FMMTL619

50V NPN LOW SATURATION TRANSISTOR IN SOT23

Features

- BV_{CEO} > 50V
- I_C = 1.25A Continuous Collector Current
- 500mW Power Dissipation
- Low Saturation Voltage $V_{CE(sat)}$ < 330mV @ 1.25A
- $R_{CE(SAT)}$ = 160mΩ for a Low Equivalent on-Resistance
- Complementary PNP type: FMMTL720
- **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**

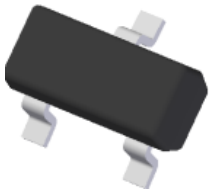
Mechanical Data

- 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)

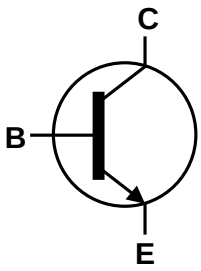
Applications

- MOSFET Gate Driving
- DC-DC / DC-AC Converters
- Regulator
- LED Driver
- Motor Control

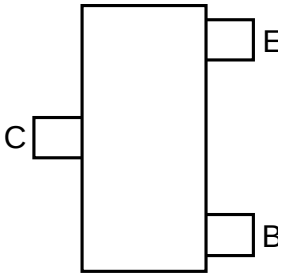
SOT23



Top View



Device Symbol



Top View
Pin-Out

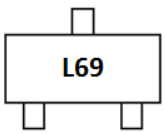
Ordering Information (Note 4)

Product	Compliance	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
FMMTL619TA	AEC-Q101	L69	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/quality/lead_free.html 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/products/packages.html.

Marking Information

SOT23



L69 = Product Type Marking Code

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Absolute Maximum Ratings (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V_{CBO}	100	V
Collector-Emitter Voltage	V_{CEO}	50	V
Emitter-Base Voltage	V_{EBO}	7	V
Continuous Collector Current	I_C	1.25	A
Peak Pulse Current	I_{CM}	2	A
Base Current	I_B	200	mA

Thermal Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 5)	P_D	500	mW
Power Dissipation (Note 6)	P_D	675	mW
Thermal Resistance, Junction to Ambient (Note 5)	$R_{\theta JA}$	250	°C/W
Thermal Resistance, Junction to Ambient (Note 6)	$R_{\theta JA}$	185	°C/W
Thermal Resistance, Junction to Lead (Note 7)	$R_{\theta JL}$	197	°C/W
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	°C

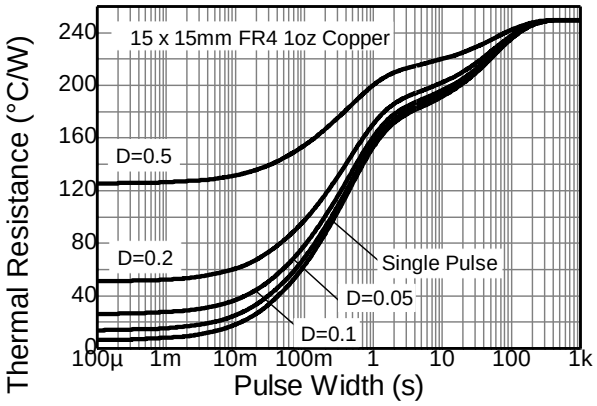
ESD Ratings (Note 8)

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

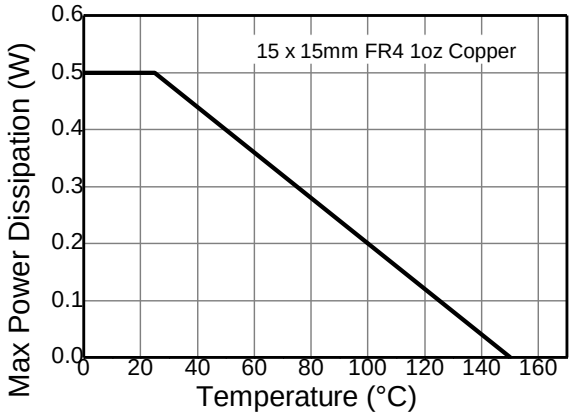
Notes:
5. For a device mounted with the collector lead on 15mm x 15mm 1oz copper that is on a single-sided 1.6mm FR4 PCB; device is measured under still air conditions whilst operating in a steady-state.
6. Same as Note 5, except the device is measured at t ≤ 5 seconds.
7. Thermal resistance from junction to solder-point (at the end of the collector lead).
8. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

