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Electrical Characteristics, NPN 3904 Section @T_A = 25°C unless otherwise specified

Characteristic	Symbol	Min	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 5)					
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	60	—	V	I_C = 10μA, 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 = 10μA, 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 5)					
DC Current Gain	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	$V_{CE(SAT)}$	—	0.20 0.30	V	I_C = 10mA, I_B = 1.0mA I_C = 50mA, I_B = 5.0mA
Base-Emitter Saturation Voltage	$V_{BE(SAT)}$	0.65 —	0.85 0.95	V	I_C = 10mA, I_B = 1.0mA I_C = 50mA, I_B = 5.0mA
SMALL SIGNAL CHARACTERISTICS					
Output Capacitance	C_{obo}	—	4.0	pF	V_{CB} = 5.0V, f = 1.0MHz, I_E = 0
Current Gain-Bandwidth Product	f_T	300	—	MHz	V_{CE} = 20V, I_C = 20mA, f = 100MHz
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	

Electrical Characteristics, PNP 3906 Section @T_A = 25°C unless otherwise specified

Characteristic	Symbol	Min	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 5)					
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	-40	—	V	I_C = -10μA, I_E = 0
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	-40	—	V	I_C = -1.0mA, I_B = 0
Emitter-Base Breakdown Voltage	$V_{(BR)EBO}$	-5.0	—	V	I_E = -10μA, 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 5)					
DC Current Gain	h_{FE}	60 80 100 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	$V_{CE(SAT)}$	—	-0.25 -0.40	V	I_C = -10mA, I_B = -1.0mA I_C = -50mA, I_B = -5.0mA
Base-Emitter Saturation Voltage	$V_{BE(SAT)}$	-0.65 —	-0.85 -0.95	V	I_C = -10mA, I_B = -1.0mA I_C = -50mA, I_B = -5.0mA
SMALL SIGNAL CHARACTERISTICS					
Output Capacitance	C_{obo}	—	4.5	pF	V_{CB} = -5.0V, f = 1.0MHz, I_E = 0
Current Gain-Bandwidth Product	f_T	250	—	MHz	V_{CE} = -20V, I_C = -10mA, f = 100MHz
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	—	225	ns	V_{CC} = -3.0V, I_C = -10mA, I_{B1} = I_{B2} = -1.0mA
Fall Time	t_f	—	75	ns	

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

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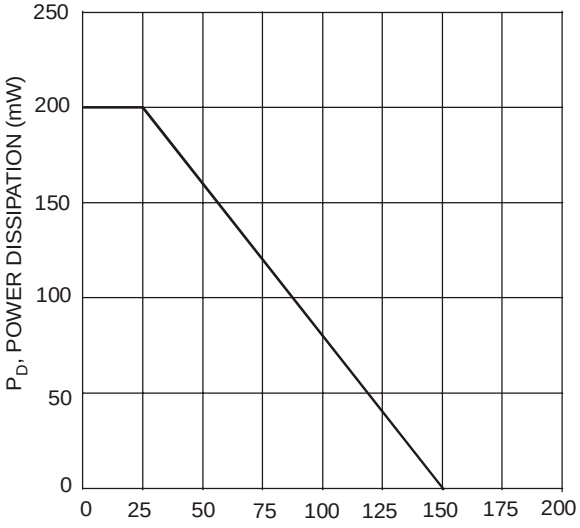


Fig. 1, Max Power Dissipation vs Ambient Temperature (Total Device) (Note 3)

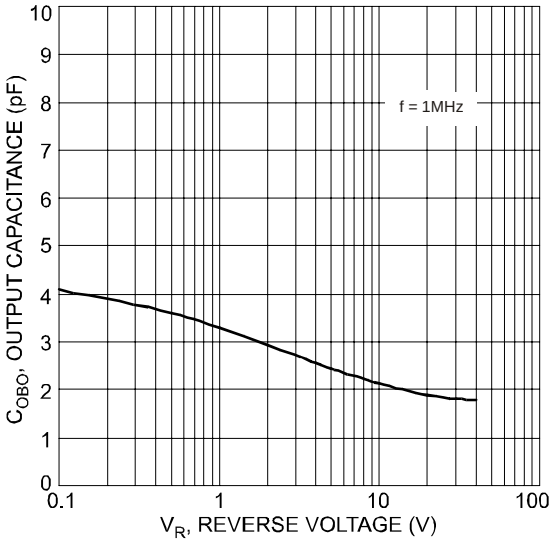


Fig. 2, Typical Output Capacitance Characteristics (NPN-3904)

