MMT3903, MMT3904 (SILICON)
MMCM3903, MMCM3904 (CERAMIC PACKAGE)

NPN SILICON ANNULAR TRANSISTORS

. . . designed for general purpose switching and amplifier applications and for complementary circuitry with PNP type MMT3905 and MMT3906 where high-density packaging is required.

- High Collector-Emitter Breakdown Voltage — BV_{CEO} = 40 Vdc (Min) @ I_C = 1.0 mAdc
- DC Current Gain Specified from 100 μAdc to 10 mAdc
- Low Output Capacitance — C_{ob} = 4.0 pF (Max) @ V_{CB} = 5.0 Vdc

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	V_{CEO}	40	Vdc
Collector-Base Voltage	V_{CB}	60	Vdc
Emitter-Base Voltage	V_{EB}	6.0	Vdc
Collector-Current — Continuous	I_C	200	mAdc
Total Power Dissipation @ T_A = 25°C *Derate above 25°C*	P_D	225 1.8	mW mW/°C
Operating and Storage Junction Temperature Range	T_J,T_{stg}	-55 to +150	°C

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	556	°C/W

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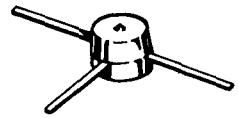
NPN SILICON SWITCHING AND AMPLIFIER TRANSISTORS

MMT3903
MMT3904



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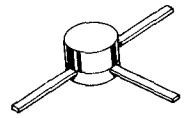
MMCM3903
MMCM3904



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ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted.)

Characteristic		Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Collector-Emitter Breakdown Voltage (1) (I_C = 1.0 mAdc, I_B = 0)		BV_{CEO}	40	–	–	Vdc
Collector-Base Breakdown Voltage (I_C = 10 μAdc, I_E = 0)		BV_{CBO}	60	–	–	Vdc
Emitter-Base Breakdown Voltage (I_E = 10 μAdc, I_C = 0)		BV_{EBO}	6.0	–	–	Vdc
Collector Cutoff Current (V_{CB} = 40 Vdc, I_E = 0)		I_{CBO}	–	–	50	nAdc
Emitter-Cutoff Current (V_{EB} = 4.0 Vdc, I_C = 0)		I_{EBO}	–	–	50	nAdc
ON CHARACTERISTICS (1)						
DC Current Gain		h_{FE}				–
(I_C = 100 μAdc, V_{CE} = 1.0 Vdc)	MMT3903		20	–	–	
	MMT3904		40	–	–	
(I_C = 1.0 mAdc, V_{CE} = 1.0 Vdc)	MMT3903		35	–	–	
	MMT3904		70	–	–	
(I_C = 10 mAdc, V_{CE} = 1.0 Vdc)	MMT3903		50	–	150	
	MMT3904		100	–	300	
Collector-Emitter Saturation Voltage (I_C = 10 mAdc, I_B = 1.0 mAdc)		$V_{CE(sat)}$	–	–	0.2	Vdc
Base-Emitter Saturation Voltage (I_C = 10 mAdc, I_B = 1.0 mAdc)		$V_{BE(sat)}$	–	–	0.85	Vdc
SMALL-SIGNAL CHARACTERISTICS						
Current-Gain–Bandwidth Product		f_T				MHz
(I_C = 10 mAdc, V_{CE} = 20 Vdc, f = 100 MHz)	MMT3903		250	–	–	
	MMT3904		300	–	–	
Output Capacitance (V_{CB} = 5.0 Vdc, I_E = 0, f = 100 kHz)		C_{ob}	–	–	4.0	pF
Input Capacitance (V_{EB} = 0.5 Vdc, I_C = 0, f = 100 kHz)		C_{ib}	–	–	8.0	pF
Noise Figure (I_C = 100 μAdc, V_{CE} = 5.0 Vdc, R_S = 1.0 k ohms, Noise Bandwidth – f = 10 Hz to 15.7 kHz)		NF	–	3.0	–	dB

