

**Features**

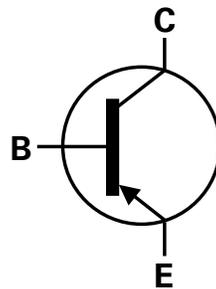
- Ideal for Medium Power Amplification and Switching
- Complementary NPN Type: [MMBT4401](#)
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. “Green” Device (Note 3)**
- **For automotive applications requiring specific change control (i.e. parts qualified to AEC-Q100/101/104/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please [contact us](#) or your local Diodes representative. <https://www.diodes.com/quality/product-definitions/>**

**Mechanical Data**

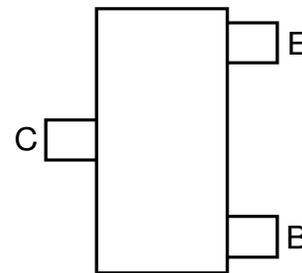
- Package: SOT23
- Package Material: Molded Plastic “Green” Compound  
UL Flammability Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish - Matte Tin Plated Leads, Solderable per MIL-STD-202, Method 208 
- Weight: 0.008 grams (Approximate)



Top View



Device Symbol



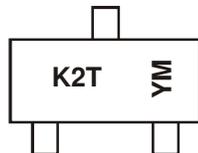
Top View  
Pinout

**Ordering Information** (Note 4)

Orderable Part Number	Package	Marking	Reel Size (inches)	Tape Width (mm)	Packing	
					Qty.	Carrier
MMBT4403-7-F	SOT23	K2T	7	8	3,000	Reel
MMBT4403-13-F	SOT23	K2T	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**



K2T = Product Type Marking Code  
 YM = Date Code Marking  
 Y or Y or Y = Year (ex: M = 2025)  
 M = Month (ex: 2 = February)

Date Code Key

Year	2003	-	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Code	P	-	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.)

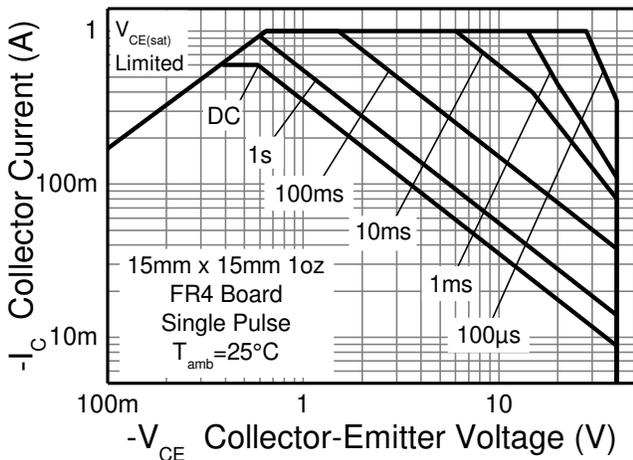
Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V <sub>CB0</sub>	-40	V
Collector-Emitter Voltage	V <sub>CEO</sub>	-40	V
Emitter-Base Voltage	V <sub>EB0</sub>	-6	V
Collector Current - Continuous (Note 7)	I <sub>C</sub>	-600	mA
Peak Pulse Collector Current	I <sub>CM</sub>	-1	A

