

# DTA114EXV3T1 Series

Preferred Devices

## Digital Transistors (BRT)

### 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 digital transistor contains a single transistor with a monolithic bias network consisting of two resistors; a series base resistor and a base-emitter resistor. The digital transistor eliminates these individual components by integrating them into a single device. The use of a digital transistor can reduce both system cost and board space. The device is housed in the SC-89 package which is designed for low power surface mount applications.

- Simplifies Circuit Design
- Reduces Board Space
- Reduces Component Count
- Available in 8 mm, 7 inch/3000 Unit Tape & Reel
- Lead-Free Plating (Pure Sn)

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

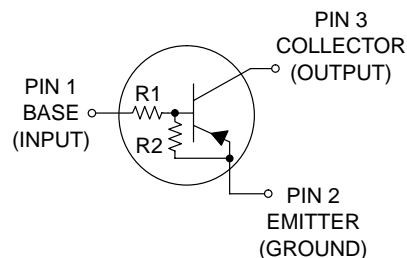
Rating	Symbol	Value	Unit
Collector-Base Voltage	$V_{CBO}$	50	Vdc
Collector-Emitter Voltage	$V_{CEO}$	50	Vdc
Collector Current	$I_C$	100	mAdc



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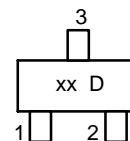
<http://onsemi.com>

### PNP SILICON DIGITAL TRANSISTORS



SC-89  
CASE 463C  
STYLE 1

#### MARKING DIAGRAM



xx = Specific Device Code  
(See Marking Table on page 2)  
D = Date Code

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

## DTA114EXV3T1 Series

### DEVICE MARKING AND RESISTOR VALUES

Device	Marking	R1 (K)	R2 (K)	Shipping†
DTA114EXV3T1	6A	10	10	3000/Tape & Reel
DTA124EXV3T1	6B	22	22	
DTA144EXV3T1	6C	47	47	
DTA114YXV3T1	6D	10	47	
DTA114TXV3T1	6E	10	∞	
DTA143TXV3T1	6F	4.7	∞	
DTA144WXV3T1	6P	47	22	
DTA144TXV3T1	6T	47	∞	
DTA143XXV3T1	6R	4.7	10	

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

### THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Total Device Dissipation, FR-4 Board (Note 1) @ $T_A = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	200 1.6	mW mW/ $^\circ\text{C}$
Thermal Resistance, Junction to Ambient (Note 1)	$R_{\theta JA}$	600	$^\circ\text{C}/\text{W}$
Total Device Dissipation, FR-4 Board (Note 2) @ $T_A = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	300 2.4	mW mW/ $^\circ\text{C}$
Thermal Resistance, Junction to Ambient (Note 2)	$R_{\theta JA}$	400	$^\circ\text{C}/\text{W}$
Junction and Storage Temperature Range	$T_J, T_{stg}$	-55 to +150	$^\circ\text{C}$

1. FR-4 @ Minimum Pad.
2. FR-4 @  $1.0 \times 1.0$  Inch Pad.

# DTA114EXV3T1 Series

## 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>	–	–	0.5	mAdc
	DTA114EXV3T1	–	–	0.2	
	DTA124EXV3T1	–	–	0.1	
	DTA144EXV3T1	–	–	0.2	
	DTA114YXV3T1	–	–	0.9	
	DTA114TXV3T1	–	–	1.9	
	DTA143TXV3T1	–	–	0.13	
	DTA144WXV3T1	–	–	0.2	
	DTA144TXV3T1	–	–	1.0	
	DTA143XXV3T1	–	–		
Collector–Base Breakdown Voltage (I <sub>C</sub> = 10 μA, I <sub>E</sub> = 0)	V <sub>(BR)CBO</sub>	50	–	–	Vdc
Collector–Emitter Breakdown Voltage (Note 3) (I <sub>C</sub> = 2.0 mA, I <sub>B</sub> = 0)	V <sub>(BR)CEO</sub>	50	–	–	Vdc

