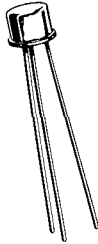


**MM3724** (SILICON)  
**MM3725**

$V_{CEO} = 30 \text{ to } 50 \text{ V}$   
 $I_C = 1.5 \text{ A}$   
 $P_D = 1 \text{ W}$

NPN silicon annular transistors designed for medium-current, high-speed saturated switching and core driver applications. Type MM3725 is complementary to PNP type MM3726.



Collector connected to case

**CASE 31**  
(TO-5)

**MAXIMUM RATINGS** ( $T_A = 25^\circ\text{C}$  unless otherwise noted)

| Rating   | Symbol         | MM3724      | MM3725 | Unit                          |
|--|----------------|-------------|--------|-------------------------------|
| Collector-Emitter Voltage  | $V_{CEO}$      | 30          | 50     | Vdc                           |
| Emitter-Base Voltage   | $V_{EB}$       | 6           |        | Vdc                           |
| Collector Current — Continuous   | $I_C$          | 1.5         |        | Adc                           |
| Total Device Dissipation @ $T_A = 25^\circ\text{C}$<br>Derate above $25^\circ\text{C}$ | $P_D$          | 1.0         | 5.71   | Watt<br>mW/ $^\circ\text{C}$  |
| Total Device Dissipation @ $T_C = 25^\circ\text{C}$<br>Derate above $25^\circ\text{C}$ | $P_D$          | 5.0         | 28.6   | Watts<br>mW/ $^\circ\text{C}$ |
| Operating and Storage Junction<br>Temperature Range                                    | $T_J, T_{stg}$ | -65 to +200 |        | $^\circ\text{C}$              |

**THERMAL CHARACTERISTICS**

| Characteristic                          | Symbol        | Max | Unit                      |
|---|---------------|-----|---------------------------|
| Thermal Resistance, Junction to Case    | $\theta_{JC}$ | 35  | $^\circ\text{C}/\text{W}$ |
| Thermal Resistance, Junction to Ambient | $\theta_{JA}$ | 175 | $^\circ\text{C}/\text{W}$ |

**MM3724, MM3725** (continued)

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

| Characteristic | Fig. No. | Symbol | Min | Max | Unit |
|----------------|----------|--------|-----|-----|------|
|----------------|----------|--------|-----|-----|------|

**OFF CHARACTERISTICS**

|  |                  |   |            |    |     |                 |
|--|------------------|---|------------|----|-----|-----------------|
| Collector-Emitter Breakdown Voltage<br>( $I_C = 10 \text{ mAdc}$ , $I_B = 0$ ) | MM3724<br>MM3725 | — | $BV_{CEO}$ | 30 | —   | Vdc             |
|  |                  |   |            | 50 | —   |                 |
| Emitter-Base Breakdown Voltage<br>( $I_E = 10 \mu\text{Adc}$ , $I_C = 0$ )     | —                | — | $BV_{EBO}$ | 6  | —   | Vdc             |
| Collector Cutoff Current<br>( $V_{CB} = 40 \text{ Vdc}$ , $I_E = 0$ )          | —                | — | $I_{CBO}$  | —  | 0.5 | $\mu\text{Adc}$ |

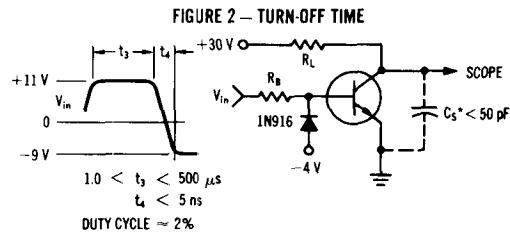
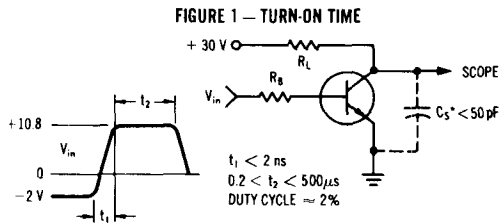
**ON CHARACTERISTICS**

