FMMT489

30V NPN MEDIUM POWER TRANSISTOR IN SOT23

Features

- BV_{CEO} > 30V
- I_C = 1A high Continuous Collector Current
- I_{CM} Up to 4A Peak Pulse Current
- Excellent h_{FE} Characteristics Up To 4A
- R_{SAT} = 175mΩ @ 1A for a Low Equivalent On-Resistance
- Low Saturation Voltage < 300mV @ 1A
- 500mW Power Dissipation
- Complementary PNP Type: FMMT589
- **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**

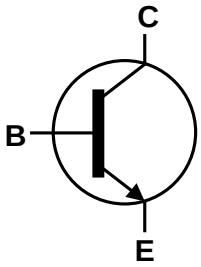
Mechanical Data

- Case: SOT-23
- 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: 0.008 grams (Approximate)

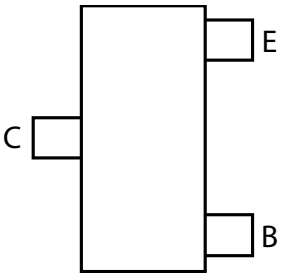
SOT23



Top View



Device Symbol



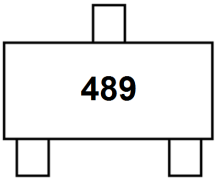
Top View
Pin-Out

Ordering Information (Note 4)

Product	Marking	Reel Size (inches)	Tape Width (mm)	Quantity per Reel
FMMT489TA	489	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/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



489 = Product Type Marking Code

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

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V_{CBO}	50	V
Collector-Emitter Voltage	V_{CEO}	30	V
Emitter-Base Voltage	V_{EBO}	7	V
Continuous Collector Current	I_C	1	A
Peak Pulse Current	I_{CM}	4	A
Base Current	I_B	200	mA

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

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 5)	P_D	500	mW
Thermal Resistance, Junction to Ambient (Note 5)	$R_{\theta JA}$	250	°C/W
Thermal Resistance, Junction to Lead (Note 6)	$R_{\theta JL}$	197	°C/W
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	°C

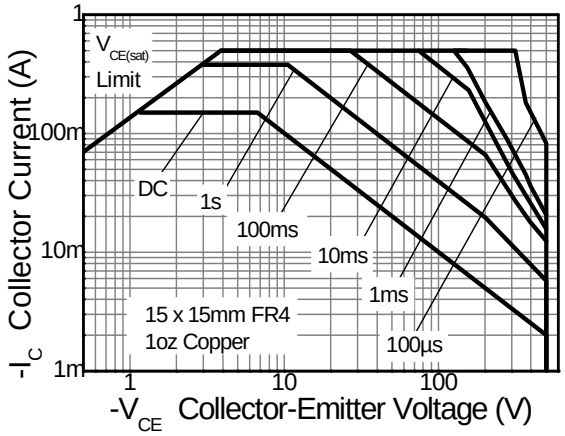
ESD Ratings (Note 7)

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

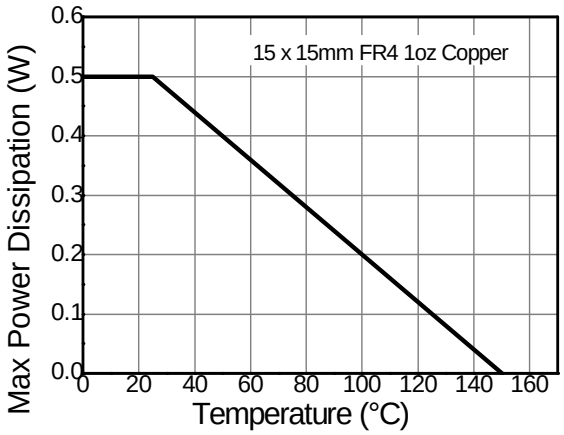
Notes:
5. For a device mounted with the collector lead on 15mm X 15mm 1oz weight copper that is on a single-sided FR4 PCB; device is measured under still air conditions whilst operating in a steady-state.
6. Thermal resistance from junction to solder-point (at the end of the collector lead).
7. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

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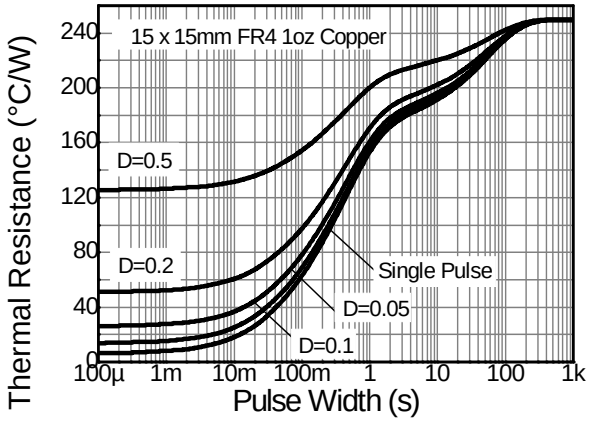
Thermal Characteristics and Derating Information



