

**Features**

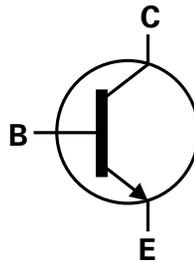
- $BV_{CEO} > 300V$
- Ideal for Medium Power Amplification and Switching
- Complementary PNP Type: [MMBTA92](#)
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **An automotive-compliant part is available under a separate datasheet ([MMBTA42Q](#))**

**Mechanical Data**

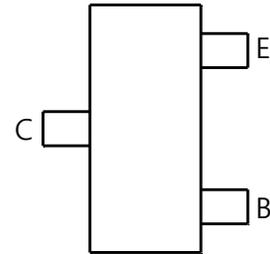
- Package: SOT23
- Package Material: Molded Plastic, "Green" Molding Compound; UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish-Matte Tin Plated Leads. Solderable per MIL-STD-202, Method 208 
- Weight: 0.008 grams (Approximate)



Top View



Device Symbol



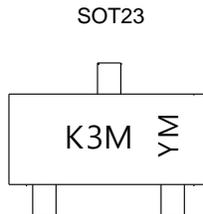
Top View  
Pin-Out

**Ordering Information** (Note 4)

Orderable Part Number	Package	Marking	Reel Size (inches)	Tape Width (mm)	Packing	
					Qty.	Carrier
MMBTA42-7-F	SOT23	K3M	7	8	3,000	Reel
MMBTA42-13-F	SOT23	K3M	13	8	10,000	Reel

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
  2. See <https://www.diodes.com/quality/lead-free/> 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 <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

**Marking Information**



K3M = Product Type Marking Code  
 YM = Date Code Marking  
 Y or  $\bar{Y}$  or  $\underline{Y}$  = Year (ex: M = 2025)  
 M = Month (ex: 5 = May)

Date Code Key

Year	1998	-	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Code	J	-	M	N	P	R	S	T	U	V	W	X

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Code	1	2	3	4	5	6	7	8	9	O	N	D

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

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V <sub>CB0</sub>	300	V
Collector-Emitter Voltage	V <sub>CEO</sub>	300	V
Emitter-Base Voltage	V <sub>EBO</sub>	6.0	V
Collector Current - Continuous	I <sub>C</sub>	500	mA

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

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 5)	P <sub>D</sub>	300	mW
Thermal Resistance, Junction to Ambient (Note 5)	R <sub>θJA</sub>	417	°C/W
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

### ESD Ratings (Note 6)

Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge - Human Body Model	ESD HBM	4000	V	3A
Electrostatic Discharge - Machine Model	ESD MM	400	V	C

- Notes:
5. For a device mounted on minimum recommended pad layout 1oz copper that is on a single-sided FR4 PCB; device is measured under still air conditions whilst operating in a steady state.
  6. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

