

Description

This Bipolar Junction Transistor (BJT) is designed to meet the stringent requirement of Automotive Applications.

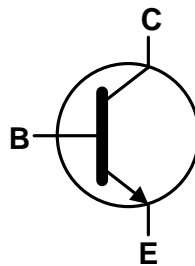
Features

- $BV_{CEO} > 75V$
- $I_C = 3A$ 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 h_{FE} 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**
- **PPAP Capable (Note 4)**

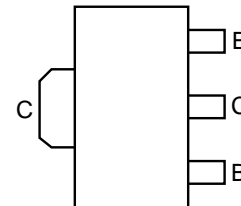
SOT89



Top View



Device Symbol



Top View
Pin-Out

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 @3
- Weight: 0.05 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

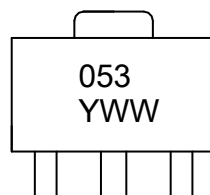
Ordering Information (Notes 4 and 5)

Part Number	Marking	Reel Size (inches)	Tape Width (mm)	Quantity Per Reel
FCX1053AQTA	053	7	12	1,000

- 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. Automotive products are AEC-Q101 qualified and are PPAP capable. Refer to http://www.diodes.com/product_compliance_definitions.html.
 5. For packaging details, go to our website at <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

Marking Information

SOT89



053 = Product Type Marking Code
 YWW = Date Code Marking
 Y = Last Digit of Year (ex: 7 = 2017)
 WW = Week Code (01 to 53)

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

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V _{CB0}	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.)

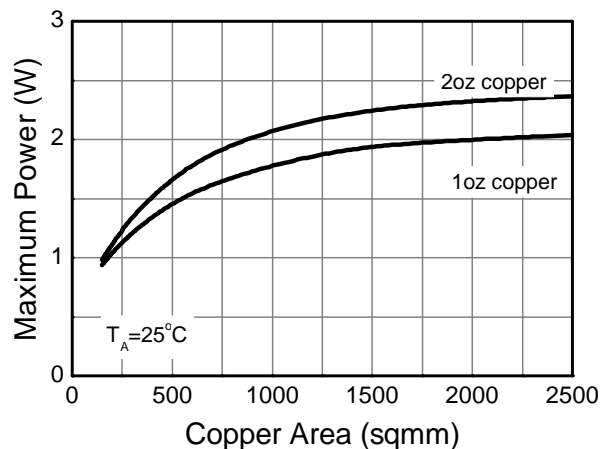
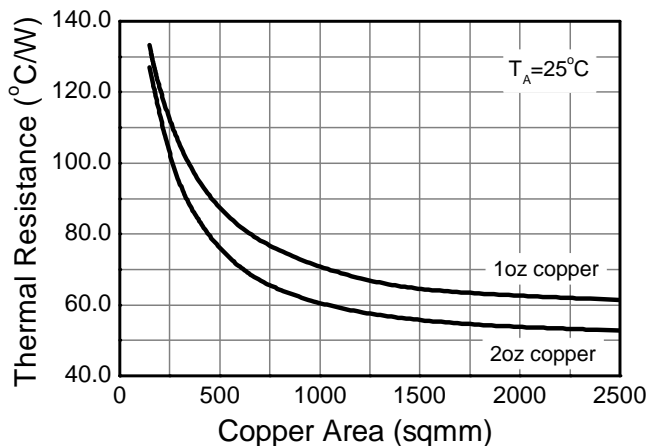
Characteristic	Symbol	Value	Unit
Power Dissipation	P _D	(Note 6)	1
		(Note 7)	1.6
		(Note 8)	2.0
Thermal Resistance, Junction to Ambient Air	R _{θJA}	(Note 6)	125
		(Note 7)	78
		(Note 8)	62.5
Thermal Resistance, Junction to Lead	R _{θJL}	3.6	°C/W
Operating and Storage Temperature Range	T _J , T _{STG}	-55 to +150	°C

