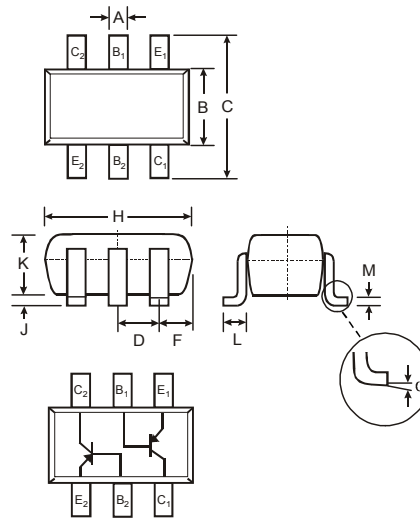


**Features**

- Epitaxial Planar Die Construction
- Ideal for Low Power Amplification and Switching
- Ultra-Small Surface Mount Package
- Lead Free/RoHS Compliant (Note 2)
- "Green" Device (Note 3 and 4)

**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
- Ordering and Date Code Information: See Page 4
- Marking Information: K3N, See Page 4
- 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
α	0°	8°
All Dimensions in mm		

**Maximum Ratings** @<sub>TA</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	I <sub>C</sub>	-200	mA
Power Dissipation (Note 1)	P <sub>d</sub>	200	mW
Thermal Resistance, Junction to Ambient	R <sub>θJA</sub>	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; 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. 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](http://www.diodes.com/products/lead_free/index.php).
  4. 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** @ $T_A = 25^\circ\text{C}$  unless otherwise specified

Characteristic	Symbol	Min	Max	Unit	Test Condition	
<b>OFF CHARACTERISTICS (Note 5)</b>						
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	-40	—	V	$I_C = -10\mu\text{A}, I_E = 0$	
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	-40	—	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	$I_{CEX}$	—	-50	nA	$V_{CE} = -30\text{V}, V_{EB(OFF)} = -3.0\text{V}$	
Base Cutoff Current	$I_{BL}$	—	-50	nA	$V_{CE} = -30\text{V}, V_{EB(OFF)} = -3.0\text{V}$	
<b>ON CHARACTERISTICS (Note 5)</b>						
DC Current Gain	$h_{FE}$	60	—	—	$I_C = -100\mu\text{A}, V_{CE} = -1.0\text{V}$	
		80	—			$I_C = -1.0\text{mA}, V_{CE} = -1.0\text{V}$
		100	300			$I_C = -10\text{mA}, V_{CE} = -1.0\text{V}$
		60	—			$I_C = -50\text{mA}, V_{CE} = -1.0\text{V}$
		30	—			$I_C = -100\text{mA}, V_{CE} = -1.0\text{V}$
Collector-Emitter Saturation Voltage	$V_{CE(SAT)}$	—	-0.25 -0.40	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	$V_{BE(SAT)}$	-0.65 —	-0.85 -0.95	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	$C_{obo}$	—	4.5	pF	$V_{CB} = -5.0\text{V}, f = 1.0\text{MHz}, I_E = 0$	
Input Capacitance	$C_{ibo}$	—	10	pF	$V_{EB} = -0.5\text{V}, f = 1.0\text{MHz}, I_C = 0$	
Input Impedance	$h_{ie}$	2.0	12	$k\Omega$	$V_{CE} = 10\text{V}, I_C = 1.0\text{mA},$ $f = 1.0\text{kHz}$	
Voltage Feedback Ratio	$h_{re}$	0.1	10	$\times 10^{-4}$		
Small Signal Current Gain	$h_{fe}$	100	400	—		
Output Admittance	$h_{oe}$	3.0	60	$\mu\text{S}$		
Current Gain-Bandwidth Product	$f_T$	250	—	MHz	$V_{CE} = -20\text{V}, I_C = -10\text{mA},$ $f = 100\text{MHz}$	
Noise Figure	NF	—	4.0	dB	$V_{CE} = -5.0\text{V}, I_C = -100\mu\text{A},$ $R_S = 1.0k\Omega, f = 1.0\text{kHz}$	
<b>SWITCHING CHARACTERISTICS</b>						
Delay Time	$t_d$	—	35	ns	$V_{CC} = -3.0\text{V}, I_C = -10\text{mA},$	
Rise Time	$t_r$	—	35	ns	$V_{BE(off)} = 0.5\text{V}, I_{B1} = -1.0\text{mA}$	
Storage Time	$t_s$	—	225	ns	$V_{CC} = -3.0\text{V}, I_C = -10\text{mA},$	
Fall Time	$t_f$	—	75	ns	$I_{B1} = I_{B2} = -1.0\text{mA}$	

Notes: 5. Short duration pulse test used to minimize self-heating effect.

