

FCX458
400V NPN HIGH VOLTAGE TRANSISTOR IN SOT89

Features

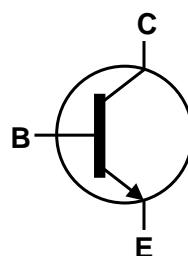
- $BV_{CEO} > 400V$
- $I_C = 225mA$ Continuous Collector Current
- $I_{CM} = 500mA$ Peak Pulse Current
- Excellent h_{FE} Characteristics up to 100mA
- Low saturation voltage $V_{CE(sat)} < 200mV$ @ 20mA
- Complementary PNP Type: FCX558
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- Halogen and Antimony Free. "Green" Device (Note 3)
- Qualified to AEC-Q101 Standards for High Reliability

Mechanical Data

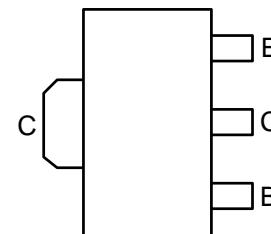
- Case: SOT89
- Case Material: Molded Plastic. "Green" Molding Compound.
- UL Flammability Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish - Matte Tin Plated Leads, Solderable per MIL-STD-202, Method 208 (e3)
- Weight: 0.055 grams (Approximate)



Top View



Equivalent Circuit

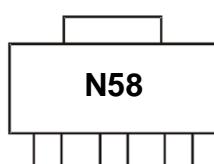
Top View
Pin-Out

Ordering Information (Note 4)

Product	Compliance	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
FCX458TA	AEC-Q101	N58	7	12mm	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. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

Marking Information



N58 = 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}	400	V
Collector-Emitter Voltage	V_{CEO}	400	V
Emitter-Base Voltage	V_{EBO}	7	V
Continuous Collector Current	I_C	225	mA
Peak Pulse Current	I_{CM}	500	mA
Base Current	I_B	200	mA

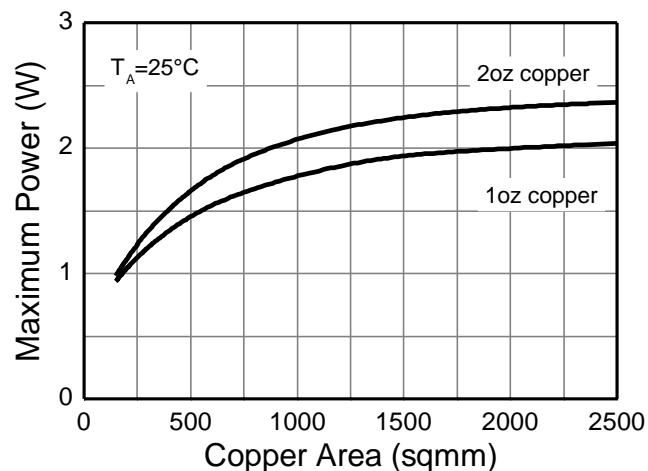
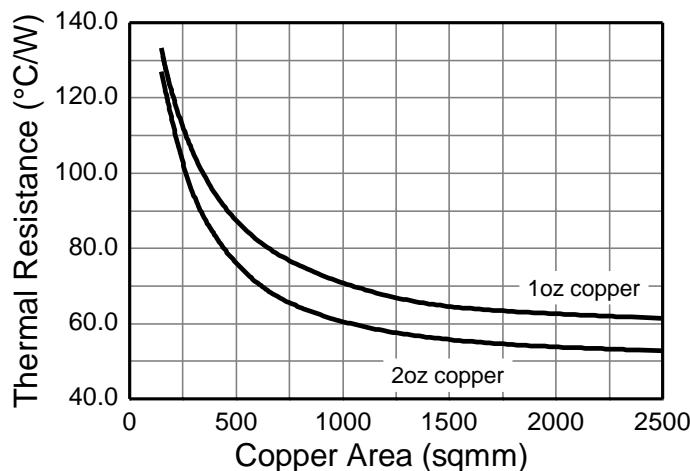
Thermal Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Power Dissipation	P_D	0.7	W
		1.0	
		1.5	
		2.0	
Thermal Resistance, Junction to Ambient Air	$R_{\theta JA}$	178	°C/W
		125	
		83	
		60	
Thermal Resistance, Junction to Lead	$R_{\theta JL}$	22	
Operating and Storage Temperature Range	T_J, T_{STG}	-65 to +150	°C