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

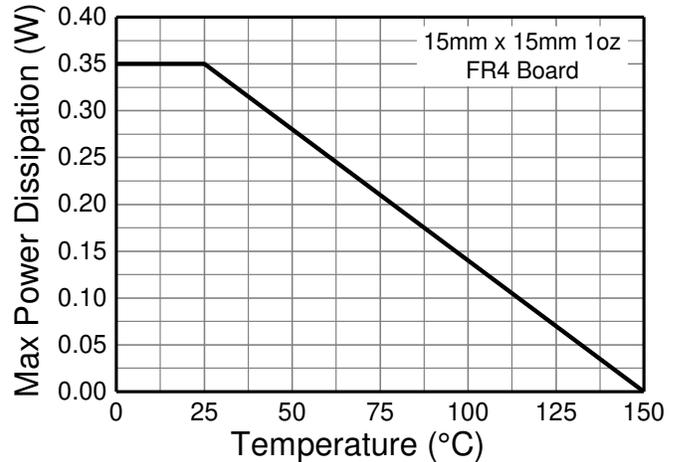
Characteristic	Symbol	Value	Unit
Collector Power Dissipation	P <sub>D</sub>	310	mW
(Note 5)		350	
Thermal Resistance, Junction to Ambient	R <sub>θJA</sub>	403	°C/W
		357	
Thermal Resistance, Junction to Leads	R <sub>θJL</sub>	350	°C/W
Thermal Resistance, Junction to Case	R <sub>θJC</sub>	55	°C/W
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

Notes: 5. For the device mounted on minimum recommended pad layout FR4 PCB with high coverage of single sided 1oz copper, in still air conditions.  
6. For the device mounted on 15mm x 15mm x 1.6mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions.  
7. Thermal resistance from junction to solder-point (at the end of the collector lead).

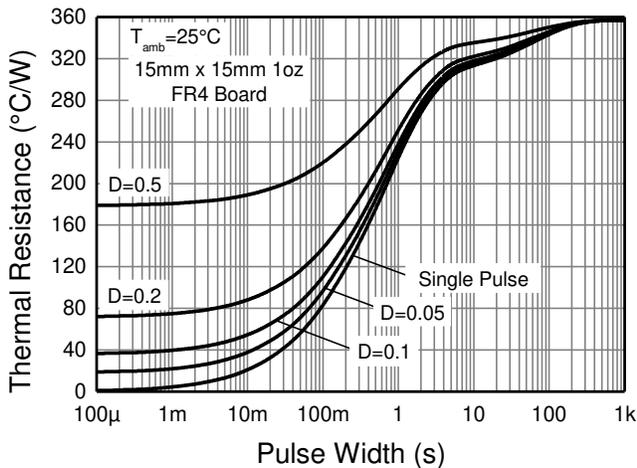
**Thermal Characteristics and Derating Information**



