

VC114EEF/VC124EEF/VC144EEF/VC114YEF/ VC114TEF/VC143TEF/VC123EEF/VC143EEF/ VC143ZEF/VC124XEF/VC123JEF

SOT-523 NPN Transistor

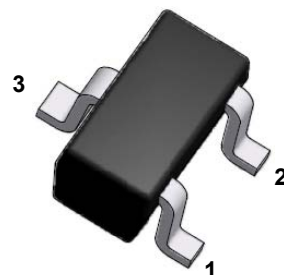
This new series of digital transistors is designed to replace a single device and its external resistor bias network. The BRT (Bias Resistor Transistor) contains a single transistor with a monolithic bias network consisting of two resistors: a series base resistor and a base-emitter resistor. The BRT eliminates these individual components by integrating them into a single device. The device is designed for low power surface mount applications.

Absolute Maximum Ratings ($T_A = 25^\circ\text{C}$ 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	$^\circ\text{C}/\text{W}$
T_J T_{STG}	Junction & Storage Temperature Range	-55 to +150	$^\circ\text{C}$

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

Green Product

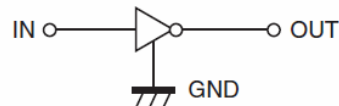
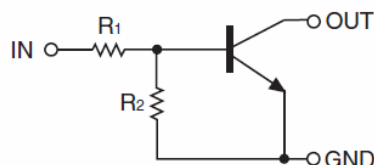


SOT-523 (SC-75A)

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 (K Ω)	R2 (K Ω)
VC114EEF	24	10	10
VC124EEF	25	22	22
VC144EEF	26	47	47
VC114YEF	64	10	47
VC114TEF	04	10	∞
VC143TEF	03	4.7	∞
VC123EEF	22	2.2	2.2
VC143EEF	23	4.7	4.7
VC143ZEF	E23	4.7	47
VC124XEF	45	22	47
VC123JEF	E42	2.2	47

Electrical Characteristics ($T_A = 25^\circ\text{C}$ unless otherwise noted)

Off Characteristics

Symbol	Parameter	Test Condition	Limits			Unit
			Min	Typ	Max	
I_{CBO}	Collector-Base Cutoff Current	$V_{CB} = 50\text{V}$, $I_E = 0\text{A}$	-	-	100	nA
I_{CEO}	Collector-Emitter Cutoff Current	$V_{CE} = 50\text{V}$, $I_B = 0\text{A}$	-	-	500	nA
I_{EBO}	Emitter-Base Cutoff Current	$V_{EB} = 6.0\text{V}$, $I_C = 0\text{A}$	-	-	-	mA
	VC114EEF		-	-	0.50	
	VC124EEF		-	-	0.20	
	VC144EEF		-	-	0.10	
	VC114YEF		-	-	0.20	
	VC114TEF		-	-	0.90	
	VC143TEF		-	-	1.90	
	VC123EEF		-	-	2.30	
	VC143EEF		-	-	1.50	
	VC143ZEF		-	-	0.18	
	VC124XEF		-	-	0.13	
	VC123JEF		-	-	0.20	
$V_{(BR)CBO}$	Collector-Base Breakdown Voltage	$I_C = 10\mu\text{A}$, $I_E = 0\text{A}$	50	-	-	Volts
$V_{(BR)CEO}$	Collector-Emitter Breakdown Voltage (Note 1)	$I_C = 2.0\text{mA}$, $I_B = 0\text{A}$	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 Gain	$V_{CE} = 10V, I_C = 5.0mA$				
	VC114EEF		35	60	--	
	VC124EEF		60	100	--	
	VC144EEF		80	140	--	
	VC114YEF		80	140	--	
	VC114TEF		160	350	--	
	VC143TEF		160	350	--	
	VC123EEF		8.0	15	--	
	VC143EEF		15	30	--	
	VC143ZEF		80	200	--	
	VC124XEF		80	150	--	
	VC123JEF		80	140	--	
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage					
	VC114EEF	$I_C = 10mA, I_B = 0.3mA$				
	VC124EEF	$I_C = 10mA, I_B = 0.3mA$				
	VC144EEF	$I_C = 10mA, I_B = 0.3mA$				
	VC114YEF	$I_C = 10mA, I_B = 0.3mA$				
	VC114TEF	$I_C = 10mA, I_B = 1mA$	--	--	0.25	Volts
	VC143TEF	$I_C = 10mA, I_B = 1mA$				
	VC123EEF	$I_C = 10mA, I_D = 5mA$				
	VC143EEF	$I_C = 10mA, I_D = 1mA$				
	VC143ZEF	$I_C = 10mA, I_D = 1mA$				
	VC124XEF	$I_C = 10mA, I_B = 1mA$				
	VC123JEF	$I_C = 10mA, I_B = 0.3mA$				
V_{OL}	Output Voltage (on)	$R_L = 1.0K\Omega$				
	VC114EEF	$V_{CC} = 5.0V, V_B = 2.5V$				
	VC124EEF	$V_{CC} = 5.0V, V_B = 2.5V$				
	VC144EEF	$V_{CC} = 5.0V, V_B = 3.5V$				
	VC114YEF	$V_{CC} = 5.0V, V_B = 2.5V$				
	VC114TEF	$V_{CC} = 5.0V, V_B = 2.5V$				
	VC143TEF	$V_{CC} = 5.0V, V_B = 2.5V$	--	--	0.20	Volts
	VC123EEF	$V_{CC} = 5.0V, V_B = 2.5V$				
	VC143EEF	$V_{CC} = 5.0V, V_B = 2.5V$				
	VC143ZEF	$V_{CC} = 5.0V, V_B = 2.5V$				
	VC124XEF	$V_{CC} = 5.0V, V_B = 2.5V$				
	VC123JEF	$V_{CC} = 5.0V, V_B = 2.5V$				