|  |        |   |               |          |            |     |
|--|--------|---|---------------|----------|------------|-----|
| DC Current Gain<br>( $I_C = 500 \text{ mAdc}$ , $V_{CE} = 2 \text{ Vdc}$ )<br>( $I_C = 1 \text{ Adc}$ , $V_{CE} = 5 \text{ Vdc}$ )                     | 9      | — | $h_{FE}$      | 25<br>15 | 150<br>—   | —   |
| Collector-Emitter Saturation Voltage<br>( $I_C = 500 \text{ mAdc}$ , $I_B = 50 \text{ mAdc}$ )<br>( $I_C = 1 \text{ Adc}$ , $I_B = 100 \text{ mAdc}$ ) | 10, 11 | — | $V_{CE(sat)}$ | —<br>—   | 0.6<br>0.9 | Vdc |
| Base-Emitter Saturation Voltage<br>( $I_C = 500 \text{ mAdc}$ , $I_B = 50 \text{ mAdc}$ )<br>( $I_C = 1 \text{ Adc}$ , $I_B = 100 \text{ mAdc}$ )      | 11     | — | $V_{BE(sat)}$ | 0.8<br>— | 1.0<br>1.3 | Vdc |

**DYNAMIC CHARACTERISTICS**

|   |            |   |           |     |    |     |
|---|------------|---|-----------|-----|----|-----|
| Current-Gain – Bandwidth Product<br>( $I_C = 50 \text{ mAdc}$ , $V_{CE} = 10 \text{ Vdc}$ , $f = 100 \text{ MHz}$ )   | —          | — | $f_T$     | 200 | —  | MHz |
| Collector-Base Capacitance<br>( $V_{CB} = 10 \text{ Vdc}$ , $I_E = 0$ , $f = 100 \text{ kHz}$ , emitter guarded)  | 3          | — | $C_{cb}$  | —   | 9  | pF  |
| Emitter-Base Capacitance<br>( $V_{BE} = 0.5 \text{ Vdc}$ , $I_C = 0$ , $f = 100 \text{ kHz}$ , collector guarded)   | 3          | — | $C_{eb}$  | —   | 80 | pF  |
| Turn-On Time<br>( $V_{CC} = 30 \text{ Vdc}$ , $V_{EB(off)} = 2 \text{ Vdc}$ , $I_C = 500 \text{ mAdc}$ ,<br>$I_{B1} = 50 \text{ mAdc}$ , $R_B = 200 \text{ ohms}$ , $R_L = 60 \text{ ohms}$ ) | 1, 5, 6    | — | $t_{on}$  | —   | 30 | ns  |
| Turn-Off Time<br>( $V_{CC} = 30 \text{ Vdc}$ , $I_C = 500 \text{ mAdc}$ , $I_{B1} = I_{B2} = 50 \text{ mAdc}$ ,<br>$R_B = 200 \text{ ohms}$ , $R_L = 60 \text{ ohms}$ )                       | 2, 6, 7, 8 | — | $t_{off}$ | —   | 50 | ns  |
| Turn-On Time<br>( $V_{CC} = 30 \text{ Vdc}$ , $V_{EB(off)} = 2 \text{ Vdc}$ , $I_C = 1 \text{ Adc}$ ,<br>$I_{B1} = 100 \text{ mAdc}$ , $R_B = 100 \text{ ohms}$ , $R_L = 30 \text{ ohms}$ )   | 1, 5, 6    | — | $t_{on}$  | —   | 40 | ns  |
| Turn-Off Time<br>( $V_{CC} = 30 \text{ Vdc}$ , $I_C = 1 \text{ Adc}$ , $I_{B1} = I_{B2} = 100 \text{ mAdc}$ ,<br>$R_B = 100 \text{ ohms}$ , $R_L = 30 \text{ ohms}$ )                         | 2, 6, 7, 8 | — | $t_{off}$ | —   | 50 | ns  |

