

## Features

- $BV_{CEO} > -12V$
- $I_C = -2.5A$  Continuous Collector Current
- $I_{CM} = -10A$  Peak Pulse Current
- Low Saturation Voltage E.g.  $-17mV$  Max @  $I_C = -100mA$ .
- $R_{CE(sat)} = 72m\Omega$  at 2.5A for a low equivalent on-resistance
- 625mW power dissipation
- $h_{FE}$  characterized up to -10A for high current gain hold-up
- Complementary NPN Type: FMMT617
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **The FMMT717Q is suitable for automotive applications requiring specific change control; this part is AEC-Q101 qualified, PPAP capable, and manufactured in IATF 16949 certified facilities.**

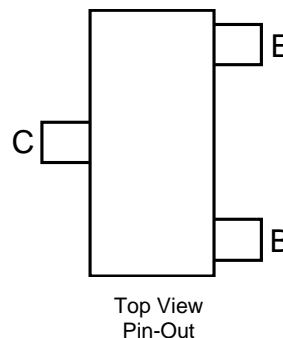
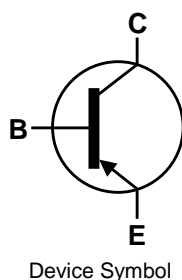
<https://www.diodes.com/quality/product-definitions/>

## Mechanical Data

- Package: SOT23
- Package 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)

## Application

- Gate-driving MOSFETs and IGBTs
- Load switches
- Battery charging
- DC-DC conversion

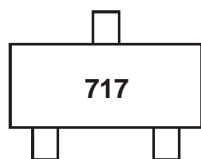


## Ordering Information (Note 4)

Orderable Part Number	Package	Marking	Reel size (inches)	Tape width (mm)	Packing	
					Qty.	Carrier
FMMT717QTA	SOT23	717	7	8	3,000	Reel

- 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



717 = Product type Marking Code

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

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V <sub>CBO</sub>	-12	V
Collector-Emitter Voltage	V <sub>CEO</sub>	-12	V
Emitter-Base Voltage	V <sub>EBO</sub>	-7	V
Continuous Collector Current	I <sub>C</sub>	-2.5	A
Peak Pulse Current	I <sub>CM</sub>	-10	A
Base Current	I <sub>B</sub>	-500	mA

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

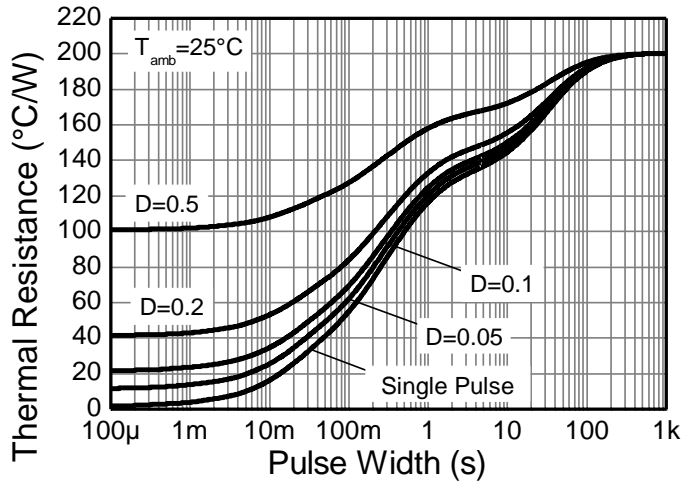
Characteristic	Symbol	Value	Unit
Power Dissipation (Note 5)	P <sub>D</sub>	625	mW
Power Dissipation (Note 6)	P <sub>D</sub>	806	mW
Thermal Resistance, Junction to Ambient (Note 5)	R <sub>θJA</sub>	200	°C/W
Thermal Resistance, Junction to Ambient (Note 6)	R <sub>θJA</sub>	155	°C/W
Thermal Resistance, Junction to Leads (Note 7)	R <sub>θJL</sub>	194	°C/W
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

**ESD Ratings** (Note 8)

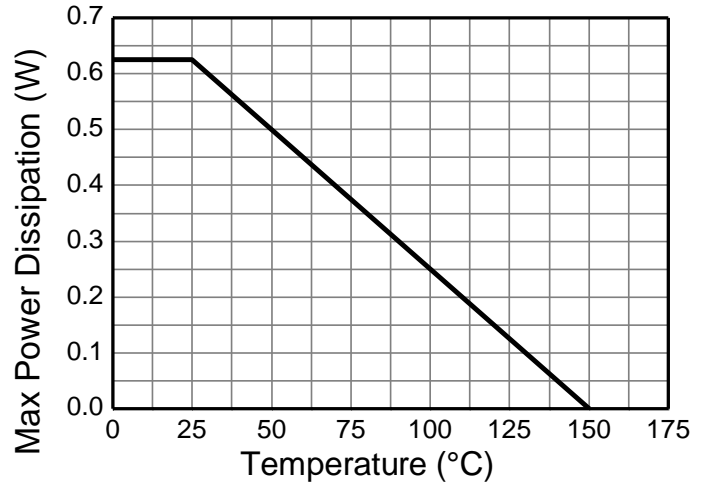
Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge - Human Body Model	ESD HBM	4,000	V	3A
Electrostatic Discharge - Machine Model	ESD MM	400	V	C

