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50V NPN LOW SATURATION TRANSISTOR IN SOT23

Features

- $BV_{CEO} > 50V$
- $I_C = 1.25A$ Continuous Collector Current
- 500mW Power Dissipation
- Low Saturation Voltage $V_{CE(sat)} < 330mV @ 1.25A$
- $R_{CE(sat)} = 160m\Omega$ 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

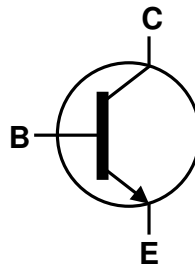
- Case: SOT23
- Case Material: Molded Plastic, "Green" Molding Compound; UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – Matte Tin Plated Leads, Solderable per MIL-STD-202, Method 208 @3
- Weight 0.008 grams (Approximate)

Applications

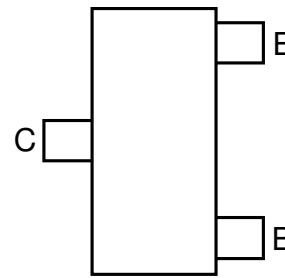
- MOSFET Gate Driving
- DC-DC / DC-AC Converters
- Regulator
- LED Driver
- Motor Control



Top View



Device Symbol



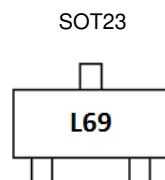
Top View
Pin-Out

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



L69 = Product Type Marking Code

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.)

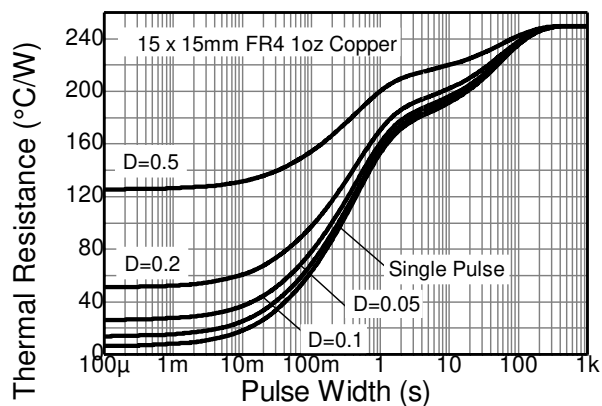
Characteristic	Symbol	Value	Unit
Power Dissipation (Note 5)	P _D	500	mW
Power Dissipation (Note 6)	P _D	675	mW
Thermal Resistance, Junction to Ambient (Note 5)	R _{θJA}	250	°C/W
Thermal Resistance, Junction to Ambient (Note 6)	R _{θJA}	185	°C/W
Thermal Resistance, Junction to Lead (Note 7)	R _{θJL}	197	°C/W
Operating and Storage Temperature Range	T _J , T _{STG}	-55 to +150	°C

ESD Ratings (Note 8)

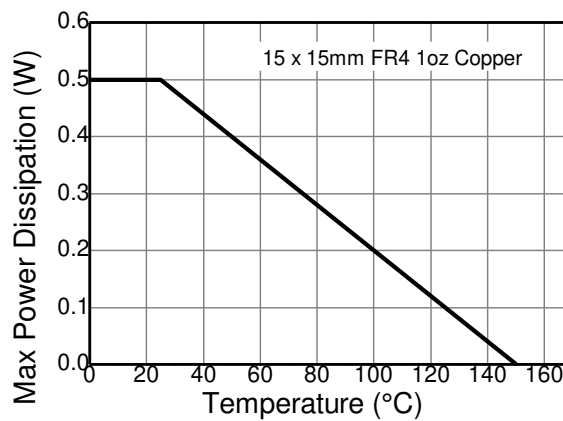
Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge - Human Body Model	ESD HBM	4,000	V	3A
Electrostatic Discharge - Machine Model	ESD MM	400	V	C

- Notes:
- 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.
 - Same as Note 5, except the device is measured at t ≤ 5 seconds.
 - Thermal resistance from junction to solder-point (at the end of the collector lead).
 - Refer to JEDEC specification JESD22-A114 and JESD22-A115.

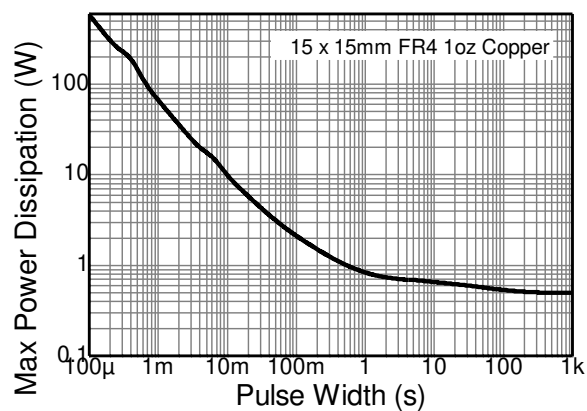
Thermal Characteristics and Derating information