**Thermal Characteristics**

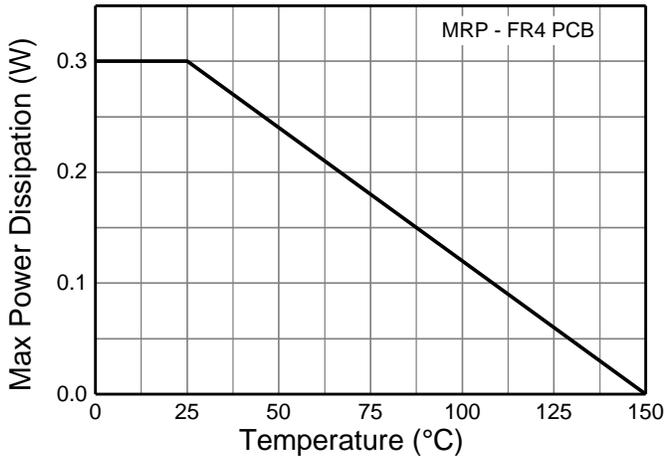


Figure 1. Derating Curve

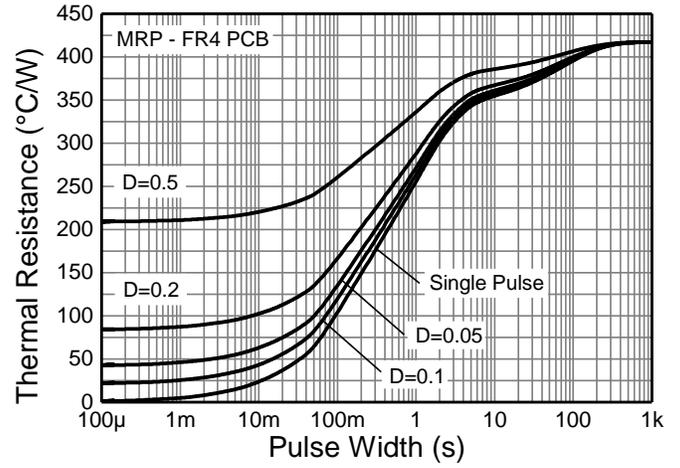


Figure 2. Transient Thermal Impedance

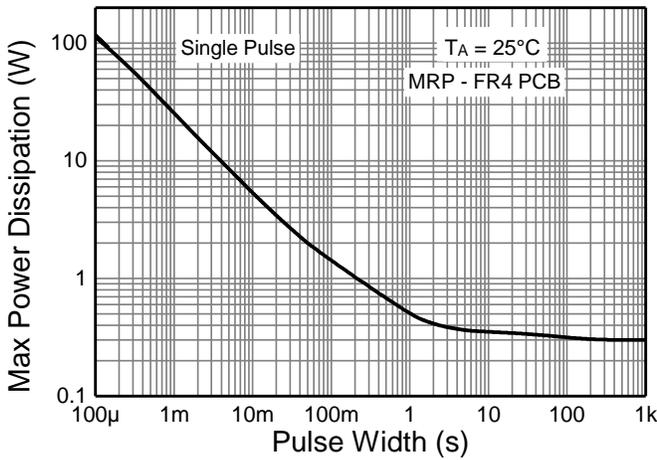


Figure 3. Pulse Power Dissipation

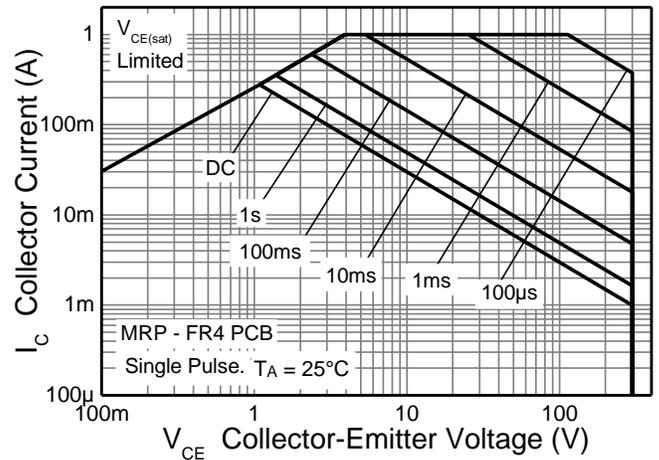


Figure 4. Safe Operating Area

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

Characteristic	Symbol	Min	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS (Note 7)</b>					
Collector-Base Breakdown Voltage	BV <sub>CB0</sub>	300	—	V	I <sub>C</sub> = 100μA, I <sub>E</sub> = 0
Collector-Emitter Breakdown Voltage	BV <sub>CEO</sub>	300	—	V	I <sub>C</sub> = 1.0mA, I <sub>B</sub> = 0
Emitter-Base Breakdown Voltage	BV <sub>EB0</sub>	6.0	—	V	I <sub>E</sub> = 100μA, I <sub>C</sub> = 0
Collector Cutoff Current	I <sub>CB0</sub>	—	100	nA	V <sub>CB</sub> = 200V, I <sub>E</sub> = 0
Emitter Cutoff Current	I <sub>EBO</sub>	—	100	nA	V <sub>EB</sub> = 6.0V, I <sub>C</sub> = 0
<b>ON CHARACTERISTICS (Note 7)</b>					
DC Current Gain	h <sub>FE</sub>	25	—	—	I <sub>C</sub> = 1.0mA, V <sub>CE</sub> = 10V
		40	—		I <sub>C</sub> = 10mA, V <sub>CE</sub> = 10V
		40	—		I <sub>C</sub> = 30mA, V <sub>CE</sub> = 10V
Collector-Emitter Saturation Voltage	V <sub>CE(sat)</sub>	—	0.5	V	I <sub>C</sub> = 20mA, I <sub>B</sub> = 2.0mA
Base-Emitter Saturation Voltage	V <sub>BE(sat)</sub>	—	0.9	V	I <sub>C</sub> = 20mA, I <sub>B</sub> = 2.0mA
<b>SMALL-SIGNAL CHARACTERISTICS</b>					
Output Capacitance	C <sub>cb</sub>	—	3.0	pF	V <sub>CB</sub> = 20V, f = 1.0MHz, I <sub>E</sub> = 0
Current Gain-Bandwidth Product	f <sub>T</sub>	50	—	MHz	V <sub>CE</sub> = 20V, I <sub>C</sub> = 10mA, f = 100MHz

