



**THE DATASHEET OF  
FMMTL717TA**



**12V PNP HIGH GAIN MEDIUM POWER TRANSISTOR IN SOT23**

**Features**

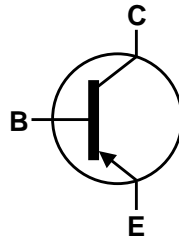
- $BV_{CEO} > -12V$
- $I_C = -1.25A$  Continuous Collector Current
- $I_{CM} = -4A$  Peak Pulse Current
- Low Saturation Voltage  $V_{CE(sat)} < -240mV @ -1A$
- $R_{CE(SAT)} = 160m\Omega$  for a low equivalent on-resistance
- 500mW power dissipation
- $h_{FE}$  characterised up to -3A for high current 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**

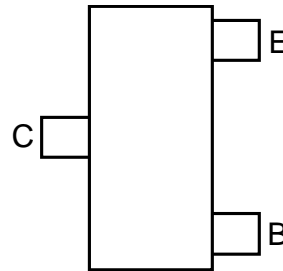
- Case: SOT23
- Case Material: Molded Plastic, "Green" Molding Compound  
UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – Matte Tin Plated Leads. Solderable per  
MIL-STD-202, Method 208 ③
- Weight 0.008 grams (approximate)



Top View



Device Symbol



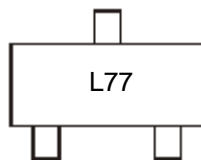
Top View  
Pin-Out

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

Product	Compliance	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
FMMTL717TA	AEC-Q101	L77	7	8	3,000
FMMTL717QTA	Automotive	L77	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/products/packages.html>.

**Marking Information**



L77 = Product Type Marking Code

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

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V <sub>CB0</sub>	-12	V
Collector-Emitter Voltage	V <sub>CEO</sub>	-12	V
Emitter-Base Voltage	V <sub>EBO</sub>	-7	V
Continuous Collector Current	I <sub>C</sub>	-1.25	A
Peak Pulse Current	I <sub>CM</sub>	-4	A
Base Current	I <sub>B</sub>	-200	mA