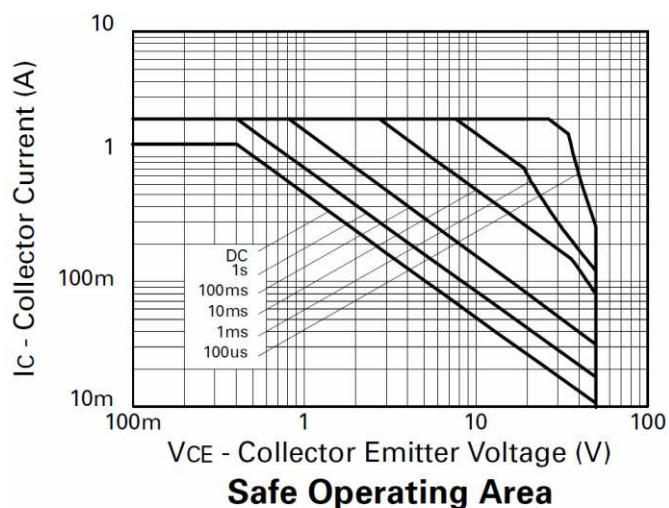
Transient Thermal Impedance



Derating Curve



Pulse Power Dissipation



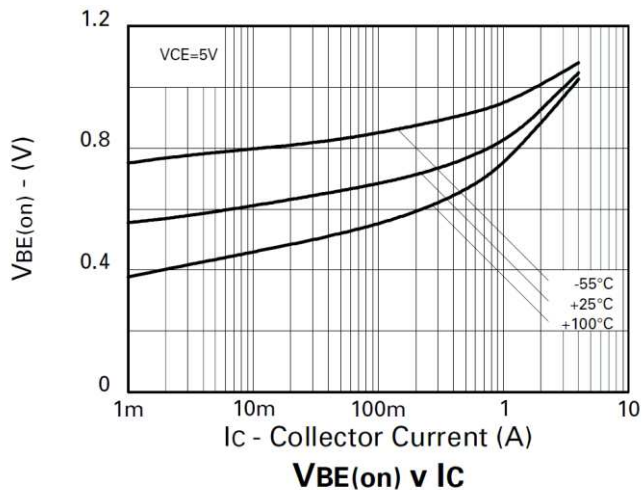
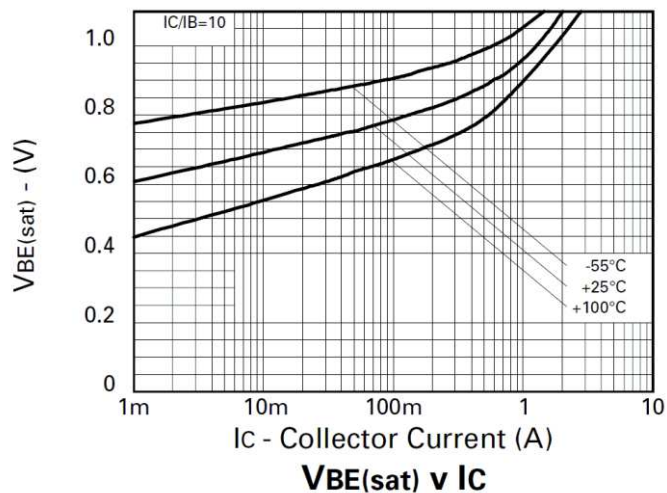
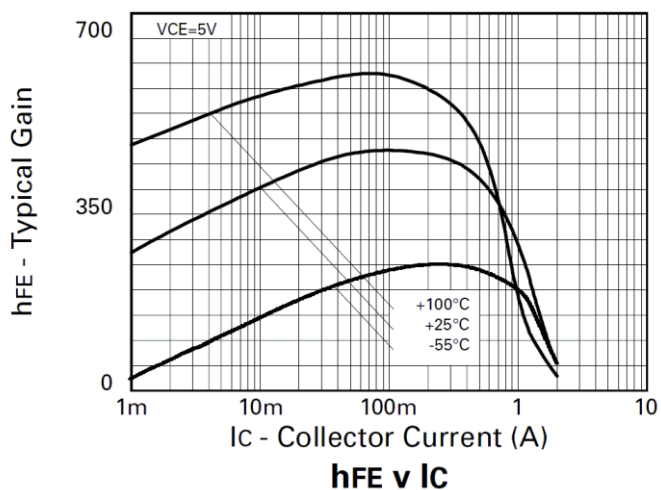
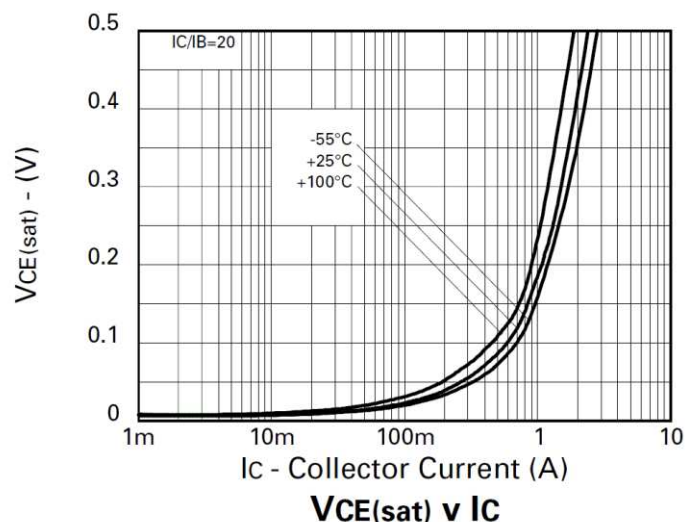
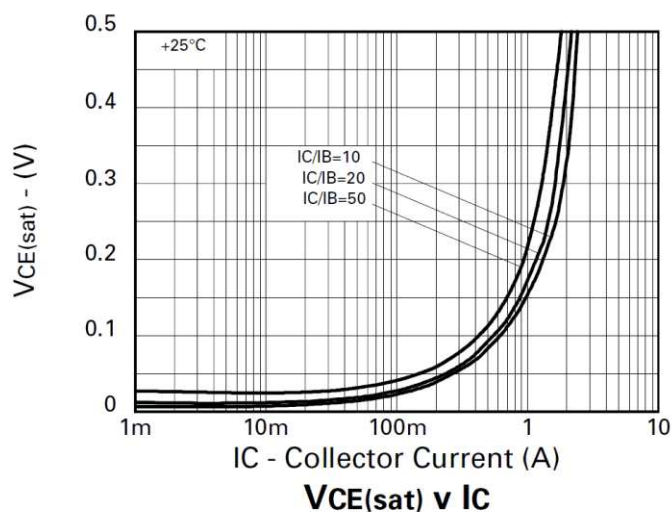
Safe Operating Area

