

**FMMT458**

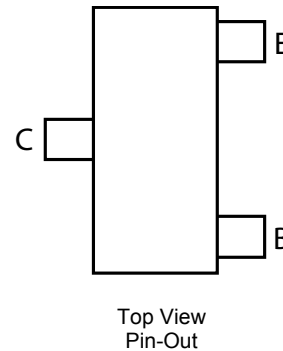
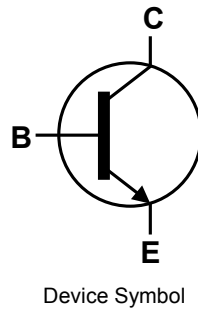
**400V NPN HIGH VOLTAGE TRANSISTOR IN SOT23**

**Features**

- $BV_{CEO} > 400V$
- $I_C = 225mA$  high Continuous Collector Current
- $I_{CM} = 1A$  Peak Pulse Current
- 500mW Power Dissipation
- Excellent  $h_{FE}$  Characteristics Up To 100mA
- Complementary PNP Type: FMMT558
- **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)**

**Mechanical Data**

- Case: SOT23
- UL Flammability Rating 94V-0
- Case material: Molded Plastic. "Green" Molding Compound.
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish - Matte Tin Plated Leads, Solderable per MIL-STD-202, Method 208 **Ⓒ3**
- Weight: 0.008 grams (Approximate)

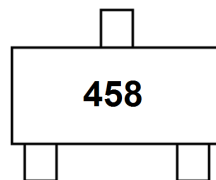


**Ordering Information** (Notes 4 & 5)

Part Number	Compliance	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
FMMT458TA	AEC-Q101	458	7	8	3,000
FMMT458QTA	Automotive	458	7	8	3,000

- 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> 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. Automotive, AEC-Q101 and standard products are electrically and thermally the same, except where specified.
  5. For packaging details, go to our website at <http://www.diodes.com>.