Note: 7. Measured under pulsed conditions. Pulse width ≤ 300μs. Duty cycle ≤ 2%.

**Typical Electrical Characteristics**

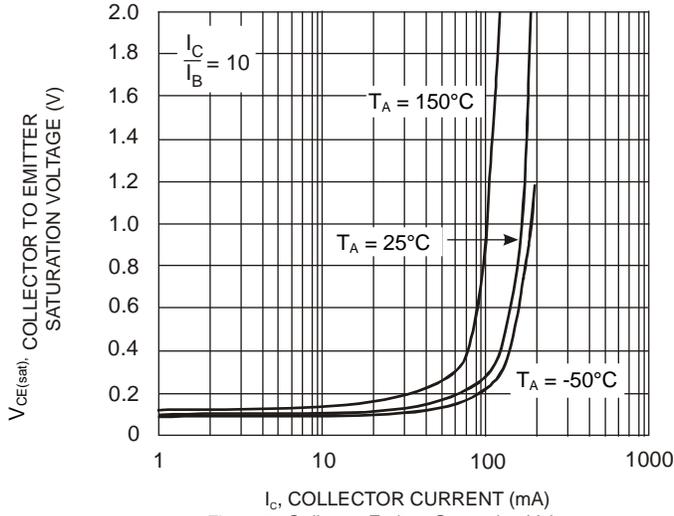


Figure 5. Collector Emitter Saturation Voltage vs. Collector Current

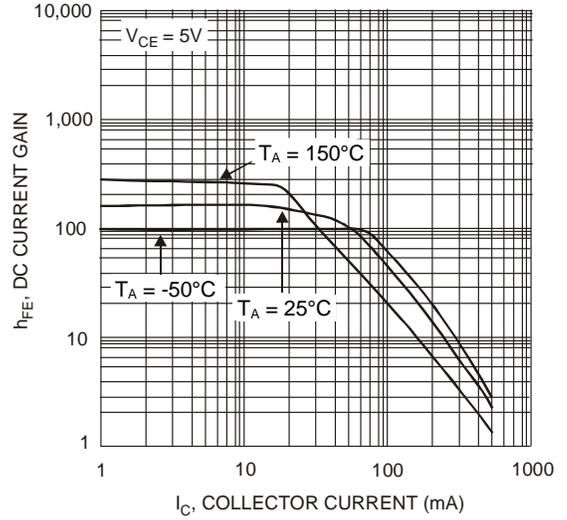


Figure 6. DC Current Gain vs. Collector Current

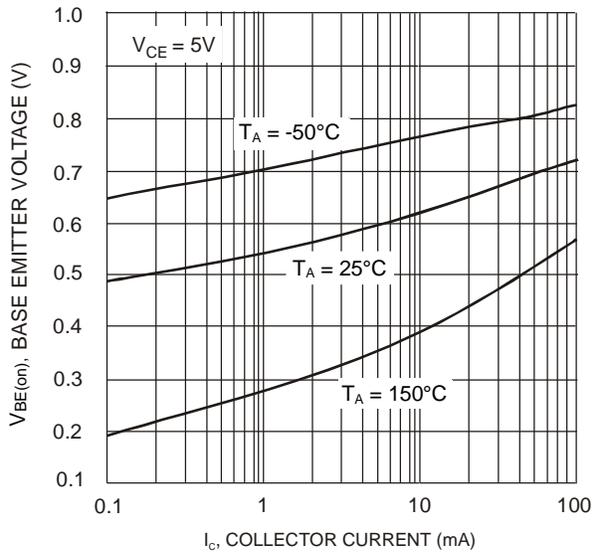


Figure 7. Base Emitter Voltage vs. Collector Current

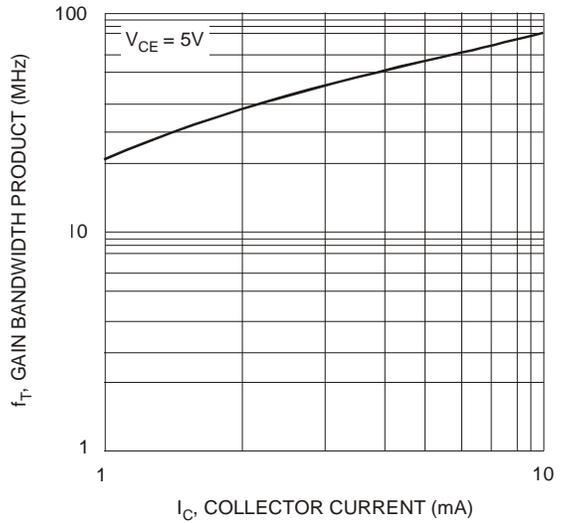
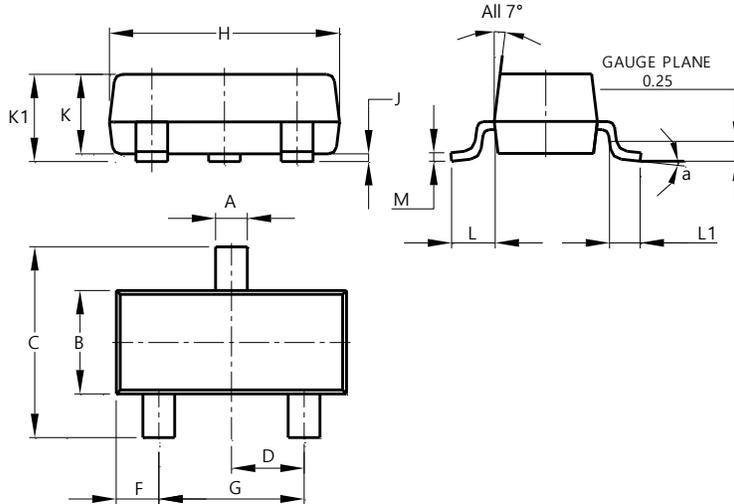


Figure 8. Gain Bandwidth Product vs. Collector Current

**Package Outline Dimensions**

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

**SOT23**

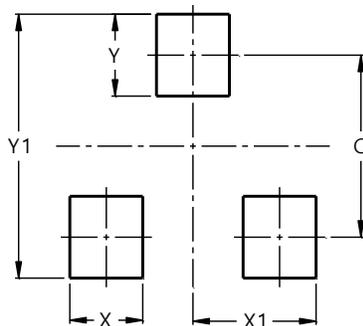


SOT23			
Dim	Min	Max	Typ
A	0.37	0.51	0.40
B	1.20	1.40	1.30
C	2.30	2.50	2.40
D	0.89	1.03	0.915
F	0.45	0.60	0.535
G	1.78	2.05	1.83
H	2.80	3.00	2.90
J	0.013	0.10	0.05
K	0.890	1.00	0.975
K1	0.903	1.10	1.025
L	0.45	0.61	0.55
L1	0.25	0.55	0.40
M	0.085	0.150	0.110
a	0°	8°	--
All Dimensions in mm			

**Suggested Pad Layout**

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

**SOT23**



Dimensions	Value (in mm)
C	2.0
X	0.8
X1	1.35
Y	0.9
Y1	2.9

Note: For high-voltage applications, the appropriate industry sector guidelines should be considered with regards to creepage and clearance distances between device terminals and PCB tracking.

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