## ON CHARACTERISTICS (Note 3)

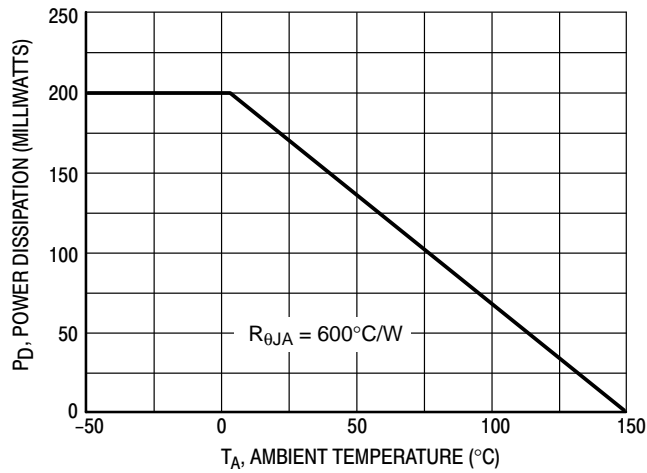
DC Current Gain (V <sub>CE</sub> = 10 V, I <sub>C</sub> = 5.0 mA)	h <sub>FE</sub>	35	60	–	
	DTA114EXV3T1	60	100	–	
	DTA124EXV3T1	80	140	–	
	DTA144EXV3T1	80	140	–	
	DTA114YXV3T1	160	250	–	
	DTA114TXV3T1	160	250	–	
	DTA143TXV3T1	80	140	–	
	DTA144WXV3T1	160	250	–	
	DTA144TXV3T1	20	35	–	
	DTA143XXV3T1				
Collector–Emitter Saturation Voltage (I <sub>C</sub> = 10 mA, I <sub>E</sub> = 0.3 mA) (I <sub>C</sub> = 10 mA, I <sub>B</sub> = 5.0 mA) DTA123EXV3T1 (I <sub>C</sub> = 10 mA, I <sub>B</sub> = 1.0 mA) DTA114TXV3T1/ DTA143TXV3T1/ DTA143ZXV3T1/DTA124XXV3T1/DTA143EXV3T1	V <sub>CE(sat)</sub>	–	–	0.25	Vdc
Output Voltage (on) (V <sub>CC</sub> = 5.0 V, V <sub>B</sub> = 2.5 V, R <sub>L</sub> = 1.0 kΩ)	V <sub>OL</sub>	–	–	0.2	Vdc
	DTA114EXV3T1	–	–	0.2	
	DTA124EXV3T1	–	–	0.2	
	DTA114YXV3T1	–	–	0.2	
	DTA114TXV3T1	–	–	0.2	
	DTA143TXV3T1	–	–	0.2	
	DTA144EXV3T1	–	–	0.2	
(V <sub>CC</sub> = 5.0 V, V <sub>B</sub> = 3.5 V, R <sub>L</sub> = 1.0 kΩ)	DTA144EXV3T1	–	–	0.2	
(V <sub>CC</sub> = 5.0 V, V <sub>B</sub> = 4.0 V, R <sub>L</sub> = 1.0 kΩ)	DTA144WXV3T1	–	–	0.2	
	DTA144TXV3T1	–	–	0.2	
	DTA143XXV3T1	–	–	0.2	
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> = 0.25 V, R <sub>L</sub> = 1.0 kΩ)	V <sub>OH</sub>	4.9	–	–	Vdc
	DTA114TXV3T1				
	DTA143TXV3T1				

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

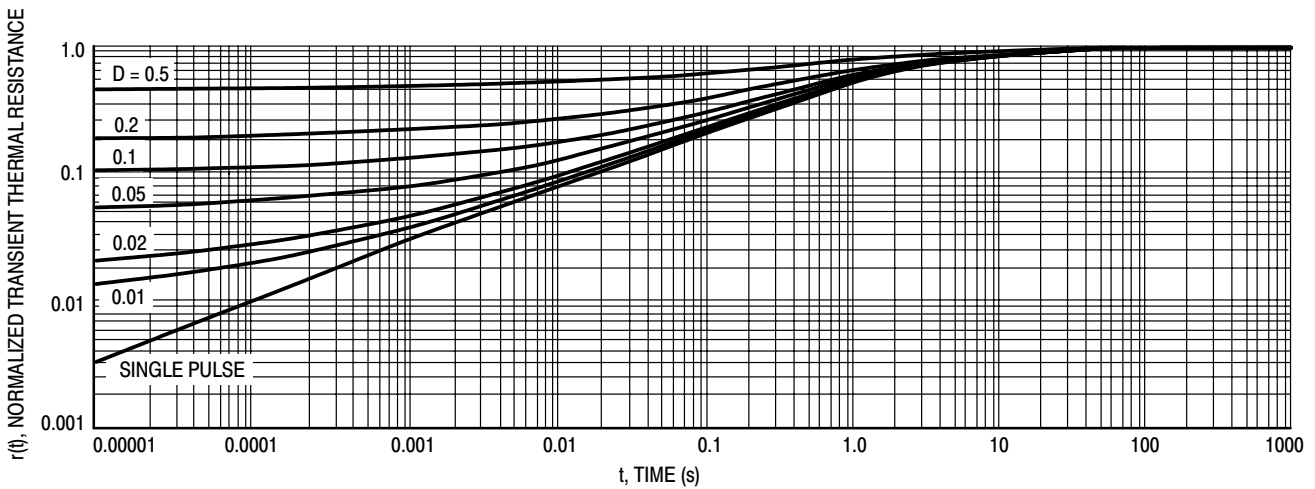
# DTA114EXV3T1 Series

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

Characteristic	Symbol	Min	Typ	Max	Unit
Input Resistor	DTA114EXV3T1	7.0	10	13	k $\Omega$
	DTA124EXV3T1	15.4	22	28.6	
	DTA144EXV3T1	32.9	47	61.1	
	DTA114YXV3T1	7.0	10	13	
	DTA114TXV3T1	7.0	10	13	
	DTA143TXV3T1	3.3	4.7	6.1	
	DTA144WXV3T1	32.9	47	61.1	
	DTA144TXV3T1	32.9	47	61.1	
	DTA143XXV3T1	3.3	4.7	6.1	
	Resistor Ratio	DTA114EXV3T1/DTA124EXV3T1/ DTA144EXV3T1	0.8	1.0	
DTA114YXV3T1		0.17	0.21	0.25	
DTA114TXV3T1/DTA143TXV3T1/ DTA144TXV3T1		-	-	-	
DTA144WXV3T1		1.7	2.1	2.6	
DTA143XXV3T1		0.38	0.47	0.56	



