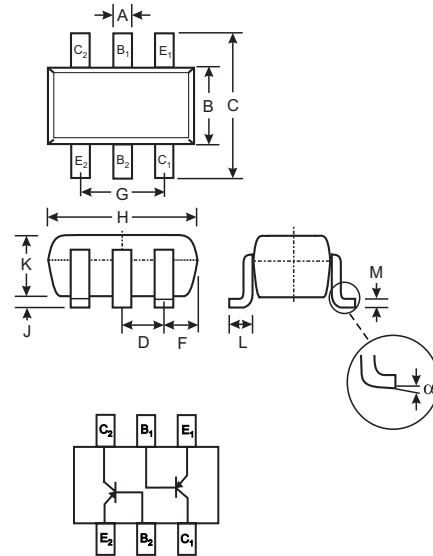


**Features**

- Epitaxial Planar Die Construction
- Complementary NPN Type Available (MMDT 5551)
- Ideal for Medium Power Amplification and Switching
- Ultra-Small Surface Mount Package
- **Lead Free/RoHS Compliant (Note 3)**

**Mechanical Data**

- Case: SOT-363
- Case Material: Molded Plastic. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020C
- Terminals: Solderable per MIL-STD-202, Method 208
- Lead Free Plating (Matte Tin Finish annealed over Alloy 42 leadframe).
- Terminal Connections: See Diagram
- Marking (See Page 2): K4M
- Order & Date Code Information: See Page 2
- Weight: 0.006 grams (approximate)



SOT-363		
Dim	Min	Max
A	0.10	0.30
B	1.15	1.35
C	2.00	2.20
D	0.65 Nominal	
F	0.30	0.40
H	1.80	2.20
J	—	0.10
K	0.90	1.00
L	0.25	0.40
M	0.10	0.25
$\alpha$	0°	8°
<b>All Dimensions in mm</b>		

**Maximum Ratings** @  $T_A = 25^\circ\text{C}$  unless otherwise specified

Characteristic	Symbol	MMDT5401	Unit
Collector-Base Voltage	$V_{CB0}$	-160	V
Collector-Emitter Voltage	$V_{CE0}$	-150	V
Emitter-Base Voltage	$V_{EB0}$	-5.0	V
Collector Current - Continuous (Note 1)	$I_C$	-200	mA
Power Dissipation (Note 1, 2)	$P_d$	200	mW
Thermal Resistance, Junction to Ambient (Note 1)	$R_{\theta JA}$	625	K/W
Operating and Storage and Temperature Range	$T_j, T_{STG}$	-55 to +150	$^\circ\text{C}$

- Notes:
1. Device mounted on FR-4 PCB, 1 inch x 0.85 inch x 0.062 inch; pad layout as shown on Diodes Inc. suggested pad layout document AP02001, which can be found on our website at <http://www.diodes.com/datasheets/ap02001.pdf>.
  2. Maximum combined dissipation.
  3. No purposefully added lead.

