



# THE DATASHEET OF FMMT620TC



**80V NPN SILICON LOW SATURATION TRANSISTOR IN SOT23**

**Features**

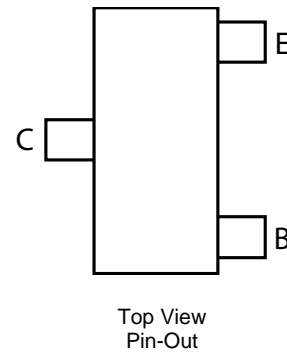
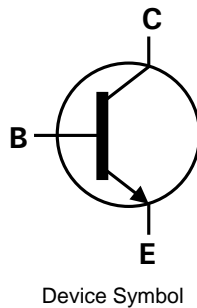
- $BV_{CEO} > 80V$
- $I_C = 1.5A$  Continuous Collector Current
- $R_{CE(SAT)} = 90m\Omega$  for a low equivalent On-Resistance
- 625mW Power dissipation
- $h_{FE}$  specified up to 5A for high current gain hold up
- **Totally Lead-Free & Fully RoHS compliant (Notes 1 & 2)**
- **Halogen and Antimony 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 (E3)
- Weight 0.008 grams (approximate)

**Applications**

- DC-DC Modules
- Power Management Functions
- Motor control and drive functions
- CCFL Backlighting Inverters

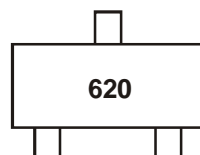


**Ordering Information** (Notes 4 & 5)

Product	Compliance	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
FMMT620TA	AEC-Q101	620	7	8	3,000
FMMT620QTA	Automotive	620	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**



620 = Product Type Marking Code

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

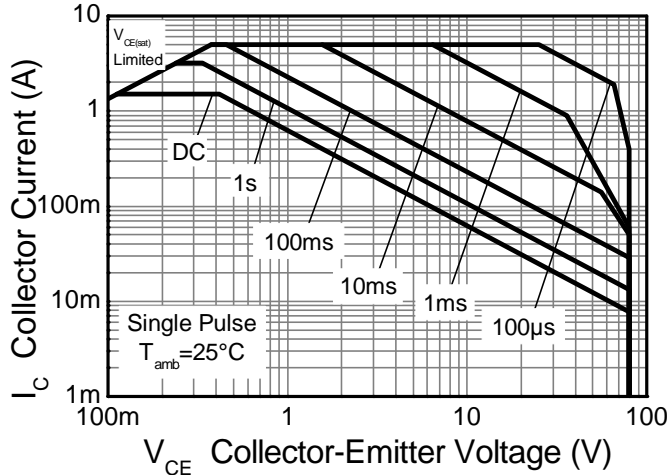
Characteristic	Symbol	Value	Unit
Collector-Base Voltage	$V_{CBO}$	100	V
Collector-Emitter Voltage	$V_{CEO}$	80	V
Emitter-Base Voltage	$V_{EBO}$	7	V
Continuous Collector Current	$I_C$	1.5	A
Peak Pulse Current	$I_{CM}$	5	A
Base Current	$I_B$	500	mA

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

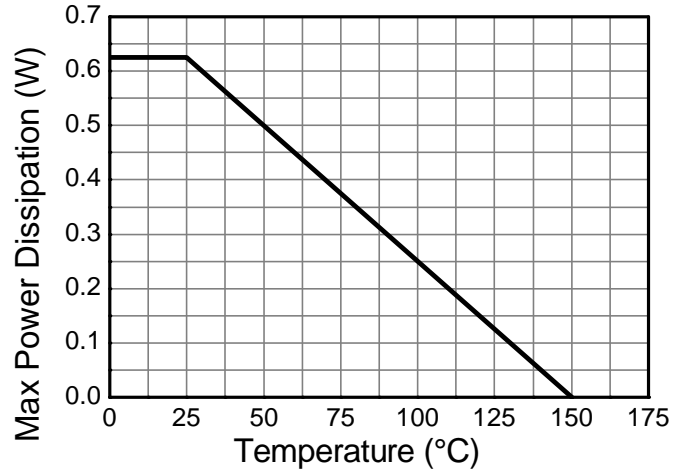
Characteristic	Symbol	Value	Unit
Power Dissipation (Note 6)	$P_D$	625	mW
Power Dissipation (Note 7)	$P_D$	806	mW
Thermal Resistance, Junction to Ambient (Note 6)	$R_{\theta JA}$	200	$^\circ\text{C}/\text{W}$
Thermal Resistance, Junction to Ambient (Note 7)	$R_{\theta JA}$	155	$^\circ\text{C}/\text{W}$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

- 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).