**Figure 1. Derating Curve**



**Figure 2. Normalized Thermal Response**

# DTA114EXV3T1 Series

## TYPICAL ELECTRICAL CHARACTERISTICS – DTA114EXV3T1

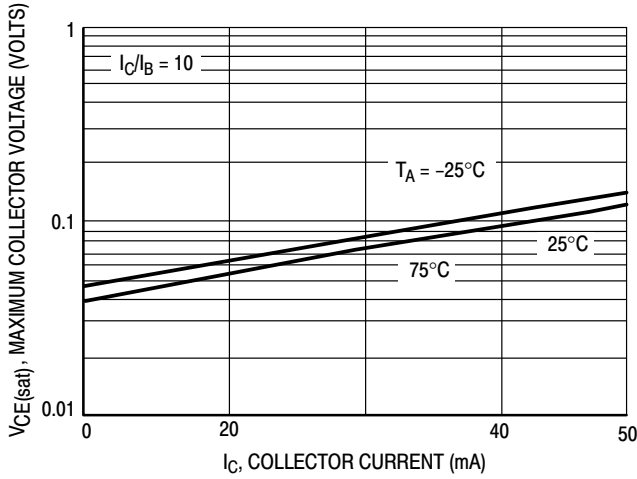


Figure 3.  $V_{CE(sat)}$  versus  $I_C$

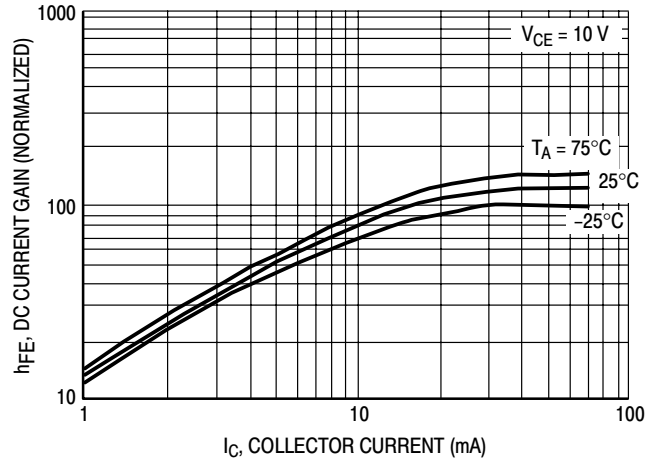


Figure 4. DC Current Gain

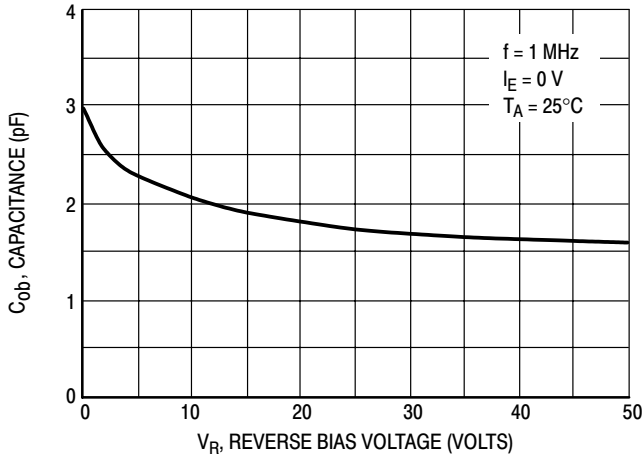


Figure 5. Output Capacitance

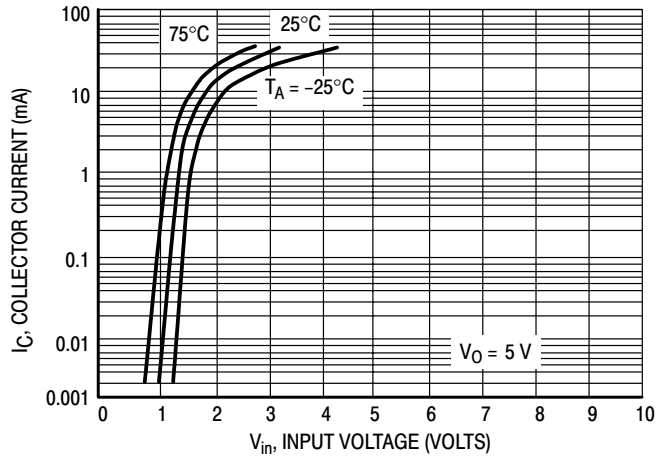


Figure 6. Output Current versus Input Voltage

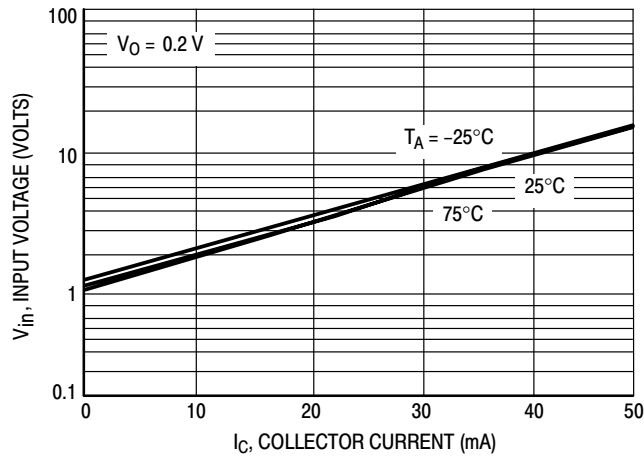


Figure 7. Input Voltage versus Output Current