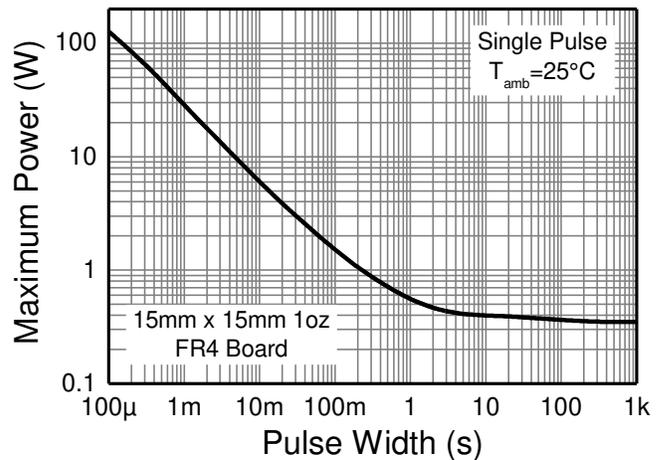
**Fig 1. Safe Operating Area**



**Fig 2. Derating Curve**



**Fig 3. Transient Thermal Impedance**



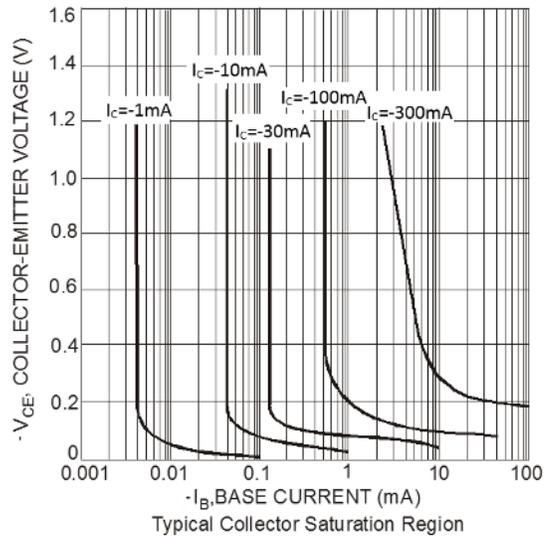
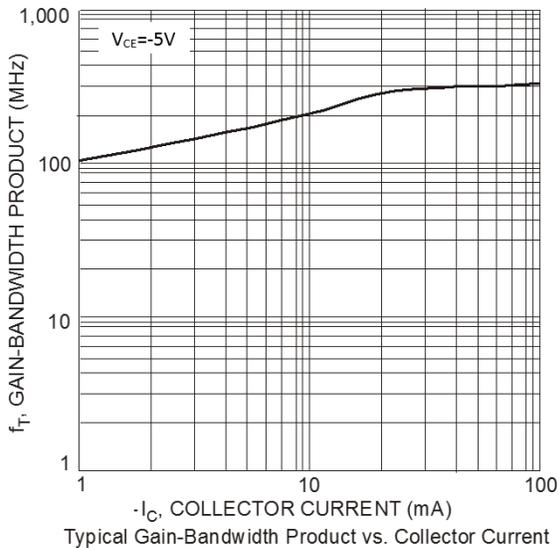
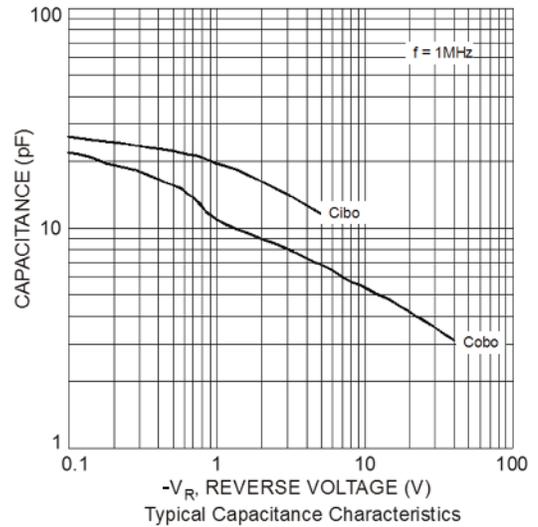
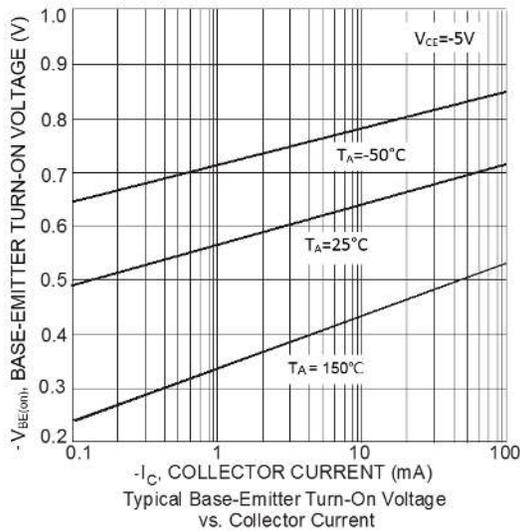
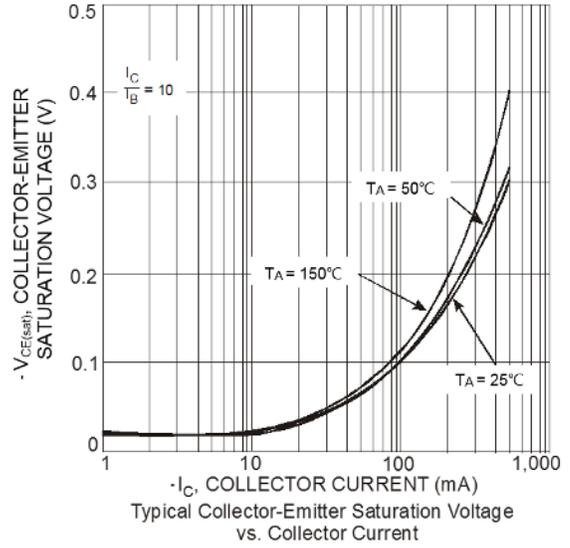
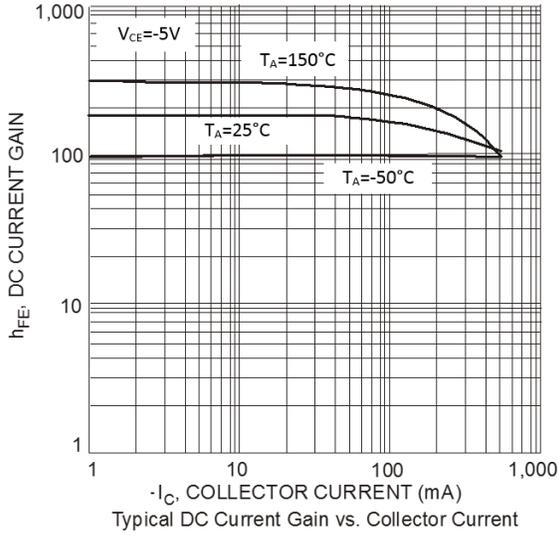
**Fig 4. Pulse Power Dissipation**