## Electrical Characteristics @ $T_A = 25^\circ\text{C}$ unless otherwise specified

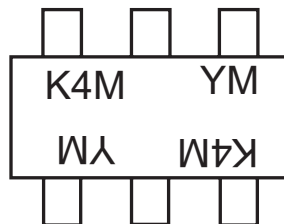
Characteristic	Symbol	Min	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS (Note 4)</b>					
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	-160	—	V	$I_C = -100\mu\text{A}$ , $I_E = 0$
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	-150	—	V	$I_C = -1.0\text{mA}$ , $I_B = 0$
Emitter-Base Breakdown Voltage	$V_{(BR)EBO}$	-5.0	—	V	$I_E = -10\mu\text{A}$ , $I_C = 0$
Collector Cutoff Current	$I_{CBO}$	—	-50	nA $\mu\text{A}$	$V_{CB} = -120\text{V}$ , $I_E = 0$ $V_{CB} = -120\text{V}$ , $I_E = 0$ , $T_A = 100^\circ\text{C}$
Emitter Cutoff Current	$I_{EBO}$	—	-50	nA	$V_{EB} = -3.0\text{V}$ , $I_C = 0$
<b>ON CHARACTERISTICS (Note 4)</b>					
DC Current Gain	$h_{FE}$	50 60 50	— 240 —	—	$I_C = -1.0\text{mA}$ , $V_{CE} = -5.0\text{V}$ $I_C = -10\text{mA}$ , $V_{CE} = -5.0\text{V}$ $I_C = -50\text{mA}$ , $V_{CE} = -5.0\text{V}$
Collector-Emitter Saturation Voltage	$V_{CE(SAT)}$	—	-0.2 -0.5	V	$I_C = -10\text{mA}$ , $I_B = -1.0\text{mA}$ $I_C = -50\text{mA}$ , $I_B = -5.0\text{mA}$
Base-Emitter Saturation Voltage	$V_{BE(SAT)}$	—	-1.0	V	$I_C = -10\text{mA}$ , $I_B = -1.0\text{mA}$ $I_C = -50\text{mA}$ , $I_B = -5.0\text{mA}$
<b>SMALL SIGNAL CHARACTERISTICS</b>					
Output Capacitance	$C_{obo}$	—	6.0	pF	$V_{CB} = -10\text{V}$ , $f = 1.0\text{MHz}$ , $I_E = 0$
Small Signal Current Gain	$h_{fe}$	40	200	—	$V_{CE} = -10\text{V}$ , $I_C = -1.0\text{mA}$ , $f = 1.0\text{kHz}$
Current Gain-Bandwidth Product	$f_T$	100	300	MHz	$V_{CE} = -10\text{V}$ , $I_C = -10\text{mA}$ , $f = 100\text{MHz}$
Noise Figure	NF	—	8.0	dB	$V_{CE} = -5.0\text{V}$ , $I_C = -200\mu\text{A}$ , $R_S = 10\Omega$ , $f = 1.0\text{kHz}$

## Ordering Information (Note 5)

Device	Packaging	Shipping
MMDT5401-7-F	SOT-363	3000/Tape & Reel

- Notes: 4. Short duration test pulse used to minimize self-heating effect.  
5. For Packaging Details, go to our website at <http://www.diodes.com/datasheets/ap02007.pdf>.

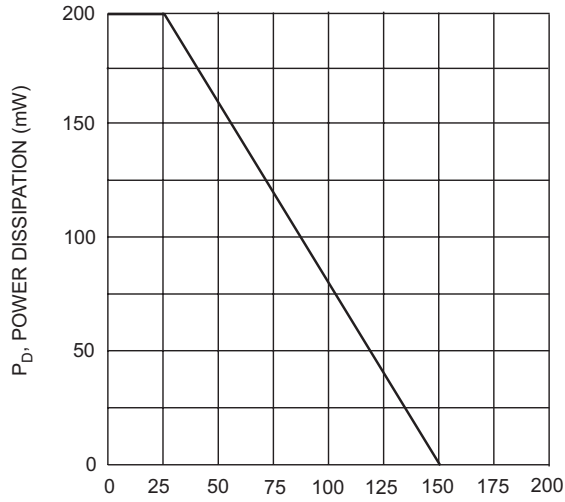
## Marking Information



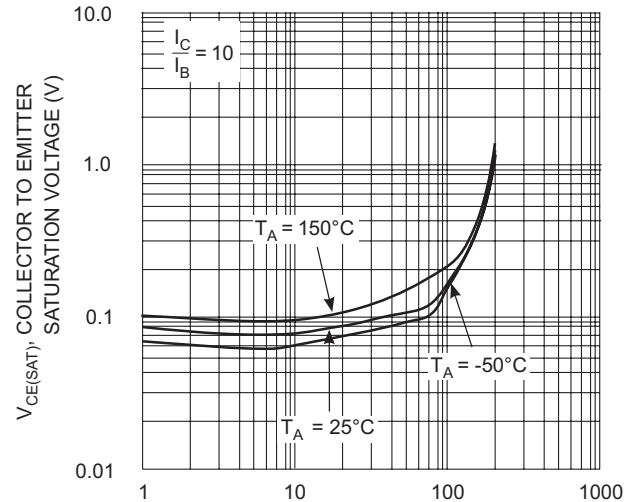
K4M = Product Type Marking Code  
YM = Date Code Marking  
Y = Year ex: N = 2002  
M = Month ex: 9 = September