# DTA114EXV3T1 Series

## TYPICAL ELECTRICAL CHARACTERISTICS – DTA124EXV3T1

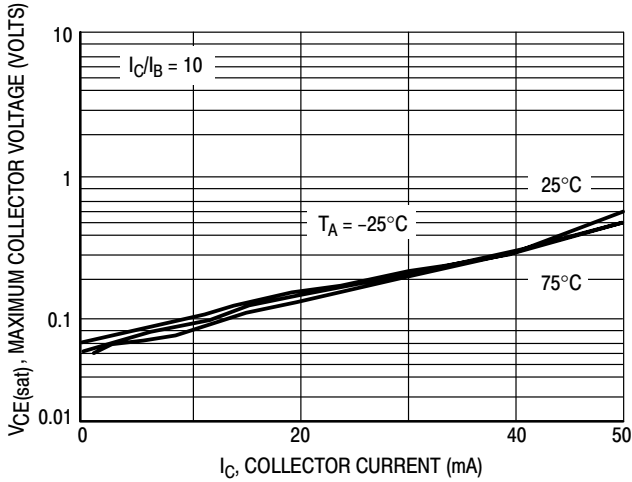


Figure 8.  $V_{CE(sat)}$  versus  $I_C$

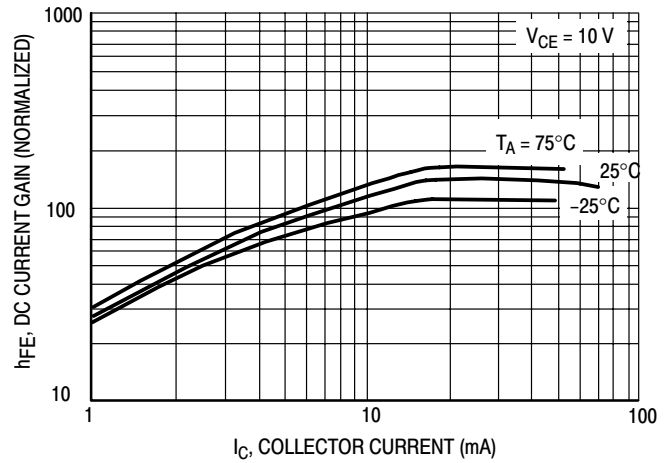


Figure 9. DC Current Gain

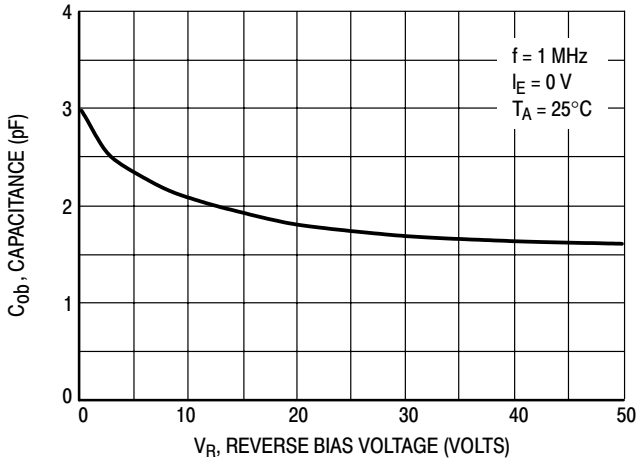


Figure 10. Output Capacitance

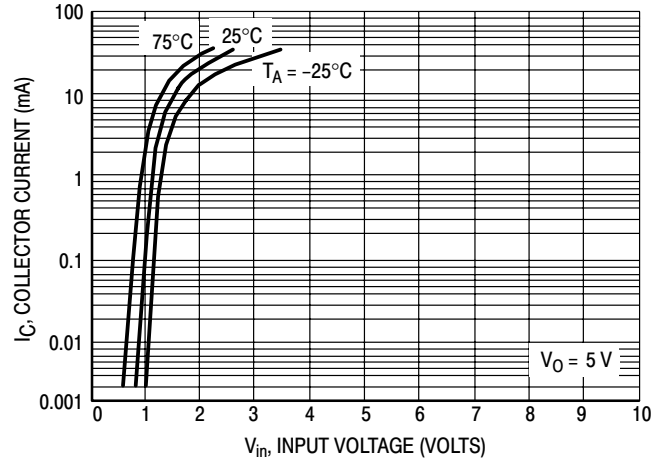


Figure 11. Output Current versus Input Voltage

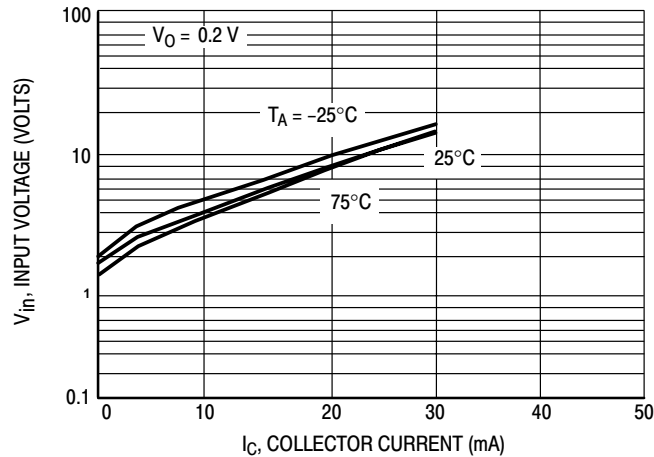


Figure 12. Input Voltage versus Output Current

# DTA114EXV3T1 Series

## TYPICAL ELECTRICAL CHARACTERISTICS – DTA144EXV3T1

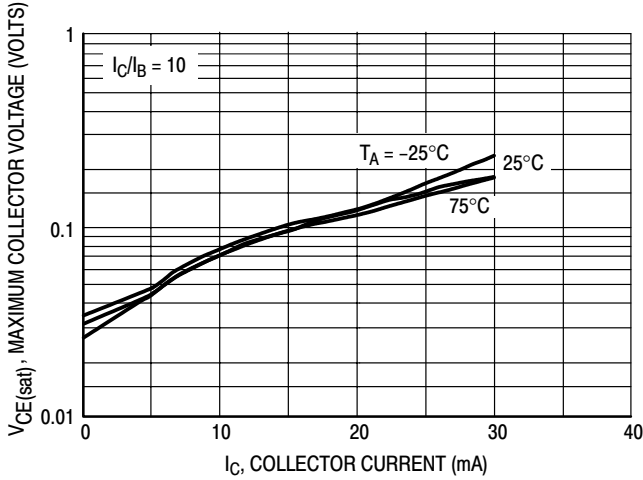


