

Features

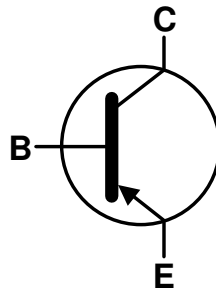
- Epitaxial Planar Die Construction
- Ideal for Medium Power Amplification and Switching
- Complementary NPN Type: DIODES MMBT4401
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **For automotive applications requiring specific change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

Mechanical Data

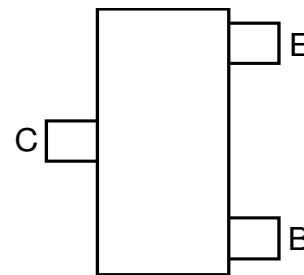
- Package: SOT23
- Package Material: Molded Plastic "Green" Compound
UL Flammability Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish - Matte Tin Plated Leads, Solderable per MIL-STD-202, Method 208 (E3)
- Weight: 0.008 grams (Approximate)



Top View



Device Symbol



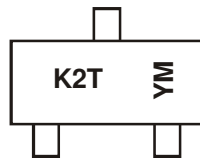
Top View
Pin-Out

Ordering Information (Note 4)

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 = Year (ex: K = 2023)
 M = Month (ex: 2 = February)

Date Code Key

Year	2003	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Code	P	K	L	M	N	O	P	R	S	T	U
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_A = +25°C, unless otherwise specified.)

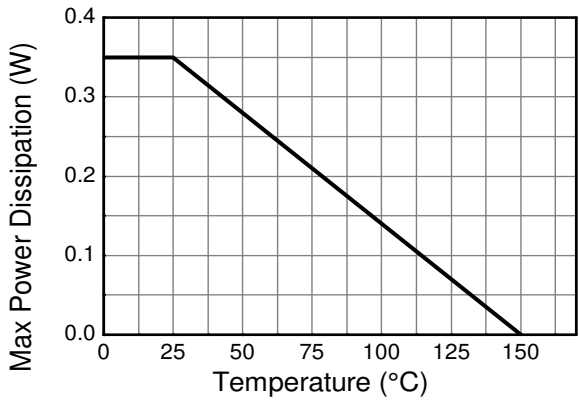
Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V _{CB0}	-40	V
Collector-Emitter Voltage	V _{CEO}	-40	V
Emitter-Base Voltage	V _{EB0}	-6	V
Collector Current - Continuous (Note 7)	I _C	-600	mA

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

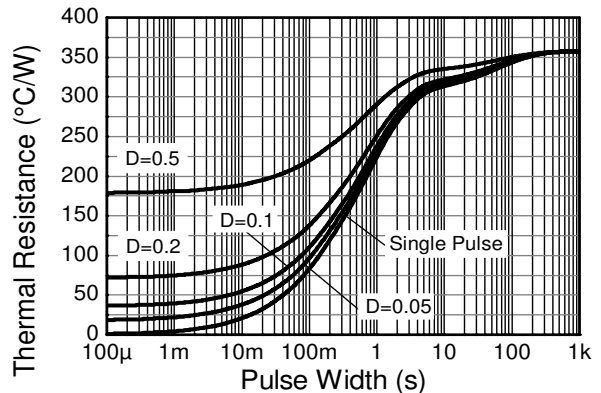
Characteristic	Symbol	Value	Unit
Collector Power Dissipation	P _D	310	mW
		350	
Thermal Resistance, Junction to Ambient	R _{θJA}	403	°C/W
		357	
Thermal Resistance, Junction to Leads	R _{θJL}	350	°C/W
Thermal Resistance, Junction to Case	R _{θJC}	55	°C/W
Operating and Storage Temperature Range	T _J , T _{STG}	-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).

