

Description

This bipolar junction transistor (BJT) has been designed to meet the stringent requirements of automotive applications.

Features

- $BV_{CEO} > -500V$
- $I_C = -150mA$ high Continuous Collector Current
- I_{CM} Up to $-500mA$ Peak Pulse Current
- Excellent h_{FE} Characteristics up to $I_C = -100mA$
- **Totally Lead-Free & Fully RoHS compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **The FMMT560Q is suitable for automotive applications requiring specific change control; this part is AEC-Q101 qualified, PPAP capable, and manufactured in IATF16949 certified facilities.**

<https://www.diodes.com/quality/product-definitions/>

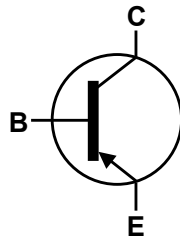
Mechanical Data

- Case: SOT23
- Case Material: Molded Plastic, "Green" Molding Compound
UL Flammability Classification 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 0.008 grams (Approximate)

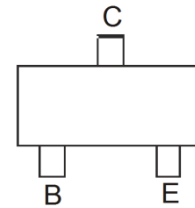
SOT23



Top View



Device Symbol



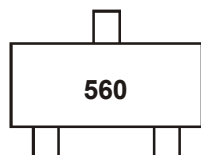
Top View
Pin-Out

Ordering Information (Notes 4)

Product	Compliance	Marking	Reel Size (inches)	Tape Width (mm)	Quantity per Reel
FMMT560QTA	Automotive	560	7	8	3000
FMMT560QTC	Automotive	560	13	8	10,000

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
 2. See <https://www.diodes.com/quality/lead-free/> 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 <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

Marking Information



560 = Product Type Marking Code

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

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V_{CB0}	-500	V
Collector-Emitter Voltage	V_{CEO}	-500	V
Emitter-Base Voltage	V_{EBO}	-7	V
Continuous Collector Current	I_C	-150	mA
Peak Pulse Current	I_{CM}	-500	mA

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

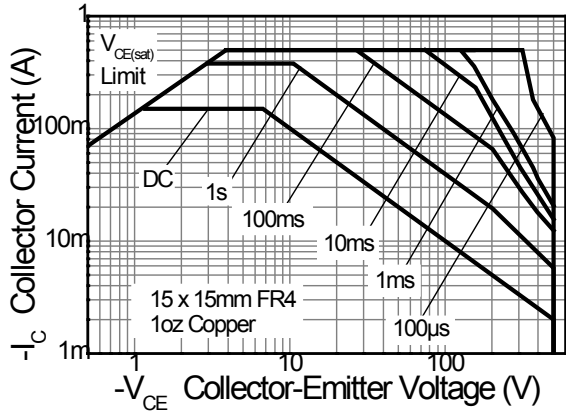
Characteristic	Symbol	Value	Unit
Power Dissipation (Note 5)	P_D	500	mW
Thermal Resistance, Junction to Ambient (Note 5)	$R_{\theta JA}$	250	$^{\circ}\text{C}/\text{W}$
Thermal Resistance, Junction to Lead (Note 6)	$R_{\theta JL}$	194	$^{\circ}\text{C}/\text{W}$
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	$^{\circ}\text{C}$

ESD Ratings (Note 7)

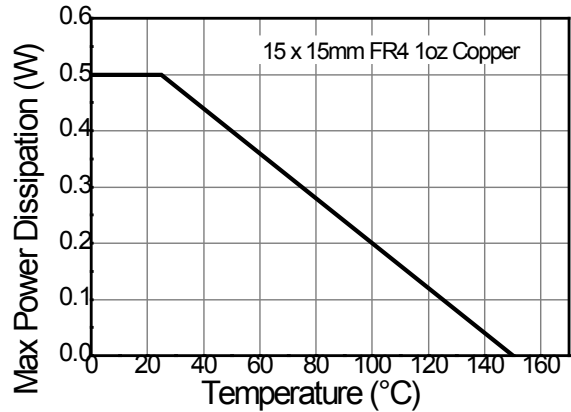
Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge - Human Body Model	ESD HBM	4000	V	3A
Electrostatic Discharge - Machine Model	ESD MM	400	V	C

- Notes:
5. For a device mounted with the collector lead on 15mm × 15mm 1oz 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.