Figure 13.  $V_{CE(sat)}$  versus  $I_C$

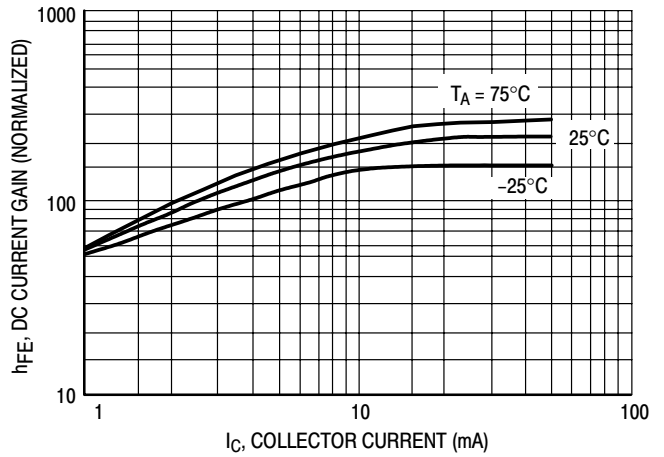


Figure 14. DC Current Gain

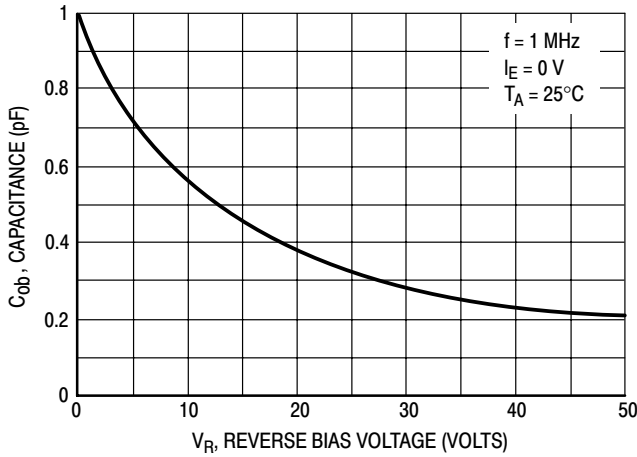


Figure 15. Output Capacitance

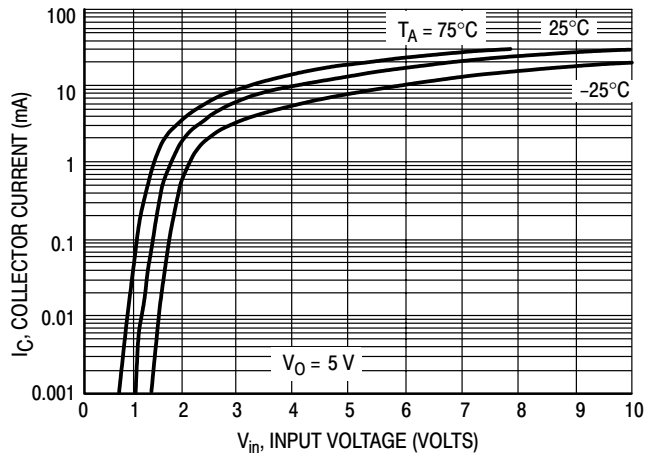


Figure 16. Output Current versus Input Voltage

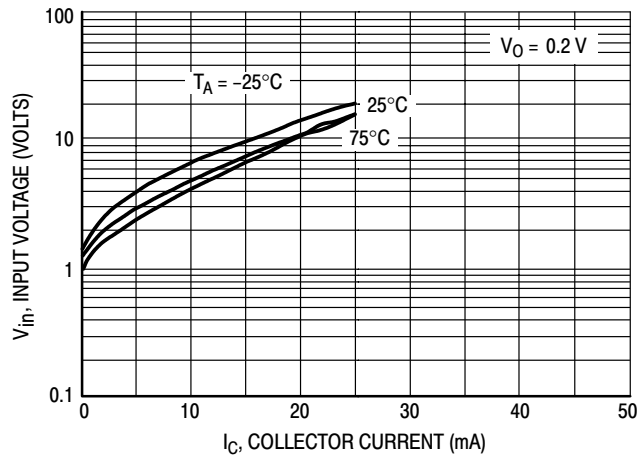


Figure 17. Input Voltage versus Output Current

# DTA114EXV3T1 Series

## TYPICAL ELECTRICAL CHARACTERISTICS – DTA114YXV3T1

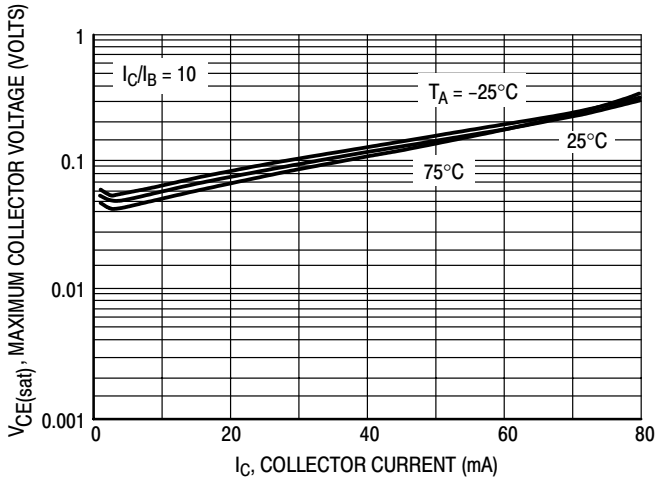


Figure 18.  $V_{CE(sat)}$  versus  $I_C$

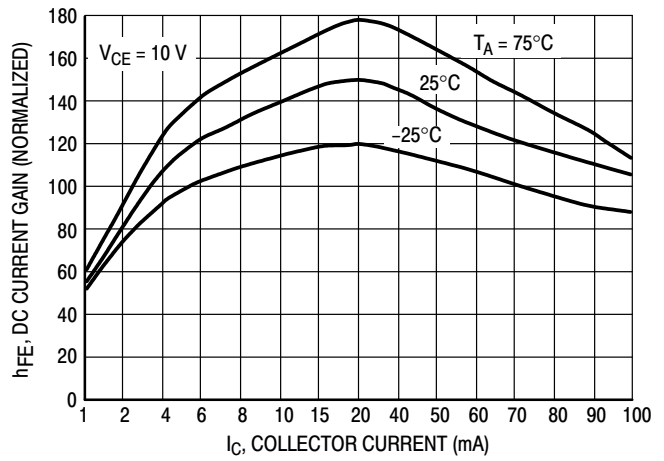