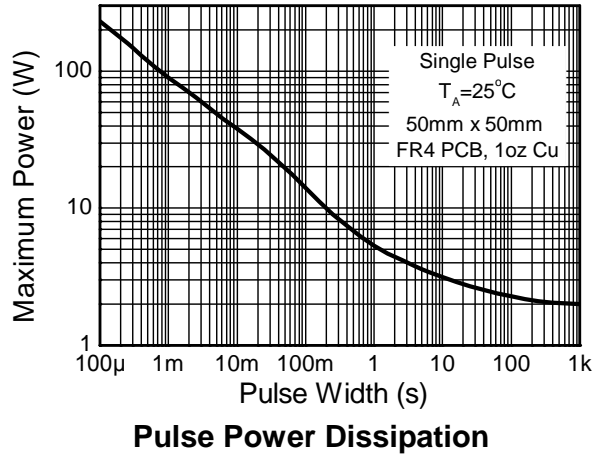
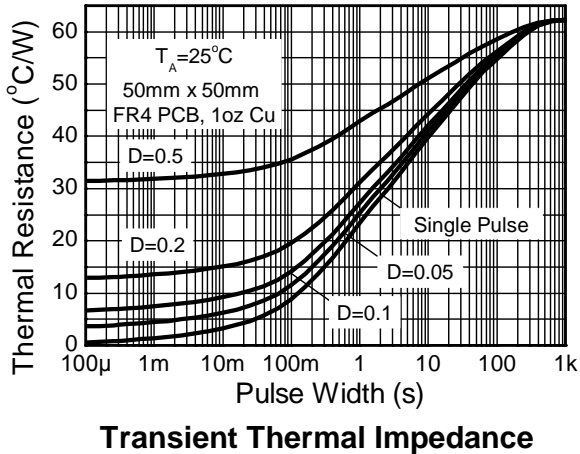
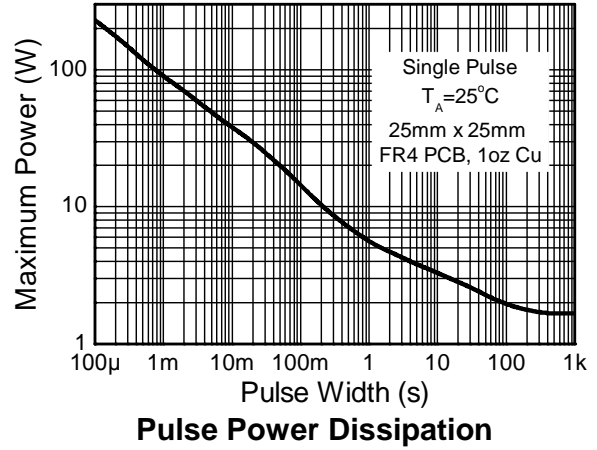
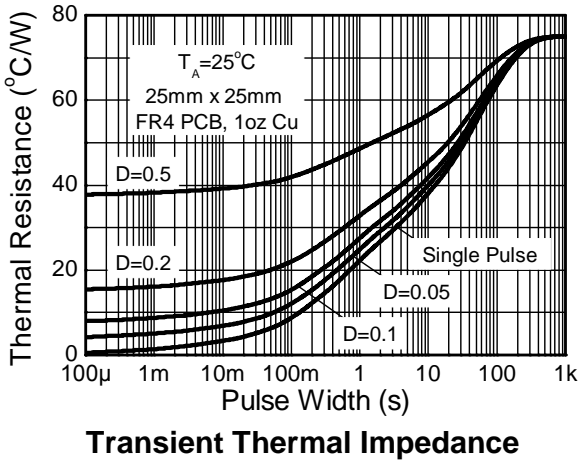
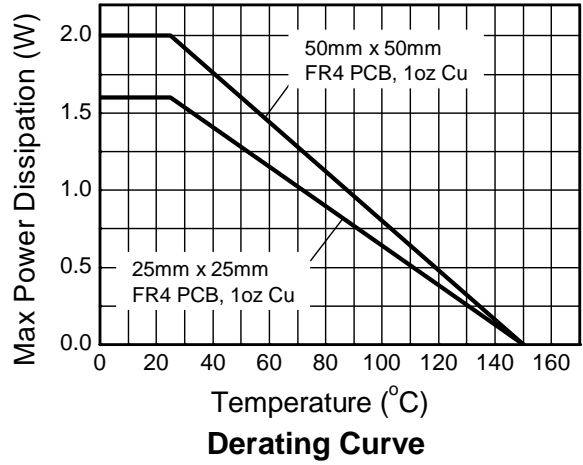
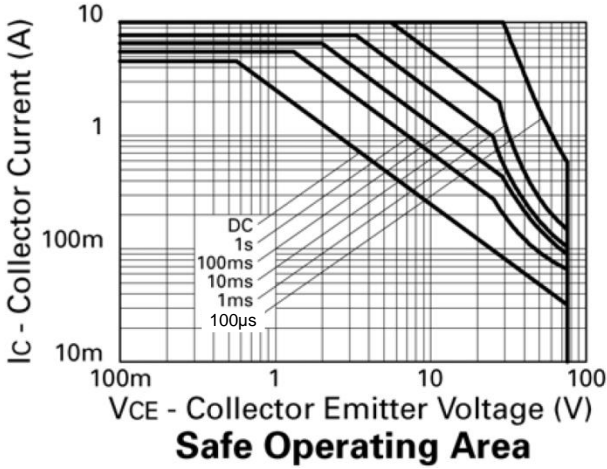
ESD Ratings (Note 10)

