75V NPN MEDIUM POWER TRANSISTOR IN SOT89

Features

- BV_{CEO} > 75V
- I_C = 3A high Continuous Current
- I_{CM} = 10A Peak Pulse Current
- High Gain Holds up h_{FE} > 300 @ I_C=1A
- Low Equivalent On-Resistance; $R_{CE(sat)}$ = 78mΩ at 4.5A
- Excellent hFE characteristics up to 10A
- **Totally Lead-Free & Fully RoHS compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

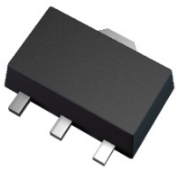
Mechanical Data

- Case: SOT89
- Case Material: Molded Plastic, "Green" Molding Compound UL Flammability Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish - Matte Tin Plated Leads, Solderable per MIL-STD-202, Method 208 (e3)
- Weight: 0.052 grams (Approximate)

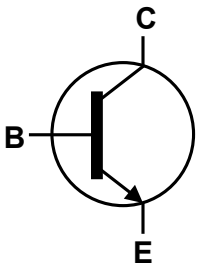
Applications

- Emergency Lighting Circuits
- Motor Driving (including DC fans)
- Solenoid, Relay and Actuator Drivers
- DC – DC Modules
- Backlight Inverters
- Power Switches
- MOSFET Gate Drivers

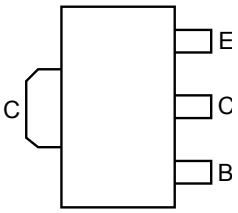
SOT89



Top View



Device Symbol



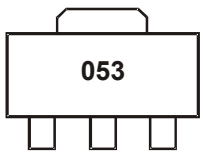
Top View
Pin-Out

Ordering Information (Note 4)

Part Number	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
FCX1053ATA	053	7	12	1,000
FCX1053A-13R	053	13	12	4,000

Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
2. See http://www.diodes.com/quality/lead_free.html for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
4. For packaging details, go to our website at http://www.diodes.com/products/packages.html.

Marking Information



053 = Product Type Marking Code

Absolute Maximum Ratings (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V_{CBO}	150	V
Collector-Emitter Voltage	V_{CEO}	75	V
Emitter-Base Voltage	V_{EBO}	7	V
Continuous Collector Current	I_C	3	A
Base Current	I_B	500	mA
Peak Pulse Current	I_{CM}	10	A

Thermal Characteristics (@T_A = +25°C, unless otherwise specified.)

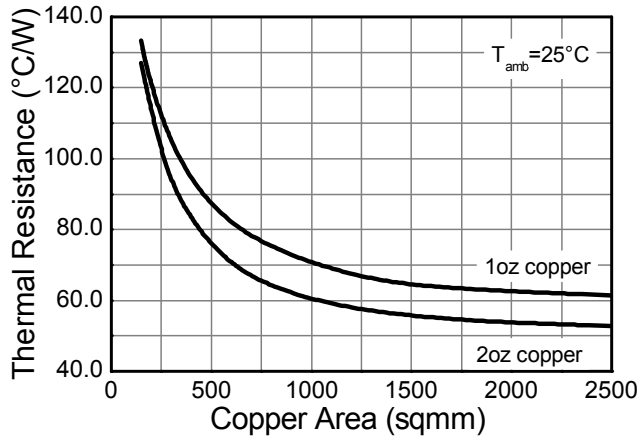
Characteristic		Symbol	Value	Unit
Power Dissipation	(Note 5)	P_D	1	W
	(Note 6)		1.6	
	(Note 7)		2.0	
Thermal Resistance, Junction to Ambient Air	(Note 5)	$R_{\theta JA}$	125	°C/W
	(Note 6)		78	
	(Note 7)		62.5	
Thermal Resistance, Junction to Lead	(Note 8)	$R_{\theta JL}$	3.6	°C/W
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +150	°C