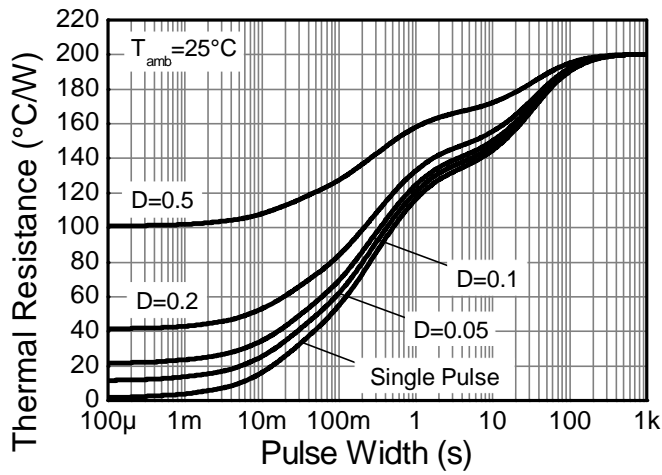
**Thermal Characteristics and Derating information**



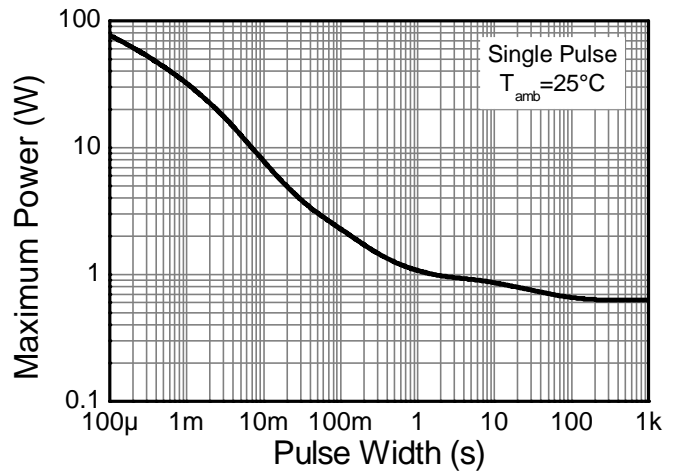
**Safe Operating Area**



**Derating Curve**



**Transient Thermal Impedance**



