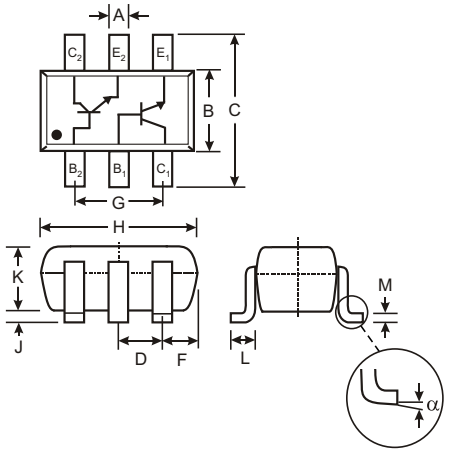
DMMT3904W

MATCHED NPN SMALL SIGNAL SURFACE MOUNT TRANSISTOR

NEW PRODUCT

Features

- Epitaxial Planar Die Construction
- Intrinsically Matched NPN Pair (Note 1)
- Small Surface Mount Package
- 2% Matched Tolerance, h_{FE}, $V_{CE(SAT)}$, $V_{BE(SAT)}$
- **Lead Free/RoHS Compliant (Note 4)**



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
	8°	
All Dimensions in mm		

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): K4A
- Marking Code & Date Code Information: See Page 2
- Ordering Information: See Below
- Weight: 0.015 grams (approx.)

Maximum Ratings @ T_A = 25 C unless otherwise specified

Characteristic	Symbol	DMMT3904W	Unit
Collector-Base Voltage	V_{CBO}	60	V
Collector-Emitter Voltage	V_{CEO}	40	V
Emitter-Base Voltage	V_{EBO}	6.0	V
Collector Current - Continuous	I_C	200	mA
Power Dissipation (Note 2)	P_d	200	mW
Thermal Resistance, Junction to Ambient (Note 2)	R_{JA}	625	C/W
Operating and Storage Temperature Range	T_j, T_{STG}	-55 to +150	C

Ordering Information (Note 3)

Device	Packaging	Shipping
DMMT3904W-7-F	SOT-363	3000/Tape & Reel

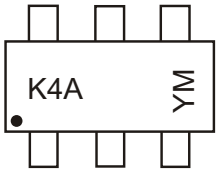
Notes:
1. Built with adjacent die from a single wafer.
2. Device mounted on FR5 PCB: 1.0 x 0.75 x 0.62 in.; pad layout as shown on suggested pad layout document AP02001, which can be found on our website at http://www.diodes.com/datasheets/ap02001.pdf.
3. For Packaging Details, go to our website at http://www.diodes.com/datasheets/ap02007.pdf.
4. No purposefully added lead.

