-92 (TO-226)	3	<a href="#">29-11</a>	Tape and Ammunition Box	2,000	\$0.067
<a href="#">Order</a> <a href="#">Samples</a>	DTA144ERLRP	Active	TO-92 (TO-226)	3	<a href="#">29-11</a>	Tape and Ammunition Box	2,000	\$0.067

#### Models

Document Title	Document ID	Rev
SP3 Model For DTA144ERLRA	<a href="#">DTA144ERLRA.SP3 - 1.0KB</a>	0
SP2 Model For DTA144ERLRA	<a href="#">DTA144ERLRA.SP2 - 1.0KB</a>	0
LIB Model For DTA144ERLRA	<a href="#">DTA144ERLRA.LIB - 1.0KB</a>	0
SIN Model For DTA144ERLRA	<a href="#">DTA144ERLRA.SIN - 1.0KB</a>	0

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