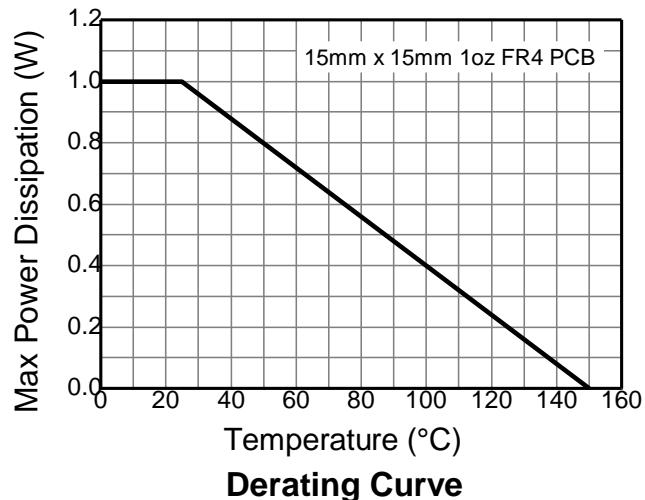
ESD Ratings (Note 10)

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

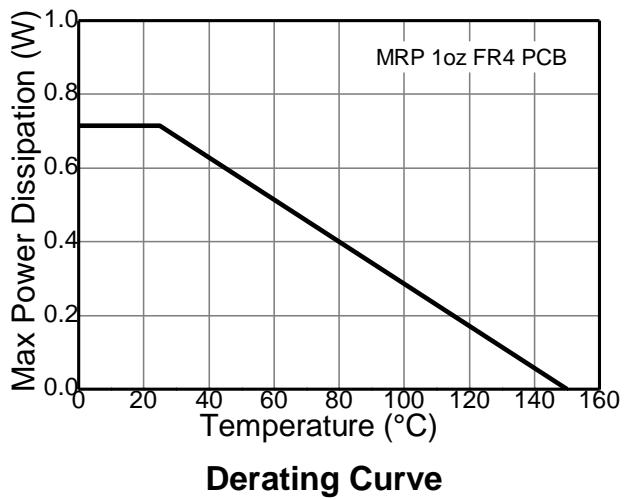
- Notes:
- 5. For a device mounted with the exposed collector pad on minimum recommended pad layout (MRP) 1oz copper that is on a single-sided 1.6mm FR4 PCB; device is measured under still air conditions whilst operating in a steady-state.
 - 6. Same as Note 5, except the device is mounted with the exposed collector pad on 15mm x 15mm 1oz copper.
 - 7. Same as Note 5, except the device is mounted with the exposed collector pad on 25mm x 25mm 1oz copper.
 - 8. Same as Note 5, except the device is mounted with the exposed collector pad 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


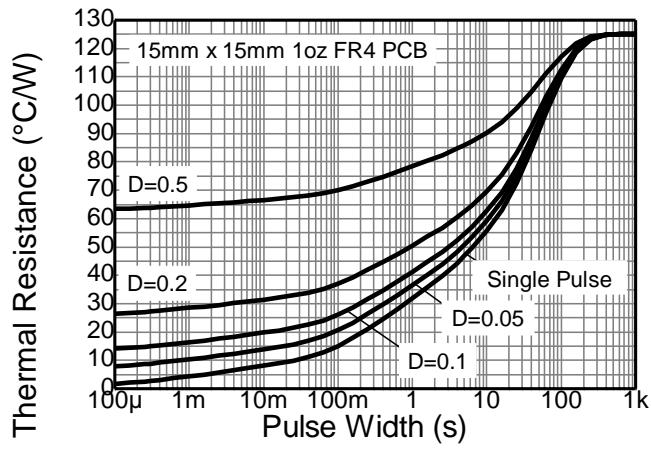
Thermal Characteristics and Derating Information (cont.)