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

Characteristic	Symbol	Min	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS (Note 8)</b>					
Collector-Base Breakdown Voltage	BV <sub>CBO</sub>	-40	—	V	I <sub>C</sub> = -100μA
Collector-Emitter Breakdown Voltage	BV <sub>CEO</sub>	-40	—	V	I <sub>C</sub> = -10mA
Emitter-Base Breakdown Voltage	BV <sub>EBO</sub>	-6	—	V	I <sub>E</sub> = -100μA
Collector Cutoff Current	I <sub>CEX</sub>	—	-100	nA	V <sub>CE</sub> = -35V, V <sub>EB(off)</sub> = -0.4V
Base Cutoff Current	I <sub>BL</sub>	—	-100	nA	V <sub>CE</sub> = -35V, V <sub>EB(off)</sub> = -0.4V
<b>ON CHARACTERISTICS (Note 8)</b>					
DC Current Gain	h <sub>FE</sub>	30	—	—	I <sub>C</sub> = -100μA, V <sub>CE</sub> = -1V
		60	—		I <sub>C</sub> = -1.0mA, V <sub>CE</sub> = -1V
		100	—		I <sub>C</sub> = -10mA, V <sub>CE</sub> = -1V
		100	300		I <sub>C</sub> = -150mA, V <sub>CE</sub> = -2V
		20	—		I <sub>C</sub> = -500mA, V <sub>CE</sub> = -2V
Collector-Emitter Saturation Voltage	V <sub>CE(sat)</sub>	—	-0.40 -0.75	V	I <sub>C</sub> = -150mA, I <sub>B</sub> = -15mA I <sub>C</sub> = -500mA, I <sub>B</sub> = -50mA
Base-Emitter Saturation Voltage	V <sub>BE(sat)</sub>	-0.75 —	-0.95 -1.30	V	I <sub>C</sub> = -150mA, I <sub>B</sub> = -15mA I <sub>C</sub> = -500mA, I <sub>B</sub> = -50mA
<b>SMALL-SIGNAL CHARACTERISTICS</b>					
Output Capacitance	C <sub>obo</sub>	—	8.5	pF	V <sub>CB</sub> = -10V, f = 1.0MHz, I <sub>E</sub> = 0
Input Capacitance	C <sub>ibo</sub>	—	30	pF	V <sub>EB</sub> = -0.5V, f = 1.0MHz, I <sub>C</sub> = 0
Input Impedance	h <sub>ie</sub>	1.5	15	kΩ	V <sub>CE</sub> = -10V, I <sub>C</sub> = -1mA, f = 1kHz
Voltage Feedback Ratio	h <sub>re</sub>	0.1	8.0	x 10 <sup>-4</sup>	
Small-Signal Current Gain	h <sub>fe</sub>	60	500	—	
Output Admittance	h <sub>oe</sub>	1.0	100	μS	
Current Gain-Bandwidth Product	f <sub>T</sub>	200	—	MHz	V <sub>CE</sub> = -10V, I <sub>C</sub> = -20mA, f = 100MHz
<b>SWITCHING CHARACTERISTICS</b>					
Delay Time	t <sub>d</sub>	—	15	ns	V <sub>CC</sub> = -30V, I <sub>C</sub> = -150mA,
Rise Time	t <sub>r</sub>	—	20	ns	V <sub>BE(off)</sub> = -2V, I <sub>B1</sub> = -15mA
Storage Time	t <sub>s</sub>	—	225	ns	V <sub>CC</sub> = -30V, I <sub>C</sub> = -150mA,
Fall Time	t <sub>f</sub>	—	30	ns	I <sub>B1</sub> = -I <sub>B2</sub> = -15mA