- Notes:
5. For a device surface mounted on 25mm X 25mm FR4 PCB with high coverage of single sided 1 oz. copper, in still air conditions; the device is measured when operating in a steady-state condition.
  6. Same as note 5, except the device is measured at t ≤ 5 sec.
  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.

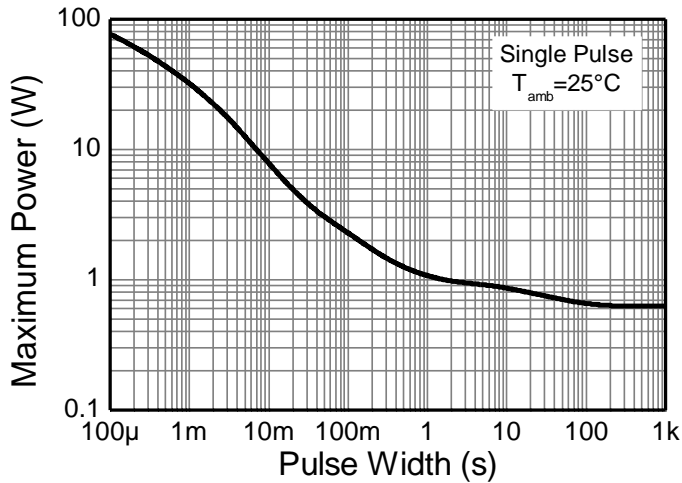
**Thermal Characteristics and Derating information**



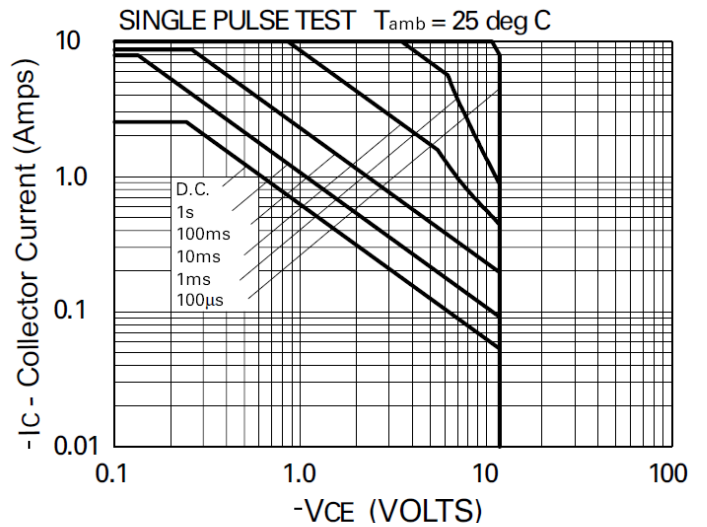
**Figure 1. Transient Thermal Impedance**