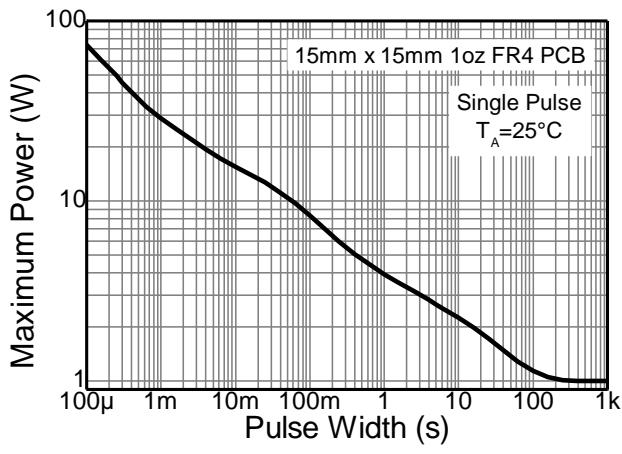
Derating Curve



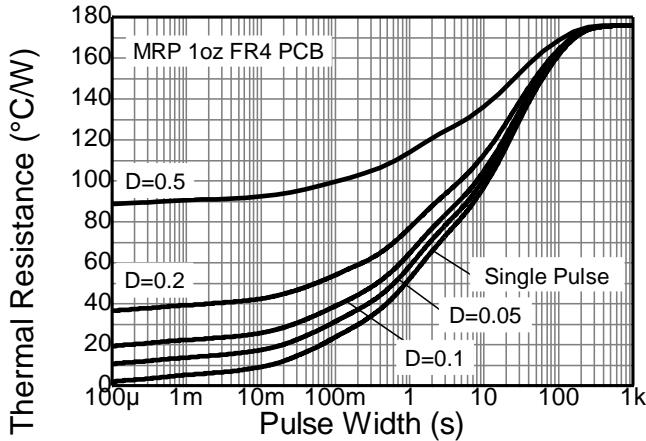
Derating Curve



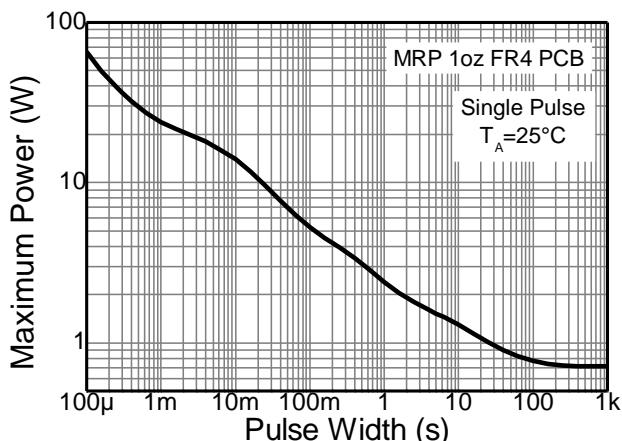
Transient Thermal Impedance



Pulse Power Dissipation



Transient Thermal Impedance



