

**15V NPN LOW SATURATION TRANSISTOR IN SOT23**

**Features**

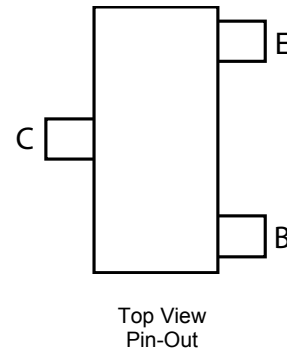
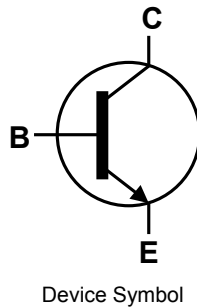
- $BV_{CEO} > 15V$
- $I_C = 3A$  high Continuous Collector Current
- $I_{CM} = 12A$  Peak Pulse Current
- $R_{CE(sat)} = 50m\Omega$  for a low equivalent On-Resistance
- 625mW Power dissipation
- $h_{FE}$  specified up to 12A for high current gain hold up
- Complementary PNP Type: FMMT717
- **Totally 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: 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 (E3)
- Weight 0.008 grams (approximate)

**Applications**

- DC-DC / DC-AC Modules
- Regulator
- LED driver
- CCFL Backlighting Inverters

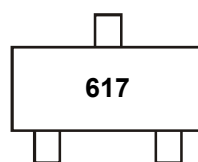


**Ordering Information** (Note 4)

Product	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
FMMT617TA	617	7	8	3,000
FMMT617TC	617	13	8	10,000

- 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. For packaging details, go to our website at <http://www.diodes.com>.

**Marking Information**



617 = Product Type Marking Code

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

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	$V_{CBO}$	15	V
Collector-Emitter Voltage	$V_{CEO}$	15	V
Emitter-Base Voltage	$V_{EBO}$	7	V
Continuous Collector Current	$I_C$	3	A
Peak Pulse Current (Note 5)	$I_{CM}$	12	A
Base Current	$I_B$	500	mA

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

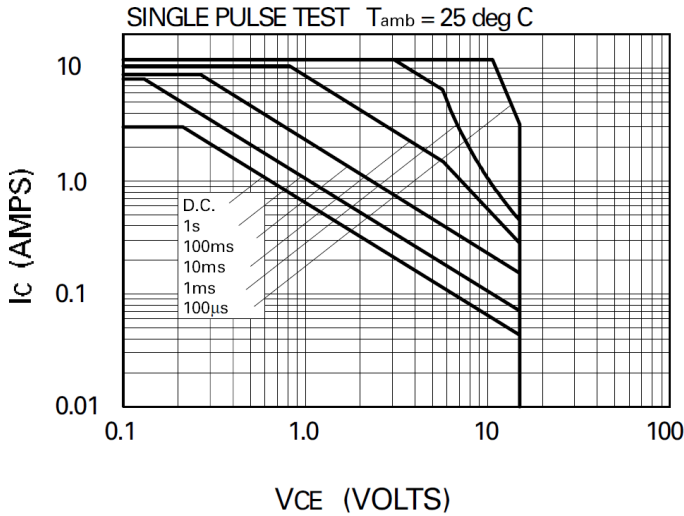
Characteristic	Symbol	Value	Unit
Power Dissipation (Note 5)	$P_D$	625	mW
Power Dissipation (Note 6)	$P_D$	806	mW
Thermal Resistance, Junction to Ambient (Note 5)	$R_{\theta JA}$	200	$^\circ\text{C}/\text{W}$
Thermal Resistance, Junction to Ambient (Note 6)	$R_{\theta JA}$	155	$^\circ\text{C}/\text{W}$
Thermal Resistance, Junction to Leads (Note 7)	$R_{\theta JL}$	194	$^\circ\text{C}/\text{W}$
Operating and Storage Temperature Range	$T_J, T_{STG}$	-55 to +150	$^\circ\text{C}$