Electrical Characteristics (@T_A = +25°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	400	-	-	I _C = 10mA, V _{CE} = 5V
		300	450	-		I _C = 200mA, V _{CE} = 5V
		200	400	-		I _C = 500mA, V _{CE} = 5V
		100	230	-		I _C = 1A, V _{CE} = 5V
		30	50	-		I _C = 2A, V _{CE} = 5V
Collector-Emitter Saturation Voltage	V _{CE(sat)}	-	24	45	mV	I _C = 100mA, I _B = 10mA
		-	60	100		I _C = 250mA, I _B = 10mA
		-	100	180		I _C = 500mA, I _B = 25mA
		-	195	330		I _C = 1.25A, 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	

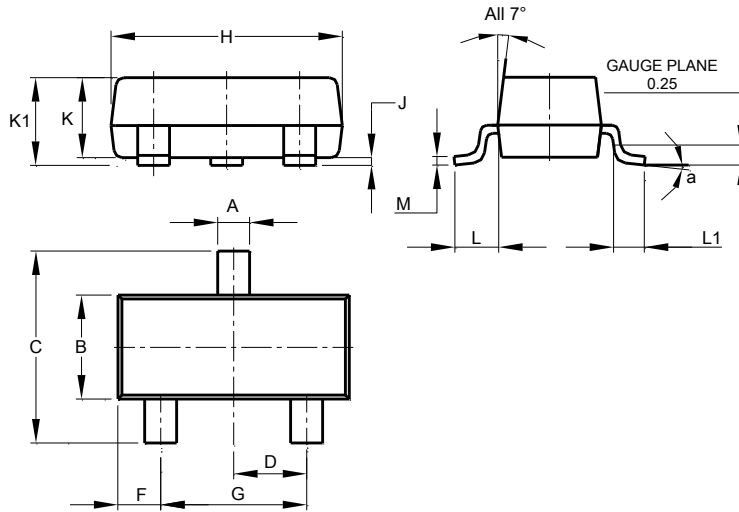
Note: 9. Measured under pulsed conditions. Pulse width ≤ 300μs. Duty cycle ≤ 2%.

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



Package Outline Dimensions

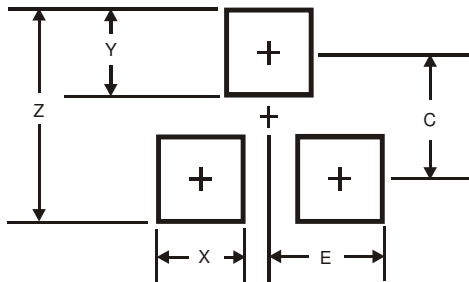
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.



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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