

**FMMT717**
**12V PNP SILICON LOW SATURATION TRANSISTOR IN SOT23**
**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
- $h_{FE}$  characterised 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)
- Qualified to AEC-Q101 Standards for High Reliability
- PPAP capable (Note 4)

**Mechanical Data**

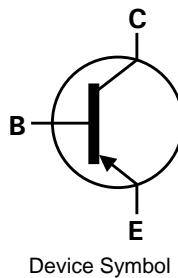
- Case: SOT23
- Case Material: molded plastic, "Green" molding compound
- UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – Matte Tin Plated Leads, Solderable per MIL-STD-202, Method 208 (E)
- Weight 0.008 grams (approximate)

**Application**

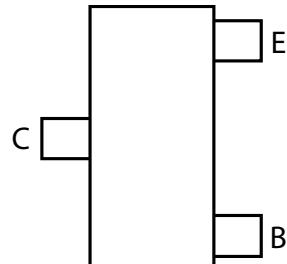
- Gate Driving MOSFETs and IGBTs
- Load switch
- Battery charging
- DC-DC conversion



Top View



Device Symbol

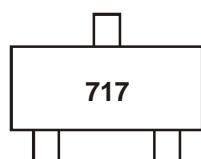

 Top View  
 Pin-Out

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

Product	Compliance	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
FMMT717TA	AEC-Q101	717	7	8	3,000
FMMT717QTA	Automotive	717	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**


717 = Product type Marking Code

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

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	$V_{CBO}$	-12	V
Collector-Emitter Voltage	$V_{CEO}$	-12	V
Emitter-Base Voltage	$V_{EBO}$	-7	V
Continuous Collector Current	$I_C$	-2.5	A
Peak Pulse Current	$I_{CM}$	-10	A
Base Current	$I_B$	-500	mA

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

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 6)	$P_D$	625	mW
Power Dissipation (Note 7)	$P_D$	806	mW
Thermal Resistance, Junction to Ambient (Note 6)	$R_{\theta JA}$	200	°C/W
Thermal Resistance, Junction to Ambient (Note 7)	$R_{\theta JA}$	155	°C/W
Thermal Resistance, Junction to Leads (Note 8)	$R_{\theta JL}$	194	°C/W
Operating and Storage Temperature Range	$T_J, T_{STG}$	-55 to +150	°C

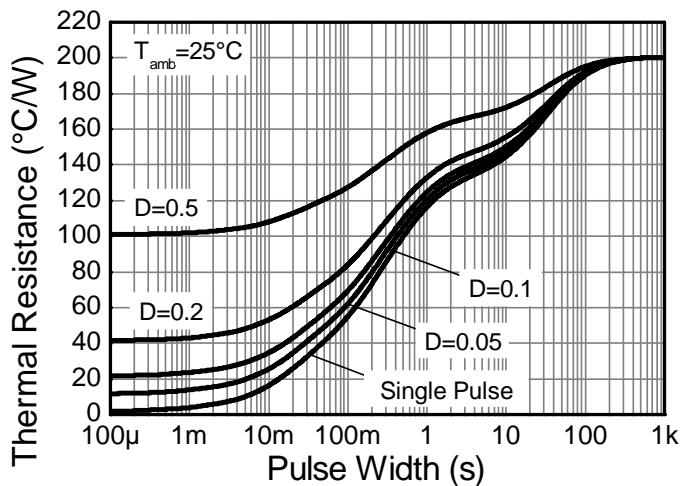
**ESD Ratings** (Note 9)

Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge - Human Body Model	ESD HBM	$\geq 8,000$	V	3B
Electrostatic Discharge - Machine Model	ESD MM	$\geq 400$	V	C

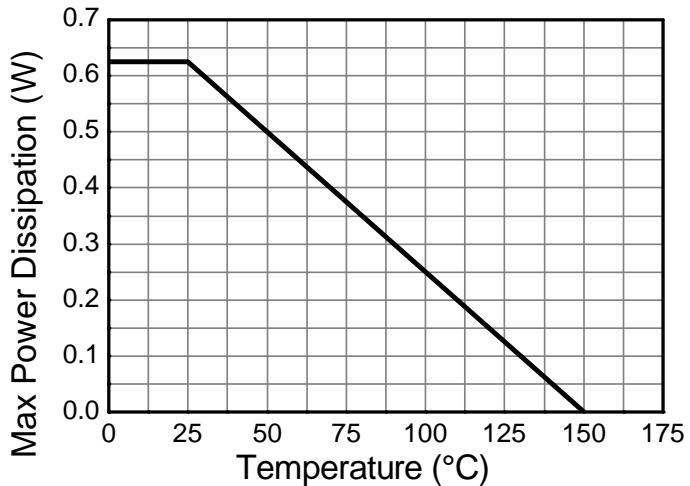
Notes:

- 6. 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.
- 7. Same as note 6, except the device is measured at  $t \leq 5$  sec.
- 8. Thermal resistance from junction to solder-point (at the end of the collector lead).
- 9. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

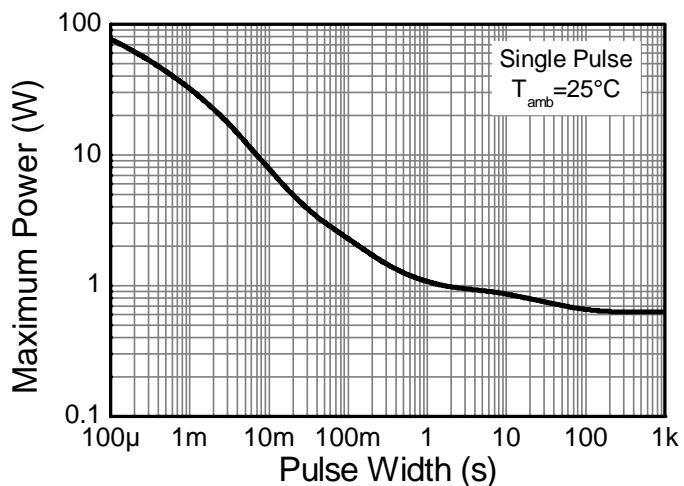
## Thermal Characteristics and Derating information