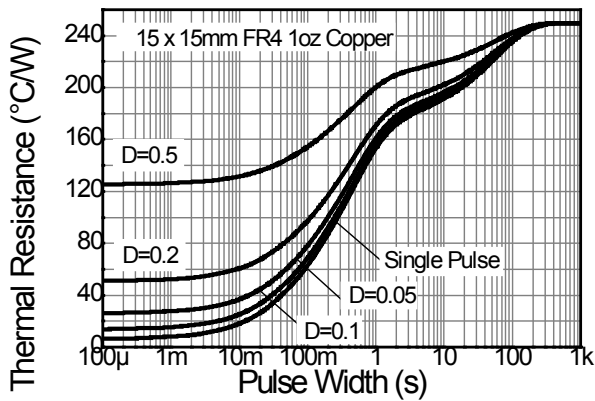
Thermal Characteristics and Derating Information



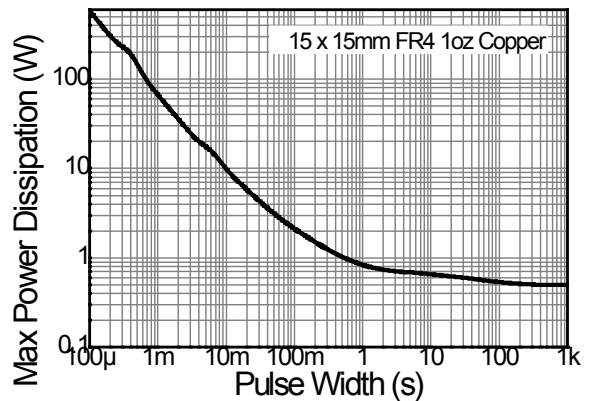
Safe Operating Area



Derating Curve



Transient Thermal Impedance