**ESD Ratings** (Note 8)

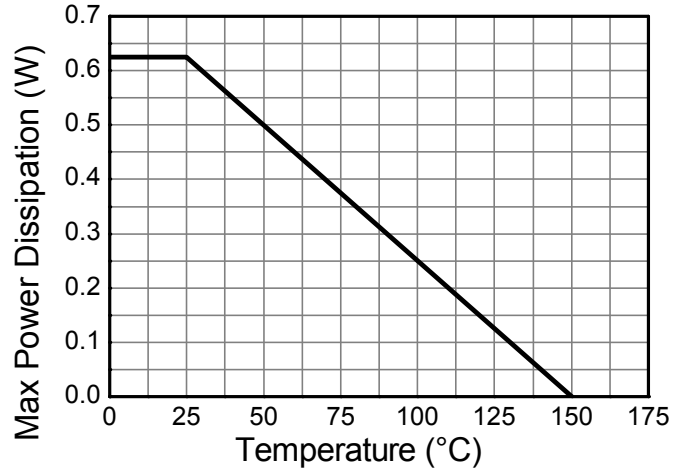
Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge - Human Body Model	ESD HBM	4,000	V	3A
Electrostatic Discharge - Machine Model	ESD MM	$\geq 400$	V	C

- 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  $t \leq 5$  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.

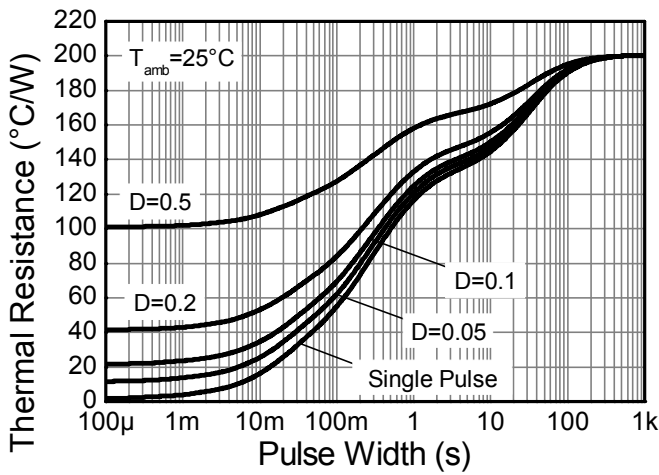
**Thermal Characteristics and Derating information**