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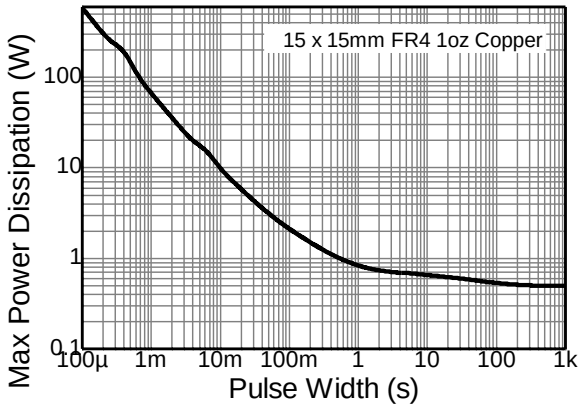
Thermal Characteristics and Derating information



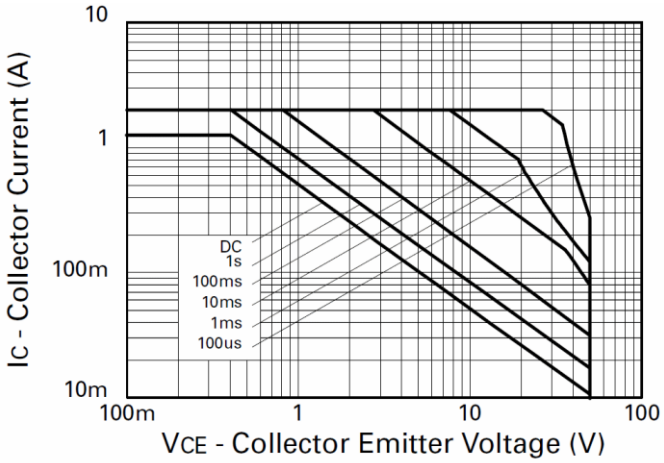
Transient Thermal Impedance



Derating Curve



Pulse Power Dissipation



Safe Operating Area

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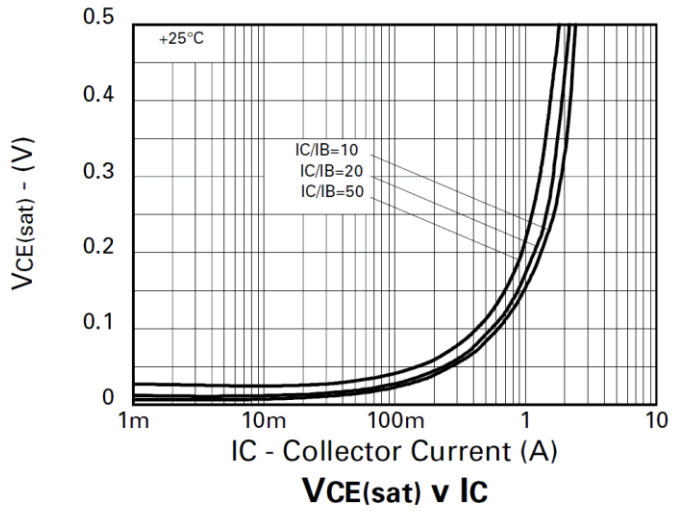
Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS						
Collector-Base Breakdown Voltage	BV_{CBO}	100	210	-	V	I_C = 100µA
Collector-Emitter Breakdown Voltage (Note 9)	BV_{CEO}	50	70	-	V	I_C = 5mA
Emitter-Base Breakdown Voltage	BV_{EBO}	7	8.5	-	V	I_E = 100µA
Collector Cut-Off Current	I_{CBO}	-	-	10	nA	V_{CB} = 80V
Emitter Cut-Off Current	I_{EBO}	-	-	10	nA	V_{EB} = 6V
Collector Emitter Cut-Off Current	I_{CES}	-	-	10	nA	V_{CES} = 50V
ON CHARACTERISTICS (Note 9)						
Static Forward Current Transfer Ratio	h_{FE}	200 300 200 100 30	400 450 400 230 50	- - - - -	-	I_C = 10mA, V_{CE} = 5V I_C = 200mA, V_{CE} = 5V I_C = 500mA, V_{CE} = 5V I_C = 1A, V_{CE} = 5V I_C = 2A, V_{CE} = 5V
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	- - - -	24 60 100 195	45 100 180 330	mV	I_C = 100mA, I_B = 10mA I_C = 250mA, I_B = 10mA I_C = 500mA, I_B = 25mA I_C = 1.25, I_B = 125mA
Base-Emitter Saturation Voltage	$V_{BE(sat)}$	-	1020	1100	mV	I_C = 1.25A, I_B = 125mA
Base-Emitter Turn-On Voltage	$V_{BE(on)}$	-	895	1000	mV	I_C = 1.25A, V_{CE} = 2V
SMALL SIGNAL CHARACTERISTICS						
Transition Frequency	f_T	-	180	-	MHz	I_C = 50mA, V_{CE} = 10V, f = 100MHz
Collector Output Capacitance	C_{obo}	-	6	8	pF	V_{CB} = 10V, f = 1MHz
Turn-On Time	$t_{(on)}$	-	182	-	ns	V_{CC} = 10V, I_C = 1A, I_{B1} = -I_{B2} = 10mA
Turn-Off Time	$t_{(off)}$	-	379	-	ns	