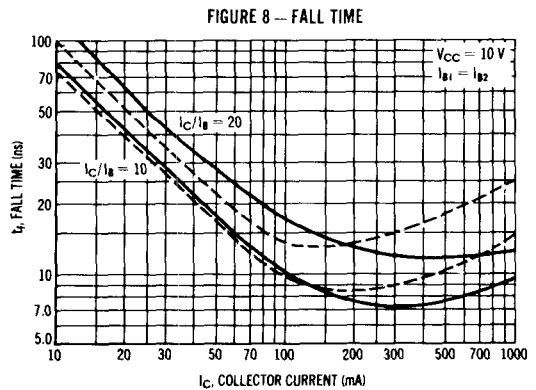
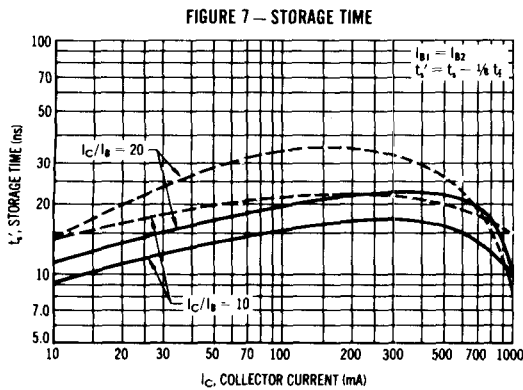
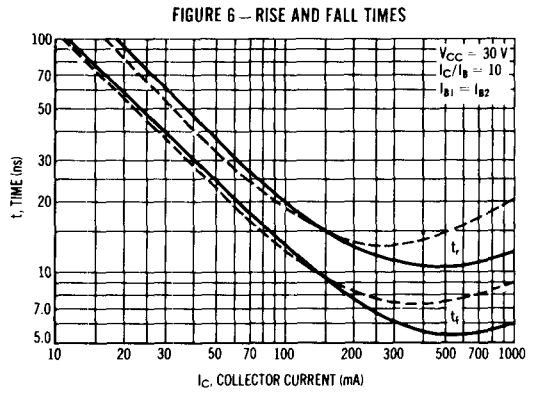
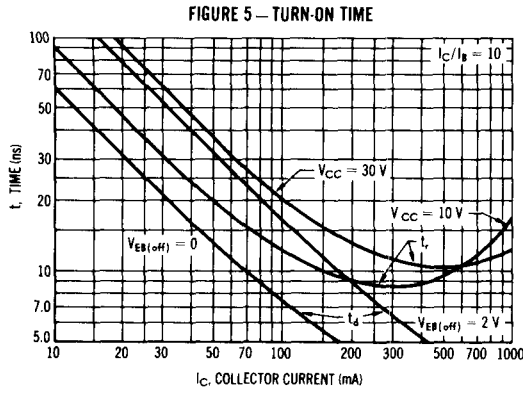
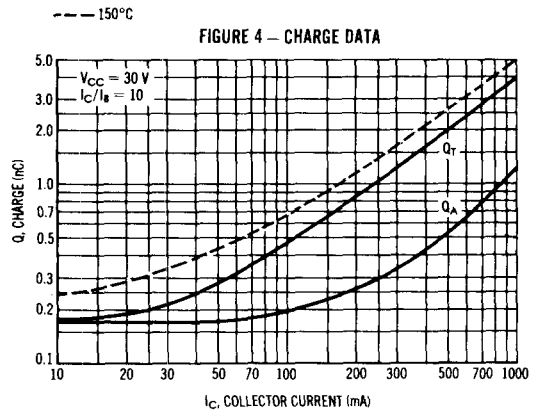
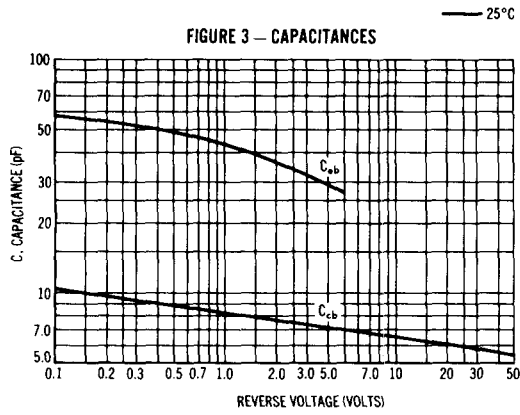
**SWITCHING TIME EQUIVALENT TEST CIRCUITS**



