





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

#### **Features**

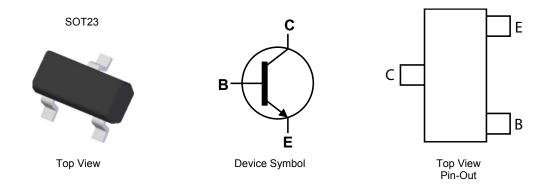
- $BV_{CEO} > 15V$
- I<sub>C</sub> = 3A high Continuous Collector Current
- I<sub>CM</sub> = 12A Peak Pulse Current
- $R_{CE(sat)}$  = 50m $\Omega$  for a low equivalent On-Resistance
- 625mW Power dissipation
- $h_{\text{FE}}$  specified up to 12A for high current gain hold up
- Complementary PNP Type: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

#### **Applications**

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



### Ordering Information (Note 4)

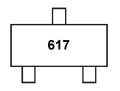
Product	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
FMMT617TA	617	7	8	3,000
FMMT617TC	617	13	8	10,000

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<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	$V_{CBO}$	15	V
Collector-Emitter Voltage	V <sub>CEO</sub>	15	V
Emitter-Base Voltage	$V_{EBO}$	7	V
Continuous Collector Current	Ic	3	Α
Peak Pulse Current (Note 5)	I <sub>CM</sub>	12	Α
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>0JL</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	С

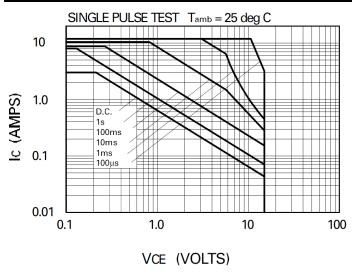
Notes:

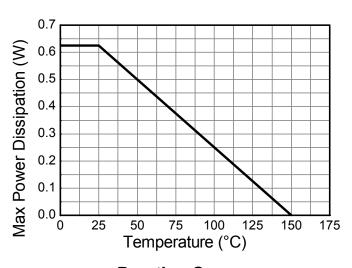
- 5. For a device surface mounted on 25mm X 25mm FR4 PCB with high coverage of single sided 1 oz copper, in still air conditions; the device is measured when operating in a steady-state condition.
- 6. Same as note 5, except the device is measured at  $t \le 5$  sec.
- 7. Thermal resistance from junction to solder-point (at the end of the collector lead).
- 8. Refer to JEDEC specification JESD22-A114 and JESD22-A115.



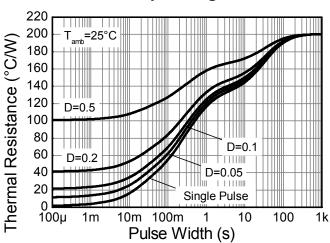


## Thermal Characteristics and Derating information

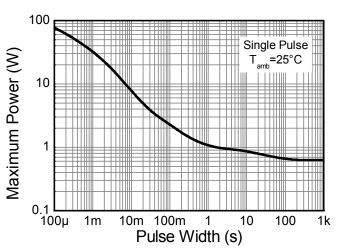




### **Safe Operating Area**



**Derating Curve** 



**Transient Thermal Impedance** 

**Pulse Power Dissipation** 





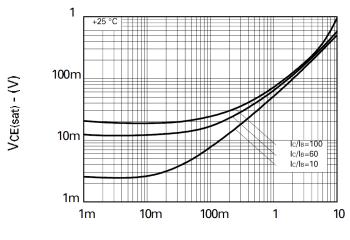
# Electrical Characteristics (@T<sub>A</sub> = +25°C, unless otherwise specified.)

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

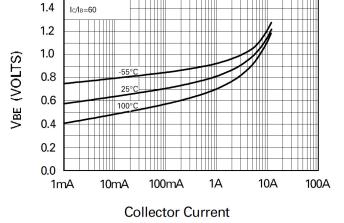
Notes: 9. Measured under pulsed conditions. Pulse width ≤ 300µs. Duty cycle ≤ 2%



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

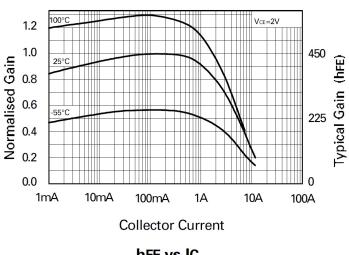


IC - Collector Current (A)

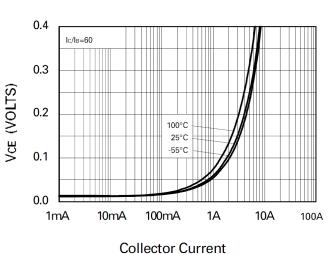


VBE(SAT) vs IC

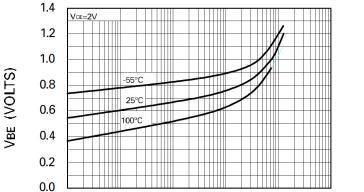
## VCE(SAT) v IC



hFE vs IC



VCE(SAT) vs IC



Collector Current

1A

10A

100mA

#### VBE(ON) vs IC

1mA

10mA

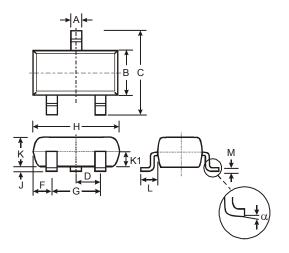
100A





# **Package Outline Dimensions**

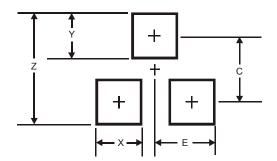
Please see AP02002 at http://www.diodes.com/datasheets/ap02002.pdf for latest version.



SOT23					
Dim	Min	Max	Тур		
Α	0.37	0.51	0.40		
В	1.20	1.40	1.30		
С	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		
Н	2.80	3.00	2.90		
7	0.013	0.10	0.05		
K	0.903	1.10	1.00		
K1	-	-	0.400		
L	0.45	0.61	0.55		
М	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		
С	2.0		
Ш	1.35		





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