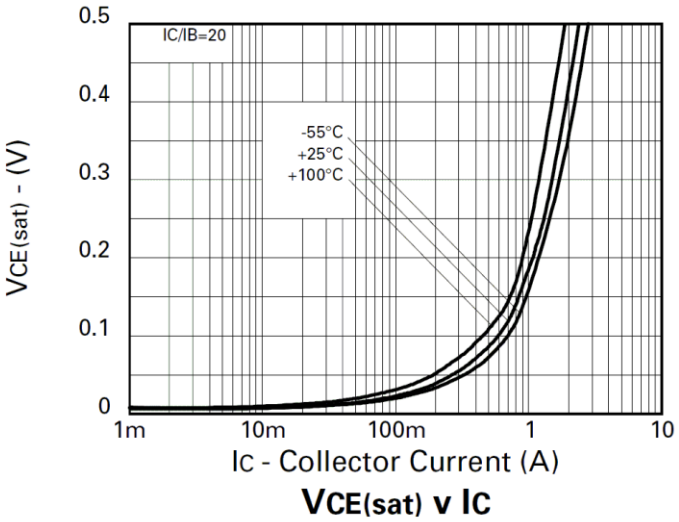
Note: 9. Measured under pulsed conditions. Pulse width ≤ 300µs. Duty cycle ≤ 2%.

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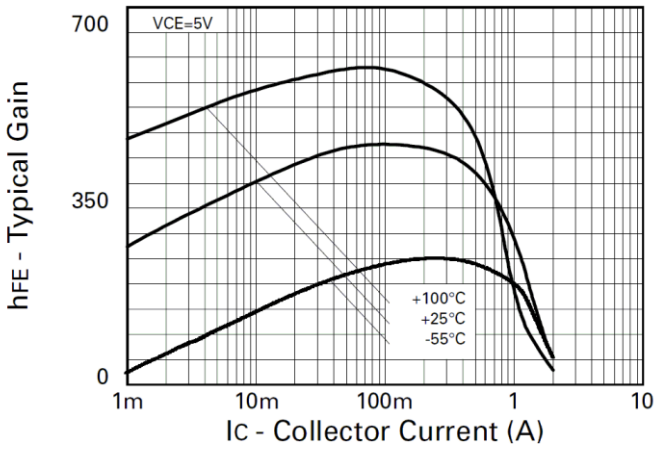
Typical Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)