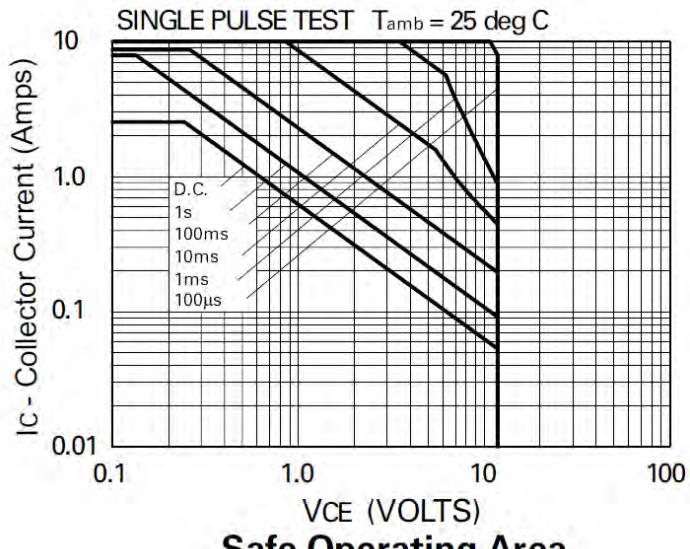
**Transient Thermal Impedance**



**Derating Curve**



**Pulse Power Dissipation**



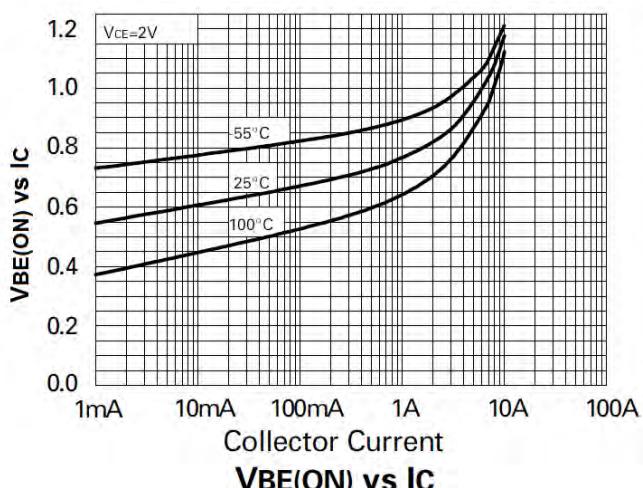
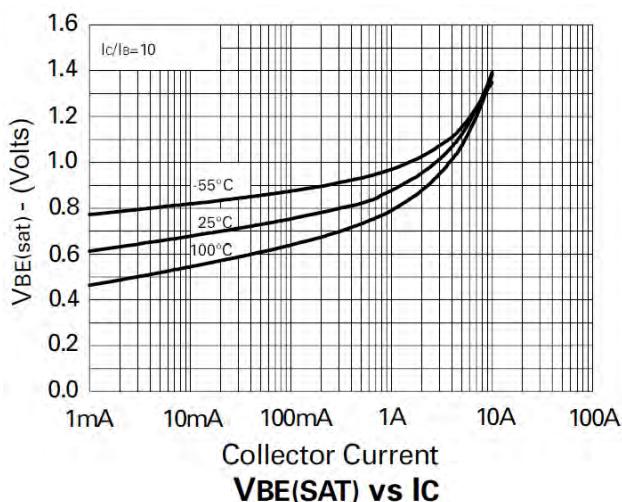
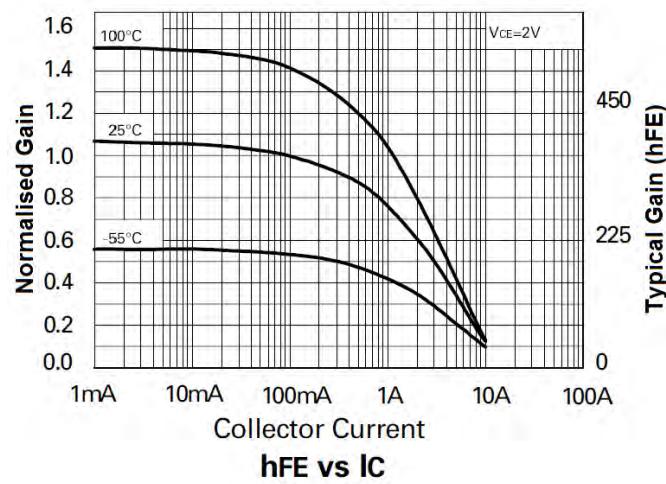
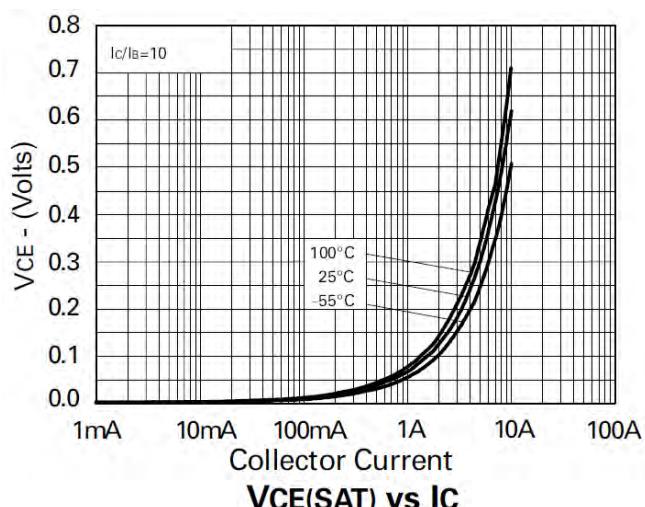
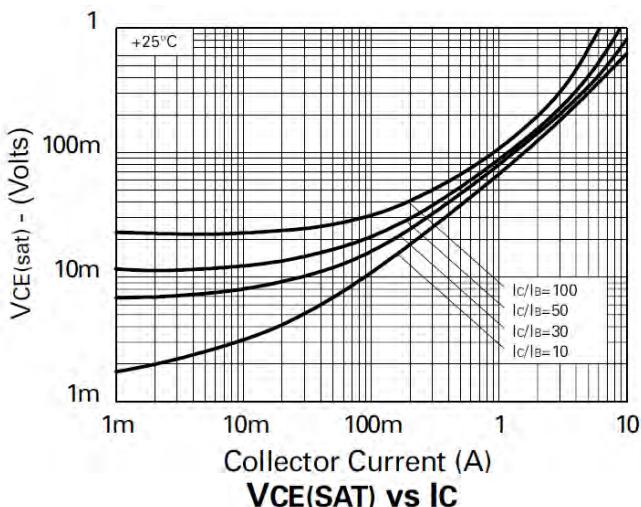
**Safe Operating Area**

