




**THE DATASHEET OF
MMDT5401-7**



Features

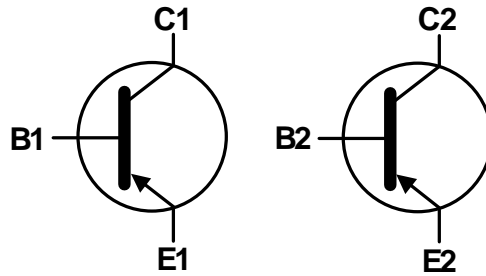
- Epitaxial Planar Die Construction
- Complementary NPN Type Available (MMDT5551)
- Ideal for Medium Power Amplification and Switching
- Ultra-Small Surface-Mount Package
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **An automotive-compliant part is available under separate datasheet ([MMDT5401Q](#))**

Mechanical Data

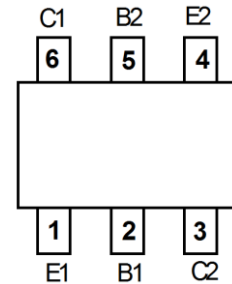
- Package: SOT363
- Package Material: Molded Plastic, "Green" Molding Compound, UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish — Matte Tin Finish. Solderable per MIL-STD-202, Method 208 
- Weight: 0.006 grams (Approximate)



Top View



Device Symbol



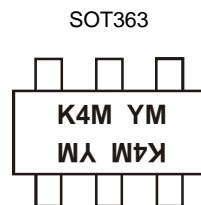
Top View
Pin-Out

Ordering Information (Note 4)

Part Number	Package	Marking	Reel Size (inches)	Tape Width (mm)	Packing	
					Qty.	Carrier
MMDT5401-7-F	SOT363	K4M	7	8	3,000	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



K4M = Product Type Marking Code
YM = Date Code Marking
Y or \bar{Y} = Year (ex: K = 2023)
M = Month (ex: 9 = September)

Date Code Key

Year	2003	...	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Code	P	...	K	L	M	N	P	R	S	T	U	V
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 _{CBO}	-160	V
Collector-Emitter Voltage	V _{CEO}	-150	V
Emitter-Base Voltage	V _{EBO}	-6	V
Continuous Collector Current	I _C	-200	mA

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

Characteristic	Symbol	Value	Unit
Power Dissipation	P _D	200	mW
		320	
Thermal Resistance, Junction to Ambient	R _{θJA}	625	°C/W
		390	
Thermal Resistance, Junction to Case	R _{θJC}	140	
Operating and Storage Temperature Range	T _J , T _{STG}	-55 to +150	°C

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS						
Collector-Base Breakdown Voltage	BV _{CBO}	-160	—	—	V	I _C = -100μA, I _E = 0
Collector-Emitter Breakdown Voltage (Note 9)	BV _{CEO}	-150	—	—	V	I _C = -1mA, I _B = 0
Emitter-Base Breakdown Voltage	BV _{EBO}	-6	—	—	V	I _E = -100μA, I _C = 0
Collector-Base Cutoff Current	I _{CBO}	—	—	-50	nA	V _{CB} = -120V, I _E = 0
		—	—	-50	μA	V _{CB} = -120V, I _E = 0, T _A = +100°C
Base-Emitter Cutoff Current	I _{EBO}	—	—	-50	nA	V _{EB} = -5V, I _C = 0
ON CHARACTERISTICS (Note 9)						
DC Current Gain	h _{FE}	50	—	—	—	I _C = -1mA, V _{CE} = -5V
		60	—	240	—	I _C = -10mA, V _{CE} = -5V
		50	—	—	—	I _C = -50mA, V _{CE} = -5V
Collector-Emitter Saturation Voltage	V _{CE(sat)}	—	—	-0.2	V	I _C = -10mA, I _B = -1mA
		—	—	-0.5	V	I _C = -50mA, I _B = -5mA
Base-Emitter Saturation Voltage	V _{BE(sat)}	—	—	-1	V	I _C = -10mA, I _B = -1mA
		—	—	—	V	I _C = -50mA, I _B = -5mA
SMALL-SIGNAL CHARACTERISTICS						
Output Capacitance	C _{obo}	—	—	6	pF	V _{CB} = -10V, f = 1MHz, I _E = 0
Small Signal Current Gain	h _{fe}	40	—	260	—	I _C = -1mA, V _{CE} = -10V, f = 1MHz
Current Gain-Bandwidth Product	f _T	100	—	300	MHz	I _C = -10mA, V _{CE} = -10V, f = 100MHz
Noise Figure	NF	—	—	8	dB	V _{CE} = -5V, I _C = -200μA, R _S = 10Ω, f = 1kHz