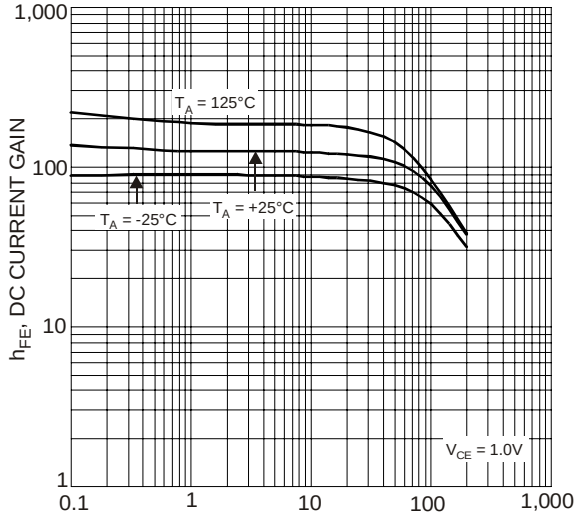


Fig. 3, Typical DC Current Gain vs Collector Current (NPN-3904)

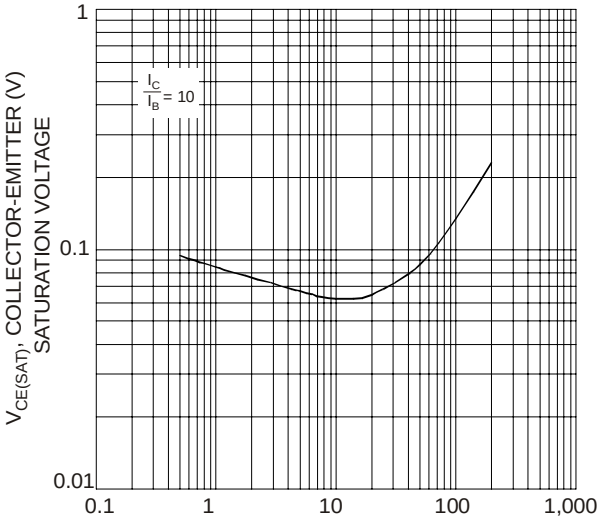


Fig. 4, Typical Collector-Emitter Saturation Voltage vs. Collector Current (NPN-3904)

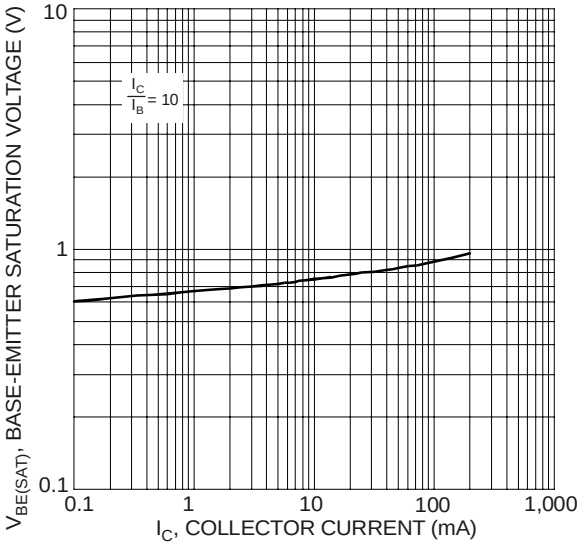


Fig. 5, Typical Base-Emitter Saturation Voltage vs. Collector Current (NPN-3904)

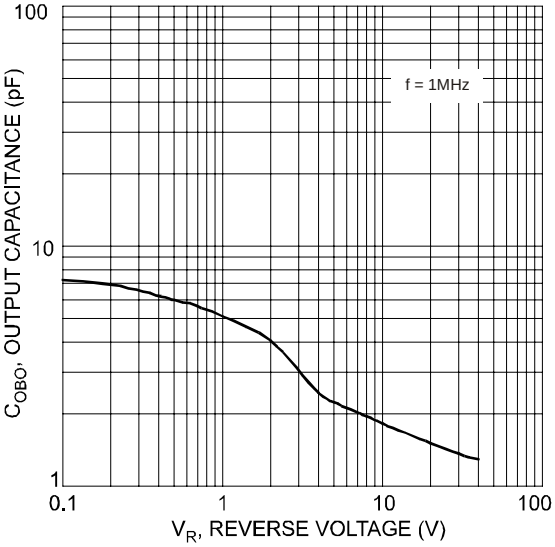


Fig. 6, Typical Output Capacitance Characteristics (PNP-3906)

