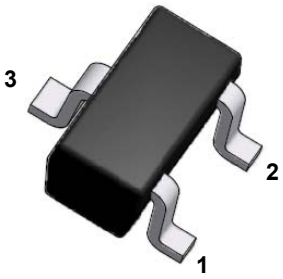
SOT-523 Bias Resistor Transistor

NPN Silicon Surface Mount Transistor with Monolithic Bias Resistor Network

Green Product

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 device is designed for low power surface mount applications.



SOT-523 (SC-75A)

Absolute Maximum Ratings (T_A = 25°C unless otherwise noted)

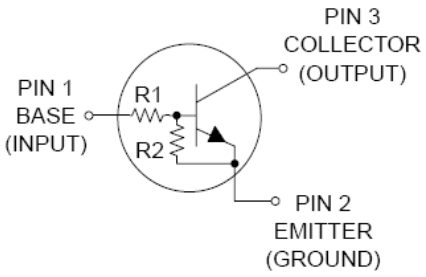
Symbol	Parameter	Value	Units
V_{CBO}	Collector-Base Voltage	50	V
V_{CEO}	Collector-Emitter Voltage	50	V
I_C	Collector Current	100	mA
P_D	Power Dissipation	150	mW
$R_{\theta JA}$	Thermal Resistance from Junction to Ambient	600	°C /W
T_J T_{STG}	Junction & Storage Temperature Range	-55 to +150	°C

These ratings are limiting values above which the serviceability of the device may be impaired.

Specification Features:

- Simplifies Circuit Design
- Reduces Board Space
- Reduces Component Count
- RoHS Compliant
- Green EMC
- Matte Tin(Sn) Lead Finish
- Weight: approx. 0.002g

Electrical Symbol:



Device Marking & Resistor Values:

Device	Marking	R1 (KΩ)	R2 (KΩ)
DTC114EE	24	10	10
DTC124EE	25	22	22
DTC144EE	26	47	47
DTC114YE	64	10	47
DTC114TE	04	10	∞
DTC143TE	03	4.7	∞
DTC123EE	22	2.2	2.2
DTC143EE	23	4.7	4.7
DTC143ZE	E23	4.7	47
DTC124XE	45	22	47
DTC123JE	E42	2.2	47

Electrical Characteristics (T_A = 25°C unless otherwise noted)

Off Characteristics

Symbol	Parameter	Test Condition	Limits			Unit
			Min	Typ	Max	
I_{CBO}	Collector-Base Cutoff Current	V_{CB} =50V, I_E =0A	-	-	100	nA
I_{CEO}	Collector-Emitter Cutoff Current	V_{CE} =50V, I_B =0A	-	-	500	nA
I_{EBO}	Emitter-Base Cutoff Current	V_{EB} =6.0V, I_C =0A				mA
	DTC114EE		-	-	0.50	
	DTC124EE		-	-	0.20	
	DTC144EE		-	-	0.10	
	DTC114YE		-	-	0.20	
	DTC114TE		-	-	0.90	
	DTC143TE		-	-	1.90	
	DTC123EE		-	-	2.30	
	DTC143EE		-	-	1.50	
	DTC143ZE		-	-	0.18	
	DTC124XE		-	-	0.13	
	DTC123JE		-	-	0.20	
$V_{(BR)CBO}$	Collector-Base Breakdown Voltage	I_C =10uA, I_E =0A	50	-	-	Volts
$V_{(BR)CEO}$	Collector-Emitter Breakdown Voltage (Note 1)	I_C =2.0mAA, I_B =0A	50	-	-	Volts

Note 1: Pulse Test. Pulse width <300us, Duty cycle < 2.0%)

On Characteristics (Note 1)

Symbol	Parameter	Test Condition	Limits			Unit
			Min	Typ	Max	
H_{FE}	DC Current Dain	V_{CE} =10V, I_C =5.0mA				
	DTC114EE		35	60	-	
	DTC124EE		60	100	-	
	DTC144EE		80	140	-	
	DTC114YE		80	140	-	
	DTC114TE		160	350	-	mA
	DTC143TE		160	350	-	
	DTC123EE		8.0	15		
	DTC143EE		15	30		
	DTC143ZE		80	200		
	DTC124XE		80	150		
	DTC123JE		80	140		
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage					
	DTC114EE	I_C=10mA, I_B=0.3mA				
	DTC124EE	I_C=10mA, I_B=0.3mA				
	DTC144EE	I_C=10mA, I_B=0.3mA				
	DTC114YE	I_C=10mA, I_B=0.3mA				
	DTC114TE	I_C=10mA, I_B=1mA	--	--	0.25	Volts
	DTC143TE	I_C=10mA, I_B=1mA				
	DTC123EE	I_C=10mA, I_D=5mA				
	DTC143EE	I_C=10mA, I_D=1mA				
	DTC143ZE	I_C=10mA, I_D=1mA				
	DTC124XE	I_C=10mA, I_B=1mA				
	DTC123JE	I_C=10mA, I_B=0.3mA				
V_{OL}	Output Voltage (on)	R_L= 1.0KΩ				
	DTC114EE	V_{CC}=5.0V, V_B=2.5V				
	DTC124EE	V_{CC}=5.0V, V_B=2.5V				
	DTC144EE	V_{CC}=5.0V, V_B=3.5V				
	DTC114YE	V_{CC}=5.0V, V_B=2.5V				
	DTC114TE	V_{CC}=5.0V, V_B=2.5V	--	--	0.20	Volts
	DTC143TE	V_{CC}=5.0V, V_B=2.5V				
	DTC123EE	V_{CC}=5.0V, V_B=2.5V				
	DTC143EE	V_{CC}=5.0V, V_B=2.5V				
	DTC143ZE	V_{CC}=5.0V, V_B=2.5V				
	DTC124XE	V_{CC}=5.0V, V_B=2.5V				
	DTC123JE	V_{CC}=5.0V, V_B=2.5V				