**Figure 2. Derating Curve**



**Figure 3. Pulse Power Dissipation**



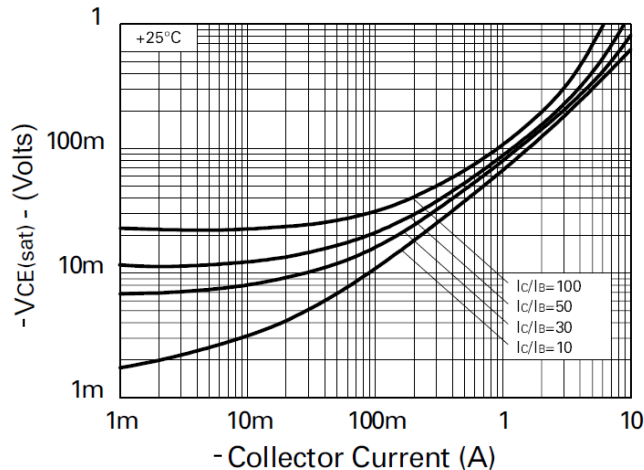
**Figure 4. Safe Operating Area**

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

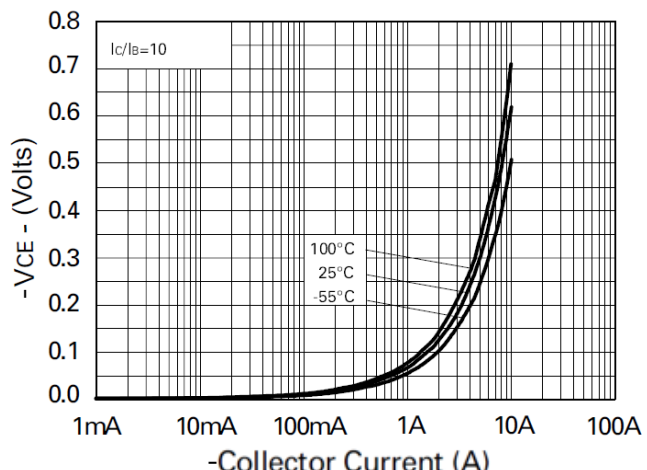
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV <sub>CBO</sub>	-12	-35	-	V	I <sub>C</sub> = -100μA
Collector-Emitter Breakdown Voltage (Note 9)	BV <sub>CEO</sub>	-12	-25	-	V	I <sub>C</sub> = -10mA
Emitter-Base Breakdown Voltage	BV <sub>EBO</sub>	-7	-8.5	-	V	I <sub>E</sub> = -100μA
Collector Cutoff Current	I <sub>CBO</sub>	-	-	-100	nA	V <sub>CB</sub> = -10V
Emitter Cutoff Current	I <sub>EBO</sub>	-	-	-100	nA	V <sub>EB</sub> = -5V
Collector Emitter Cutoff Current	I <sub>CES</sub>	-	-	-100	nA	V <sub>CE</sub> = -10V
Static Forward Current Transfer Ratio (Note 9)	h <sub>FE</sub>	300	475	-	-	I <sub>C</sub> = -10mA, V <sub>CE</sub> = -2V
		300	450	-		I <sub>C</sub> = -100mA, V <sub>CE</sub> = -2V
		180	275	-		I <sub>C</sub> = -2.5A, V <sub>CE</sub> = -2V
		60	100	-		I <sub>C</sub> = -8A, V <sub>CE</sub> = -2V
		45	70	-		I <sub>C</sub> = -10A, V <sub>CE</sub> = -2V
Collector-Emitter Saturation Voltage (Note 9)	V <sub>CE(sat)</sub>	-	-10	-17	mV	I <sub>C</sub> = -0.1A, I <sub>B</sub> = -10mA
		-	-100	-140		I <sub>C</sub> = -1A, I <sub>B</sub> = -10mA
		-	-110	-170		I <sub>C</sub> = -1.5A, I <sub>B</sub> = -50mA
		-	-180	-220		I <sub>C</sub> = -2.5A, I <sub>B</sub> = -50mA
Base-Emitter Turn-On Voltage (Note 9)	V <sub>BE(on)</sub>	-	-0.8	-1.0	V	I <sub>C</sub> = -2.5A, V <sub>CE</sub> = -2V
Base-Emitter Saturation Voltage (Note 9)	V <sub>BE(sat)</sub>	-	-0.9	-1.0	V	I <sub>C</sub> = -2.5A, I <sub>B</sub> = -50mA
Output Capacitance	C <sub>obo</sub>	-	40	50	pF	V <sub>CB</sub> = -10V, f = 1MHz
Transition Frequency	f <sub>T</sub>	80	110	-	MHz	V <sub>CE</sub> = -10V, I <sub>C</sub> = -50mA, f = 100MHz
Turn-On Time	t <sub>on</sub>	-	70	-	ns	V <sub>CC</sub> = -6V, I <sub>C</sub> = -2A
Turn-Off Time	t <sub>off</sub>	-	130	-	ns	I <sub>B1</sub> = -I <sub>B2</sub> = -50mA

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

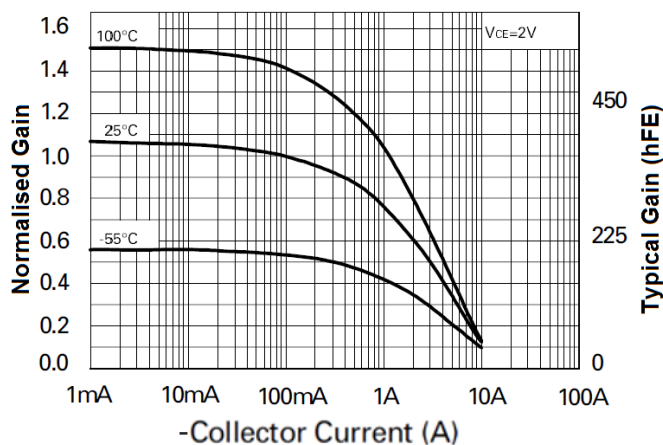
**Typical Electrical Characteristics** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)