Electrical Characteristics @ T_A = 25 C unless otherwise specified

Characteristic	Symbol	Min	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 6)					
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	60		V	I_C = 10 A, I_E = 0
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	40		V	I_C = 1.0mA, I_B = 0
Emitter-Base Breakdown Voltage	$V_{(BR)EBO}$	6.0		V	I_E = 10 A, I_C = 0
Collector Cutoff Current	I_{CEX}		50	nA	V_{CE} = 30V, $V_{EB(OFF)}$ = 3.0V
Base Cutoff Current	I_{BL}		50	nA	V_{CE} = 30V, $V_{EB(OFF)}$ = 3.0V
ON CHARACTERISTICS (Note 6)					
DC Current Gain (Note 7)	h_{FE}	40 70 100 60 30	300		I_C = 100µA, V_{CE} = 1.0V I_C = 1.0mA, V_{CE} = 1.0V I_C = 10mA, V_{CE} = 1.0V I_C = 50mA, V_{CE} = 1.0V I_C = 100mA, V_{CE} = 1.0V
Collector-Emitter Saturation Voltage (Note 7)	$V_{CE(SAT)}$		0.20 0.30	V	I_C = 10mA, I_B = 1.0mA I_C = 50mA, I_B = 5.0mA
Base-Emitter Saturation Voltage (Note 7)	$V_{BE(SAT)}$	0.65	0.85 0.95	V	I_C = 10mA, I_B = 1.0mA I_C = 50mA, I_B = 5.0mA
Base-Emitter Voltage Matching	V_{BE}		1	mV	V_{CE} = 5V, I_C = 2mA
SMALL SIGNAL CHARACTERISTICS					
Output Capacitance	C_{obo}		4.0	pF	V_{CB} = 5.0V, f = 1.0MHz, I_E = 0
Input Capacitance	C_{ibo}		8.0	pF	V_{EB} = 0.5V, f = 1.0MHz, I_C = 0
Input Impedance	h_{ie}	1.0	10	k	V_{CE} = 10V, I_C = 1.0mA, f = 1.0kHz
Voltage Feedback Ratio	h_{re}	0.5	8	x 10^{-4}	
Small Signal Current Gain	h_{fe}	100	400		
Output Admittance	h_{oe}	1.0	40	S	
Current Gain-Bandwidth Product	f_T	300		MHz	V_{CE} = 20V, I_C = 10mA, f = 100MHz
Noise Figure	NF		5.0	dB	V_{CE} = 5.0V, I_C = 100 A, R_S = 1.0k f = 1.0kHz
SWITCHING CHARACTERISTICS					
Delay Time	t_d		35	ns	V_{CC} = 3.0V, I_C = 10mA, $V_{BE(off)}$ = -0.5V, I_{B1} = 1.0mA
Rise Time	t_r		35	ns	
Storage Time	t_s		200	ns	V_{CC} = 3.0V, I_C = 10mA, I_{B1} = I_{B2} = 1.0mA
Fall Time	t_f		50	ns	

Notes: 5. Short duration test pulse used to minimize self-heating effect.
6. The DC current gain, h_{FE}, (matched at I_C = 10mA and V_{CE} = 1.0V) Collector Emitter Saturation Voltage, $V_{CE(SAT)}$, and Base Emitter Saturation Voltage, $V_{BE(SAT)}$ are matched with typical matched tolerances of 1% and maximum of 2%.

Marking Information



K4A = Product Type Marking Code
YM = Date Code Marking
Y = Year ex: N = 2002
M = Month ex: 9 = September

Date Code Key

Year	2002	2003	2004	2005	2006	2007	2008
Code	N	P	R	S	T	U	V

Month	Jan	Feb	March	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Code	1	2	3	4	5	6	7	8	9	O	N	D

