



# MMDT440

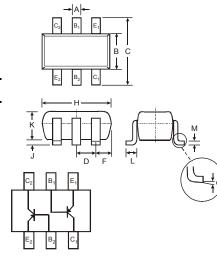
DUAL PNP SMALL SIGNAL SURFACE MOUNT TRANSISTOR

### Features

- Epitaxial Planar Die Construction
- Ideal for Low Power Amplification and Switching •
- Ultra-Small Surface Mount Package
- Lead Free/RoHS Compliant (Note 3)
- "Green" Device (Note 4 and 5)

# **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 Information: K2T See Page 4
- Ordering & Date Code Information: See Page 4
- Weight: 0.006 grams (approximate)



SOT-363								
Dim	Min	Max						
Α	0.10	0.30						
В	1.15	1.35						
С	2.00 2.20							
D	0.65 Nominal							
F	0.30	0.40						
н	1.80	2.20						
J		0.10						
к	0.90	1.00						
L	0.25	0.40						
м	0.10	0.25						
α	0°	8°						
All Din	nensions	in mm						

# Maximum Ratings @T<sub>A</sub> = 25°C unless otherwise specified

Characteristic	Symbol	Value	Unit		
Collector-Base Voltage		V <sub>CBO</sub>	-40	V	
Collector-Emitter Voltage		V <sub>CEO</sub>	-40	V	
Emitter-Base Voltage		V <sub>EBO</sub>	-5.0	V	
Collector Current - Continuous	(Note 1)	Ic	-600	mA	
Power Dissipation	(Note 1, 2)	Pd	200	mW	
Thermal Resistance, Junction to Ambient	(Note 1)	$R_{ heta}$ JA	625	°C/W	
Operating and Storage Temperature Range		T <sub>j</sub> , T <sub>STG</sub>	-55 to +150	°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.

Maximum combined dissipation. 2.

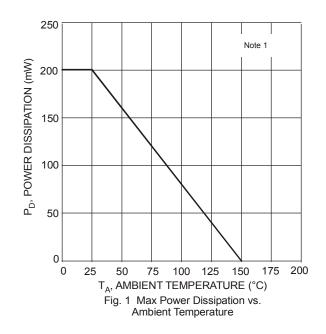
No purposefully added lead. 3.

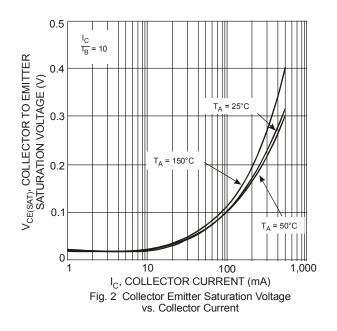
Diodes Inc.'s "Green" policy can be found on our website at http://www.diodes.com/products/lead\_free/index.php.
Product manufactured with Date Code UO (week 40, 2007) and newer are built with Green Molding Compound. Product manufactured prior to Date Code UO are built with Non-Green Molding Compound and may contain Halogens or Sb2O3 Fire Retardants.