- Notes:
- For a device mounted on minimum recommended pad layout 1oz weight copper that is on a single-sided FR-4 PCB; device is measured under still air conditions whilst operating in a steady-state.
 - Same as Note 5, except the device is mounted 25mm X 25mm 2oz copper.
 - Maximum combined dissipation.
 - Thermal resistance from junction to the top of package.
 - Measured under pulsed conditions. Pulse width ≤ 300μs. Duty cycle ≤ 2%.

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

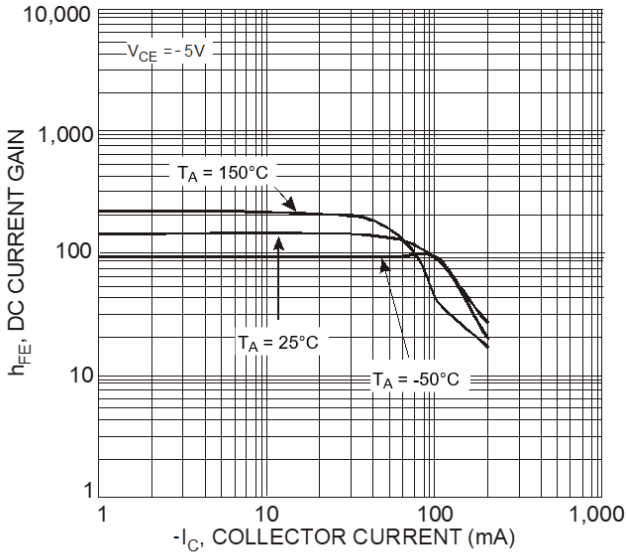


Fig. 1 Typical DC Current Gain vs. Collector Current

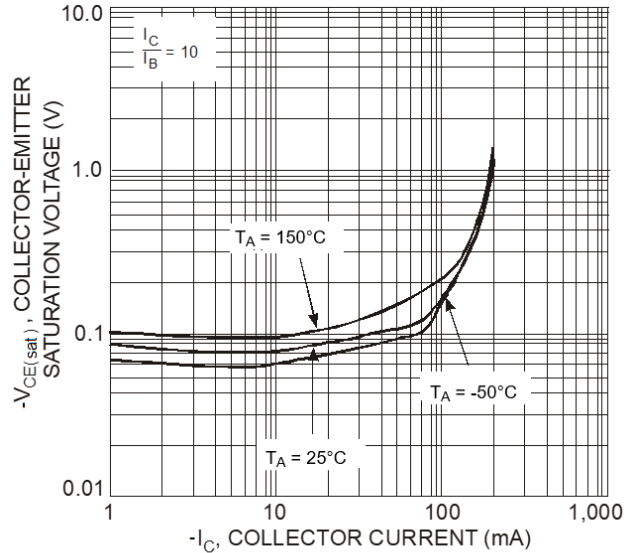


Fig. 2 Typical Collector-Emitter Saturation Voltage vs. Collector Current

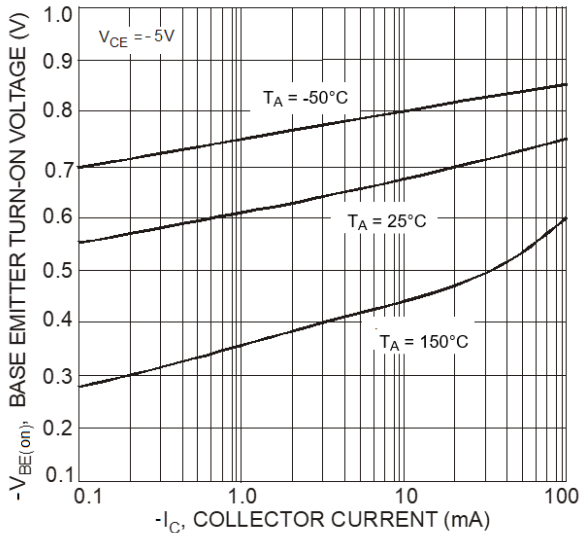


Fig. 3 Typical Base-Emitter Turn-On Voltage vs. Collector Current

