

**20V PNP SILICON LOW SATURATION TRANSISTOR IN SOT23**

**Features and Benefits**

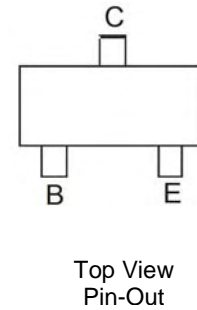
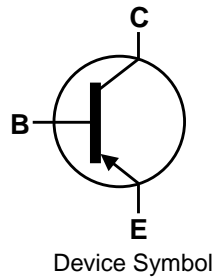
- $BV_{CEO} > -20V$
- $I_C = -1A$  Continuous Collector Current
- $I_{CM} = -2A$  Peak Pulse Current
- Low Saturation Voltage  $V_{CE(sat)} < -320mV @ -1A$
- $h_{FE}$  characterised up to  $-1.5A$  for high current gain hold-up
- 500mW power dissipation
- Complementary part number FMMTL618
- **Lead Free, RoHS Compliant (Note 1)**
- **Halogen and Antimony Free "Green" Device (Note 2)**
- **Qualified to AEC-Q101 Standards for High Reliability**

**Mechanical Data**

- Case: SOT-23
- UL Flammability Rating 94V-0
- Case material: molded Plastic.
- Moisture Sensitivity: Level 1 per J-STD-020D
- Terminals: Matte Tin Finish annealed over Copper plated Alloy 42 leadframe. Solderable per MIL-STD-202, Method 208
- Weight: 0.008 grams (Approximate)

**Applications**

- MOSFET Gate Driving
- DC-DC Converters
- Charging circuit
- Power switches

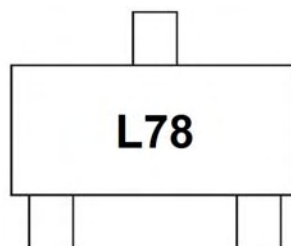


**Ordering Information** (Note 3)

Product	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
FMMTL718TA	L78	7	8	3,000

- Notes:
1. No purposefully added lead.
  2. Diodes Inc.'s "Green" Policy can be found on our website at <http://www.diodes.com>
  3. For Packaging Details, go to our website at <http://www.diodes.com>.

**Marking Information**



L78 = Product Type Marking Code

**Maximum Ratings** @ $T_A = 25^\circ\text{C}$  unless otherwise specified

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	$V_{CBO}$	-20	V
Collector-Emitter Voltage	$V_{CEO}$	-20	V
Emitter-Base Voltage	$V_{EBO}$	-5	V
Continuous Collector Current	$I_C$	-1	A
Peak Pulse Current	$I_{CM}$	-2	A
Base Current	$I_B$	-200	mA

**Thermal Characteristics** @ $T_A = 25^\circ\text{C}$  unless otherwise specified

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 4)	$P_D$	500	mW
Thermal Resistance, Junction to Ambient (Note 4)	$R_{\theta JA}$	250	$^\circ\text{C/W}$
Thermal Resistance, Junction to Lead (Note 5)	$R_{\theta JL}$	197	$^\circ\text{C/W}$
Operating and Storage Temperature Range	$T_J, T_{STG}$	-55 to +150	$^\circ\text{C}$