Note: 8. Short duration pulse test used to minimize self-heating effect.

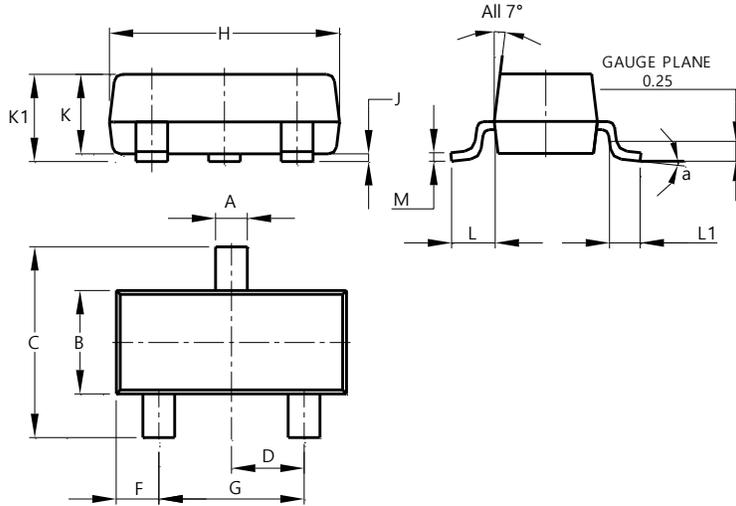
**Typical Electrical Characteristics** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)



**Package Outline Dimensions**

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

**SOT23**

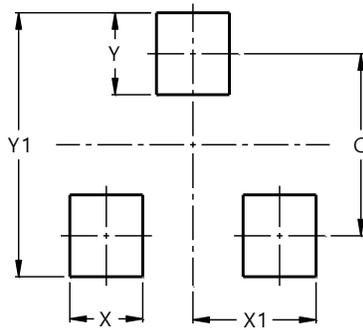


SOT23			
Dim	Min	Max	Typ
A	0.37	0.51	0.40
B	1.20	1.40	1.30
C	2.30	2.50	2.40
D	0.89	1.03	0.915
F	0.45	0.60	0.535
G	1.78	2.05	1.83
H	2.80	3.00	2.90
J	0.013	0.10	0.05
K	0.890	1.00	0.975
K1	0.903	1.10	1.025
L	0.45	0.61	0.55
L1	0.25	0.55	0.40
M	0.085	0.150	0.110
a	0°	8°	--
All Dimensions in mm			

**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

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