Pulse Power Dissipation

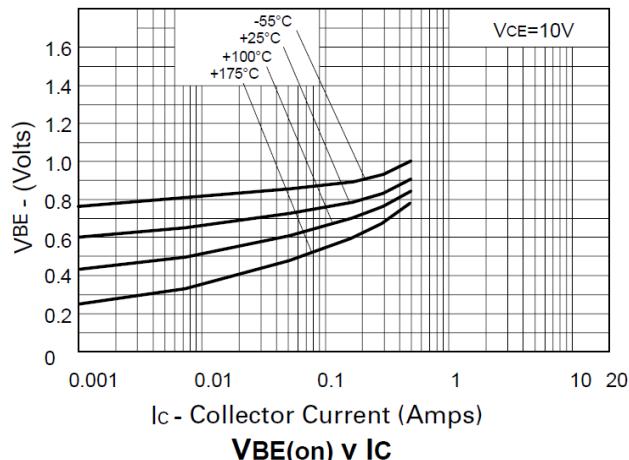
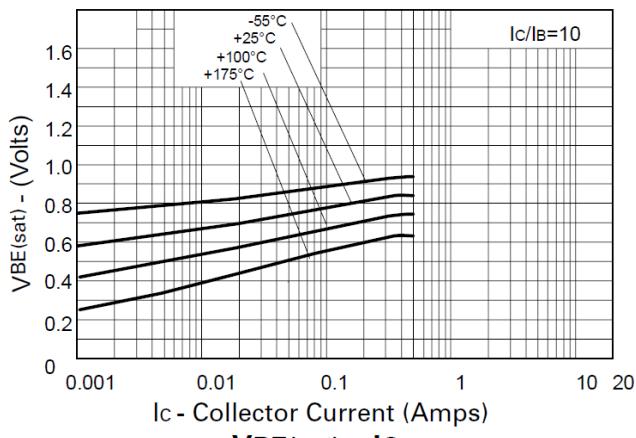
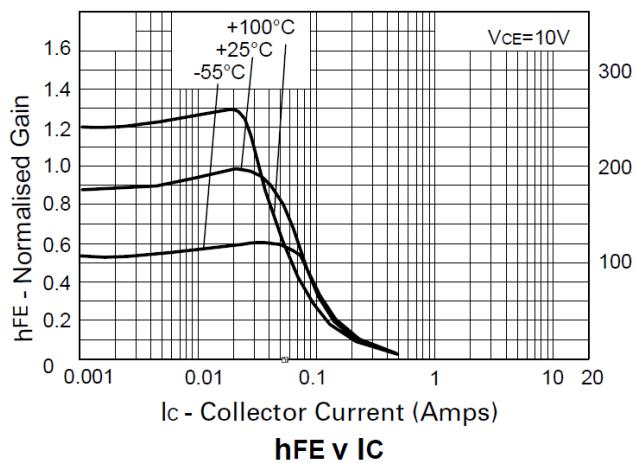
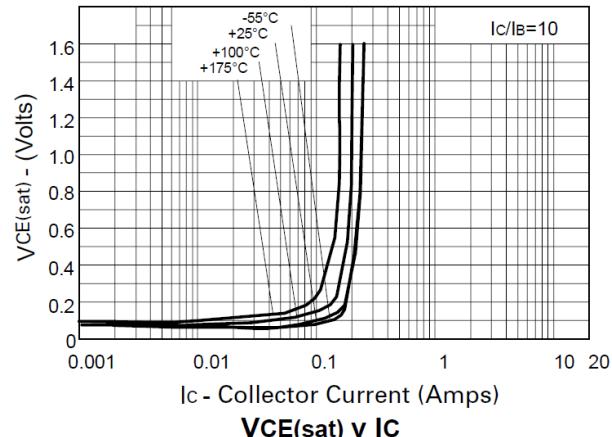
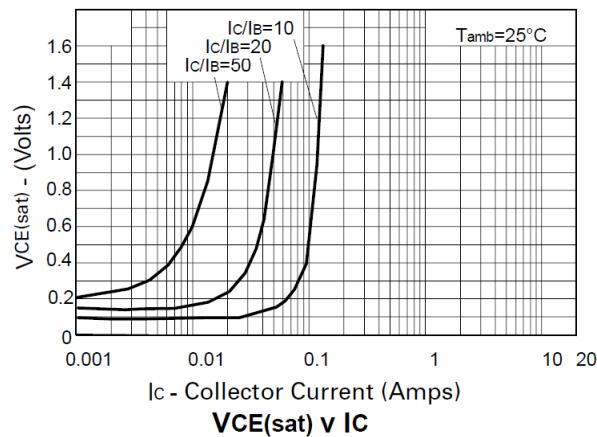
FCX458