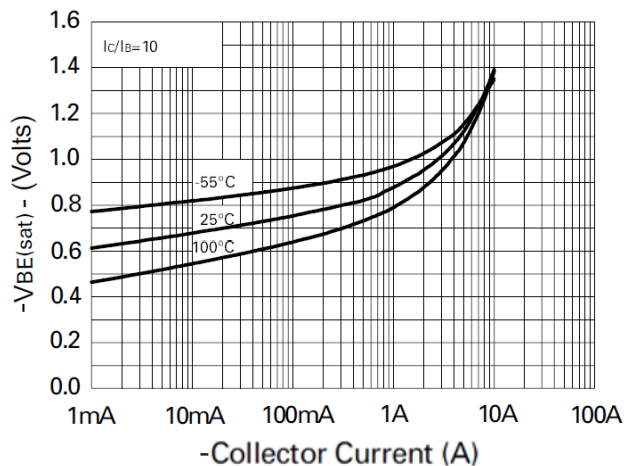
**Figure 5.  $V_{CE(sat)}$  vs  $I_C$**



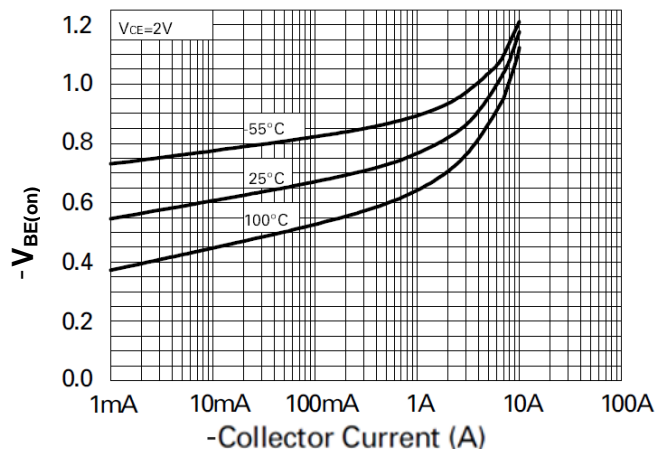
**Figure 6.  $V_{CE(sat)}$  vs  $I_C$**



**Figure 7.  $h_{FE}$  vs  $I_C$**



**Figure 8.  $V_{BE(sat)}$  vs  $I_C$**

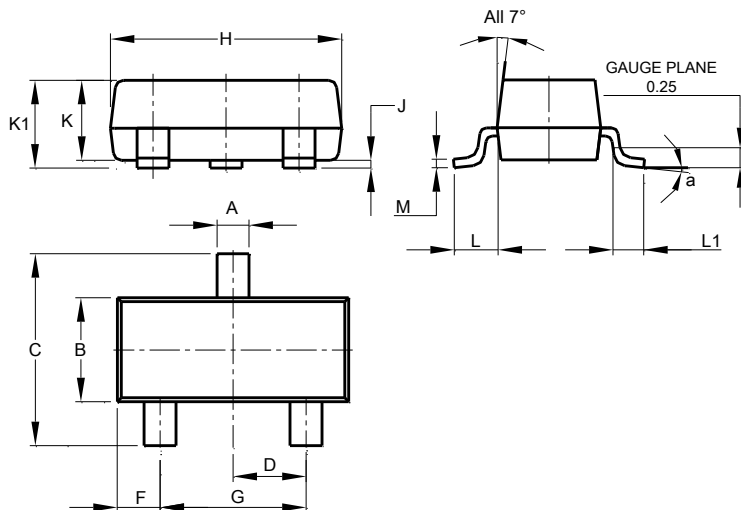


**Figure 9.  $V_{BE(on)}$  vs  $I_C$**

**Package Outline Dimensions**

Please see <https://www.diodes.com/design/support/packaging/> for the latest version.

**SOT23**

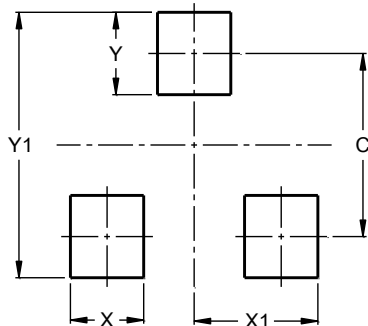


SOT23			
Dim	Min	Max	Typ
A	0.37	0.51	0.40
B	1.20	1.40	1.30
C	2.30	2.50	2.40
D	0.89	1.03	0.915
F	0.45	0.60	0.535
G	1.78	2.05	1.83
H	2.80	3.00	2.90
J	0.013	0.10	0.05
K	0.890	1.00	0.975
K1	0.903	1.10	1.025
L	0.45	0.61	0.55
L1	0.25	0.55	0.40
M	0.085	0.150	0.110
a	0°	8°	--
All Dimensions in mm			

**Suggested Pad Layout**

Please see <https://www.diodes.com/design/support/packaging/> for the latest version.

**SOT23**



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

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