

75V NPN MEDIUM POWER TRANSISTOR IN SOT89

Features

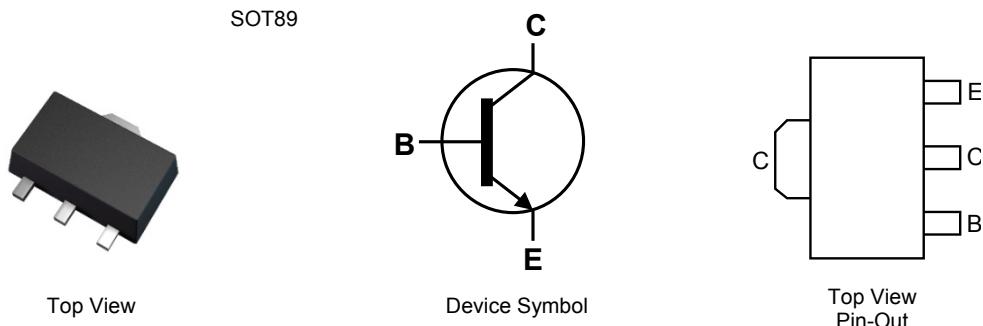
- $BV_{CEO} > 75V$
- $I_C = 3A$ high Continuous Current
- $I_{CM} = 10A$ Peak Pulse Current
- High Gain Holds up $h_{FE} > 300$ @ $I_C=1A$
- Low Equivalent On-Resistance; $R_{CE(sat)} = 78m\Omega$ at 4.5A
- Excellent hFE characteristics up to 10A
- **Totally Lead-Free & Fully RoHS compliant (Notes 1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

Applications

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

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)



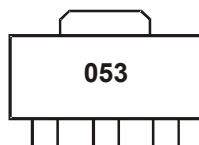
Ordering Information (Note 4)

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 (@ $T_A = +25^\circ\text{C}$, 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 (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

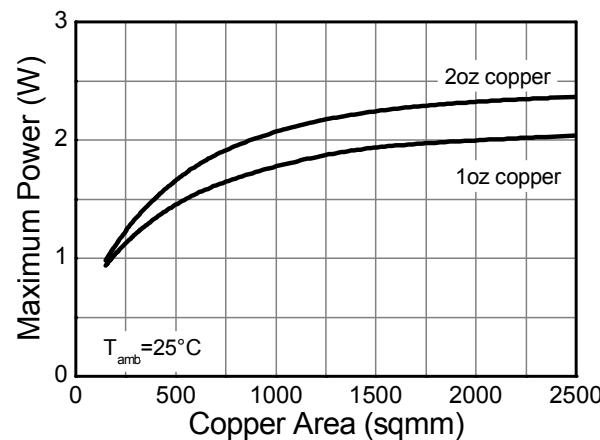
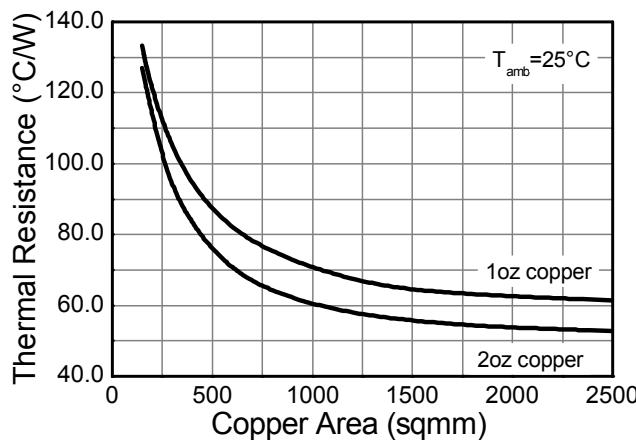
Characteristic	Symbol	Value	Unit
Power Dissipation	P_D	1	W
		1.6	
		2.0	
Thermal Resistance, Junction to Ambient Air	$R_{\theta JA}$	125	°C/W
		78	
		62.5	
Thermal Resistance, Junction to Lead	$R_{\theta JL}$	3.6	°C/W
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	°C