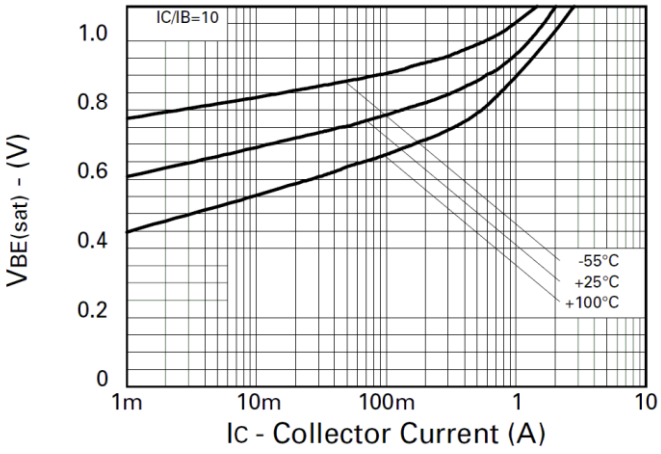
VCE(sat) v IC



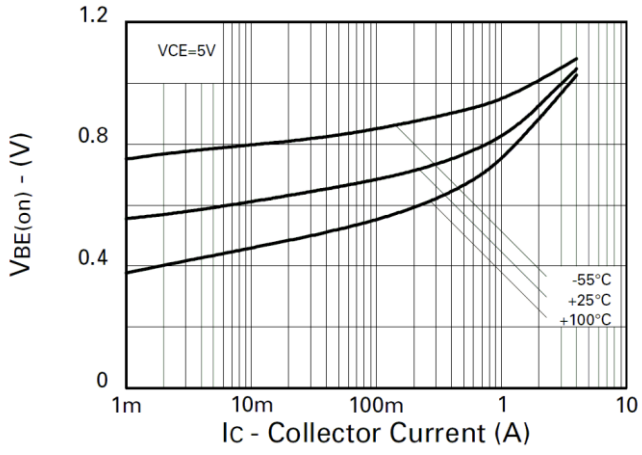
VCE(sat) v IC



hFE v IC



VBE(sat) v IC

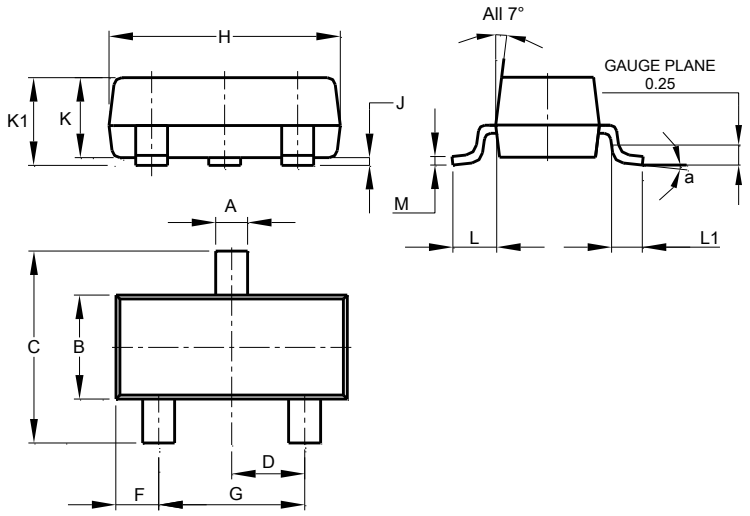


VBE(on) v IC

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Package Outline Dimensions

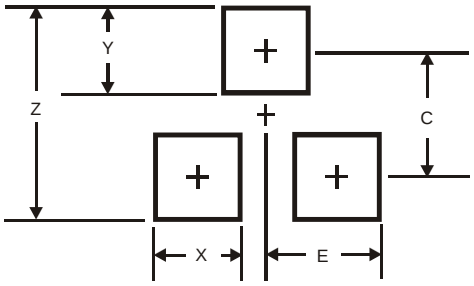
Please see AP02002 at http://www.diodes.com/datasheets/ap02002.pdf for the latest version.



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	0.890	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	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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