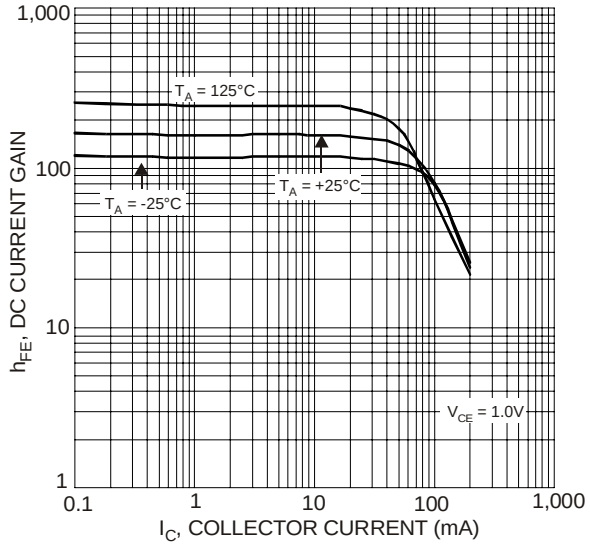


Fig. 7, Typical DC Current Gain vs Collector Current (PNP-3906)

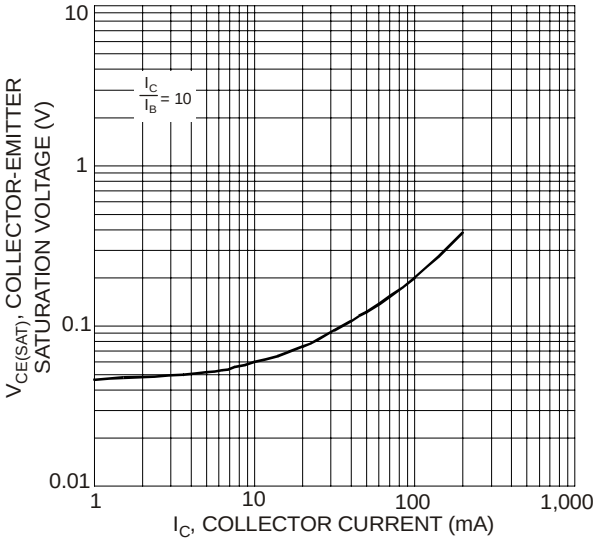


Fig. 8, Typical Collector-Emitter Saturation Voltage vs. Collector Current (PNP-3906)

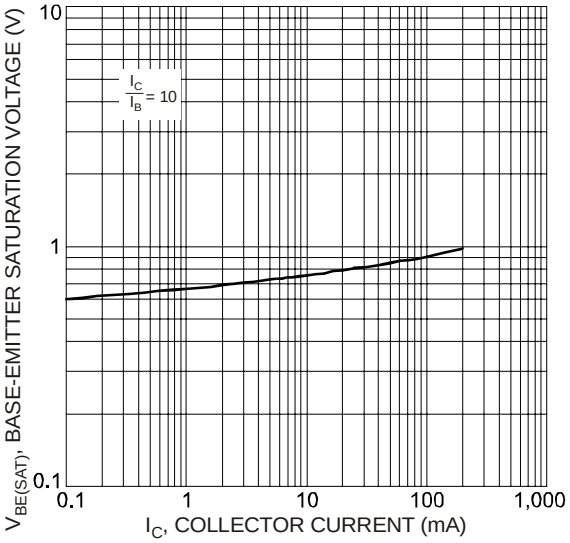


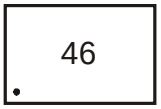
Fig. 9, Typical Base-Emitter Saturation Voltage vs. Collector Current (PNP-3906)

Ordering Information (Note 6)

Device	Packaging	Shipping
MMDT3946LP4-7	DFN1310H4-6	3000/Tape & Reel

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

Marking Information



46= Product Type Marking Code

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