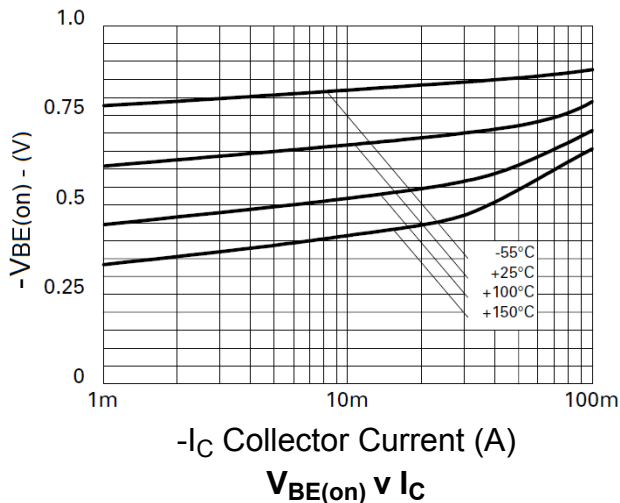
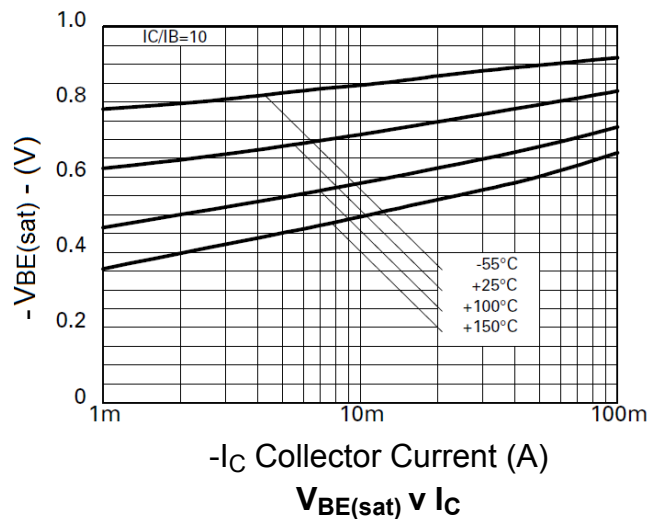
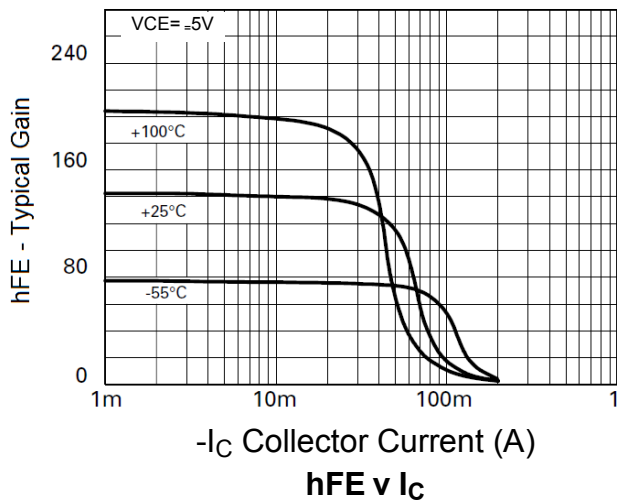
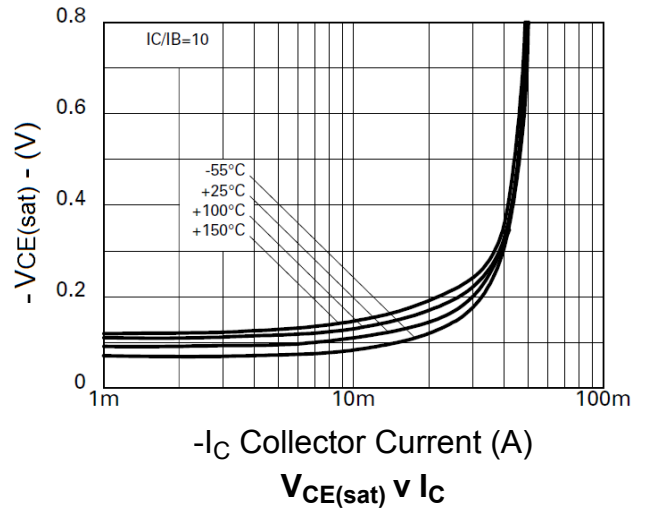
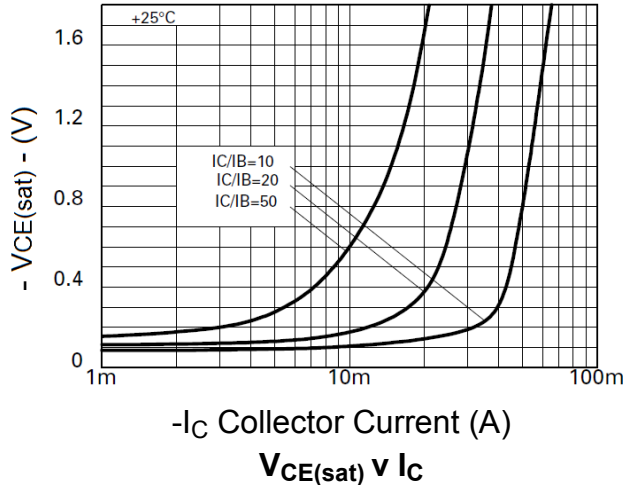
Pulse Power Dissipation