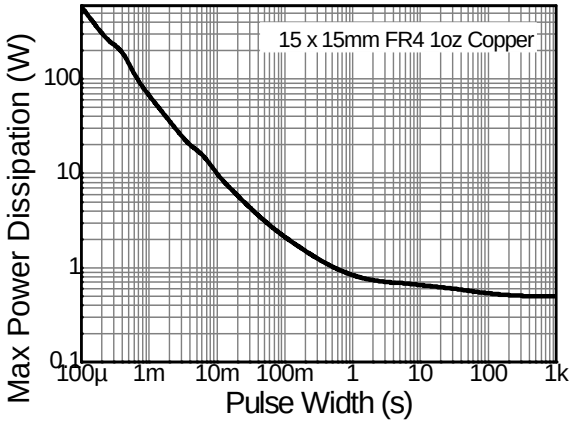
Safe Operating Area



Derating Curve



Transient Thermal Impedance



Pulse Power Dissipation

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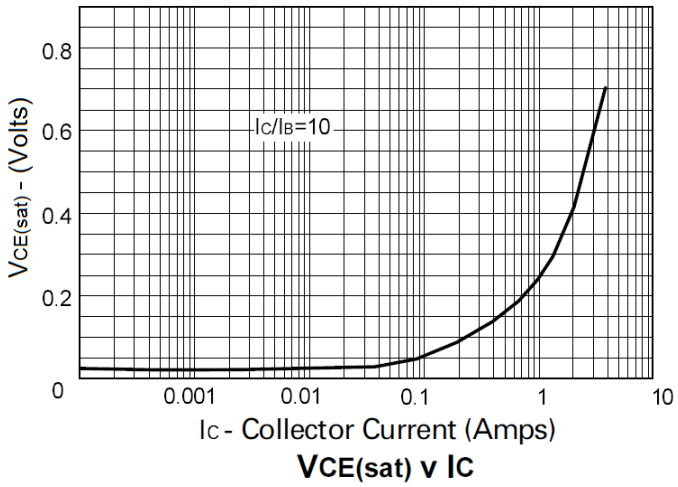
Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV_{CBO}	50		V	I_C = 100 µA
Collector-Emitter Breakdown Voltage (Note 8)	BV_{CEO}	30		V	I_C = 10 mA
Emitter-Base Breakdown Voltage	BV_{EBO}	7		V	I_E = 100 µA
Collector-Base Cutoff Current	I_{CBO}		100	nA	V_{CB} = 30V
Emitter-Base Cutoff Current	I_{EBO}		100	nA	V_{EB} = 6V
Collector-Emitter Cutoff Current	I_{CES}		100	nA	V_{CES}= 30V
Static Forward Current Transfer Ratio (Note 8)	h_{FE}	100 100 60 20	- 300 - -		I_C = 1mA, V_{CE} = 2V I_C = 1A, V_{CE} = 2V I_C = 2A, V_{CE} = 2V I_C = 4A, V_{CE} = 2V
Collector-Emitter Saturation Voltage (Note 8)	$V_{CE(sat)}$		300 600	mV mV	I_C = 1A, I_B = 100mA I_C = 2A, I_B = 200mA
Base-Emitter Turn-On Voltage (Note 8)	$V_{BE(on)}$		1.0	V	I_C = 1A, V_{CE} = 2V
Base-Emitter Saturation Voltage (Note 8)	$V_{BE(sat)}$		1.1	V	I_C = 1A, I_B = 100mA
Output Capacitance	C_{obo}		10	pF	V_{CB} = 10V, f = 1MHz
Transition Frequency	f_T	150		MHz	V_{CE} = 10V, I_C = 50mA, f = 100MHz

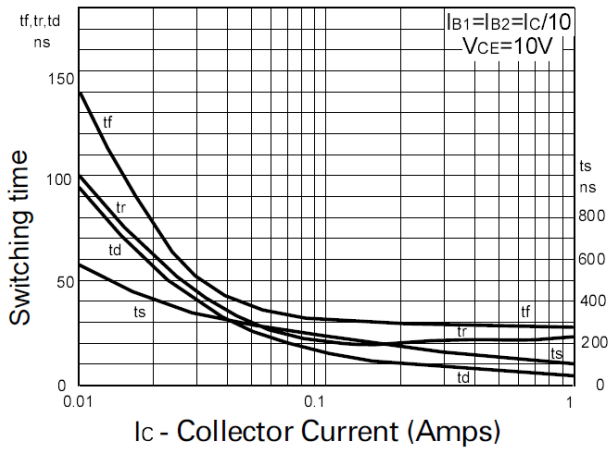
Note: 8. Measured under pulsed conditions. Pulse width ≤ 300µs. Duty cycle ≤ 2%