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	$\text{BV}_{\text{CBO}}$	-12	-35	-	V	$I_C = -100\mu\text{A}$
Collector-Emitter Breakdown Voltage (Note 10)	$\text{BV}_{\text{CEO}}$	-12	-25	-	V	$I_C = -10\text{mA}$
Emitter-Base Breakdown Voltage	$\text{BV}_{\text{EBO}}$	-7	-8.5	-	V	$I_E = -100\mu\text{A}$
Collector Cutoff Current	$I_{\text{CBO}}$	-	-	-100	nA	$V_{\text{CB}} = -10\text{V}$
Emitter Cutoff Current	$I_{\text{EBO}}$	-	-	-100	nA	$V_{\text{EB}} = -5\text{V}$
Collector Emitter Cutoff Current	$I_{\text{CES}}$	-	-	-100	nA	$V_{\text{CE}} = -10\text{V}$
Static Forward Current Transfer Ratio (Note 10)	$h_{\text{FE}}$	300	475	-		$I_C = -10\text{mA}, V_{\text{CE}} = -2\text{V}$
		300	450	-		$I_C = -100\text{mA}, V_{\text{CE}} = -2\text{V}$
		180	275	-		$I_C = -2.5\text{A}, V_{\text{CE}} = -2\text{V}$
		60	100	-		$I_C = -8\text{A}, V_{\text{CE}} = -2\text{V}$
		45	70	-		$I_C = -10\text{A}, V_{\text{CE}} = -2\text{V}$
Collector-Emitter Saturation Voltage (Note 10)	$V_{\text{CE}(\text{sat})}$	-	-10	-17		$I_C = -0.1\text{A}, I_B = -10\text{mA}$
		-	-100	-140		$I_C = -1\text{A}, I_B = -10\text{mA}$
		-	-110	-170		$I_C = -1.5\text{A}, I_B = -50\text{mA}$
		-	-180	-220		$I_C = -2.5\text{A}, I_B = -50\text{mA}$
Base-Emitter Turn-On Voltage (Note 10)	$V_{\text{BE}(\text{on})}$	-	-0.8	-1.0	V	$I_C = -2.5\text{A}, V_{\text{CE}} = -2\text{V}$
Base-Emitter Saturation Voltage (Note 10)	$V_{\text{BE}(\text{sat})}$	-	-0.9	-1.0	V	$I_C = -2.5\text{A}, I_B = -50\text{mA}$
Output Capacitance	$C_{\text{obo}}$	-	21	30	pF	$V_{\text{CB}} = -10\text{V}, f = 1\text{MHz}$
Transition Frequency	$f_T$	80	110	-	MHz	$V_{\text{CE}} = -10\text{V}, I_C = -50\text{mA}, f = 100\text{MHz}$
Turn-On Time	$t_{\text{on}}$	-	70	-	ns	$V_{\text{CC}} = -6\text{V}, I_C = -2\text{A}$
Turn-Off Time	$t_{\text{off}}$	-	130	-	ns	$I_{\text{B1}} = I_{\text{B2}} = 50\text{mA}$

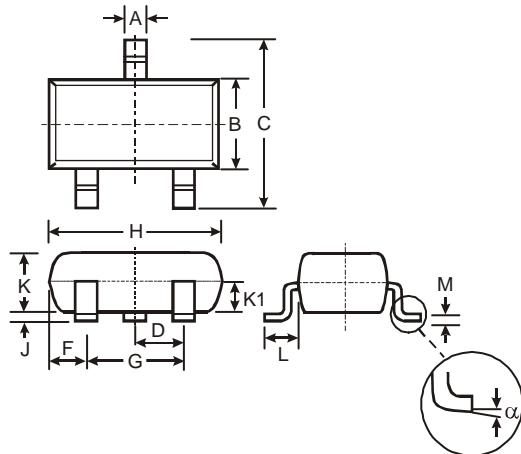
Notes: 10. Measured under pulsed conditions. Pulse width  $\leq 300\mu\text{s}$ . Duty cycle  $\leq 2\%$

**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.

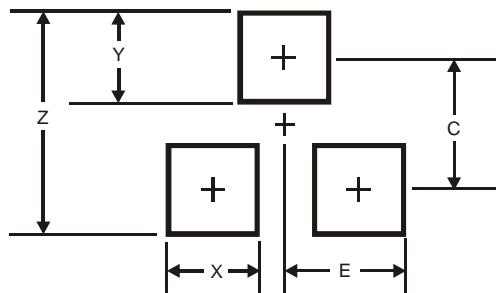


SOT23			
Dim	Min	Max	Typ
A	0.37	0.51	0.40
B	1.20	1.40	1.30
C	2.30	2.50	2.40
D	0.89	1.03	0.915
F	0.45	0.60	0.535
G	1.78	2.05	1.83
H	2.80	3.00	2.90
J	0.013	0.10	0.05
K	0.903	1.10	1.00
K1	-	-	0.400
L	0.45	0.61	0.55
M	0.085	0.18	0.11
alpha	0°	8°	-

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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