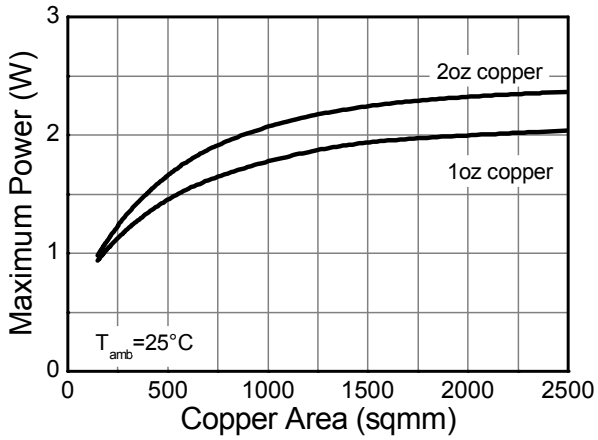
ESD Ratings (Note 9)

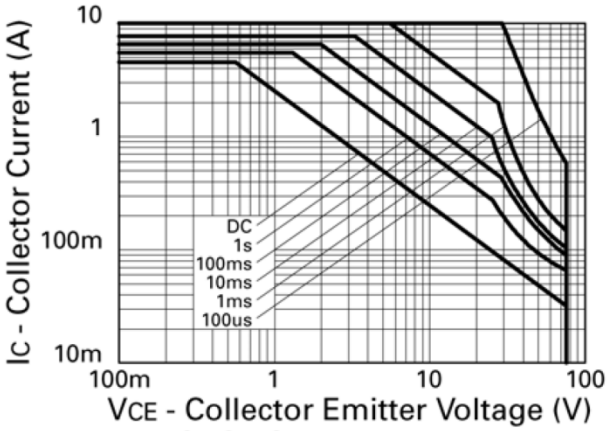
Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge - Human Body Model	ESD HBM	4,000	V	3A
Electrostatic Discharge - Machine Model	ESD MM	400	V	C

Notes:
5. For a device mounted with the exposed collector pad on 15mm x 15mm 1oz copper that is on a single-sided 1.6mm FR4 PCB; device is measured under still air conditions whilst operating in a steady-state.
6. Same as note (5), except the device is mounted on 25mm x 25mm 1oz copper.
7. Same as note (5), except the device is mounted on 50mm x 50mm 1oz copper.
8. Thermal resistance from junction to solder-point (on the exposed collector pad).
9. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

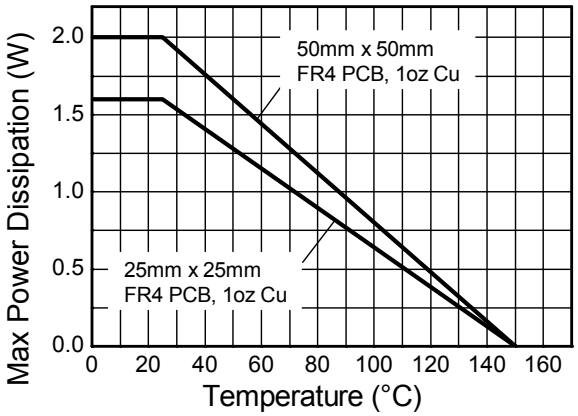
Thermal Characteristics and Derating Information



