

MM3734 (SILICON)

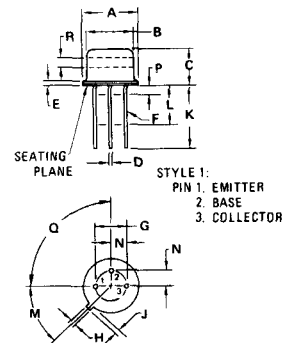
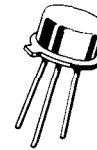
MM3735

NPN SILICON ANNULAR CORE DRIVER TRANSISTORS

... designed for use in core driver applications and high speed, high-current switching applications.

- Collector-Emitter Breakdown Voltage –
 $V_{CE0} = 30 \text{ Vdc (Min) – MM3734}$
 $= 50 \text{ Vdc (Min) – MM3735}$
- Low Collector-Emitter Saturation Voltage –
 $V_{CE(sat)} = 0.29 \text{ Vdc (Typ) @ } I_C = 1.0 \text{ Adc}$
- High Current-Gain-Bandwidth Product –
 $f_T = 400 \text{ MHz (Typ) @ } I_C = 50 \text{ mAdc}$
- Fast Switching Times –
 $t_{on} = 16 \text{ ns (Typ) @ } I_C = 1.0 \text{ Adc}$
 $t_{off} = 28 \text{ ns (Typ) @ } I_C = 1.0 \text{ Adc}$
- Devices Electrically Similar to 2N3734 and 2N3735

NPN SILICON CORE DRIVER TRANSISTORS



DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	8.89	9.40	0.350	0.370
B	8.00	8.51	0.315	0.335
C	6.10	6.60	0.240	0.260
D	0.406	0.533	0.016	0.021
E	0.229	3.18	0.009	0.125
F	0.406	0.483	0.016	0.019
G	4.83	5.33	0.190	0.210
H	0.711	0.864	0.028	0.034
J	0.737	1.02	0.029	0.040
K	12.70	~	0.500	~
L	6.35	~	0.250	~
M	45°	NOM	45°	NOM
P	~	1.27	~	0.050
Q	90°	NOM	90°	NOM
R	2.54	~	0.100	~

CASE 79
TO-39

MAXIMUM RATINGS

Rating	Symbol	MM3734	MM3735	Unit
Collector-Emitter Voltage	V_{CE0}	30	50	Vdc
Collector-Base Voltage	V_{CB}	50	75	Vdc
Emitter-Base Voltage	V_{EB}		5.0	Vdc
Collector Current – Continuous	I_C		1.5	A dc
Total Power Dissipation @ $T_A = 25^\circ\text{C}$ Derate above 25°C	P_D	1.0	5.71	Watt mW/ $^\circ\text{C}$
Total Power Dissipation @ $T_C = 25^\circ\text{C}$ Derate above 25°C	P_D	4.0	22.8	Watts mW/ $^\circ\text{C}$
Operating and Storage Junction Temperature Range	T_J, T_{stg}	-65 to +200		$^\circ\text{C}$

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$ (1)	175	$^\circ\text{C/W}$
Thermal Resistance, Junction to Case	$R_{\theta JC}$	44	$^\circ\text{C/W}$

(1) $R_{\theta JA}$ is measured with the device soldered into a typical printed circuit board.

MM3734, MM3735 (continued)

ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ unless otherwise noted.)