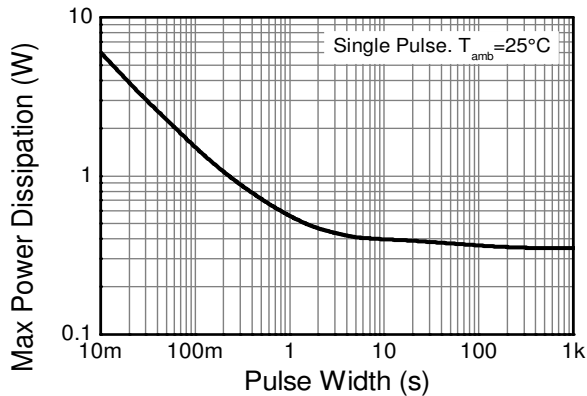
Thermal Characteristics and Derating Information



Derating Curve



Transient Thermal Impedance



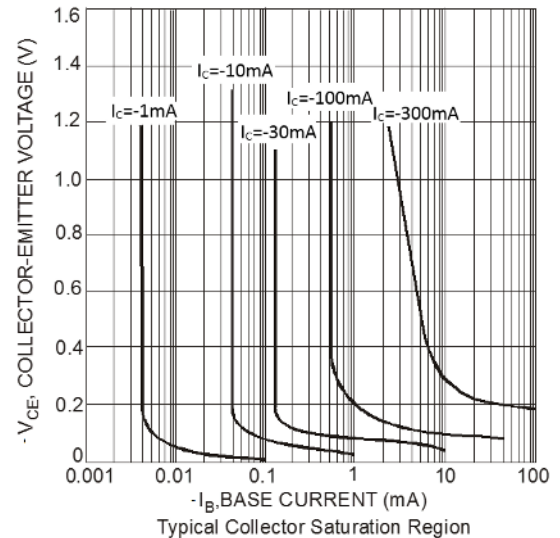
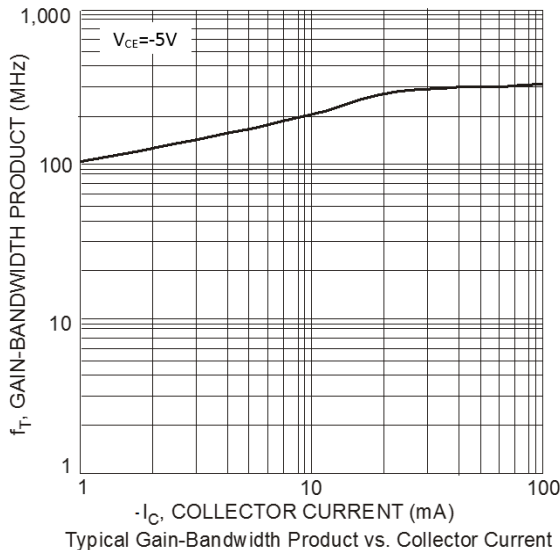
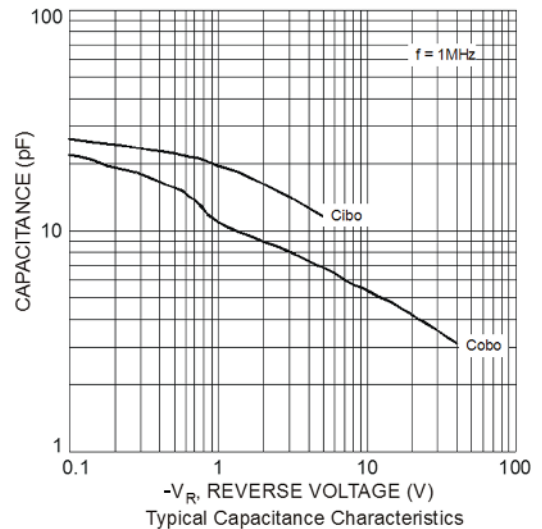
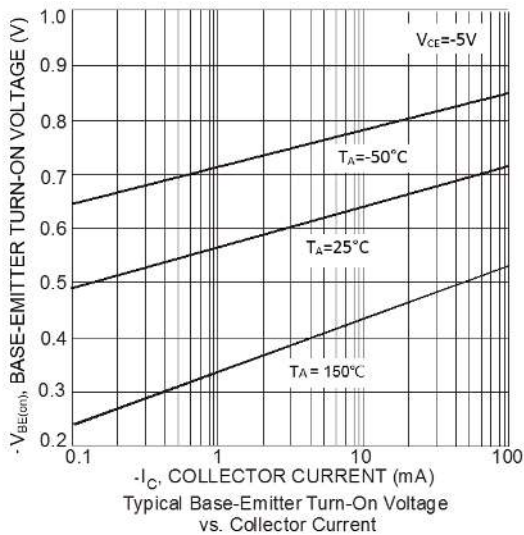
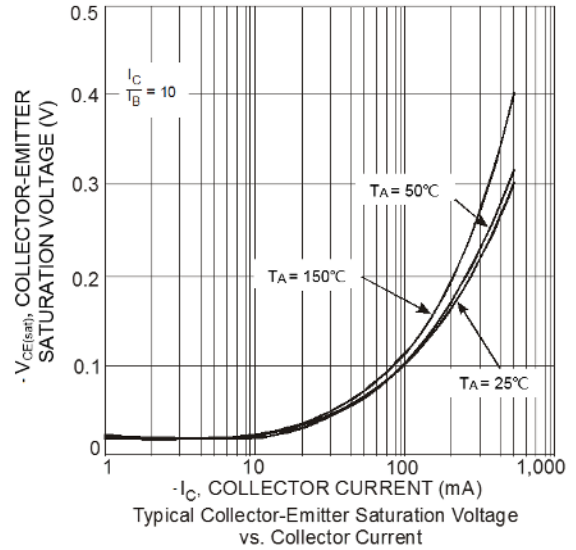
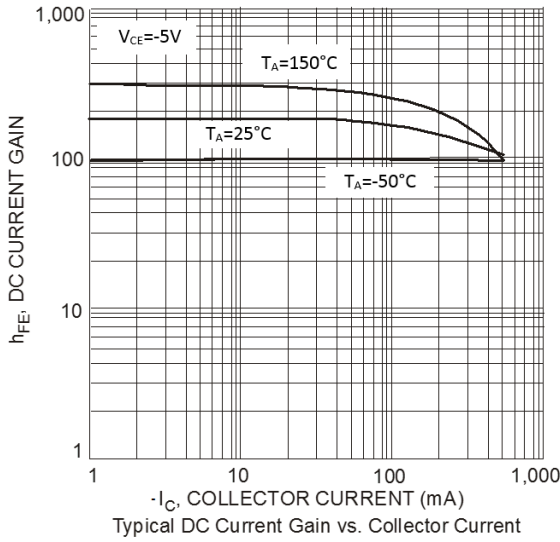
Pulse Power Dissipation