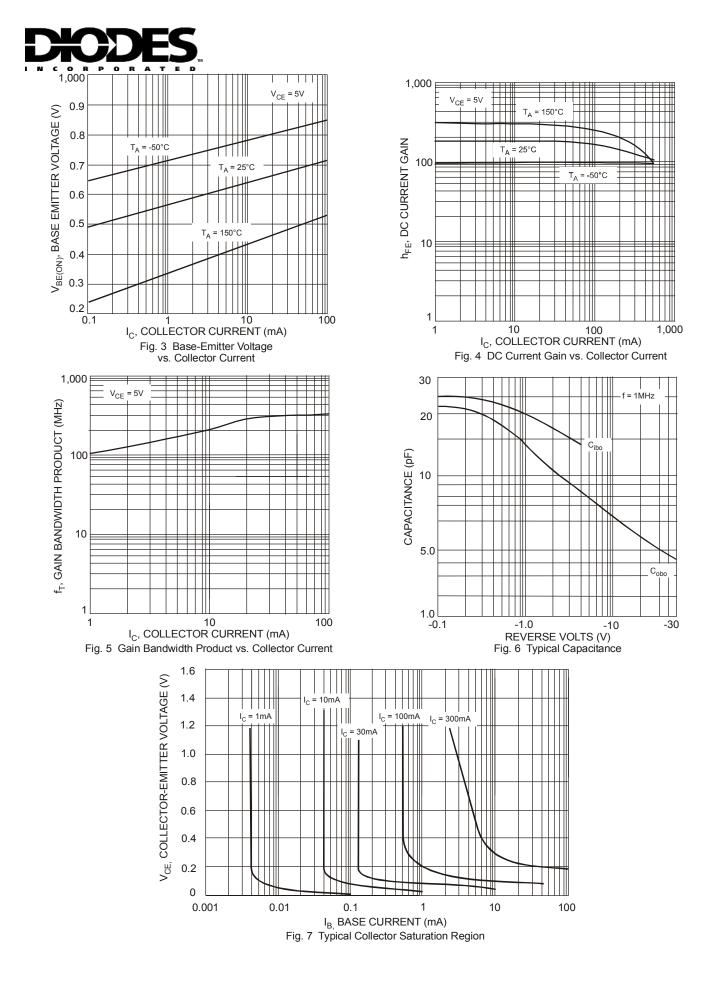


Electrical Characteristics @T <sub>A</sub> = 25°C unless otherwise specified									
Characteristic	Symbol	Min	Max	Unit	Test Condition				
OFF CHARACTERISTICS (Note 6)				•	•				
Collector-Base Breakdown Voltage	V <sub>(BR)CBO</sub>	-40	_	V	$I_{\rm C} = -100 \mu {\rm A}, I_{\rm E} = 0$				
Collector-Emitter Breakdown Voltage	V <sub>(BR)CEO</sub>	-40	_	V	I <sub>C</sub> = -1.0mA, I <sub>B</sub> = 0				
Emitter-Base Breakdown Voltage	V <sub>(BR)EBO</sub>	-5.0	_	V	$I_{E} = -100 \mu A$ , $I_{C} = 0$				
Collector Cutoff Current	I <sub>CEX</sub>	_	-100	nA	$V_{CE} = -35V, V_{EB(OFF)} = -0.4V$				
Base Cutoff Current	I <sub>BL</sub>	_	-100	nA	$V_{CE} = -35V, V_{EB(OFF)} = -0.4V$				
ON CHARACTERISTICS (Note 6)									
DC Current Gain	h <sub>FE</sub>	30 60 100 100 20	  300	_	$ \begin{split} I_{C} &= -100 \mu A,  V_{CE} &= -1.0V \\ I_{C} &= -1.0m A,  V_{CE} &= -1.0V \\ I_{C} &= -10m A,  V_{CE} &= -1.0V \\ I_{C} &= -150m A,  V_{CE} &= -2.0V \\ I_{C} &= -500m A,  V_{CE} &= -2.0V \end{split} $				
Collector-Emitter Saturation Voltage	V <sub>CE(SAT)</sub>		-0.40 -0.75	V	$I_{C}$ = -150mA, $I_{B}$ = -15mA $I_{C}$ = -500mA, $I_{B}$ = -50mA				
Base-Emitter Saturation Voltage	V <sub>BE(SAT)</sub>	-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 <sub>cb</sub>	_	8.5	pF	$V_{CB}$ = -10V, f = 1.0MHz, I <sub>E</sub> = 0				
Input Capacitance	Ceb	_	30	pF	$V_{EB}$ = -0.5V, f = 1.0MHz, I <sub>C</sub> = 0				
nput Impedance	h <sub>ie</sub>	1.5	15	kΩ					
Voltage Feedback Ratio	h <sub>re</sub>	0.1	8.0	x 10 <sup>-4</sup>	V <sub>CE</sub> = -10V, I <sub>C</sub> = -1.0mA,				
Small Signal Current Gain	h <sub>fe</sub>	60	500		f = 1.0kHz				
Output Admittance	h <sub>oe</sub>	1.0	100	μS					
Current Gain-Bandwidth Product	fT	200	—	MHz	V <sub>CE</sub> = -10V, I <sub>C</sub> = -20mA, f = 100MHz				
SWITCHING CHARACTERISTICS									
Delay Time	t <sub>d</sub>	_	15	ns	V <sub>CC</sub> = -30V, I <sub>C</sub> = -150mA,				
Rise Time	tr		20	ns	$V_{BE(off)}$ = -2.0V, $I_{B1}$ = -15mA				
Storage Time	ts	—	225	ns	V <sub>CC</sub> = -30V, I <sub>C</sub> = -150mA,				
Fall Time	tf	_	30	ns	I <sub>B1</sub> = I <sub>B2</sub> = -15mA				

Notes: 6. Short duration pulse test used to minimize self-heating effect.







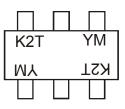


## Ordering Information (Note 7)

Device	Packaging	Shipping			
MMDT4403-7-F	SOT-363	3000/Tape & Reel			

Notes: 7. For packaging details, go to our website at http://www.diodes.com/datasheets/ap02007.pdf.

# **Marking Information**



K2T = Product Type Marking Code YM = Date Code Marking Y = Year ex: N = 2002 M = Month ex: 9 = September

Date Code Key

Year	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Code	J	К	L	М	Ν	Р	R	S	Т	U	V	W	Х	Y	Z
Month	Jan	Feb	<b>)</b>	Mar	Apr	Мау	Ju	n	Jul	Aug	Sep	Oc	t I	lov	Dec
Code	1	2		3	4	5	6		7	8	9	0		Ν	D

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