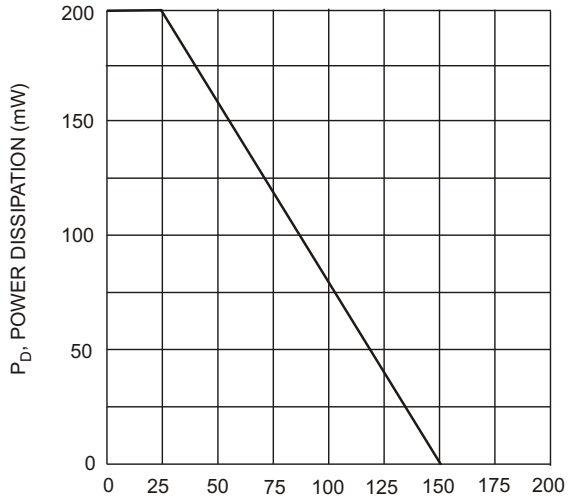


Fig. 1, Max Power Dissipation vs Ambient Temperature

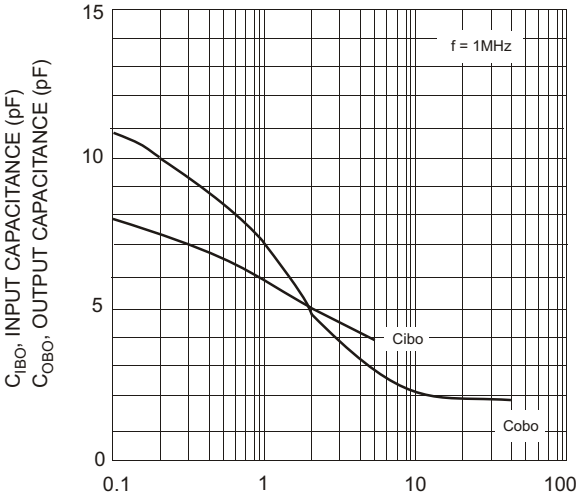


Fig. 2, Input and Output Capacitance vs. Collector-Base Voltage

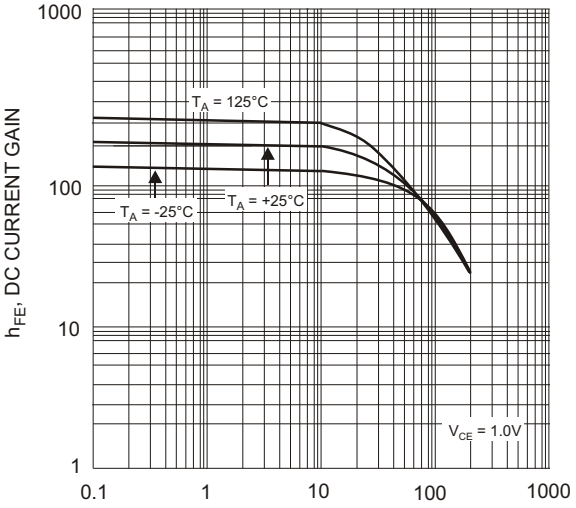


Fig. 3, Typical DC Current Gain vs Collector Current

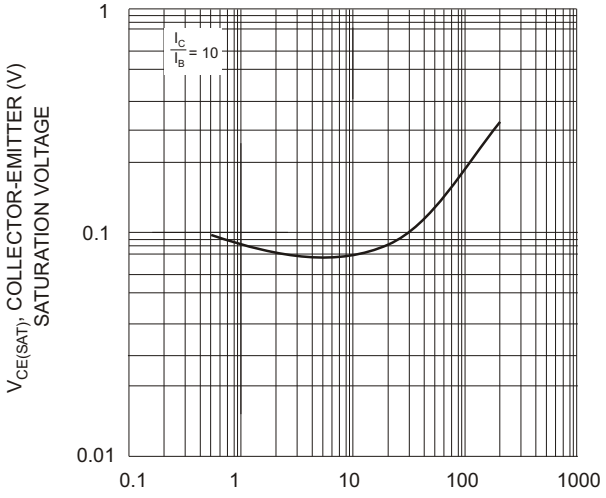


Fig. 4, Typical Collector-Emitter Saturation Voltage vs. Collector Current

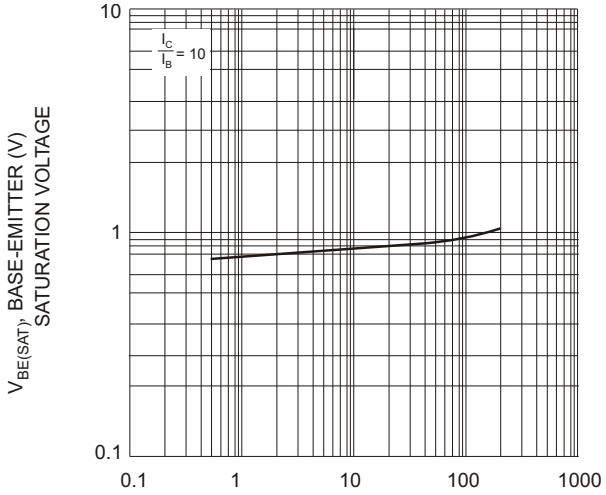


Fig. 5, Typical Base-Emitter Saturation Voltage vs. Collector Current

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