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:
- 6. 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.
 - 7. Same as note 6, except the device is mounted on 25mm x 25mm 1oz copper.
 - 8. Same as note 6, except the device is mounted on 50mm x 50mm 1oz copper.
 - 9. Thermal resistance from junction to solder-point (on the exposed collector pad).
 - 10. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

Thermal Characteristics and Derating Information



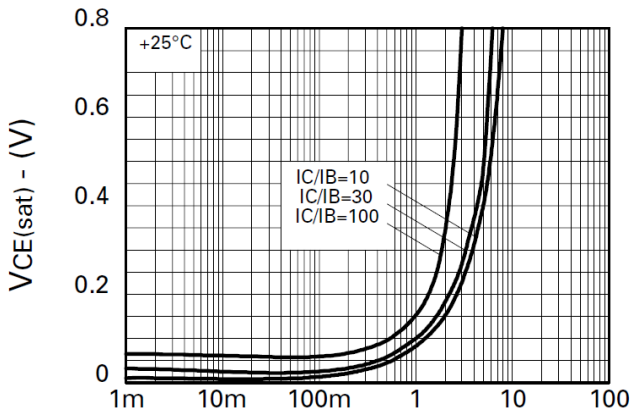


Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

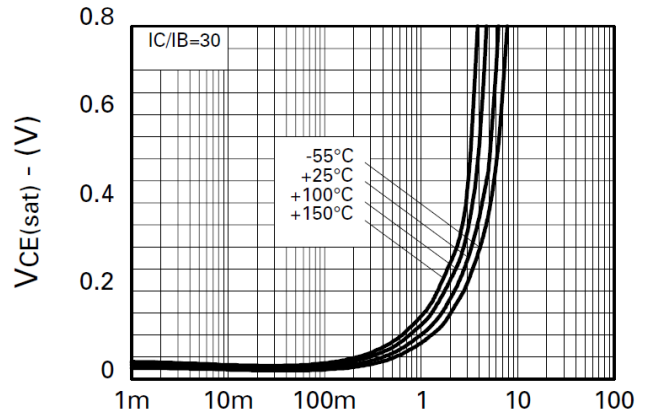
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV _{CBO}	150	250	—	V	I _C = 100μA
Collector-Emitter Breakdown Voltage	BV _{CES}	150	250	—	V	I _C = 100μA
Collector-Emitter Breakdown Voltage (Note 11)	BV _{CEO}	75	100	—	V	I _C = 10mA
Collector-Emitter Breakdown Voltage	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 (Note 11)	h _{FE}	270	440	—	—	I _C = 10mA, V _{CE} = 2V
		300	450	1200		I _C = 0.5A, V _{CE} = 2V
		300	450	—		I _C = 1A, V _{CE} = 2V
		40	60	—		I _C = 4.5A, V _{CE} = 2V
		—	20	—		I _C = 10A, V _{CE} = 2V
Collector-Emitter Saturation Voltage (Note 11)	V _{CE(SAT)}	—	21	30	mV	I _C = 0.2A, I _B = 20mA
		—	55	75		I _C = 0.5A, I _B = 20mA
		—	150	200		I _C = 1A, I _B = 10mA
		—	160	210		I _C = 2A, I _B = 100mA
		—	350	440		I _C = 4.5A, I _B = 200mA
Base-Emitter Saturation Voltage (Note 11)	V _{BE(SAT)}	—	900	1000	mV	I _C = 3A, I _B = 100mA
Base-Emitter Turn-on Voltage (Note 11)	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: 11. Measured under pulsed conditions. Pulse width = 300μs. Duty cycle ≤ 2%.

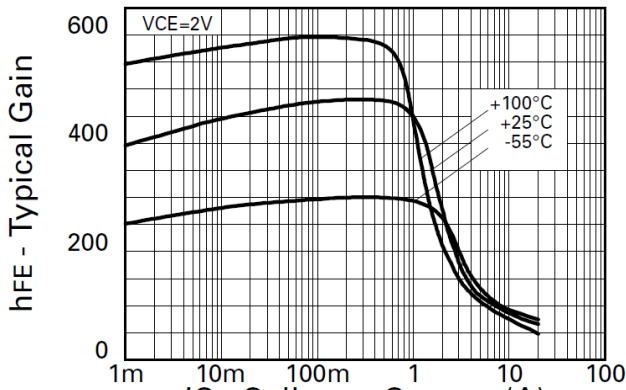
Typical Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)