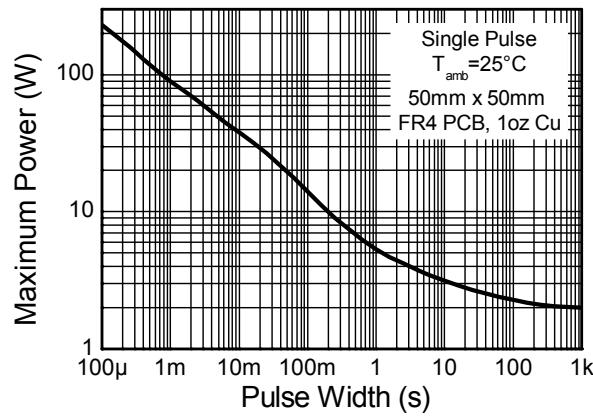
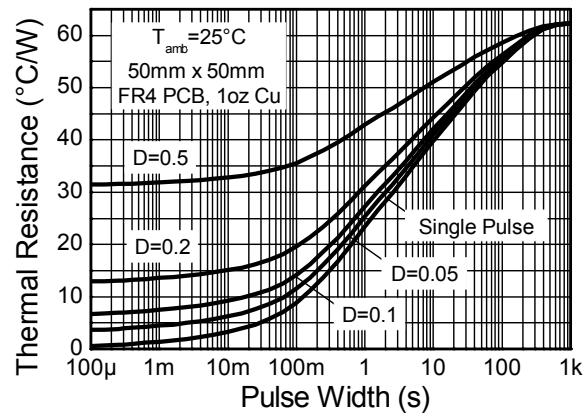
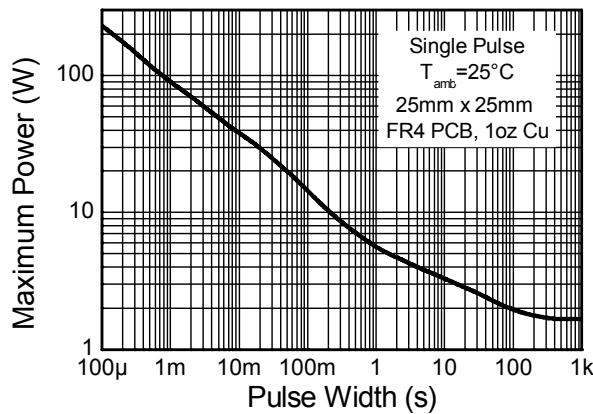
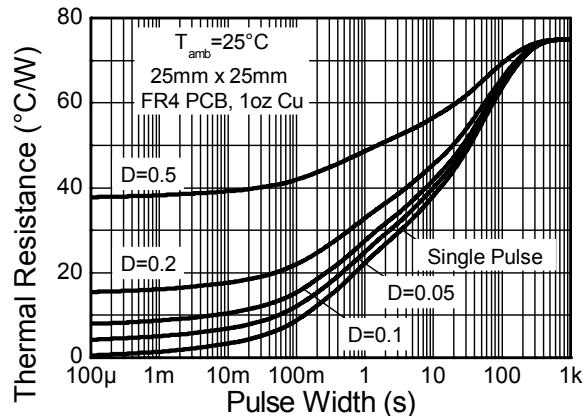
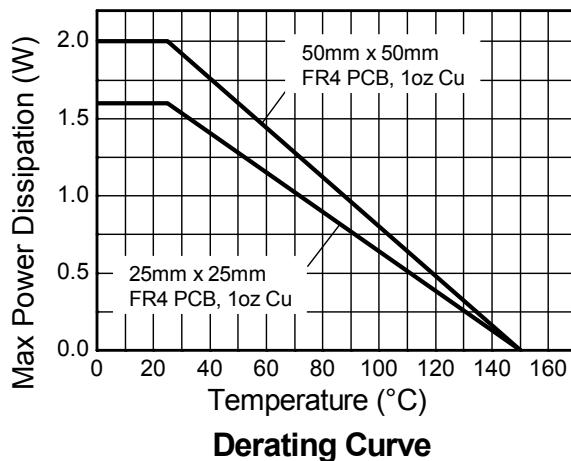
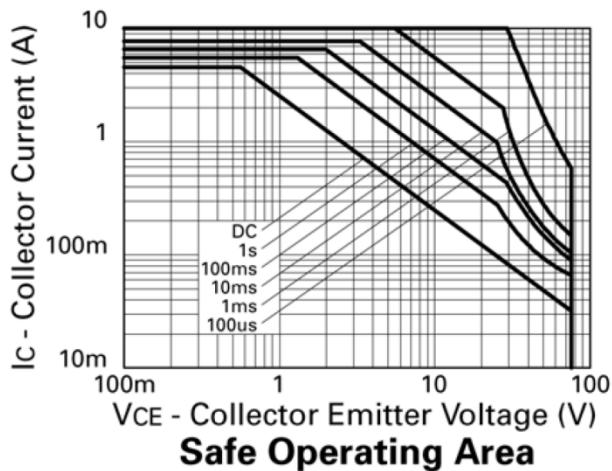
ESD Ratings (Note 9)