\*TOTAL SHUNT CAPACITANCE OF TEST JIG, CONNECTORS, AND OSCILLOSCOPE

**MM3724, MM3725** (continued)

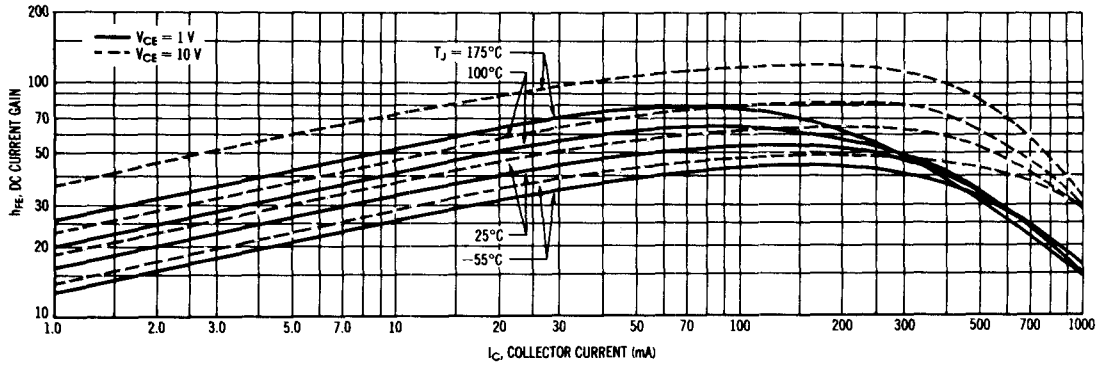
**TRANSIENT CHARACTERISTICS**



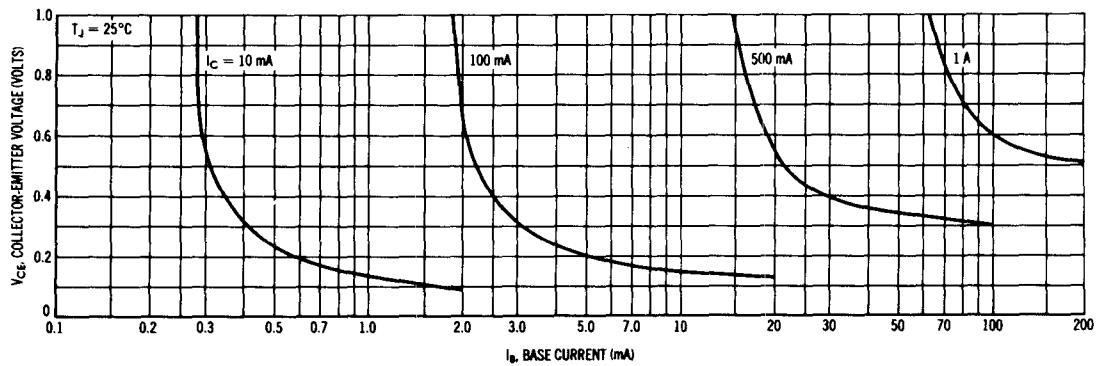
**MM3724, MM3725** (continued)

**STATIC CHARACTERISTICS**

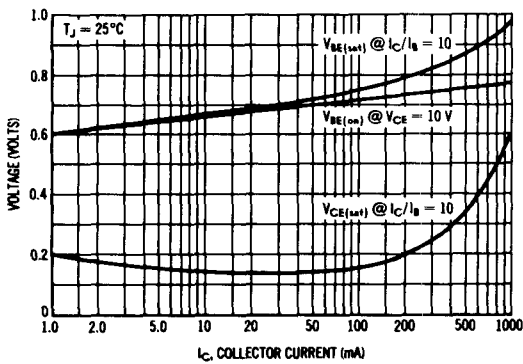
**FIGURE 9 — CURRENT GAIN**



**FIGURE 10 — SATURATION REGION**



**FIGURE 11 — "ON" VOLTAGES**



**FIGURE 12 — TEMPERATURE COEFFICIENTS**