**Marking Information**



458 = Product Type Marking Code

**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	$I_{CM}$	1	A
Base Current	$I_B$	200	mA

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

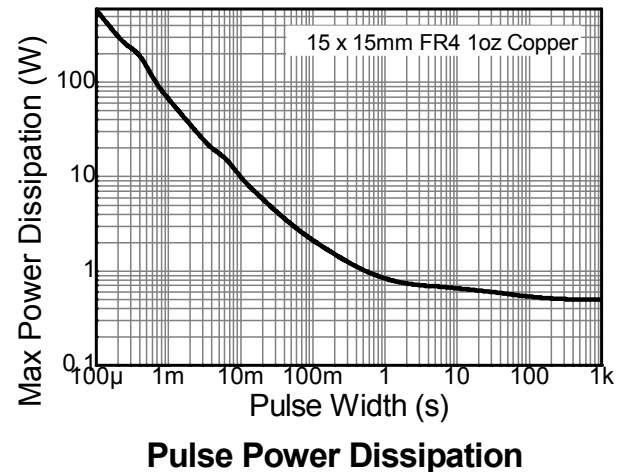
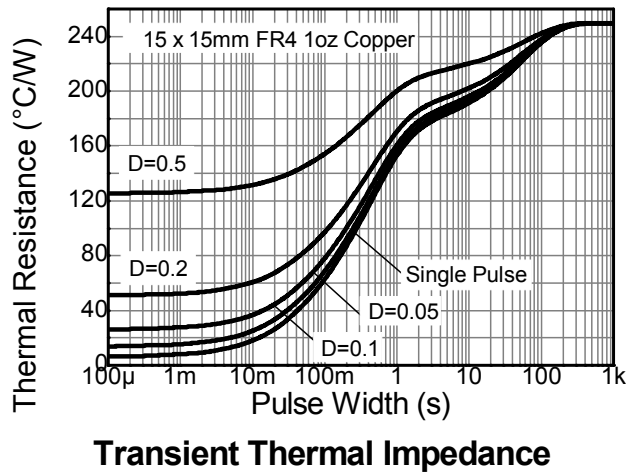
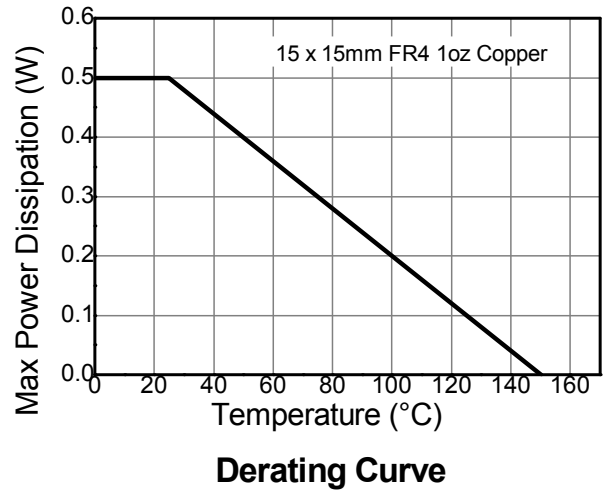
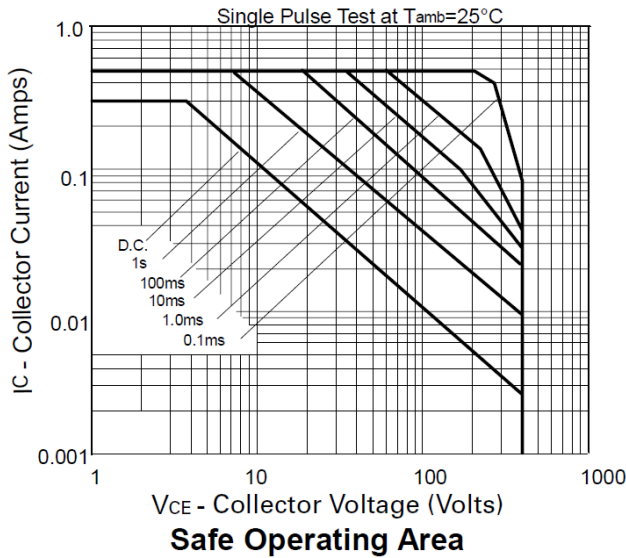
Characteristic	Symbol	Value	Unit
Power Dissipation (Note 6)	$P_D$	500	mW
Thermal Resistance, Junction to Ambient (Note 6)	$R_{\theta JA}$	250	$^\circ\text{C}/\text{W}$
Thermal Resistance, Junction to Lead (Note 7)	$R_{\theta JL}$	197	$^\circ\text{C}/\text{W}$
Operating and Storage Temperature Range	$T_J, T_{STG}$	-55 to +150	$^\circ\text{C}$

**ESD Ratings** (Note 8)

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

- Notes:
6. For a device surface mounted on 15mm X 15mm X 1.6mm FR4 PCB with high coverage of single sided 1 oz copper, in still air conditions.
  7. Thermal resistance from junction to solder-point (at the end of the collector lead).
  8. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