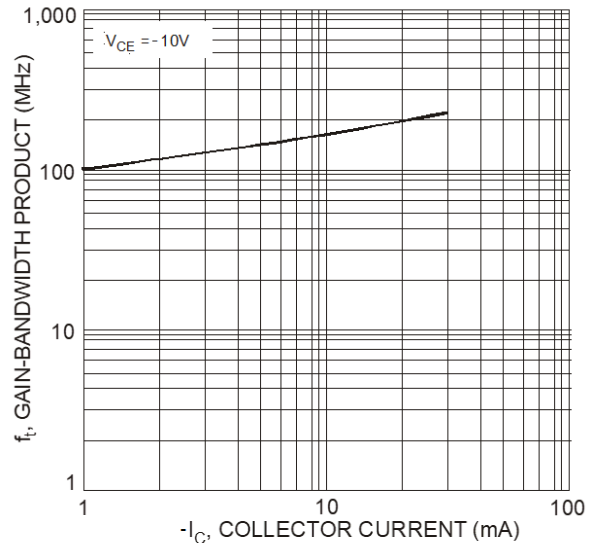
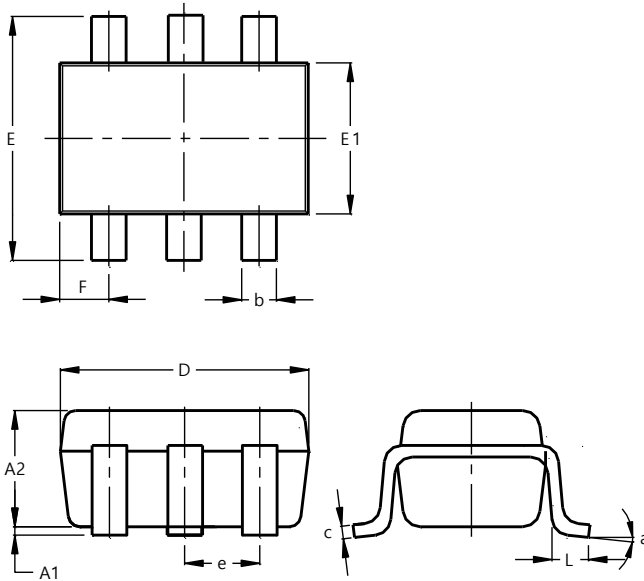


Fig. 4 Typical Gain-Bandwidth Product vs. Collector Current

Package Outline Dimensions

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

SOT363

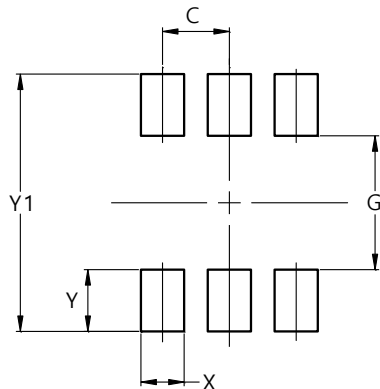


SOT363			
Dim	Min	Max	Typ
A1	0.00	0.10	0.05
A2	0.90	1.00	0.95
b	0.10	0.30	0.25
c	0.10	0.22	0.11
D	1.80	2.20	2.15
E	2.00	2.20	2.10
E1	1.15	1.35	1.30
e	0.650 BSC		
F	0.40	0.45	0.425
L	0.25	0.40	0.30
a	0°	8°	--
All Dimensions in mm			

Suggested Pad Layout

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

SOT363



Dimensions	Value (in mm)
C	0.650
G	1.300
X	0.420
Y	0.600
Y1	2.500

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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