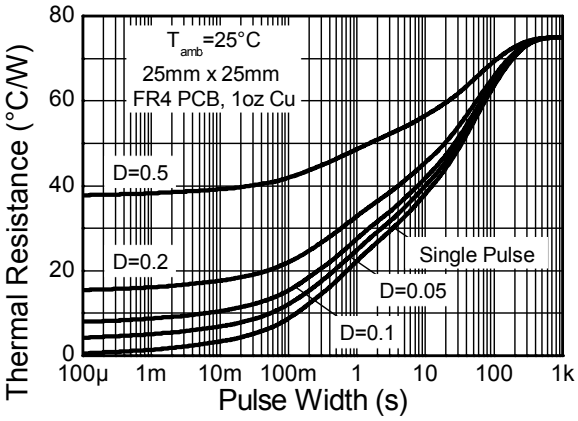




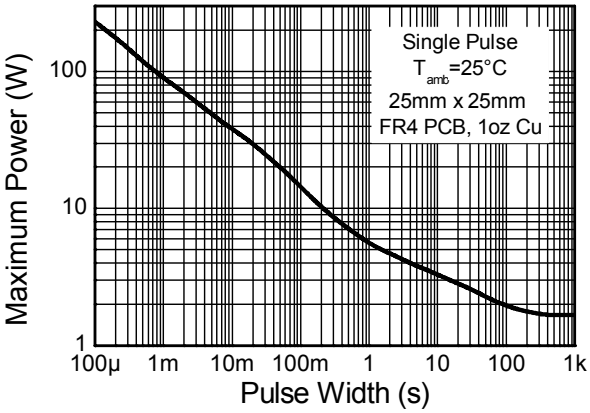
Safe Operating Area



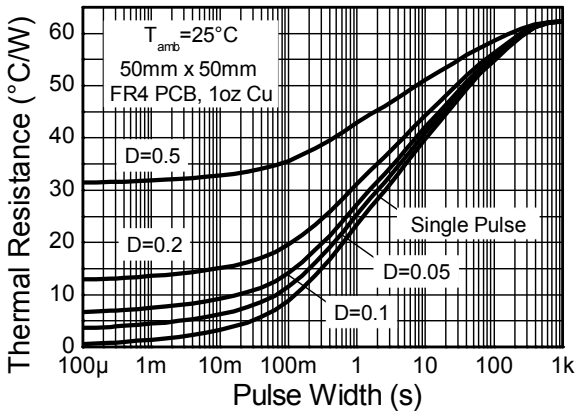
Derating Curve



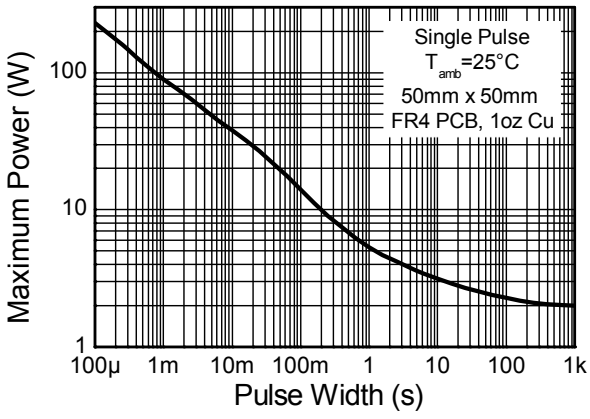
Transient Thermal Impedance



Pulse Power Dissipation



Transient Thermal Impedance



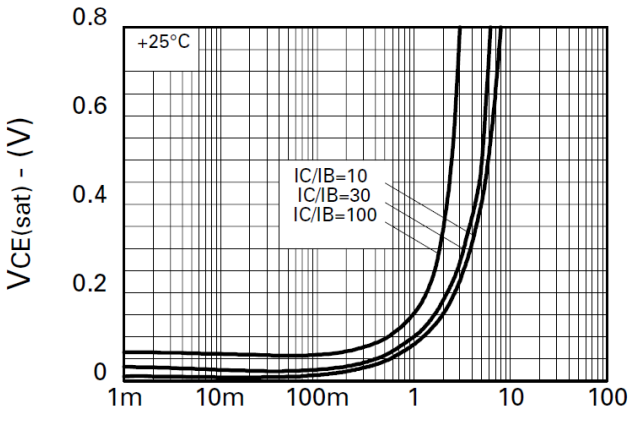
Pulse Power Dissipation

Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

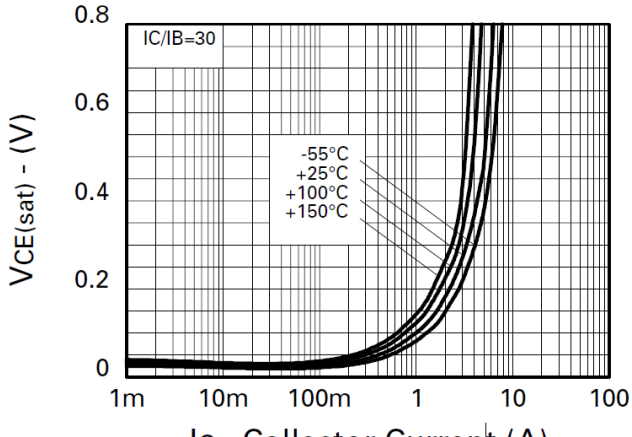
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV_{CBO}	150	250	—	V	I_C = 100μA
Collector-Emitter Breakdown Voltage	BV_{CES}	150	250	—	V	I_C = 100μA
Collector-Emitter Breakdown Voltage (Notes 10)	BV_{CEO}	75	100	—	V	I_C = 10mA
Collector-Emitter Breakdown Voltage	BV_{CEV}	150	250	—	V	I_C = 100μA, V_{EB} = 1V
Emitter-Base Breakdown Voltage	BV_{EBO}	7	8.8	—	V	I_E = 100μA
Collector Cutoff Current	I_{CBO}	—	0.9	50	nA	V_{CB} = 120V
Collector Cutoff Current	I_{CES}	—	1.5	50	nA	V_{CES} = 120V
Emitter Cutoff Current	I_{EBO}	—	0.3	20	nA	V_{EB} = 5.6V