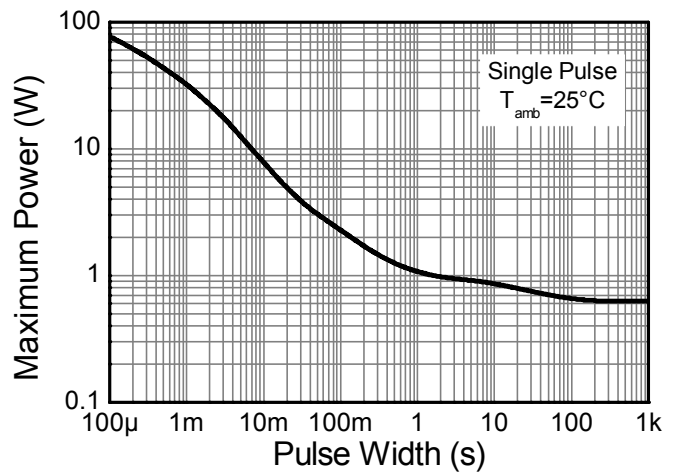
**Safe Operating Area**



**Derating Curve**



**Transient Thermal Impedance**



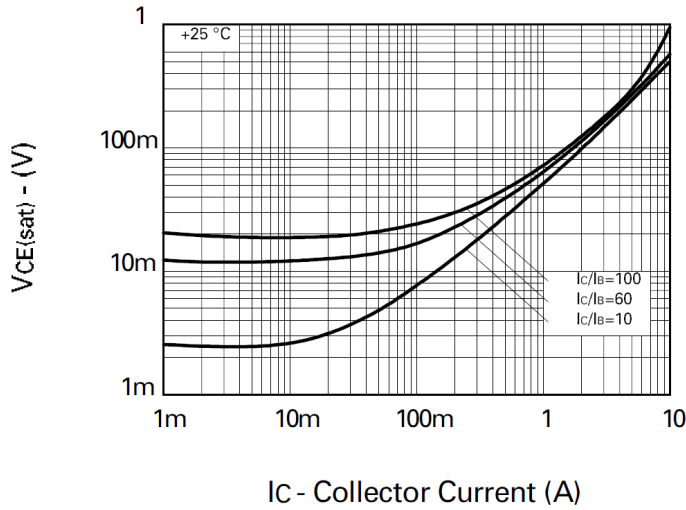
**Pulse Power Dissipation**

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

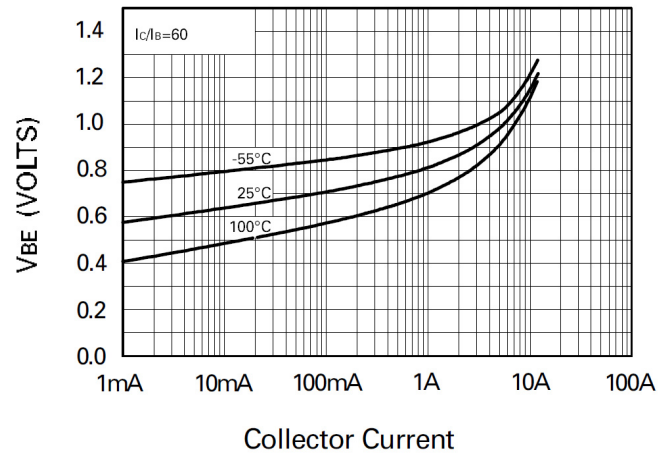
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	$BV_{CBO}$	15	70	-	V	$I_C = 100\mu\text{A}$
Collector-Emitter Breakdown Voltage (Note 9)	$BV_{CEO}$	15	18	-	V	$I_C = 10\text{mA}$
Emitter-Base Breakdown Voltage	$BV_{EBO}$	7	8.2	-	V	$I_E = 100\mu\text{A}$
Collector Cut-off Current	$I_{CBO}$	-	<1	100	nA	$V_{CB} = 10\text{V}$
Emitter Cut-off Current	$I_{EBO}$	-	<1	100	nA	$V_{EB} = 5.6\text{V}$
Collector Emitter Cut-off Current	$I_{CES}$	-	<1	100	nA	$V_{CES} = 10\text{V}$
Static Forward Current Transfer Ratio (Note 9)	$h_{FE}$	200	415	-	-	$I_C = 10\text{mA}, V_{CE} = 2\text{V}$
		300	450	-		$I_C = 200\text{mA}, V_{CE} = 2\text{V}$
		200	320	-		$I_C = 3\text{A}, V_{CE} = 2\text{V}$
		150	240	-		$I_C = 5\text{A}, V_{CE} = 2\text{V}$
		-	80	-		$I_C = 12\text{A}, V_{CE} = 2\text{V}$
Collector-Emitter Saturation Voltage (Note 9)	$V_{CE(sat)}$	-	8	14	mV	$I_C = 0.1\text{A}, I_B = 10\text{mA}$
		-	70	100		$I_C = 1\text{A}, I_B = 10\text{mA}$
		-	150	200		$I_C = 3\text{A}, I_B = 50\text{mA}$
Base-Emitter Saturation Voltage (Note 9)	$V_{BE(sat)}$	-	0.9	1.0	V	$I_C = 3\text{A}, I_B = 50\text{mA}$
Base-Emitter Saturation Voltage (Note 9)	$V_{BE(on)}$	-	0.84	1.0	V	$I_C = 3\text{A}, V_{CE} = 2\text{V}$
Transition Frequency	$f_T$	80	120	-	MHz	$I_C = 50\text{mA}, V_{CE} = 10\text{V}, f = 50\text{MHz}$
Collector Output Capacitance	$C_{obo}$	-	30	40	pF	$V_{CB} = 10\text{V}, f = 1\text{MHz}$
Turn-On Time	$t_{(on)}$	-	120	-	ns	$V_{CC} = 10\text{V}, I_C = 3\text{A},$
Turn-Off Time	$t_{(off)}$	-	160	-	ns	$I_{B1} = -I_{B2} = 50\text{mA}$

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

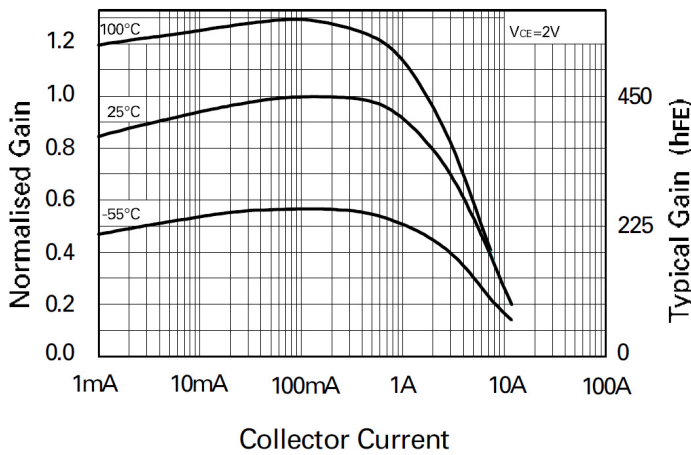
**Typical Electrical Characteristics** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)