Characteristic	Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS					
Collector-Emitter Breakdown Voltage (1) ($I_C = 10 \text{ mAdc}$, $I_B = 0$)	MM3734 MM3735 BV_{CEO}	30 50	— —	— —	Vdc
Collector-Base Breakdown Voltage ($I_C = 10 \mu\text{Adc}$, $I_E = 0$)	MM3734 MM3735 BV_{CBO}	50 75	— —	— —	Vdc
Emitter-Base Breakdown Voltage ($I_E = 10 \mu\text{Adc}$, $I_C = 0$)	BV_{EBO}	5.0	—	—	Vdc
Collector Cutoff Current ($V_{CB} = 30 \text{ Vdc}$, $I_E = 0$) ($V_{CB} = 30 \text{ Vdc}$, $I_E = 0$, $T_A = 100^\circ\text{C}$)	I_{CBO}	— —	— —	500 75	nAdc μAdc
ON CHARACTERISTICS (1)					
DC Current Gain ($I_C = 10 \text{ mAdc}$, $V_{CE} = 1.0 \text{ Vdc}$) ($I_C = 100 \text{ mAdc}$, $V_{CE} = 1.0 \text{ Vdc}$) ($I_C = 500 \text{ mAdc}$, $V_{CE} = 1.0 \text{ Vdc}$) ($I_C = 1.0 \text{ Adc}$, $V_{CE} = 1.5 \text{ Vdc}$) ($I_C = 1.5 \text{ Adc}$, $V_{CE} = 5.0 \text{ Vdc}$)	MM3734 MM3735 MM3734 MM3735 h_{FE}	40 50 35 25 20 25 20	85 100 65 35 35 30 30	— — — 100 100 — —	—
Collector-Emitter Saturation Voltage ($I_C = 10 \text{ mAdc}$, $I_B = 1.0 \text{ mAdc}$) ($I_C = 100 \text{ mAdc}$, $I_B = 10 \text{ mAdc}$) ($I_C = 500 \text{ mAdc}$, $I_B = 50 \text{ mAdc}$) ($I_C = 1.0 \text{ Adc}$, $I_B = 100 \text{ mAdc}$)	$V_{CE(sat)}$	— — — —	0.15 0.16 0.20 0.29	0.25 0.30 0.5 1.0	Vdc
Base-Emitter Saturation Voltage ($I_C = 10 \text{ mAdc}$, $I_B = 1.0 \text{ mAdc}$) ($I_C = 100 \text{ mAdc}$, $I_B = 10 \text{ mAdc}$) ($I_C = 500 \text{ mAdc}$, $I_B = 50 \text{ mAdc}$) ($I_C = 1.0 \text{ Adc}$, $I_B = 100 \text{ mAdc}$)	$V_{BE(sat)}$	— — — 0.8	0.65 0.75 0.86 0.94	0.8 0.9 1.2 1.4	Vdc
DYNAMIC CHARACTERISTICS					
Current-Gain-Bandwidth Product ($I_C = 50 \text{ mAdc}$, $V_{CE} = 10 \text{ Vdc}$, $f = 100 \text{ MHz}$)	f_T	200	400	—	MHz
Output Capacitance ($V_{CB} = 10 \text{ Vdc}$, $I_E = 0$, $f = 1.0 \text{ MHz}$)	C_{ob}	—	7.3	15	pF
Input Capacitance ($V_{BE} = 0.5 \text{ Vdc}$, $I_C = 0$, $f = 1.0 \text{ MHz}$)	C_{ib}	—	72	90	pF
SWITCHING CHARACTERISTICS (Figure 11)					
Turn-On Time ($V_{CC} = 30 \text{ Vdc}$, $V_{BE(off)} = 2.0 \text{ Vdc}$, $I_C = 1.0 \text{ Adc}$, $I_{B1} = 100 \text{ mAdc}$)	t_{on}	—	16	35	ns
Turn-Off Time ($V_{CC} = 30 \text{ Vdc}$, $I_C = 1.0 \text{ Adc}$, $I_{B1} = I_{B2} = 100 \text{ mAdc}$)	t_{off}	—	28	60	ns

(1) Pulse Width: Pulse Width $\leq 300 \mu\text{s}$, Duty Cycle $\leq 2.0\%$.