SWITCHING TIME TEST CIRCUITS

FIGURE 1 – TURN-ON TIME

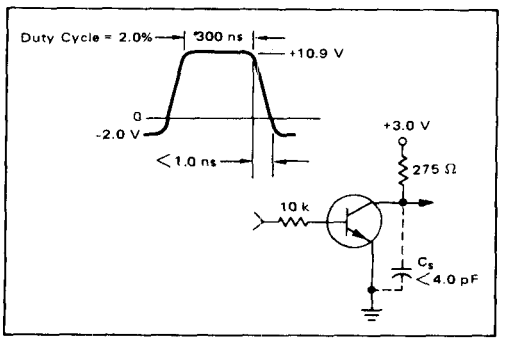


FIGURE 2 – TURN-OFF TIME

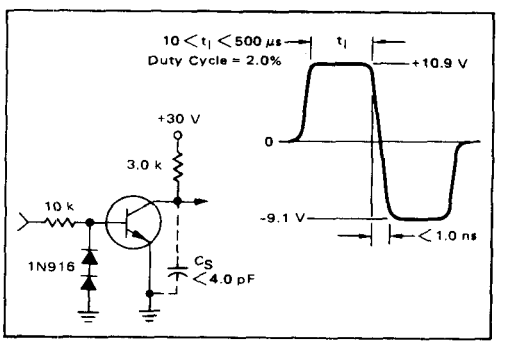
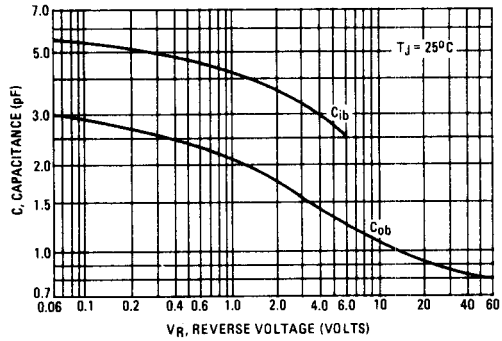