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

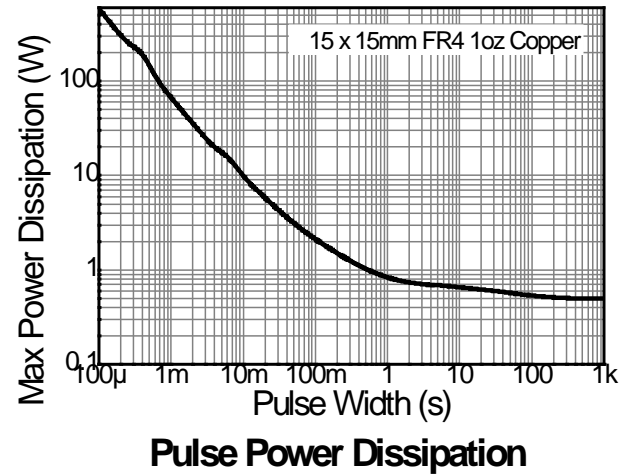
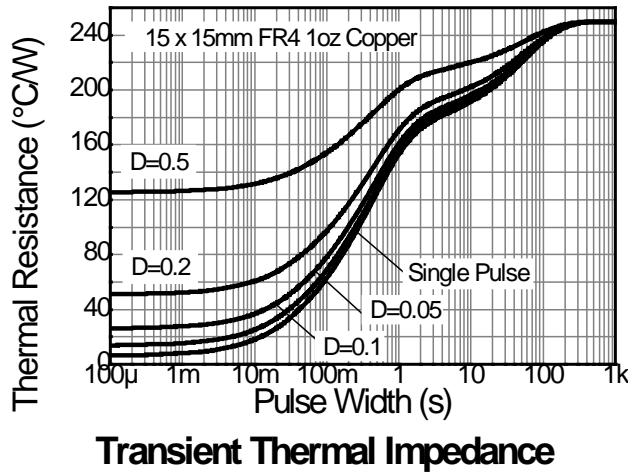
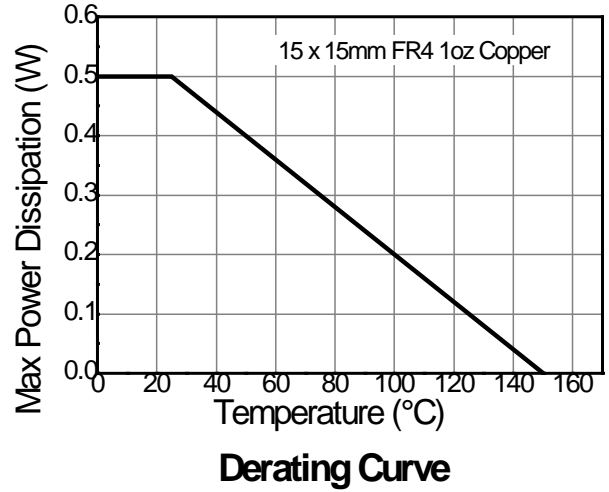
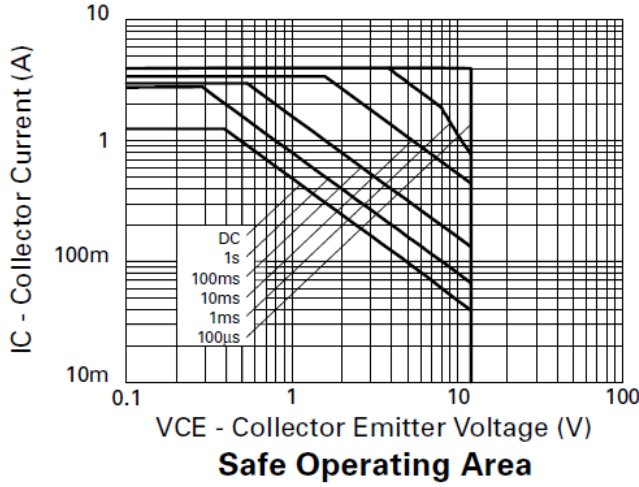
Characteristic	Symbol	Value	Unit
Power Dissipation (Note 6)	P <sub>D</sub>	500	mW
Thermal Resistance, Junction to Ambient (Note 6)	R <sub>θJA</sub>	250	°C/W
Thermal Resistance, Junction to Lead (Note 7)	R <sub>θJL</sub>	197	°C/W
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-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	C

- Notes:
6. For a device mounted with the collector lead on 15mm x 15mm 1oz copper that is on a single-sided FR4 PCB; device is measured under still air conditions whilst operating in a steady-state.
  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**