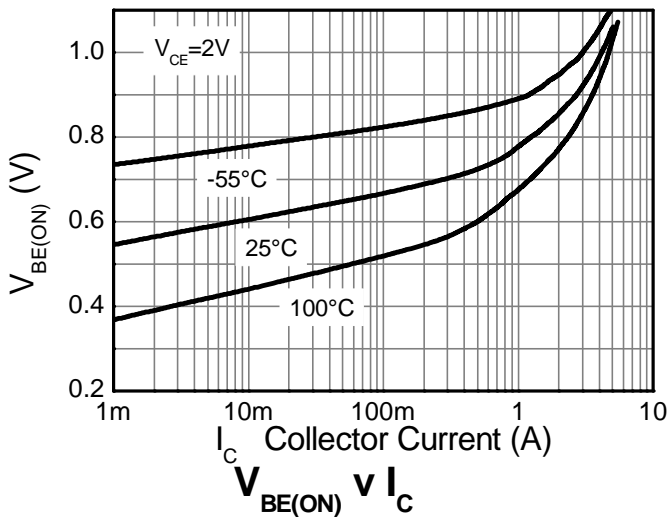
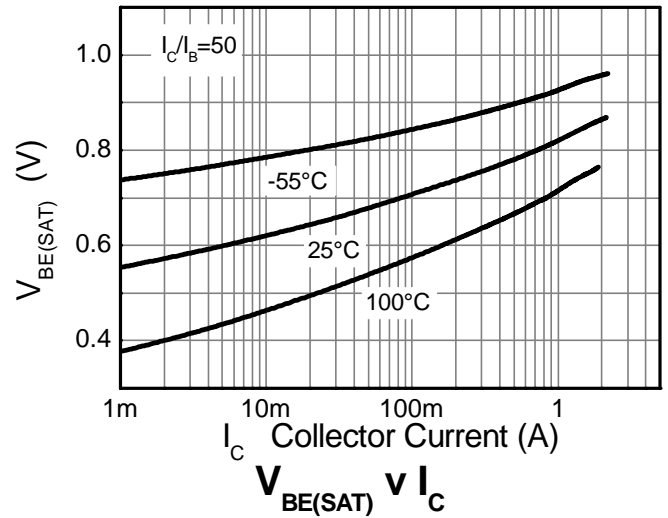
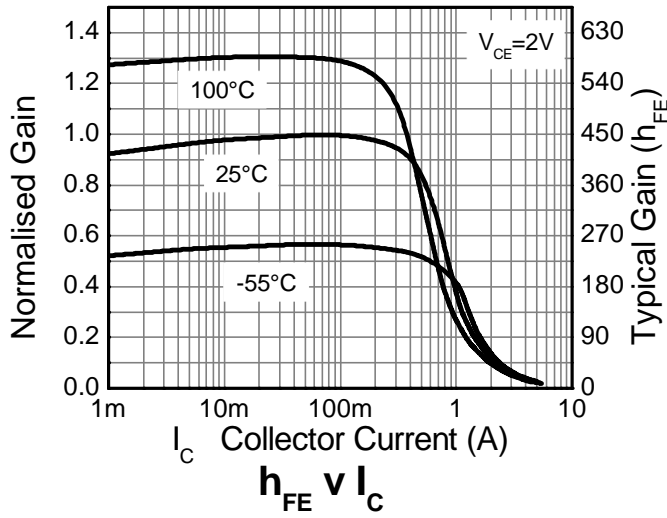
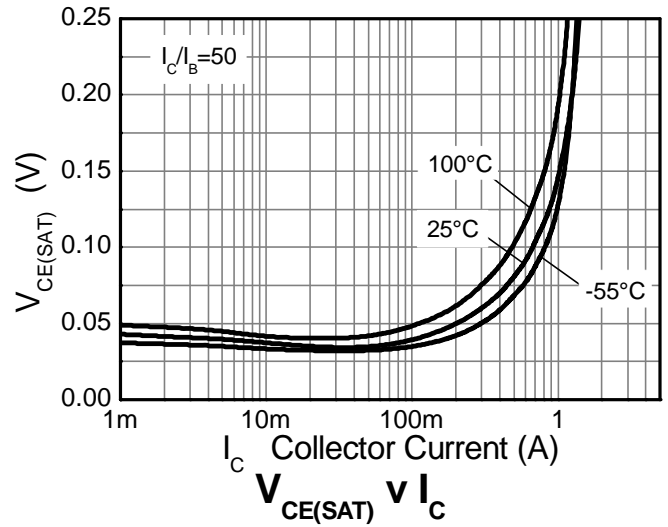
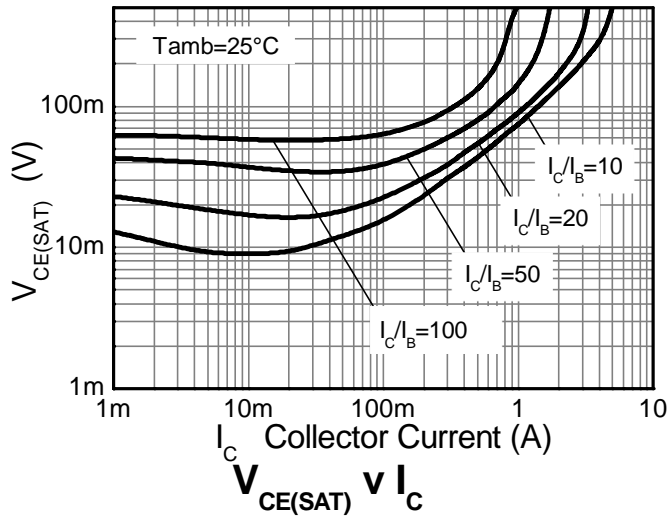
**Pulse Power Dissipation**