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV _{CBO}	-500	—	—	V	I _C = -100μA
Collector-Emitter Breakdown Voltage (Note 8)	BV _{CEO}	-500	—	—	V	I _C = -1mA
Emitter-Base Breakdown Voltage	BV _{EBO}	-7	—	—	V	I _E = -100μA
Collector Cutoff Current	I _{CBO}	—	—	-100	nA	V _{CB} = -500V
Emitter Cutoff Current	I _{EBO}	—	—	-100	nA	V _{EB} = -5V
Static Forward Current Transfer Ratio (Note 8)	h _{FE}	100 80 —	— — 15	300 300 —	—	I _C = -1mA, V _{CE} = -10V I _C = -50mA, V _{CE} = -10V I _C = -100mA, V _{CE} = -10V
Collector-Emitter Saturation Voltage (Note 8)	V _{CE(sat)}	—	—	-200 -500	mV	I _C = -20mA, I _B = -2mA I _C = -50mA, I _B = -10mA
Base-Emitter Saturation Voltage (Note 8)	V _{BE(sat)}	—	—	-0.9	V	I _C = -50mA, I _B = -10mA
Base-Emitter Turn-On Voltage (Note 8)	V _{BE(on)}	—	—	-0.9	V	I _C = -50mA, V _{CE} = -10V
Output Capacitance	C _{obo}	—	—	8	pF	V _{CB} = -20V, f = 1MHz
Transition Frequency	f _T	60	—	—	MHz	V _{CE} = -20V, I _C = -10mA, f = 50MHz
Turn-On Time	t _{on}	—	110	—	ns	V _{CE} = -100V, I _C = -50mA,
Turn-Off Time	t _{off}	—	1.5	—	μs	I _{B1} = -5mA, I _{B2} = 10mA

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

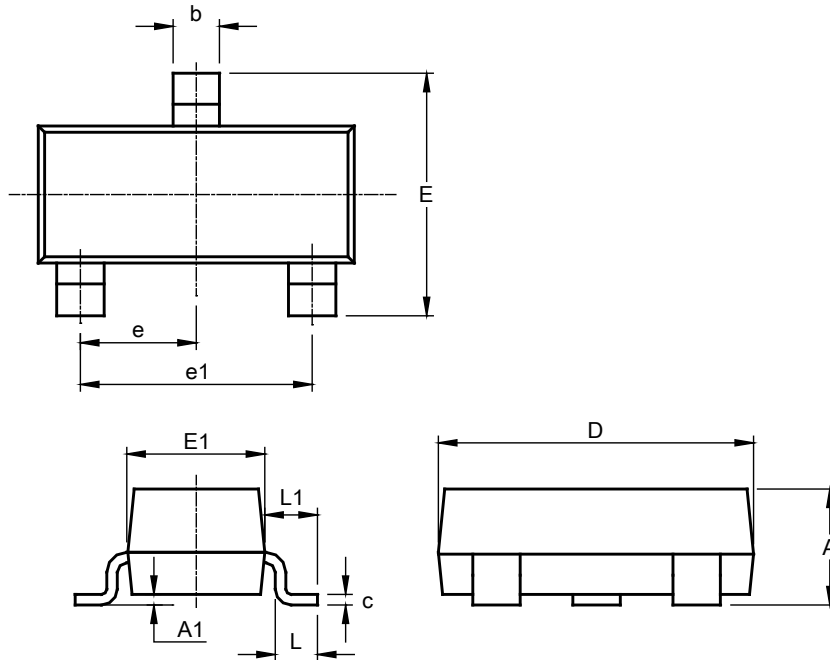
Typical Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)



Package Outline Dimensions

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

SOT23 Type DN

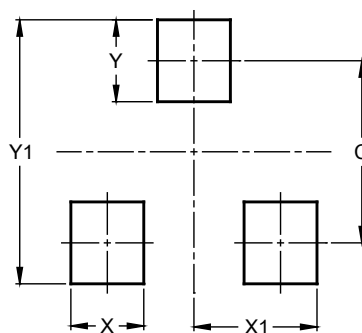


SOT23 Type DN			
Dim	Min	Max	Typ
A	0.89	1.12	1.00
A1	0.01	0.10	0.05
b	0.30	0.51	0.45
c	0.08	0.20	0.10
D	2.80	3.04	3.00
E	2.10	2.64	2.42
E1	1.20	1.40	1.37
e	0.95 REF		
e1	1.90 REF		
L	0.25	0.60	0.30
L1	0.45	0.62	0.54
All Dimensions in mm			

Suggested Pad Layout

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

SOT23 Type DN



Dimensions	Value (in mm)
C	2.0
X	0.8
X1	1.35
Y	0.9
Y1	2.9

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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