





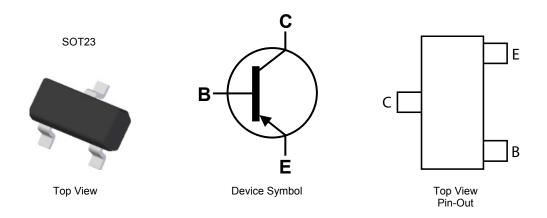
#### **400V PNP HIGH VOLTAGE TRANSISTOR IN SOT23**

#### **Features**

- BV<sub>CEO</sub> > -400V
- I<sub>C</sub> = -150mA high Continuous Collector Current
- I<sub>CM</sub> = -500mA Peak Pulse Current
- 500mW Power Dissipation
- Excellent h<sub>FE</sub> Characteristics Up To -100mA
- Complementary NPN Type: FMMT458
- Totally Lead-Free & Fully RoHS compliant (Note 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
- Case material: molded plastic. "Green" molding compound.
- UL Flammability Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Weight: 0.008 grams (Approximate)



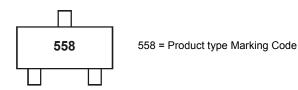
#### Ordering Information (Notes 4 & 5)

Product	Compliance	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
FMMT558TA	AEC-Q101	558	7	8	3,000
FMMT558QTA	Automotive	558	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**





# Maximum Ratings (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V <sub>CBO</sub>	-400	V
Collector-Emitter Voltage	V <sub>CEO</sub>	-400	V
Emitter-Base Voltage	V <sub>EBO</sub>	-7	V
Continuous Collector Current	I <sub>C</sub>	-150	mA
Peak Pulse Current	I <sub>CM</sub>	-500	mA
Base Current	I <sub>B</sub>	-200	mA

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

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 6)	P <sub>D</sub>	500	mW
Thermal Resistance, Junction to Ambient (Note 6)	$R_{ hetaJA}$	250	°C/W
Thermal Resistance, Junction to Lead (Note 7)	$R_{ heta JL}$	197	°C/W
Operating and Storage Temperature Range	$T_{J_1}T_{STG}$	-55 to +150	°C

#### ESD Ratings (Note 8)

Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge - Human Body Model	ESD HBM	≥ 8,000	V	3B
Electrostatic Discharge - Machine Model	ESD MM	≥ 400	V	С

Notes:

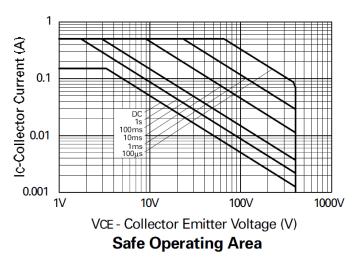
- 6. For a device surface mounted on 15mm X 15mm X 1.6mm FR4 PCB with high coverage of single sided 1 oz copper, in still air conditions 7. Thermal resistance from junction to solder-point (at the end of the collector lead).

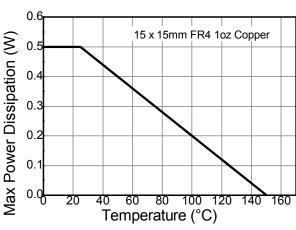
  8. Refer to JEDEC specification JESD22-A114 and JESD22-A115.



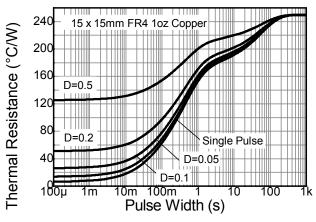


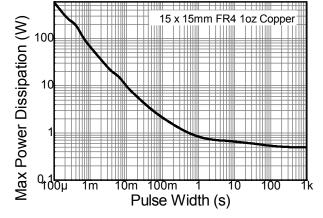
## **Thermal Characteristics and Derating information**