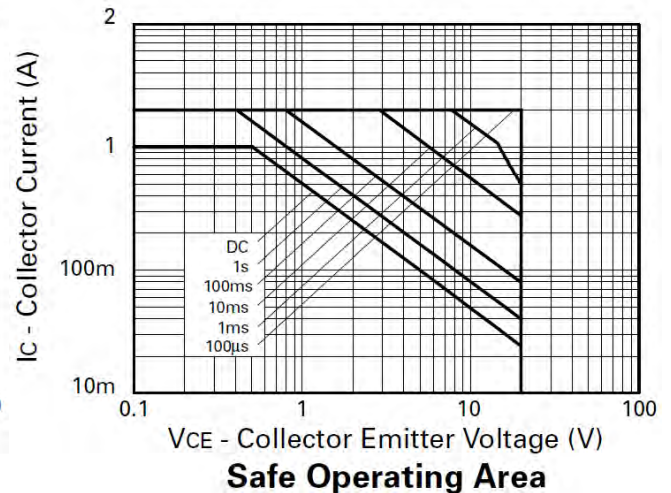
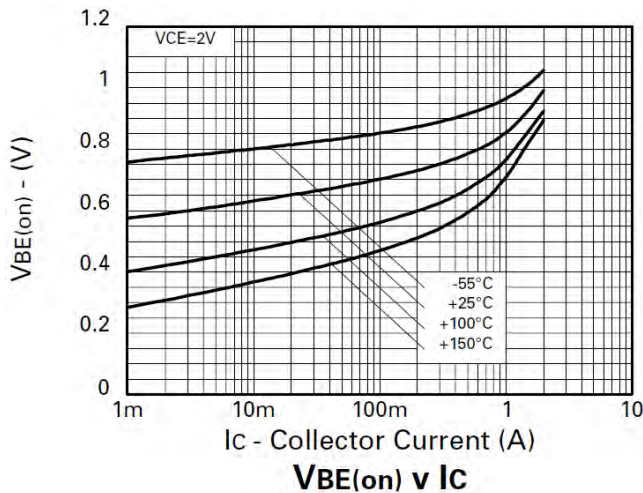
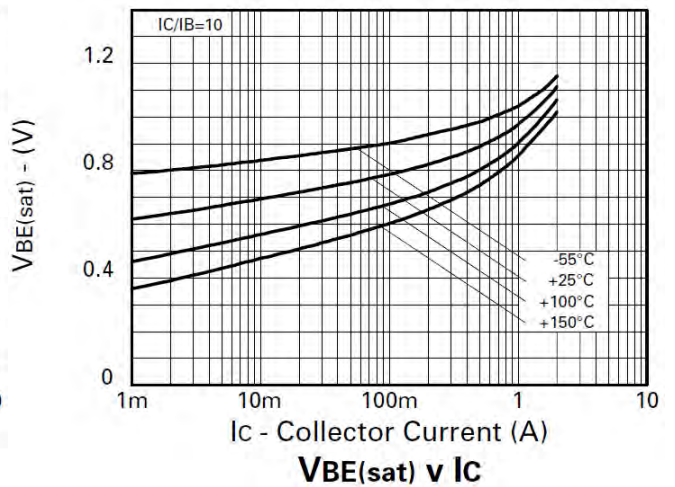
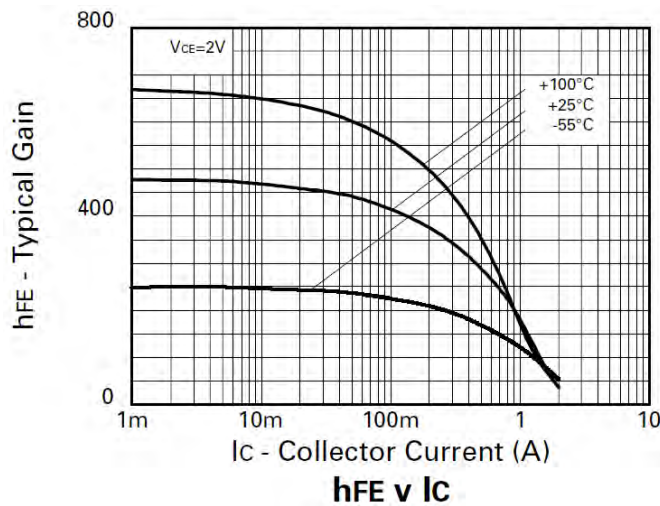
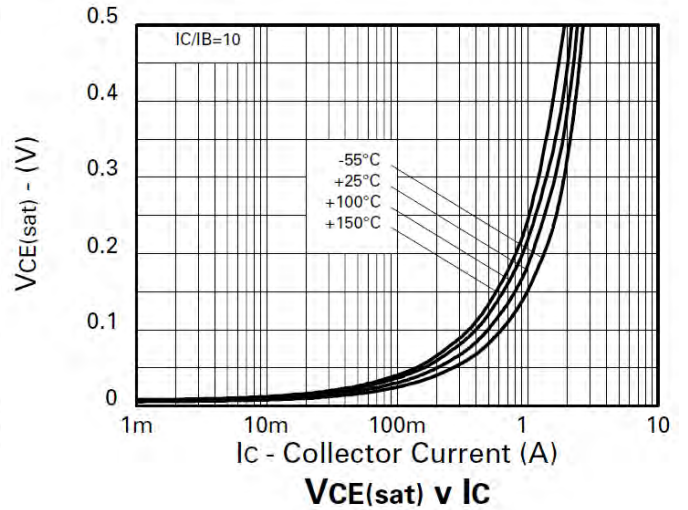
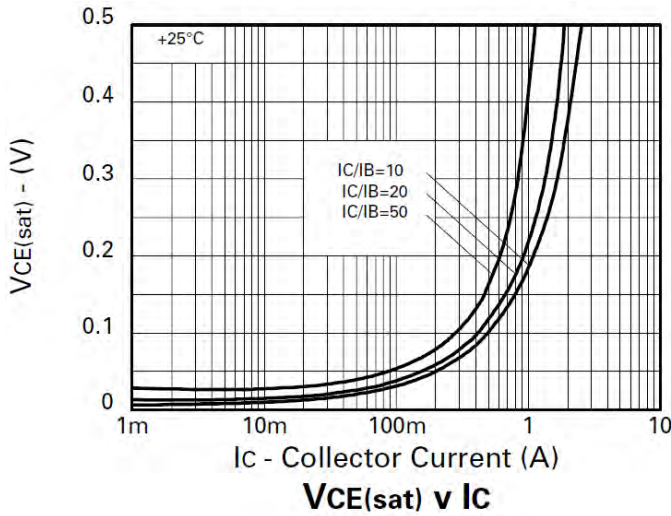
- Notes:
4. For a device surface mounted on 15mm X 15mm FR4 PCB with high coverage of single sided 1 oz copper, in still air conditions; the device is measured when operating in a steady-state condition.
  5. Thermal resistance from junction to solder-point (at the end of the collector lead).