FIGURE 3 – CAPACITANCE



CURRENT-GAIN – BANDWIDTH PRODUCT

FIGURE 4 – MMT3903

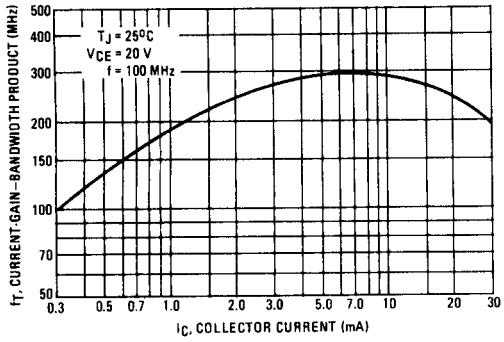


FIGURE 5 – MMT3904

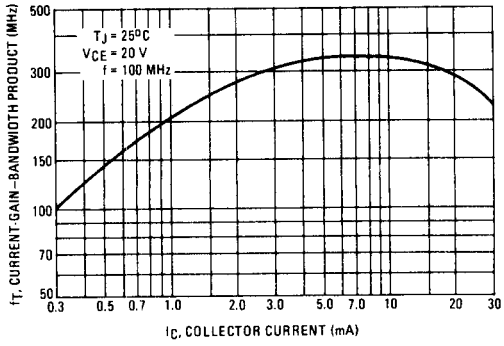


FIGURE 6 – TURN-ON TIME

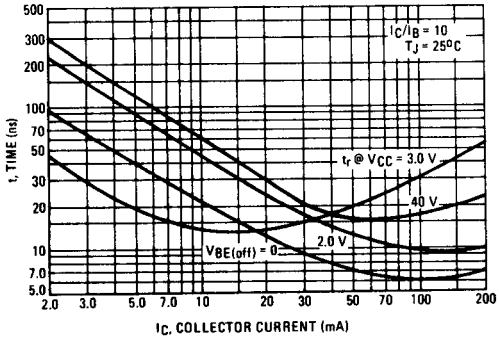


FIGURE 7 – TURN-OFF TIME

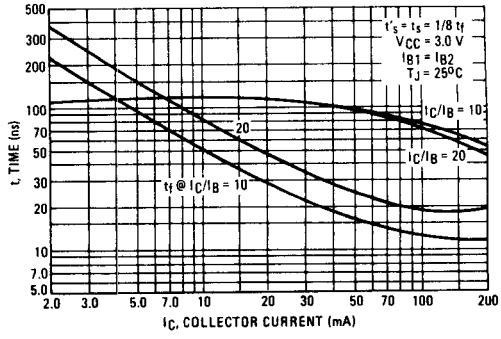


FIGURE 8 – DC CURRENT GAIN

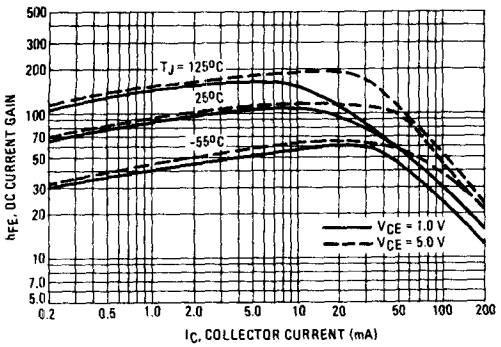


FIGURE 9 – "ON" VOLTAGE

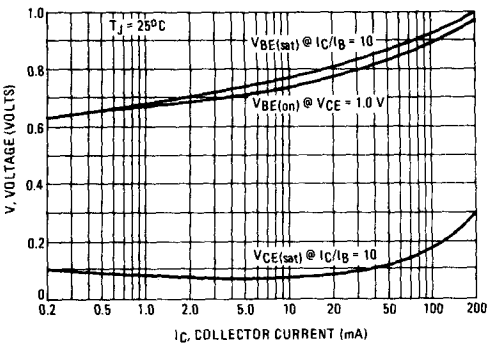


FIGURE 10 – COLLECTOR SATURATION REGION

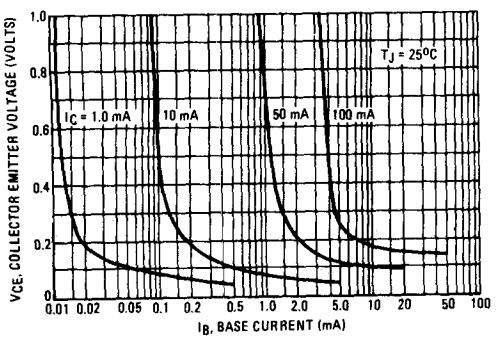
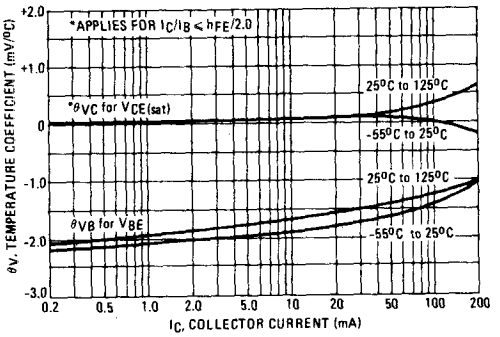
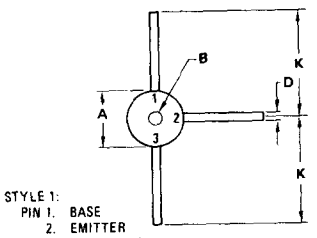


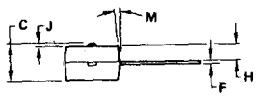
FIGURE 11 – TEMPERATURE COEFFICIENTS



MMT3903
MMT3904



STYLE 1:
PIN 1. BASE
2. EMITTER
3. COLLECTOR



DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	1.98	2.34	0.078	0.092
B	0.38	0.64	0.015	0.025
C	1.24	1.55	0.049	0.061
D	0.25	0.41	0.010	0.016
F	0.10	0.15	0.004	0.006
H	0.51	0.76	0.020	0.030
J	0.03	0.08	0.001	0.003
K	4.19	4.45	0.165	0.175
M	3°	7°	3°	7°

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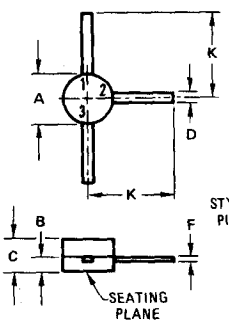
MMCM3903
MMCM3904



STYLE 1:
PIN 1. BASE
2. EMITTER
3. COLLECTOR

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	2.03	2.67	0.080	0.105
B	0.51	0.76	0.020	0.030
C	1.27	2.03	0.050	0.080
D	0.25	0.41	0.010	0.016
F	0.08	0.15	0.003	0.006
K	4.06	4.57	0.160	0.180

NOTE:
A Tolerance of .25 mm (.010) must be allowed at point leads protrude from package for glass run over.

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