FIGURE 1 – ACTIVE-REGION SAFE OPERATING AREA

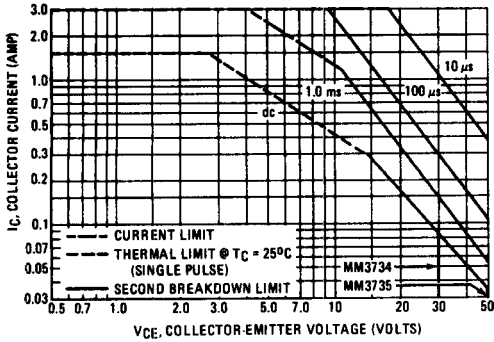


FIGURE 3 – "ON" VOLTAGES

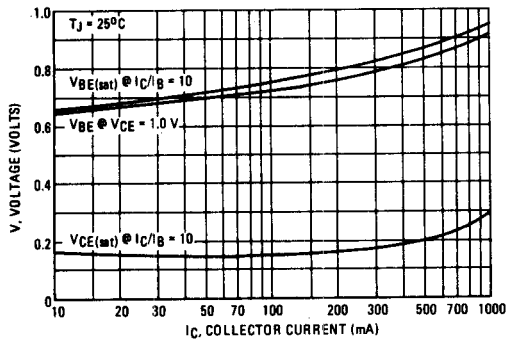


FIGURE 5 – TEMPERATURE COEFFICIENT

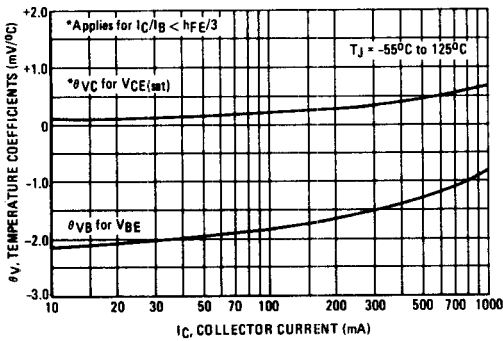


FIGURE 2 – DC CURRENT GAIN

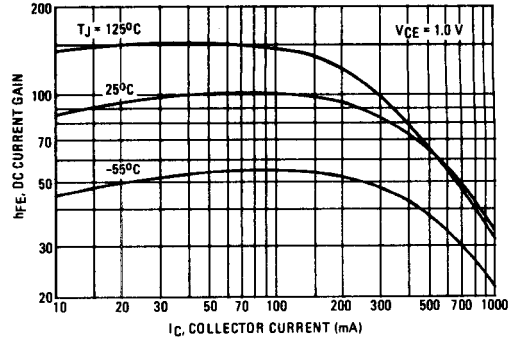


FIGURE 4 – COLLECTOR SATURATION REGION

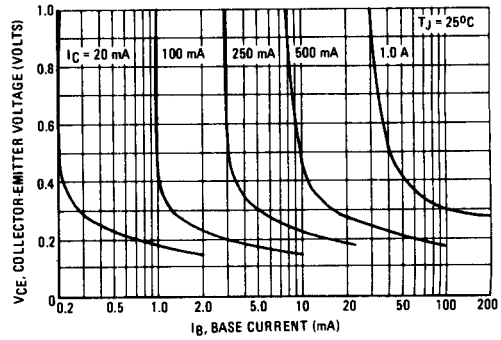
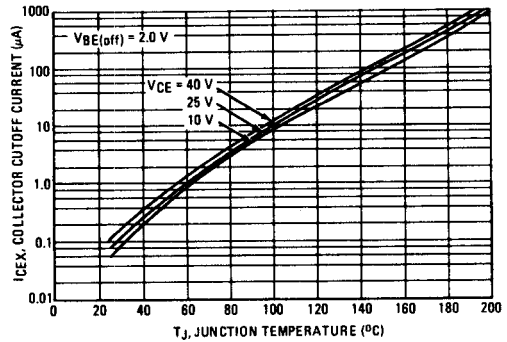


FIGURE 6 – COLLECTOR CUTOFF CURRENT



DYNAMIC CHARACTERISTICS

FIGURE 7 – CURRENT-GAIN-BANDWIDTH PRODUCT

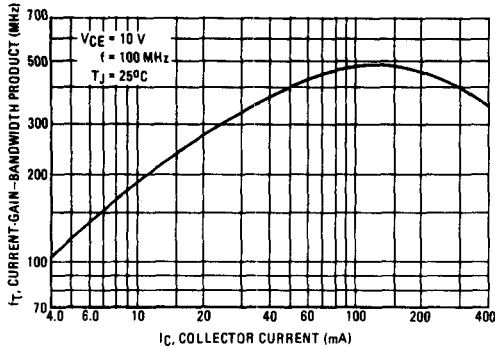


FIGURE 8 – CAPACITANCE

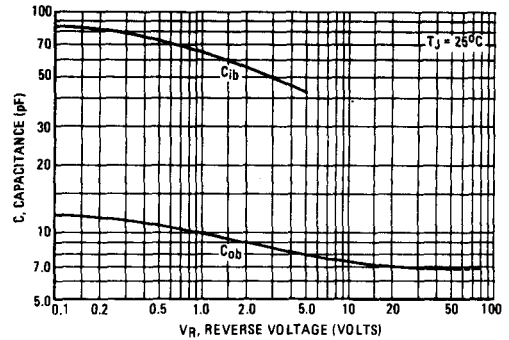


FIGURE 9 – TURN-ON TIME

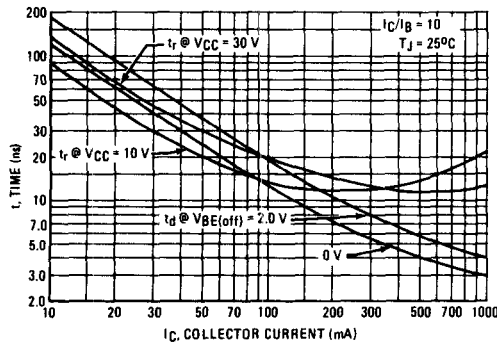


FIGURE 10 – TURN-OFF TIME

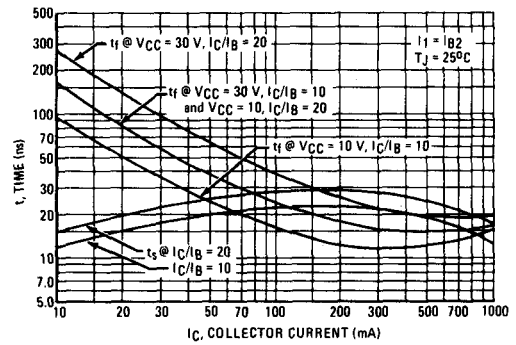


FIGURE 11 – SWITCHING TIME TEST CIRCUITS