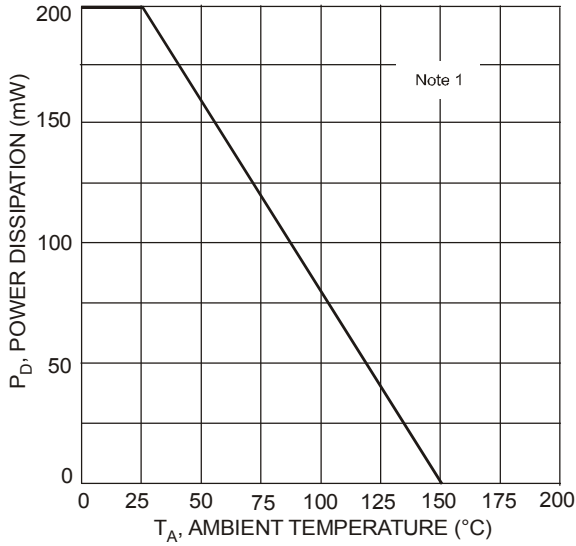


Fig. 1, Max Power Dissipation vs. Ambient Temperature

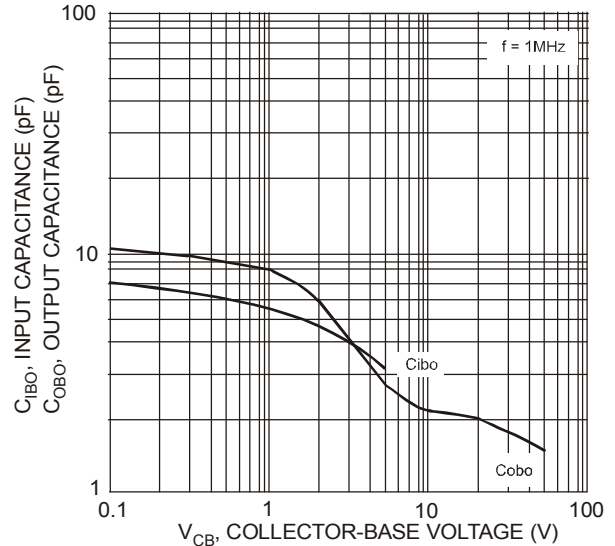


Fig. 2, Input and Output Capacitance vs. Collector-Base Voltage

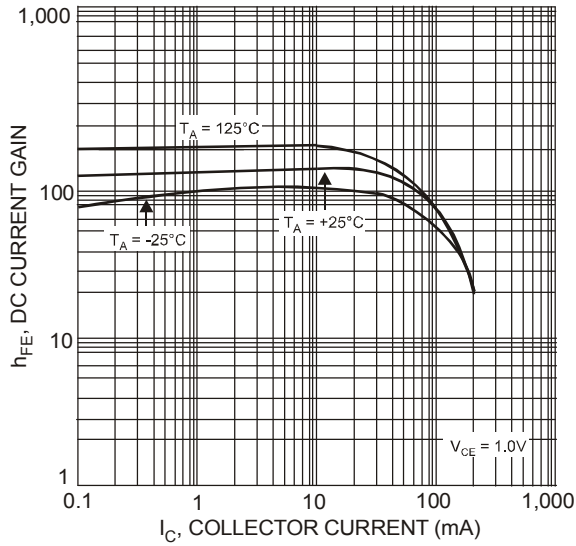


Fig. 3, Typical DC Current Gain vs. Collector Current

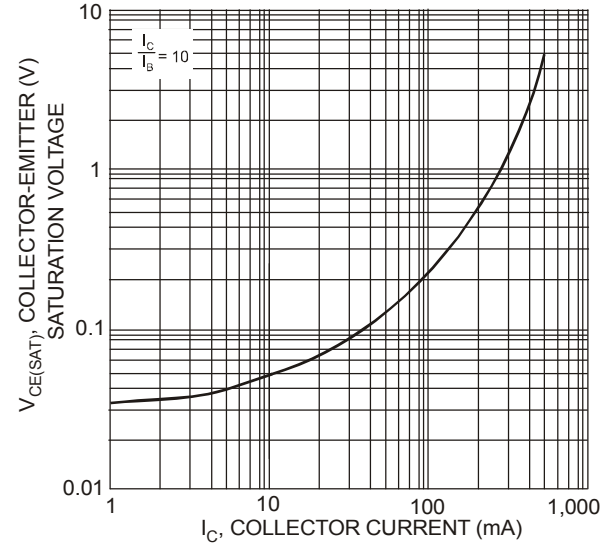


Fig. 4, Typical Collector-Emitter Saturation Voltage vs. Collector Current

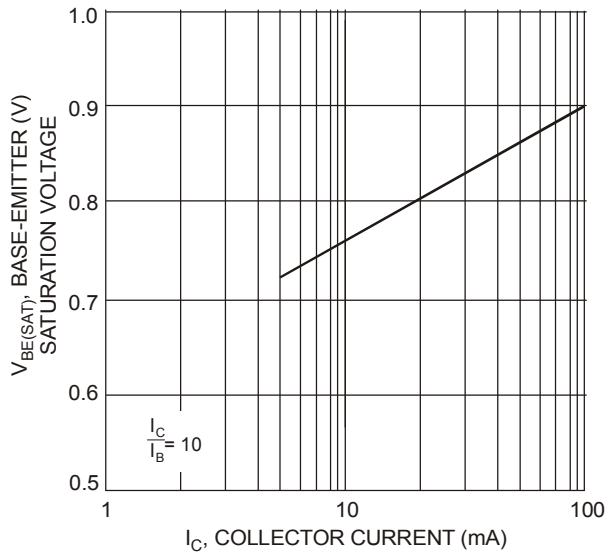


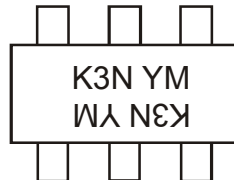
Fig. 5, Typical Base-Emitter Saturation Voltage vs. Collector Current

## Ordering Information (Note 6)

Device	Packaging	Shipping
MMDT3906-7-F	SOT-363	3000/Tape & Reel

Notes: 6. For packaging details, go to our website at <http://www.diodes.com/datasheets/ap02007.pdf>.

## Marking Information



K3N = 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	K	L	M	N	P	R	S	T	U	V	W	X	Y	Z

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

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