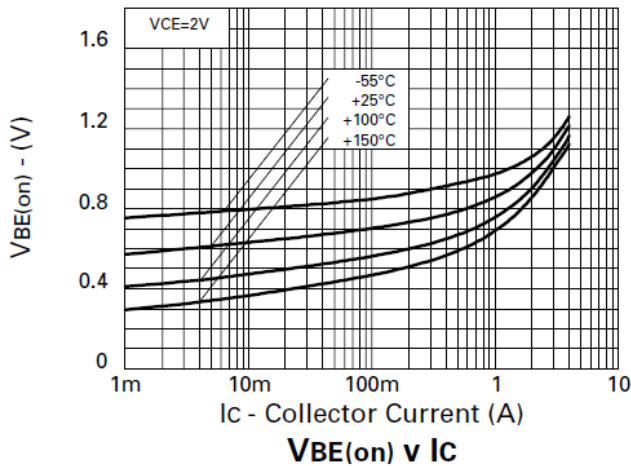
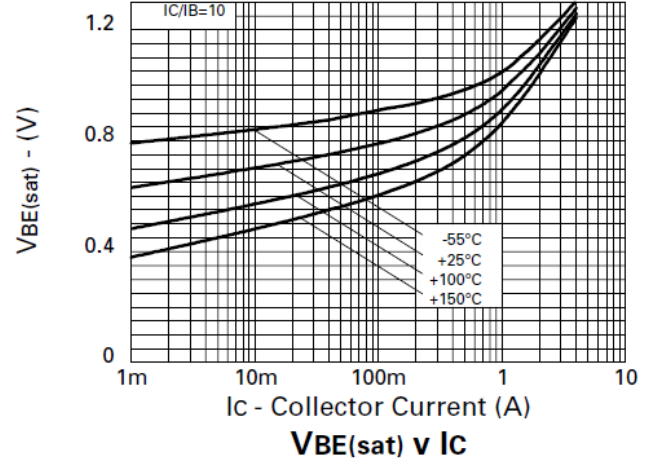
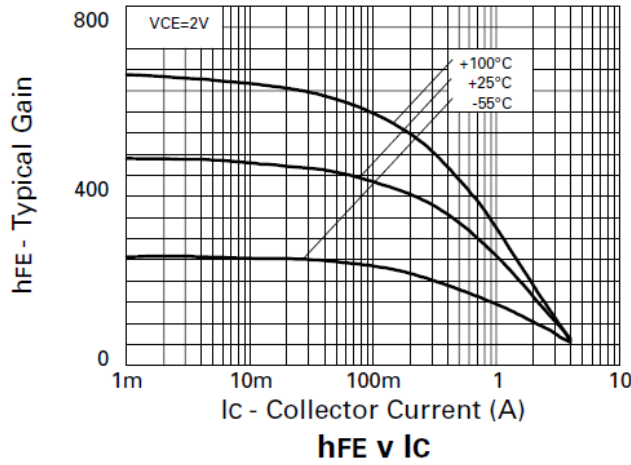
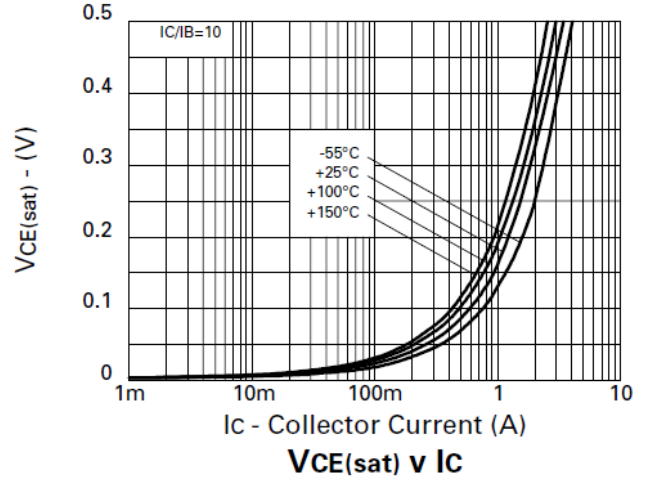
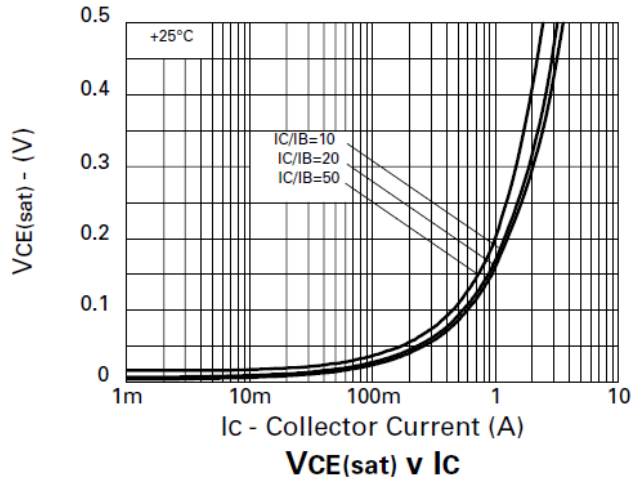


**Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV <sub>CBO</sub>	-12	-35	-	V	I <sub>C</sub> = -100μA
Collector-Emitter Breakdown Voltage (Note 9)	BV <sub>CEO</sub>	-12	-25	-	V	I <sub>C</sub> = -10mA
Emitter-Base Breakdown Voltage	BV <sub>EBO</sub>	-7	-8.5	-	V	I <sub>E</sub> = -100μA
Collector Cutoff Current	I <sub>CBO</sub>	-	<-1	-10	nA	V <sub>CB</sub> = -10V
Emitter Cutoff Current	I <sub>EBO</sub>	-	<-1	-10	nA	V <sub>EB</sub> = -5.6V
Collector Emitter Cutoff Current	I <sub>CES</sub>	-	<-1	-10	nA	V <sub>CE</sub> = -10V
Static Forward Current Transfer Ratio (Note 9)	h <sub>FE</sub>	300	490	-	-	I <sub>C</sub> = -10mA, V <sub>CE</sub> = -2V
		300	450	-		I <sub>C</sub> = -0.1A, V <sub>CE</sub> = -2V
		180	275	-		I <sub>C</sub> = -1A, V <sub>CE</sub> = -2V
		100	180	-		I <sub>C</sub> = -2A, V <sub>CE</sub> = -2V
		50	110	-		I <sub>C</sub> = -3A, V <sub>CE</sub> = -2V
Collector-Emitter Saturation Voltage (Note 9)	V <sub>CE(sat)</sub>	-	-24	-40	mV	I <sub>C</sub> = -0.1A, I <sub>B</sub> = -10mA
		-	-94	-140	mV	I <sub>C</sub> = -0.5A, I <sub>B</sub> = -20mA
		-	-160	-240	mV	I <sub>C</sub> = -1A, I <sub>B</sub> = -50mA
		-	-200	-290	mV	I <sub>C</sub> = -1.25A, I <sub>B</sub> = -50mA
Base-Emitter Turn-On Voltage(Note 9)	V <sub>BE(on)</sub>	-	-875	-1000	mV	I <sub>C</sub> = -1.25A, V <sub>CE</sub> = -2V
Base-Emitter Saturation Voltage(Note 9)	V <sub>BE(sat)</sub>	-	-970	-1100	mV	I <sub>C</sub> = -1.25A, I <sub>B</sub> = -50mA
Output Capacitance	C <sub>obo</sub>	-	15	20	pF	V <sub>CB</sub> = -10V, f = 1MHz
Transition Frequency	f <sub>T</sub>	-	205	-	MHz	V <sub>CE</sub> = -10V, I <sub>C</sub> = -50mA, f = 100MHz
Turn-On Time	t <sub>on</sub>	-	76	-	ns	V <sub>CC</sub> = -10V, I <sub>C</sub> = -1A
Turn-Off Time	t <sub>off</sub>	-	149	-	ns	I <sub>B1</sub> = -I <sub>B2</sub> = -10mA

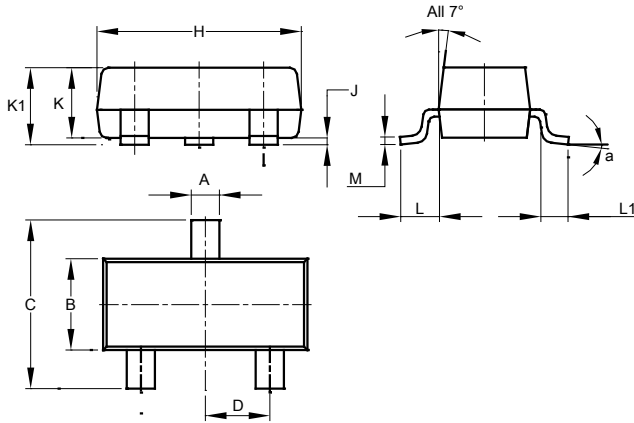
Notes: 9. Measured under pulsed conditions. Pulse width ≤ 300μs. Duty cycle ≤ 2%

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



**Package Outline Dimensions**

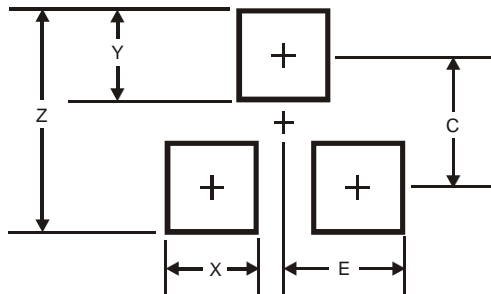
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



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	0.890	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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