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV <sub>CBO</sub>	100	180	-	V	I <sub>C</sub> = 100μA
Collector-Emitter Breakdown Voltage (Note 9)	BV <sub>CEO</sub>	80	110	-	V	I <sub>C</sub> = 1mA
Emitter-Base Breakdown Voltage	BV <sub>EBO</sub>	7	8	-	V	I <sub>E</sub> = 100μA
Collector Cut-off Current	I <sub>CBO</sub>	-	-	100	nA	V <sub>CB</sub> = 80V
Emitter Cut-off Current	I <sub>EBO</sub>	-	-	100	nA	V <sub>EB</sub> = 6.0V
Collector Emitter Cut-off Current	I <sub>CES</sub>	-	-	100	nA	V <sub>CES</sub> = 80V
Static Forward Current Transfer Ratio (Note 9)	h <sub>FE</sub>	200 300 110 60 20 -	450 450 170 90 30 10	- 900 - - - -	-	I <sub>C</sub> = 10mA, V <sub>CE</sub> = 2V I <sub>C</sub> = 200mA, V <sub>CE</sub> = 2V I <sub>C</sub> = 1A, V <sub>CE</sub> = 2V I <sub>C</sub> = 1.5A, V <sub>CE</sub> = 2V I <sub>C</sub> = 3A, V <sub>CE</sub> = 2V I <sub>C</sub> = 5A, V <sub>CE</sub> = 2V
Collector-Emitter Saturation Voltage (Note 9)	V <sub>CE(sat)</sub>	- - - -	15 45 145 160	20 60 185 200	mV	I <sub>C</sub> = 0.1A, I <sub>B</sub> = 10mA I <sub>C</sub> = 0.5A, I <sub>B</sub> = 50mA I <sub>C</sub> = 1A, I <sub>B</sub> = 20mA I <sub>C</sub> = 1.5A, I <sub>B</sub> = 20mA
Base-Emitter Saturation Voltage (Note 9)	V <sub>BE(sat)</sub>	-	0.86	1.0	V	I <sub>C</sub> = 1.5A, I <sub>B</sub> = 50mA
Base-Emitter Saturation Voltage (Note 9)	V <sub>BE(on)</sub>	-	0.82	0.95	V	I <sub>C</sub> = 1.5A, V <sub>CE</sub> = 2V
Transition Frequency	f <sub>T</sub>	100	160	-	MHz	I <sub>C</sub> = 50mA, V <sub>CE</sub> = 10V, f = 100MHz
Collector Output Capacitance	C <sub>obo</sub>	-	11.5	18	pF	V <sub>CB</sub> = 10V, f = 1MHz
Turn-On Time	t <sub>(on)</sub>	-	86	-	ns	V <sub>CC</sub> = 10V, I <sub>C</sub> = 500mA,
Turn-Off Time	t <sub>(off)</sub>	-	1128	-	ns	I <sub>B1</sub> = -I <sub>B2</sub> = 25mA

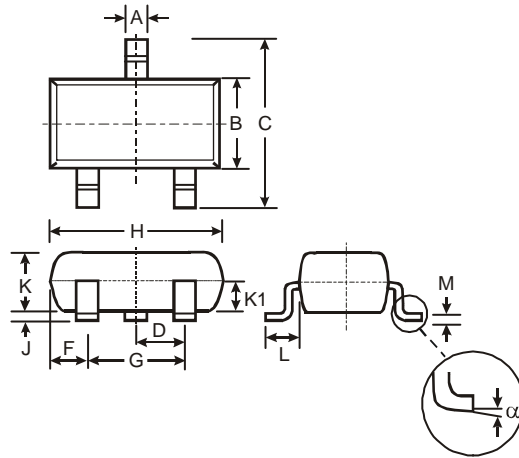
Notes: 9. Measured under pulsed conditions. Pulse width ≤ 300μs. Duty cycle ≤ 2%

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



**Package Outline Dimensions**

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

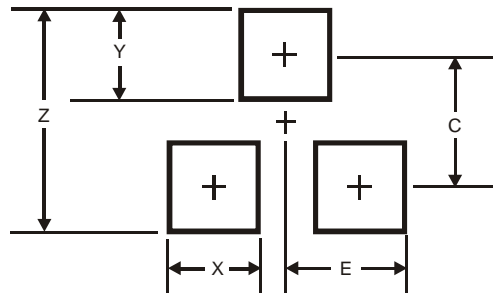


SOT23			
Dim	Min	Max	Typ
A	0.37	0.51	0.40
B	1.20	1.40	1.30
C	2.30	2.50	2.40
D	0.89	1.03	0.915
F	0.45	0.60	0.535
G	1.78	2.05	1.83
H	2.80	3.00	2.90
J	0.013	0.10	0.05
K	0.903	1.10	1.00
K1	-	-	0.400
L	0.45	0.61	0.55
M	0.085	0.18	0.11
α	0°	8°	-

**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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