**Thermal Characteristics and Derating Information**

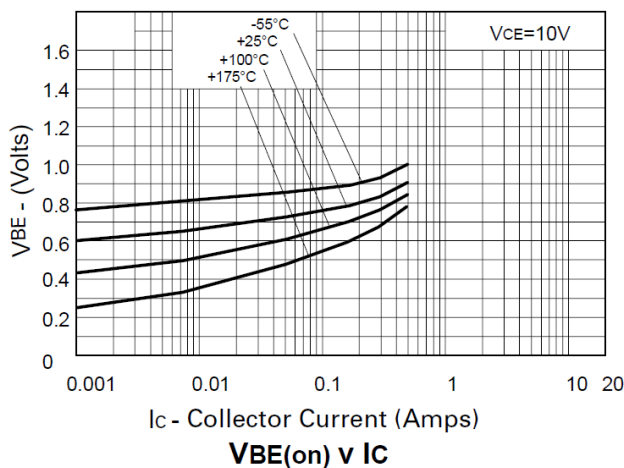
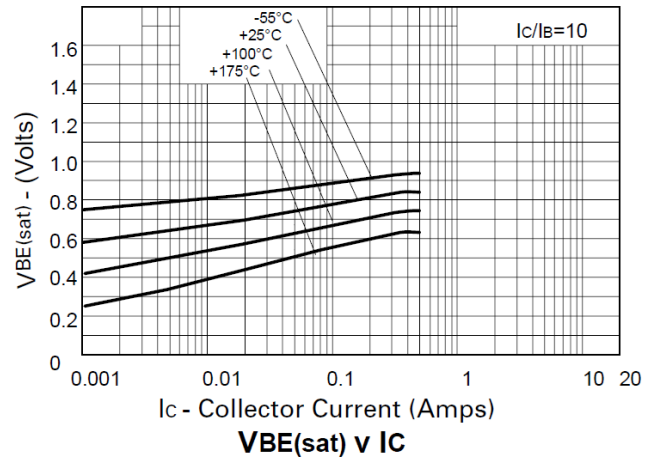
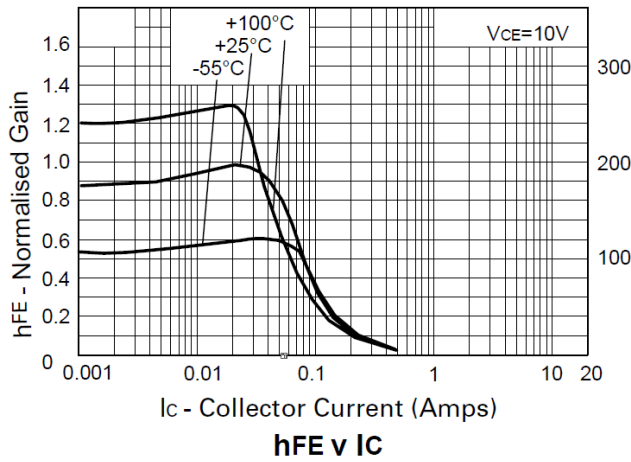
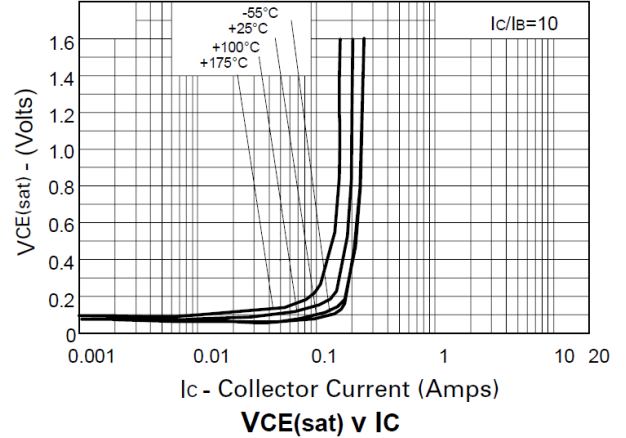
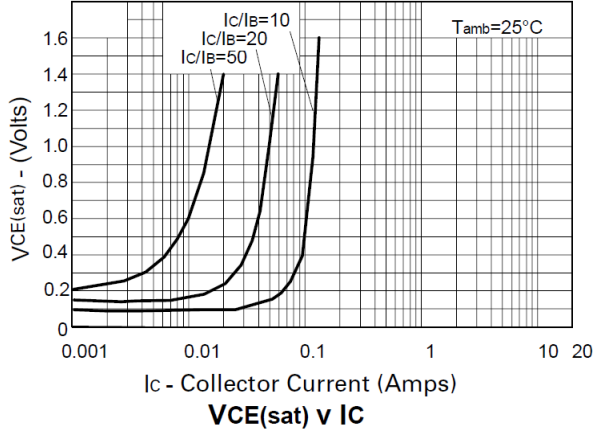


**Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV <sub>CBO</sub>	400	—	—	V	I <sub>C</sub> = 100μA
Collector-Emitter Breakdown Voltage (Note 9)	BV <sub>CEO</sub>	400	—	—	V	I <sub>C</sub> = 1mA
Emitter-Base Breakdown Voltage	BV <sub>EBO</sub>	7	—	—	V	I <sub>E</sub> = 100μA
Collector Cutoff Current	I <sub>CBO</sub>	—	—	100	nA	V <sub>CB</sub> = 320V
Emitter Cutoff Current	I <sub>EBO</sub>	—	—	100	nA	V <sub>EB</sub> = 5.6V
Collector Emitter Cutoff Current	I <sub>CES</sub>	—	—	100	nA	V <sub>CE</sub> = 320V
Static Forward Current Transfer Ratio (Note 9)	h <sub>FE</sub>	100 100 15	—	300	—	I <sub>C</sub> = 1mA, V <sub>CE</sub> = 10V I <sub>C</sub> = 50mA, V <sub>CE</sub> = 10V I <sub>C</sub> = 100mA, V <sub>CE</sub> = 10V
Collector-Emitter Saturation Voltage (Note 9)	V <sub>CE(sat)</sub>	—	—	200 500	mV mV	I <sub>C</sub> = 20mA, I <sub>B</sub> = 2mA I <sub>C</sub> = 50mA, I <sub>B</sub> = 6mA
Base-Emitter Turn-On Voltage(Note 9)	V <sub>BE(on)</sub>	—	—	0.9	V	I <sub>C</sub> = 50mA, V <sub>CE</sub> = 10V
Base-Emitter Saturation Voltage(Note 9)	V <sub>BE(sat)</sub>	—	—	0.9	V	I <sub>C</sub> = 50mA, I <sub>B</sub> = 5mA
Output Capacitance	C <sub>obo</sub>	—	—	5	pF	V <sub>CB</sub> = 20V. f = 1MHz
Transition Frequency	f <sub>T</sub>	50	—	—	MHz	V <sub>CE</sub> = 20V, I <sub>C</sub> = 10mA, f = 20MHz
Turn-On Time	t <sub>on</sub>	—	135	—	ns	V <sub>CE</sub> = 100V, I <sub>C</sub> = 50mA
Turn-Off Time	t <sub>off</sub>	—	2260	—	ns	I <sub>B1</sub> = 5mA, I <sub>B2</sub> = -10mA

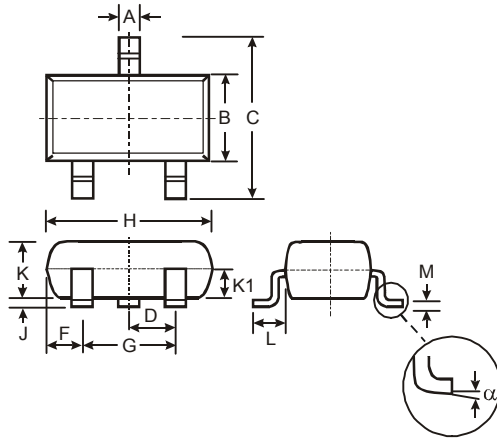
Notes: 9. Measured under pulsed conditions. Pulse width ≤ 300 μs. Duty cycle ≤ 2%.

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



### Package Outline Dimensions

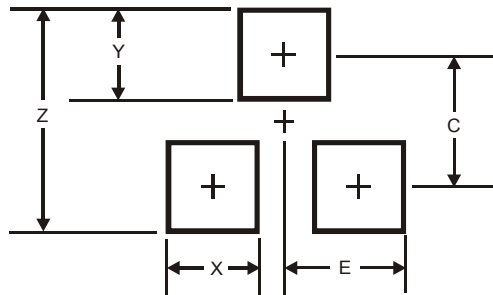
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



SOT23			
Dim	Min	Max	Typ
A	0.37	0.51	0.40
B	1.20	1.40	1.30
C	2.30	2.50	2.40
D	0.89	1.03	0.915
F	0.45	0.60	0.535
G	1.78	2.05	1.83
H	2.80	3.00	2.90
J	0.013	0.10	0.05
K	0.903	1.10	1.00
K1	-	-	0.400
L	0.45	0.61	0.55
M	0.085	0.18	0.11
α	0°	8°	-
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)
Z	2.9
X	0.8
Y	0.9
C	2.0
E	1.35

Note: For high voltage applications, the appropriate industry sector guidelines should be considered with regards to voltage spacing between terminals.

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