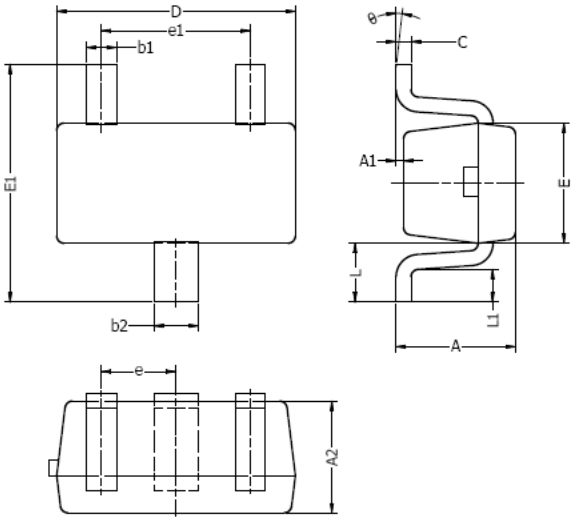
On Characteristics

Symbol	Parameter		Test Condition	Limits			Unit
				Min	Typ	Max	
V_{OH}	Output Voltage (on)		R_L= 1.0KΩ				
		DTC114EE	V_{CC}=5.0V, V_B=0.5V				
		DTC124EE	V_{CC}=5.0V, V_B=0.5V				
		DTC144EE	V_{CC}=5.0V, V_B=0.5V				
		DTC114YE	V_{CC}=5.0V, V_B=0.5V				
		DTC114TE	V_{CC}=5.0V, V_B=0.25V	4.9	--	--	Volts
		DTC143TE	V_{CC}=5.0V, V_B=0.25V				
		DTC123EE	V_{CC}=5.0V, V_B=0.5V				
		DTC143EE	V_{CC}=5.0V, V_B=0.5V				
		DTC143ZE	V_{CC}=5.0V, V_B=0.25V				
		DTC124XE	V_{CC}=5.0V, V_B=0.5V				
		DTC123JE	V_{CC}=5.0V, V_B=0.5V				

Electrical Characteristics (T_A = 25°C unless otherwise noted)

Symbol	Characteristic		Min	Typ	Max	Unit
R1	Input Resistor	DTC114EE	7.0	10	13	
		DTC124EE	15.4	22	28.6	
		DTC144EE	32.9	47	61.1	
		DTC114YE	7.0	10	13	
		DTC114TE	7.0	10	13	
		DTC143TE	3.3	4.7	6.1	KΩ
		DTC123EE	1.5	2.2	2.9	
		DTC143EE	3.3	4.7	6.1	
		DTC143ZE	3.3	4.7	6.1	
		DTC124XE	15.4	22	28.6	
		DTC123JE	1.54	2.2	2.86	
R1/R2	Resistor Ratio	DTC114EE	0.8	1.0	1.2	
		DTC124EE	0.8	1.0	1.2	
		DTC144EE	0.8	1.0	1.2	
		DTC114YE	0.17	0.21	0.25	
		DTC114TE	-	-	-	
		DTC143TE	-	-	-	--
		DTC123EE	0.8	1.0	1.2	
		DTC143EE	0.8	1.0	1.2	
		DTC143ZE	0.055	0.1	0.185	
		DTC124XE	0.38	0.47	0.56	
		DTC123JE	0.038	0.047	0.056	

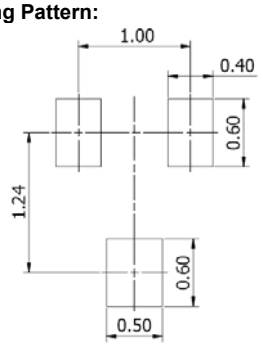
SOT-523 Package Outline



DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	0.70	0.90	0.028	0.035
A1	0.00	0.10	0.000	0.004
A2	0.70	0.80	0.028	0.031
b1	0.15	0.25	0.006	0.010
b2	0.25	0.35	0.010	0.014
c	0.10	0.20	0.004	0.008
D	1.50	1.70	0.059	0.067
E	0.70	0.90	0.028	0.035
E1	1.45	1.75	0.057	0.069
e	0.50 TYP.		0.020 TYP.	
e1	0.90	1.10	0.035	0.043
L	0.40 REF.		0.016 REF.	
L1	0.10	0.30	0.004	0.012
θ	0^0	8^0	0^0	8^0

NOTES:
1. Above package outline conforms to JEITA EAIJ ED-7500A SC-75A.
2. Dimensions are exclusive of Burrs, Mold Flash & Tie Bar extrusions.

Typical Soldering Pattern:



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