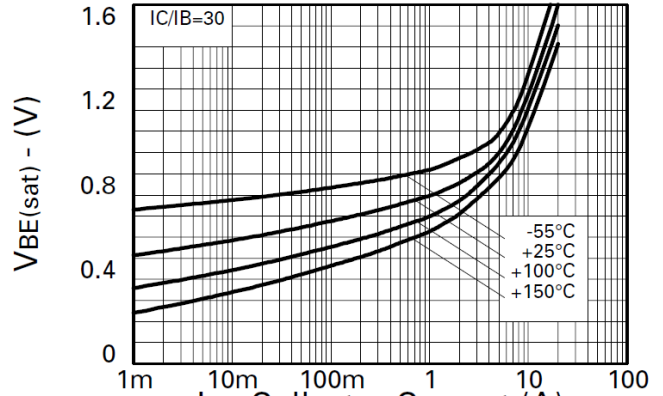
$V_{CE(sat)}$ v I_C



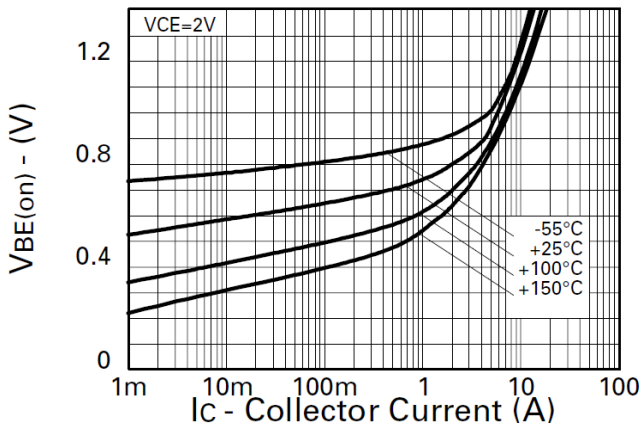
$V_{CE(sat)}$ v I_C



h_{FE} v I_C



$V_{BE(sat)}$ v I_C

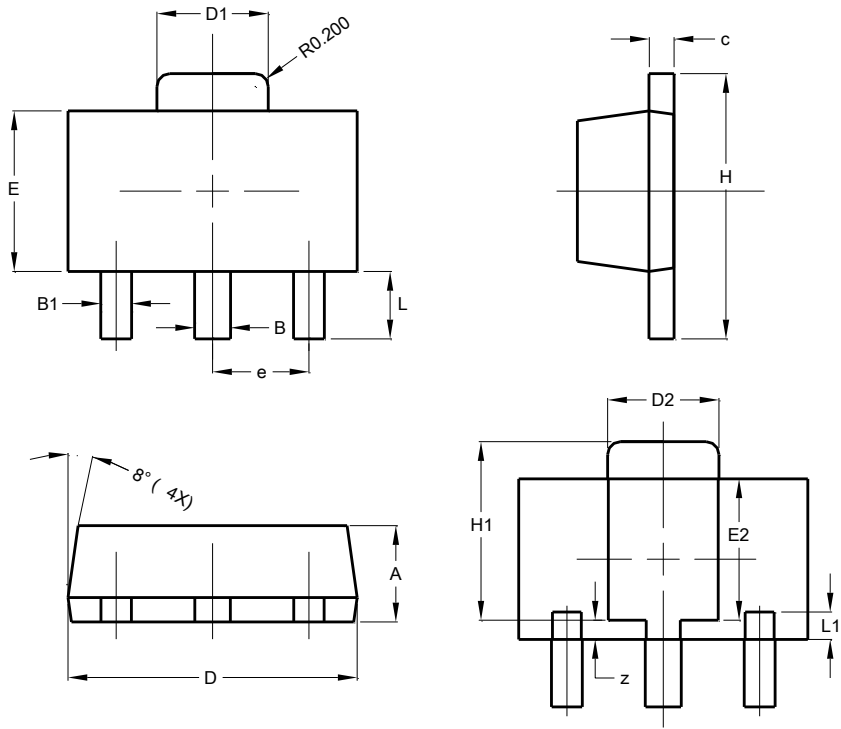


$V_{BE(on)}$ v I_C

Package Outline Dimensions

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

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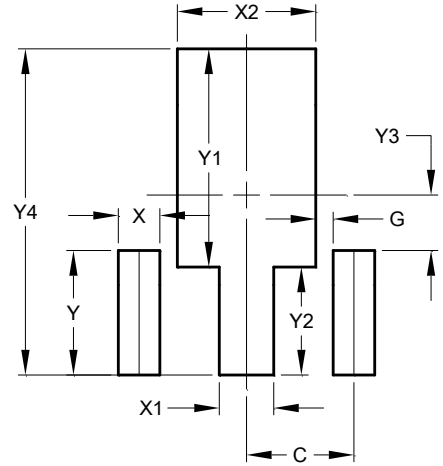


SOT89			
Dim	Min	Max	Typ
A	1.40	1.60	1.50
B	0.50	0.62	0.56
B1	0.42	0.54	0.48
c	0.35	0.43	0.38
D	4.40	4.60	4.50
D1	1.62	1.83	1.733
D2	1.61	1.81	1.71
E	2.40	2.60	2.50
E2	2.05	2.35	2.20
e	-	-	1.50
H	3.95	4.25	4.10
H1	2.63	2.93	2.78
L	0.90	1.20	1.05
L1	0.327	0.527	0.427
z	0.20	0.40	0.30
All Dimensions in mm			

Suggested Pad Layout

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

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Dimensions	Value (in mm)
C	1.500
G	0.244
X	0.580
X1	0.760
X2	1.933
Y	1.730
Y1	3.030
Y2	1.500
Y3	0.770
Y4	4.530

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