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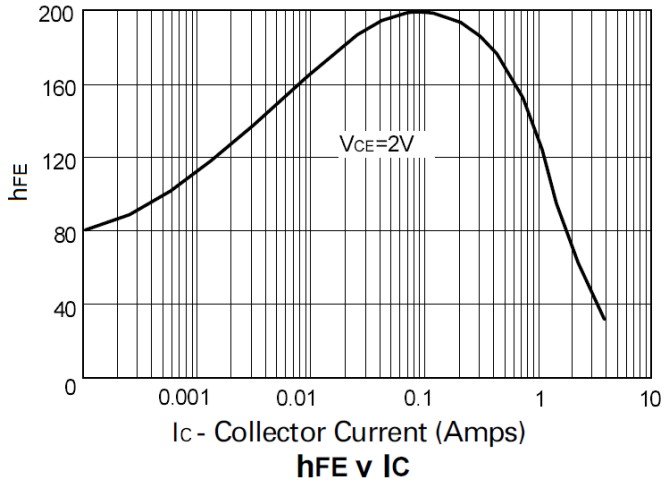
Typical Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)



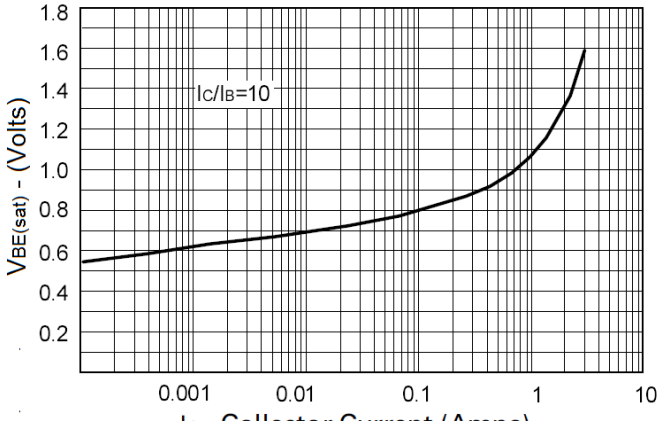
VCE(sat) v IC



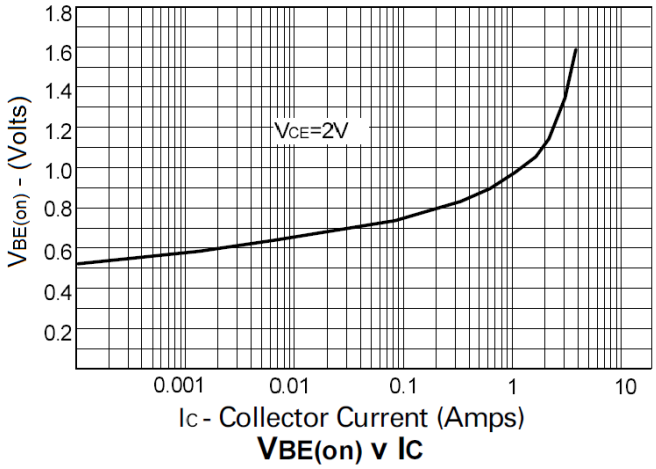
Switching Speeds



hFE v IC



VBE(sat) v IC

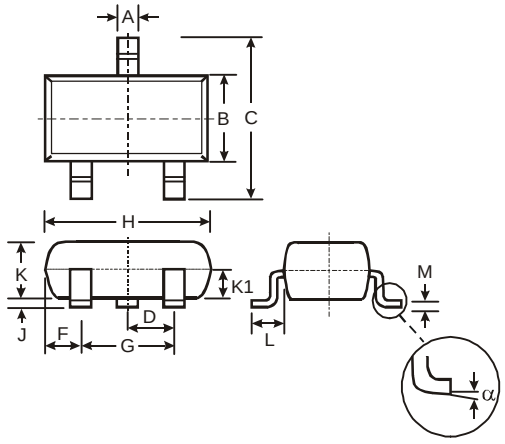


VBE(on) v IC

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Package Outline Dimensions

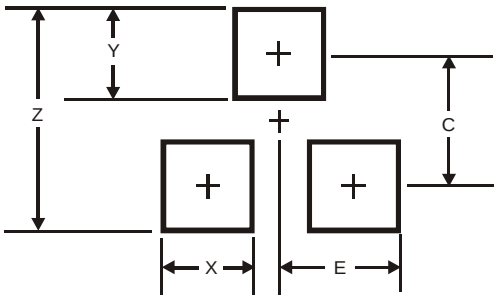
Please see AP02002 at http://www.diodes.com/datasheets/ap02002.pdf for latest version.



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

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