# **Derating Curve**





**Transient Thermal Impedance** 

**Pulse Power Dissipation** 



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

Characteristic	Symbol	Min	Тур	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV <sub>CBO</sub>	-400	-	-	V	$I_{C} = -100 \mu A$
Collector-Emitter Breakdown Voltage (Note 9)	BV <sub>CEO</sub>	-400	-	-	V	$I_C = -1mA$
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 -	-	$I_C$ = -1mA, $V_{CE}$ = -10V $I_C$ = -50mA, $V_{CE}$ = -10V $I_C$ = -100mA, $V_{CE}$ = -10V
Collector-Emitter Saturation Voltage (Note 9)	V <sub>CE(sat)</sub>		-	-200 -500	mV mV	$I_C = -20$ mA, $I_B = -2$ mA $I_C = -50$ mA, $I_B = -6$ mA
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	$I_{\rm C}$ = -50mA, $I_{\rm B}$ = -5mA
Output Capacitance	$C_obo$	-	-	5	pF	V <sub>CB</sub> = -20V, f = 1MHz
Transition Frequency	f <sub>T</sub>	50	-	-	MHz	$V_{CE} = -20V, I_{C} = -10mA,$ f = 20MHz
Turn-On Time	t <sub>on</sub>	-	95	-	ns	$V_{CE} = -100V, I_{C} = -50mA$
Turn-Off Time	t <sub>off</sub>	-	1600	-	ns	$I_{B1} = 5mA$ , $I_{B2} = -10mA$

Notes: 9. Measured under pulsed conditions. Pulse width  $\leq$  300 $\mu$ s. Duty cycle  $\leq$  2%



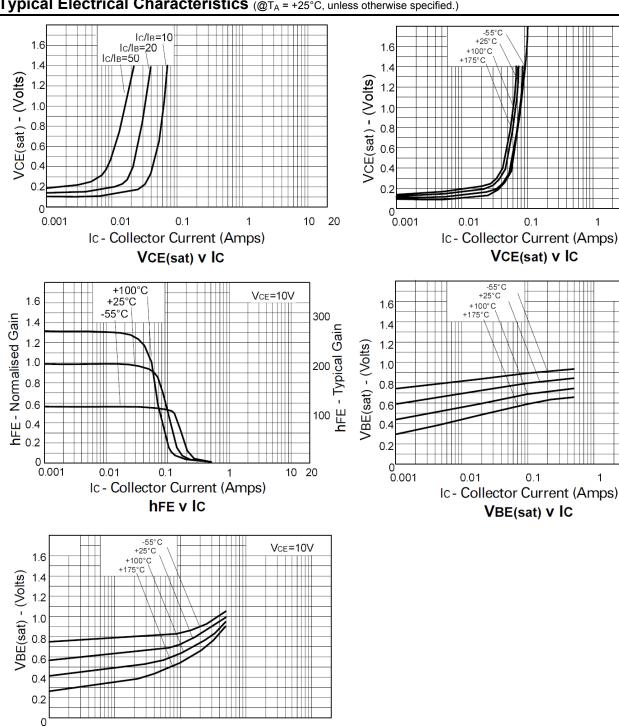
Ic/I<sub>B</sub>=10

10 20

10 20

 $I_C/I_B=10$ 

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



0.1

Ic - Collector Current (Amps) VBE(on) v IC

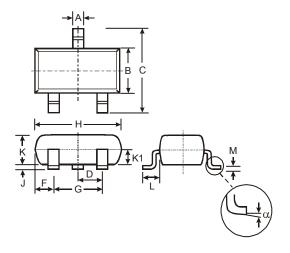
0.001

10 20



# **Package Outline Dimensions**

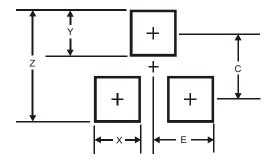
Please see AP02002 at http://www.diodes.com/datasheets/ap02002.pdf for latest version.



SOT23					
Dim	Min	Max	Тур		
Α	0.37	0.51	0.40		
В	1.20	1.40	1.30		
С	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		
Н	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		
М	0.085	0.18	0.11		
α	0°	8°	-		
All	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			
С	2.0			
Е	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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