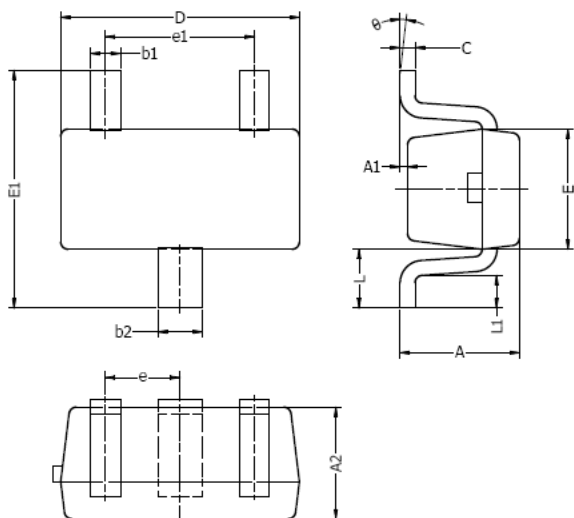
On Characteristics

Symbol	Parameter	Test Condition	Limits			Unit
			Min	Typ	Max	
V _{OH}	Output Voltage (on)	R _L = 1.0KΩ				
	VC114EEF	V _{CC} =5.0V, V _B =0.5V				
	VC124EEF	V _{CC} =5.0V, V _B =0.5V				
	VC144EEF	V _{CC} =5.0V, V _B =0.5V				
	VC114YEF	V _{CC} =5.0V, V _B =0.5V				
	VC114TEF	V _{CC} =5.0V, V _B =0.25V				
	VC143TEF	V _{CC} =5.0V, V _B =0.25V				
	VC123EEF	V _{CC} =5.0V, V _B =0.5V				
	VC143EEF	V _{CC} =5.0V, V _B =0.5V				
	VC143ZEF	V _{CC} =5.0V, V _B =0.25V				
	VC124XEF	V _{CC} =5.0V, V _B =0.5V				
	VC123JEF	V _{CC} =5.0V, V _B =0.5V				
			4.9	--	--	Volts

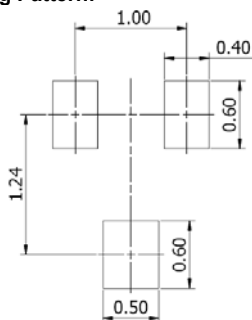
Electrical Characteristics (T_A = 25°C unless otherwise noted)

Symbol	Characteristic		Min	Typ	Max	Unit
R1	Input Resistor	VC114EEF	7.0	10	13	
		VC124EEF	15.4	22	28.6	
		VC144EEF	32.9	47	61.1	
		VC114YEF	7.0	10	13	
		VC114TEF	7.0	10	13	
		VC143TEF	3.3	4.7	6.1	
		VC123EEF	1.5	2.2	2.9	
		VC143EEF	3.3	4.7	6.1	
		VC143ZEF	3.3	4.7	6.1	
		VC124XEF	15.4	22	28.6	
		VC123JEF	1.54	2.2	2.86	
						KΩ
R1/R2	Resistor Ratio	VC114EEF	0.8	1.0	1.2	
		VC124EEF	0.8	1.0	1.2	
		VC144EEF	0.8	1.0	1.2	
		VC114YEF	0.17	0.21	0.25	
		VC114TEF	-	-	-	
		VC143TEF	-	-	-	
		VC123EEF	0.8	1.0	1.2	
		VC143EEF	0.8	1.0	1.2	
		VC143ZEF	0.055	0.1	0.185	
		VC124XEF	0.38	0.47	0.56	
		VC123JEF	0.038	0.047	0.056	
						--

SOT-523 Package Outline



Typical Soldering Pattern:



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°	8°	0°	8°

NOTES:

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

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