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV _{CBO}	400	—	—	V	I _C = 100µA
Collector-Emitter Breakdown Voltage (Note 11)	BV _{CEO}	400	—	—	V	I _C = 1mA
Emitter-Base Breakdown Voltage	BV _{EBO}	7	—	—	V	I _E = 100µA
Collector-Base Cutoff Current	I _{CBO}	—	<1	100	nA	V _{CB} = 320V
Collector Cutoff Current	I _{CES}	—	<1	100	nA	V _{CES} = 320V
Emitter Cutoff Current	I _{EBO}	—	<1	100	nA	V _{EB} = 5.6V
Collector-Emitter Saturation Voltage (Note 11)	V _{CES(sat)}	—	—	200	mV	I _C = 20mA, I _B = 2mA
		—	—	500		I _C = 50mA, I _B = 6mA
Base-Emitter Saturation Voltage (Note 11)	V _{BE(sat)}	—	—	900	mV	I _C = 50mA, I _B = 5mA
Base-Emitter Turn-On Voltage (Note 11)	V _{BE(on)}	—	—	900	mV	I _C = 50mA, V _{CE} = 10V
DC Current Gain (Note 11)	h _{FE}	100 100 15	—	300	—	I _C = 1mA, V _{CE} = 10V I _C = 50mA, V _{CE} = 10V I _C = 100mA, V _{CE} = 10V
Transitional Frequency	f _T	50	—	—	MHz	I _C = 10mA, V _{CE} = 20V, f = 20MHz
Output Capacitance	C _{obo}	—	—	5	pF	V _{CB} = 20V. f = 1MHz
Turn-On Time	t _{on}	—	135	—	ns	I _C = 50mA, V _{CE} = 100V, I _{B1} = 5mA, I _{B2} = -10mA
Turn-Off Time	t _{off}	—	2260	—	ns	

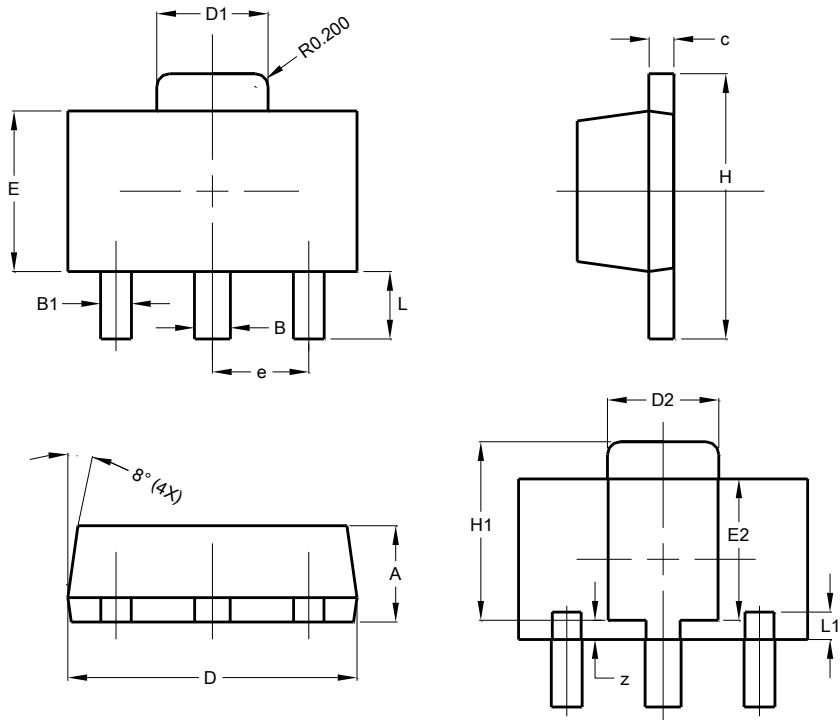
Note: 11. Measured under pulsed conditions. Pulse width ≤ 300µs. Duty cycle ≤ 2%

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



Package Outline Dimensions

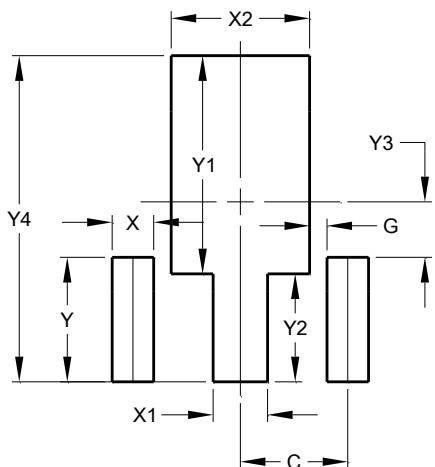
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.



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	0.427 REF		
Z	0.30 REF		
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)
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

Note: For high voltage applications, the appropriate industry sector guidelines should be considered with regards to creepage and clearance distances between device terminals and PCB tracking.

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