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

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

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

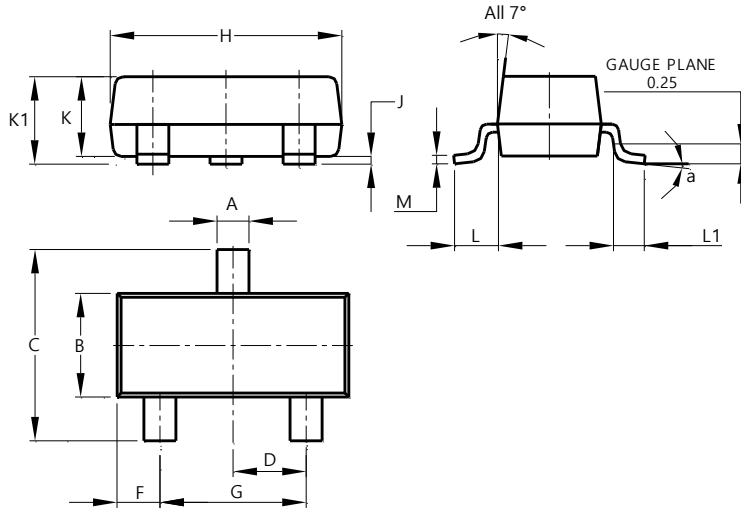
Typical Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)



Package Outline Dimensions

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

SOT23

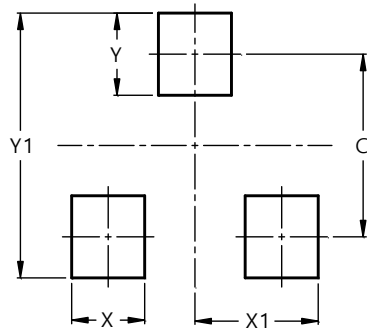


SOT23			
Dim	Min	Max	Typ
A	0.37	0.51	0.40
B	1.20	1.40	1.30
C	2.30	2.50	2.40
D	0.89	1.03	0.915
F	0.45	0.60	0.535
G	1.78	2.05	1.83
H	2.80	3.00	2.90
J	0.013	0.10	0.05
K	0.890	1.00	0.975
K1	0.903	1.10	1.025
L	0.45	0.61	0.55
L1	0.25	0.55	0.40
M	0.085	0.150	0.110
a	0°	8°	--
All Dimensions in mm			

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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