DC current transfer Static ratio (Notes 10)	h_{FE}	270 300 300 40	440 450 450 60 20	1200		I_C = 10mA, V_{CE} = 2V I_C = 0.5A, V_{CE} = 2V I_C = 1A, V_{CE} =2V I_C = 4.5A, V_{CE} = 2V I_C = 10A, V_{CE} = 2V
Collector-Emitter Saturation Voltage (Notes 10)	$V_{CE(sat)}$	—	21 55 150 160 350	30 75 200 210 440	mV	I_C = 0.2A, I_B = 20mA I_C = 0.5A, I_B = 20mA I_C = 1A, I_B = 10mA I_C = 2A, I_B = 100mA I_C = 4.5A, I_B = 200mA
Base-Emitter Saturation Voltage (Notes 10)	$V_{BE(sat)}$	—	900	1000	mV	I_C = 3A, I_B = 100mA
Base-Emitter Turn-on Voltage (Notes 10)	$V_{BE(on)}$	—	825	950	mV	I_C = 3A, V_{CE} = 2V
Transitional Frequency	f_T	—	140	—	MHz	I_C = 50mA, V_{CE} = 10V, f = 100MHz
Output capacitance	C_{obo}	—	21	30	pF	V_{CB} = 10V, f = 1MHz,
Switching Time	t_{on}	—	162	—	ns	V_{CC} = 50V, I_C = 2A, I_{B1} = I_{B2} = ±20mA
	t_{off}		900		ns	

Note: 10. Measured under pulsed conditions. Pulse width = 300μs. Duty cycle ≤ 2%.

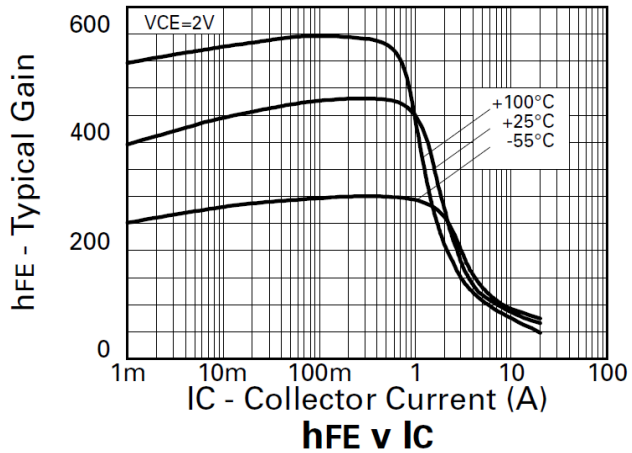
Typical Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)