Figure 19. DC Current Gain

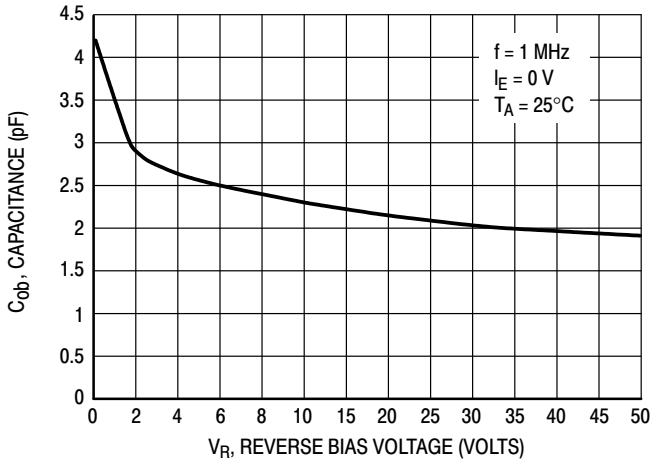


Figure 20. Output Capacitance

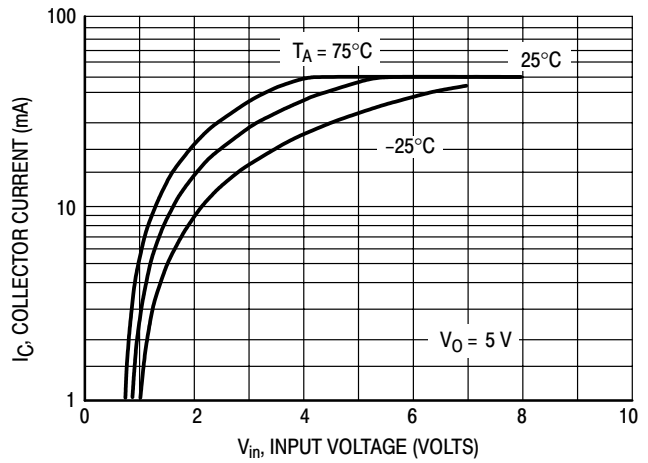


Figure 21. Output Current versus Input Voltage

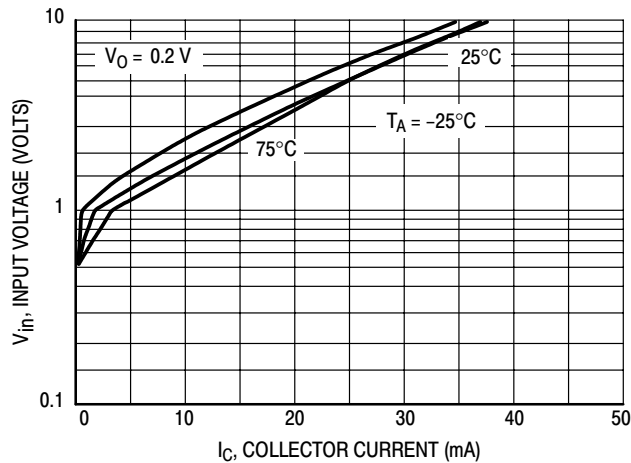


Figure 22. Input Voltage versus Output Current



TYPICAL ELECTRICAL CHARACTERISTICS — DTA144WXV3T1

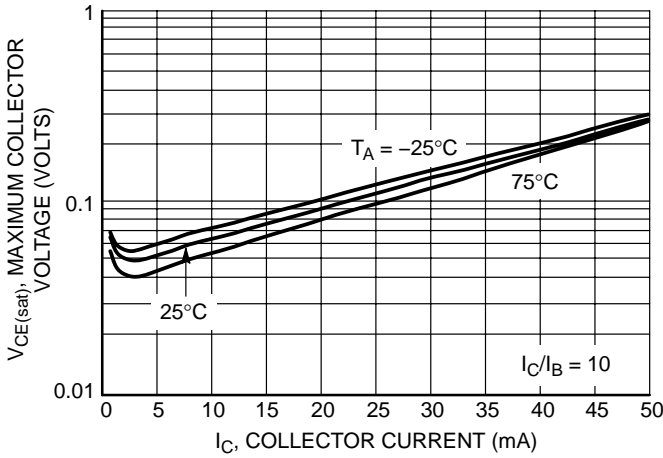


Figure 23. Maximum Collector Voltage versus Collector Current

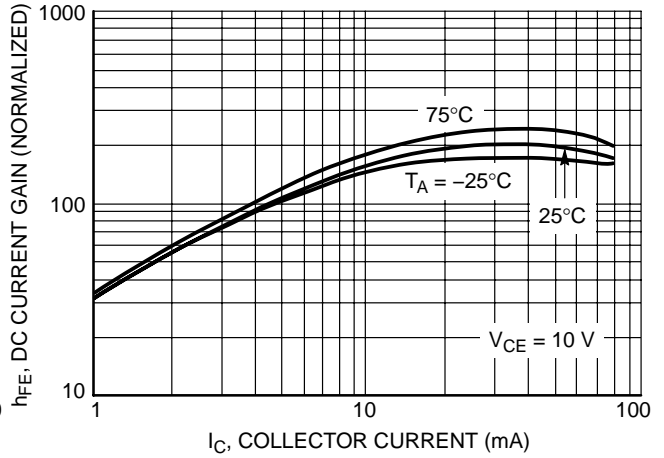


Figure 24. DC Current Gain

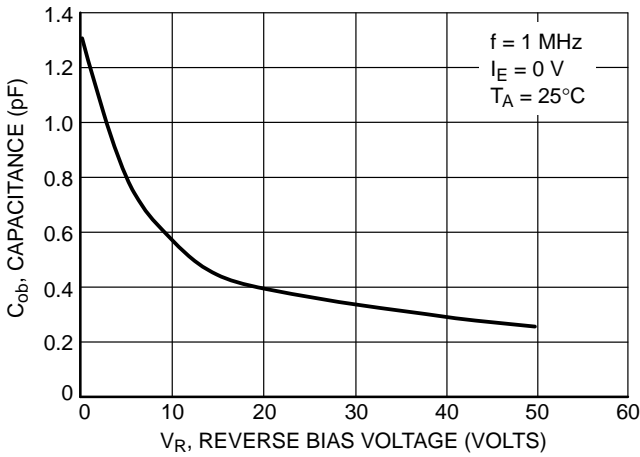


Figure 25. Output Capacitance