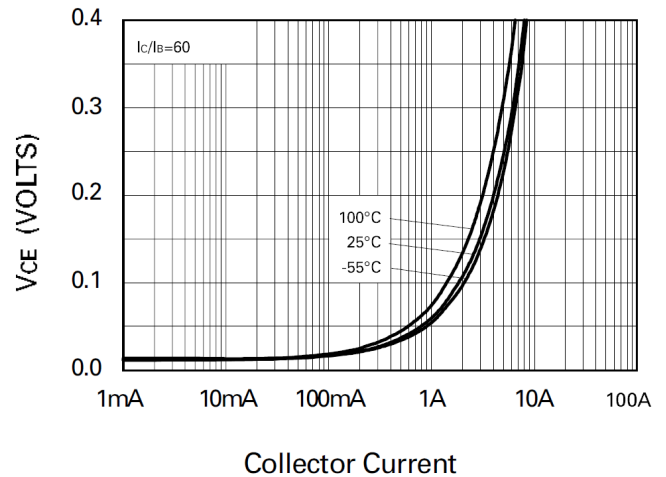
**$V_{CE(SAT)}$  v  $I_C$**



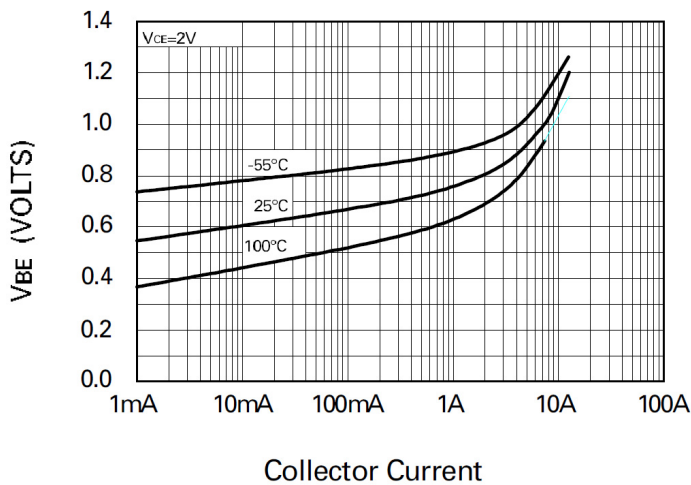
**$V_{BE(SAT)}$  vs  $I_C$**



**hFE vs  $I_C$**



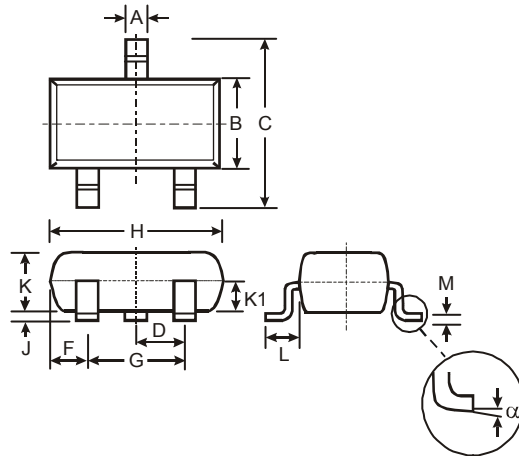
**$V_{CE(SAT)}$  vs  $I_C$**



**$V_{BE(ON)}$  vs  $I_C$**

## Package Outline Dimensions

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

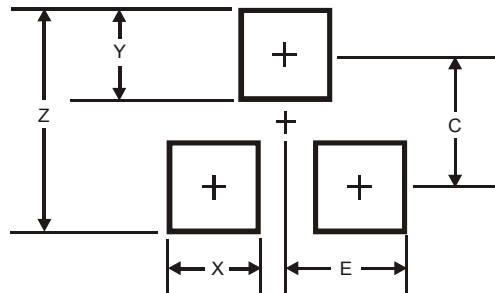


SOT23			
Dim	Min	Max	Typ
A	0.37	0.51	0.40
B	1.20	1.40	1.30
C	2.30	2.50	2.40
D	0.89	1.03	0.915
F	0.45	0.60	0.535
G	1.78	2.05	1.83
H	2.80	3.00	2.90
J	0.013	0.10	0.05
K	0.903	1.10	1.00
K1	-	-	0.400
L	0.45	0.61	0.55
M	0.085	0.18	0.11
α	0°	8°	-

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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