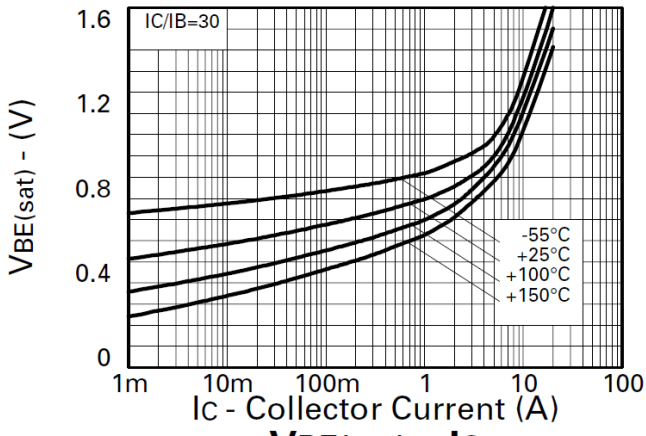
VCE(sat) v IC



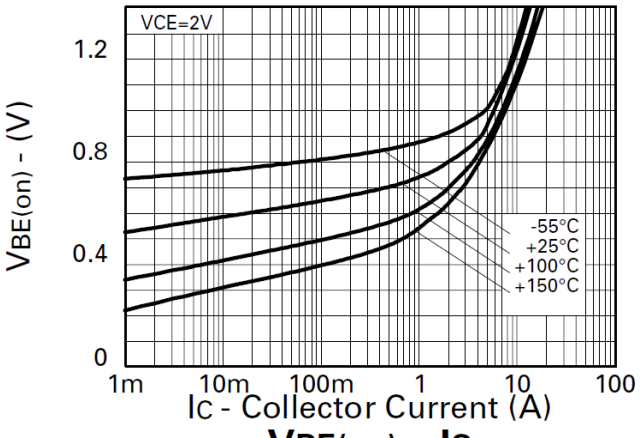
VCE(sat) v IC



hFE v IC



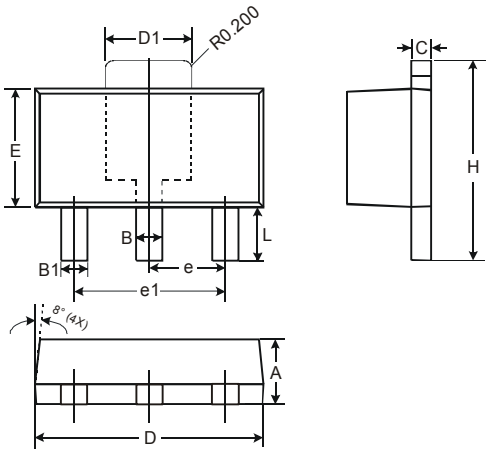
VBE(sat) v IC



VBE(on) v IC

Package Outline Dimensions

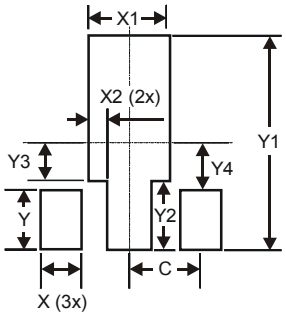
Please see AP02002 at http://www.diodes.com/datasheets/ap02002.pdf for latest version.



SOT89		
Dim	**Min**	Max
A	1.40	1.60
B	0.44	0.62
B1	0.35	0.54
C	0.35	0.43
D	4.40	4.60
D1	1.52	1.83
E	2.29	2.60
e	1.50 Typ	
e1	3.00 Typ	
H	3.94	4.25
L	0.89	1.20
All Dimensions in mm		

Suggested Pad Layout

Please see AP02001 at http://www.diodes.com/datasheets/ap02001.pdf for the latest version.



Dimensions	Value (in mm)
X	0.900
X1	1.733
X2	0.416
Y	1.300
Y1	4.600
Y2	1.475
Y3	0.950
Y4	1.125
C	1.500

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