**Electrical Characteristics** @ $T_A = 25^\circ\text{C}$  unless otherwise specified

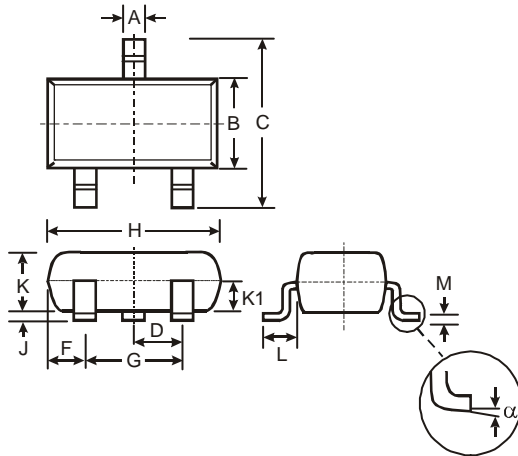
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	$BV_{CBO}$	-20	-65		V	$I_C = -100 \mu\text{A}$
Collector-Emitter Breakdown Voltage (Note 6)	$BV_{CEO}$	-20	-55		V	$I_C = -10 \text{ mA}$
Emitter-Base Breakdown Voltage	$BV_{EBO}$	-5	-8.8		V	$I_E = -100 \mu\text{A}$
Collector Cutoff Current	$I_{CBO}$			-10	nA	$V_{CB} = -15\text{V}$
Emitter Cutoff Current	$I_{EBO}$			-10	nA	$V_{EB} = -4\text{V}$
Collector Emitter Cutoff Current	$I_{CES}$			-10	nA	$V_{CE} = -15\text{V}$
Static Forward Current Transfer Ratio (Note 6)	$h_{FE}$	300 300 200 120 50	500 450 320 200 80			$I_C = -10\text{mA}, V_{CE} = -2\text{V}$ $I_C = -100\text{mA}, V_{CE} = -2\text{V}$ $I_C = -0.5\text{A}, V_{CE} = -2\text{V}$ $I_C = -1\text{A}, V_{CE} = -2\text{V}$ $I_C = -1.5\text{A}, V_{CE} = -2\text{V}$
Collector-Emitter Saturation Voltage (Note 6)	$V_{CE(sat)}$		-33 -130 -230 -315	-50 -180 -320 -450	mV mV mV mV	$I_C = -100\text{mA}, I_B = -10\text{mA}$ $I_C = -500\text{mA}, I_B = -20\text{mA}$ $I_C = -1\text{A}, I_B = -50\text{mA}$ $I_C = -1.5\text{A}, I_B = -100\text{mA}$
Base-Emitter Turn-On Voltage (Note 6)	$V_{BE(on)}$		-0.85	-1.0	V	$I_C = -1.25\text{A}, V_{CE} = -2\text{V}$
Base-Emitter Saturation Voltage (Note 6)	$V_{BE(sat)}$		-0.95	-1.1	V	$I_C = -1.25\text{A}, I_B = -100\text{mA}$
Equivalent On-Resistance	$R_{CE(sat)}$		210		m $\Omega$	$I_C = -1.5\text{A}$
Output Capacitance	$C_{obo}$		9	12	pF	$V_{CB} = -10\text{V}, f = 1\text{MHz}$
Transition Frequency	$f_T$		265		MHz	$V_{CE} = -10\text{V}, I_C = -50\text{mA}, f = 100\text{MHz}$
Turn-On Time	$t_{on}$		108		ns	$V_{CC} = -10\text{V}, I_C = -1\text{A}$
Turn-Off Time	$t_{off}$		121		ns	$I_{B1} = I_{B2} = -10\text{mA}$

- Note: 6. Measured under pulsed conditions. Pulse width  $\leq 300 \mu\text{s}$ . Duty cycle  $\leq 2\%$

**Typical Electrical Characteristics**

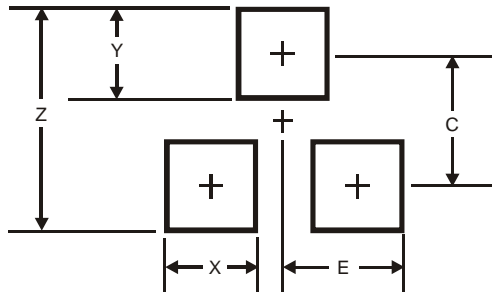


**Package Outline Dimensions**



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**



Dimensions	Value (in mm)
Z	2.9
X	0.8
Y	0.9
C	2.0
E	1.35

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