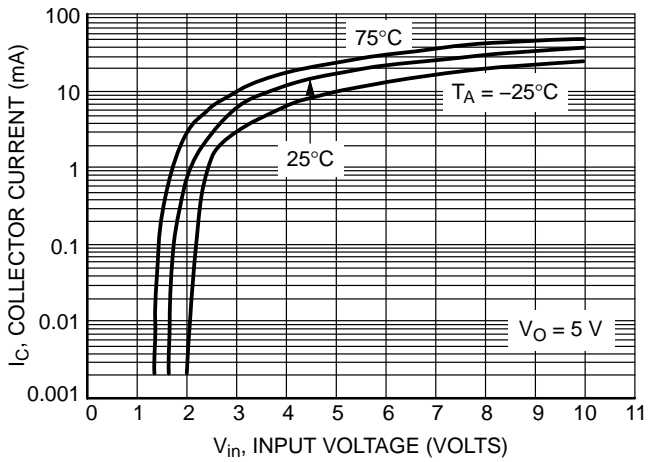


Figure 26. Output Current versus Input Voltage

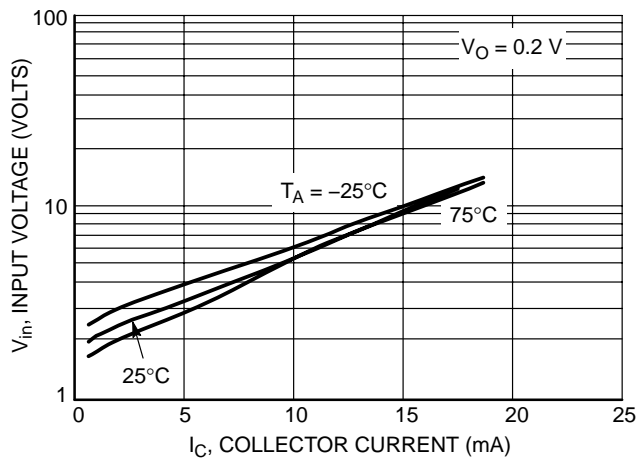


Figure 27. Input Voltage versus Output Current

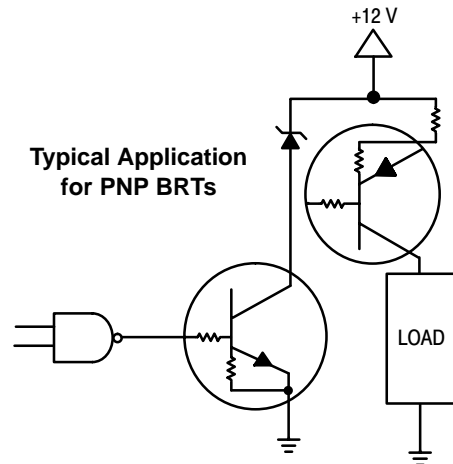
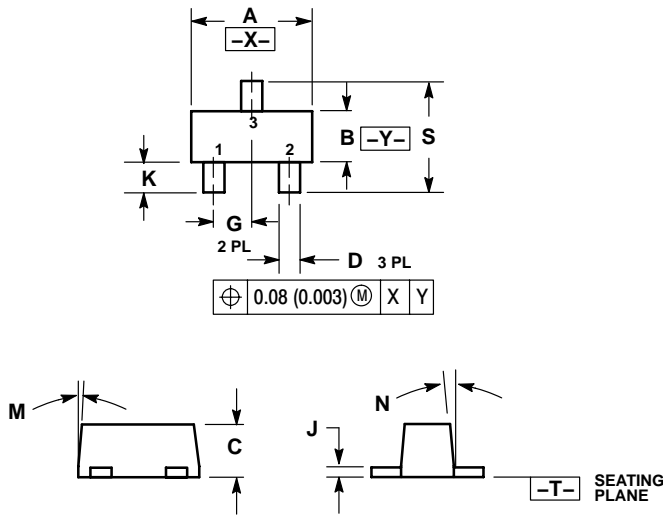


Figure 28. Inexpensive, Unregulated Current Source

# DTA114EXV3T1 Series

## PACKAGE DIMENSIONS

SC-89  
CASE 463C-03  
ISSUE C



### NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETERS
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH THICKNESS. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.
4. 463C-01 OBSOLETE, NEW STANDARD 463C-02.

DIM	MILLIMETERS			INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	1.50	1.60	1.70	0.059	0.063	0.067
B	0.75	0.85	0.95	0.030	0.034	0.040
C	0.60	0.70	0.80	0.024	0.028	0.031
D	0.23	0.28	0.33	0.009	0.011	0.013
G	0.50 BSC			0.020 BSC		
H	0.53 REF			0.021 REF		
J	0.10	0.15	0.20	0.004	0.006	0.008
K	0.30	0.40	0.50	0.012	0.016	0.020
L	1.10 REF			0.043 REF		
M	---	---	10	---	---	10
N	---	---	10	---	---	10
S	1.50	1.60	1.70	0.059	0.063	0.067

### STYLE 1:

1. BASE
2. EMITTER
3. COLLECTOR

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