### Date Code Key

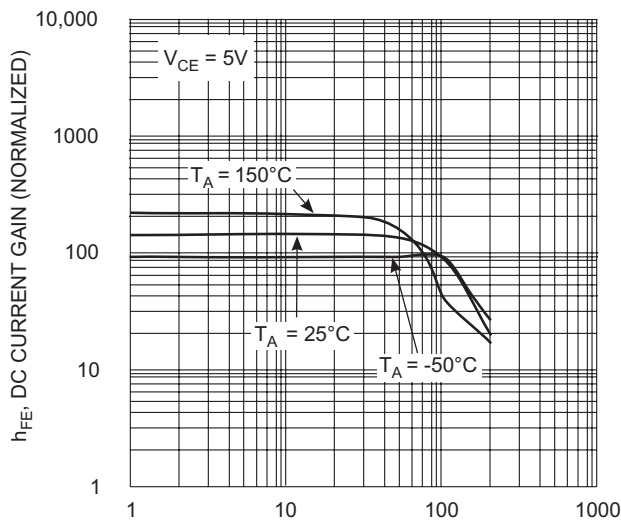
<b>Year</b>	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
<b>Code</b>	J	K	L	M	N	P	R	S	T	U	V	W
<b>Month</b>	Jan	Feb	March	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
<b>Code</b>	1	2	3	4	5	6	7	8	9	O	N	D



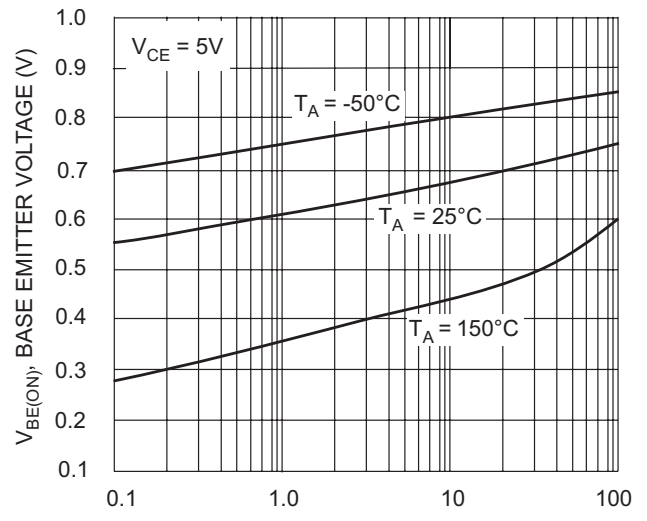
T<sub>A</sub>, AMBIENT TEMPERATURE (°C)  
Fig. 1, Max Power Dissipation vs Ambient Temperature



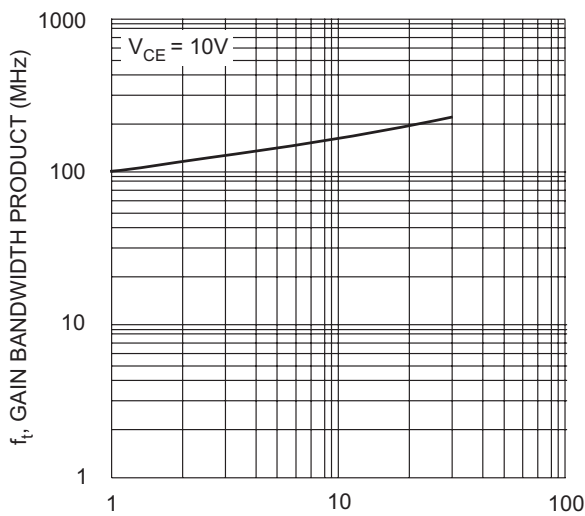
I<sub>C</sub>, COLLECTOR CURRENT (mA)  
Fig. 2, Collector Emitter Saturation Voltage vs. Collector Current



I<sub>C</sub>, COLLECTOR CURRENT (mA)  
Fig. 3, DC Current Gain vs. Collector Current



I<sub>C</sub>, COLLECTOR CURRENT (mA)  
Fig. 4, Base Emitter Voltage vs. Collector Current



I<sub>C</sub>, COLLECTOR CURRENT (mA)  
Fig. 5, Gain Bandwidth Product vs Collector Current

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