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


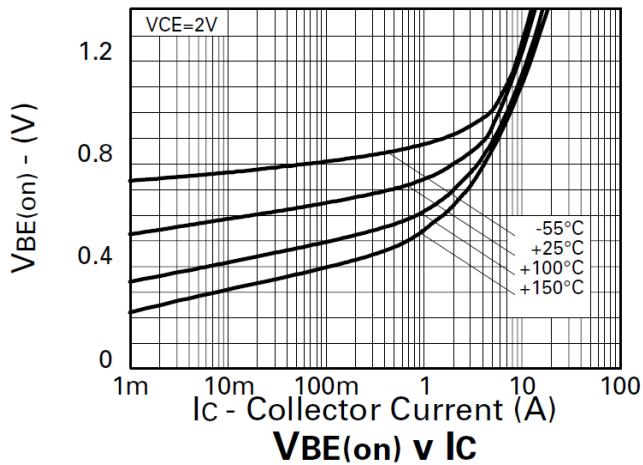
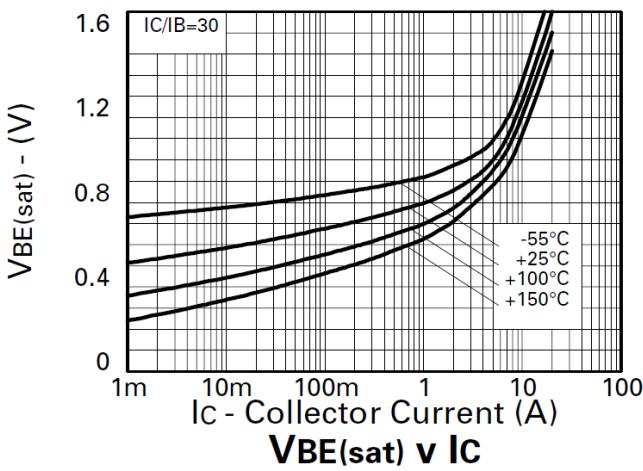
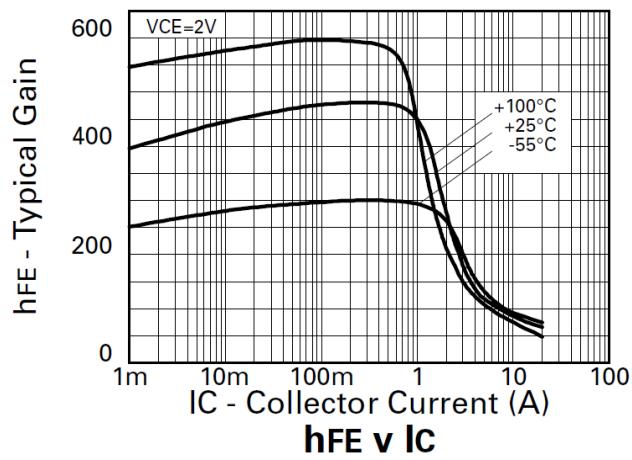
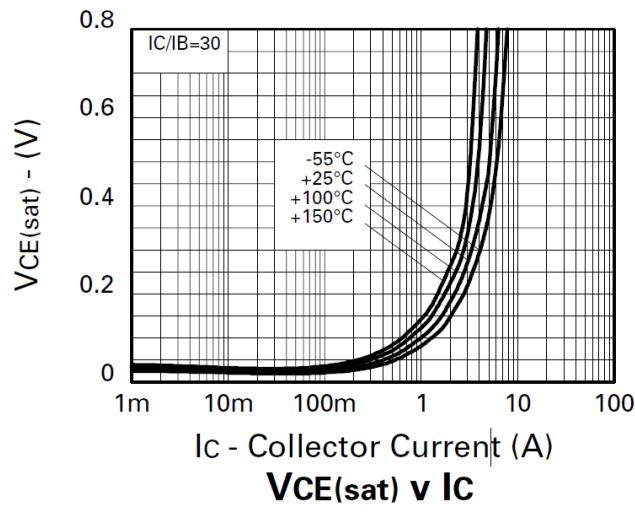
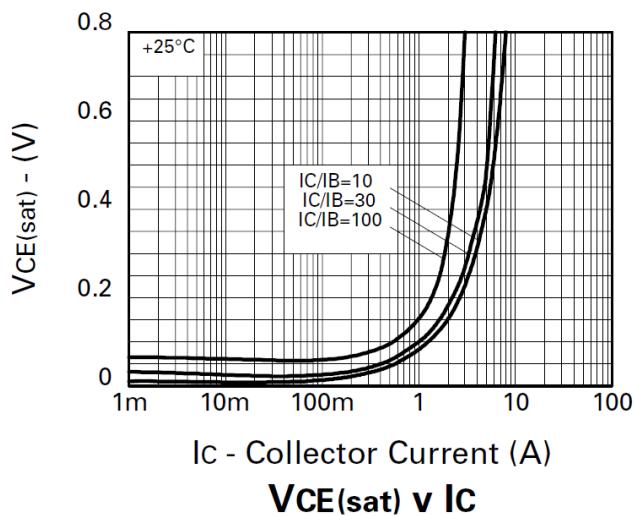


Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

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

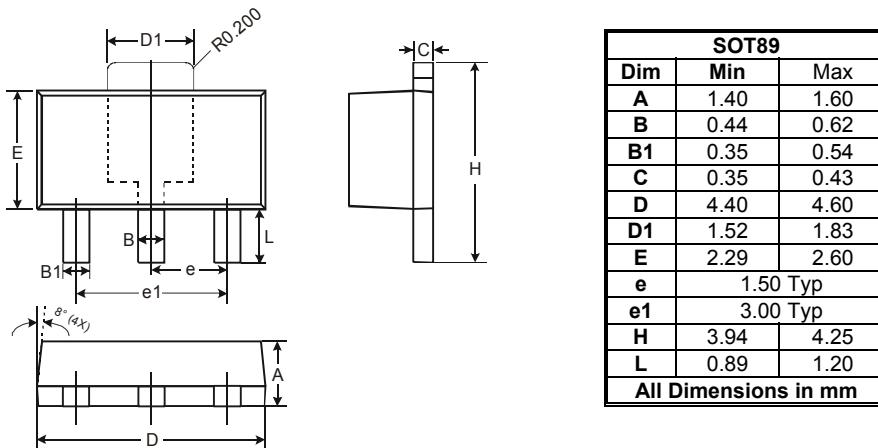
Note: 10. Measured under pulsed conditions. Pulse width = 300 μs . Duty cycle $\leq 2\%$.

Typical Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)



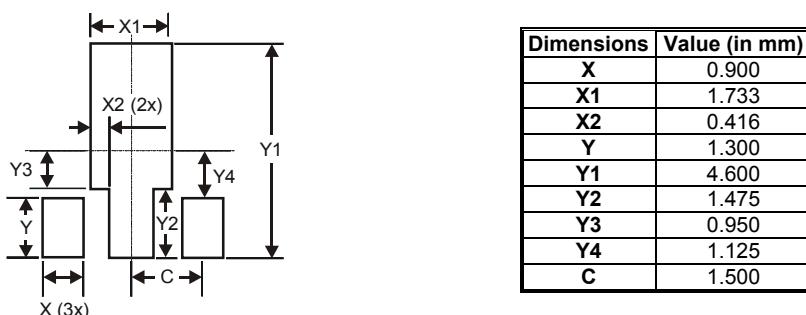
Package Outline Dimensions

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



Suggested Pad Layout

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



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