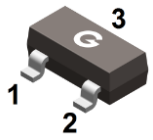
# PNP Silicon Epitaxial Planar Transistor

## TFMMT720 TFMMT720-3L

## Features

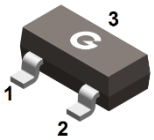
HF

- Low collector-emitter saturation voltage
- High collector current capability
- $I_C$ up to 4A peak pulse current
- Complementary NPN type: TFMMT619, TFMMT619-3L
- RoHS compliant with Halogen-free
- Qualified to AEC-Q101 Standards



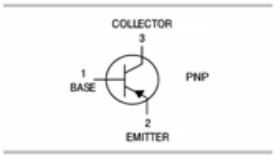

TFMMT720

SOT-23




TFMMT720-3L

SOT-23-3L




## Mechanical Data

- Case: SOT-23, SOT-23-3L
- Molding compound: UL flammability classification rating 94V-0
- Terminals: Tin-plated; solderability per MIL-STD-202, Method 208

## Ordering Information

| Part Number | Package | Shipping Quantity | Marking Code |
|---|---|---|---|
| TFMMT720 | SOT-23 | 3000 pcs / Tape & Reel | 720 |
| TFMMT720-3L | SOT-23-3L | 3000 pcs / Tape & Reel | 720 |

## Maximum Ratings (@ $T_A$ = 25°C unless otherwise specified)

| Parameter | Symbol | Value | Unit |
|---|---|---|---|
| Collector-Base Breakdown Voltage | $V_{CBO}$ | -40 | V |
| Collector-Emitter Breakdown Voltage | $V_{CEO}$ | -40 | V |
| Emitter-Base Breakdown Voltage | $V_{EBO}$ | -5 | V |
| Collector Current (Continuous) | $I_C$ | -2 | A |
| Collector Current (Peak, $t_p \leq 1ms$) | $I_{CM}$ | -4 | A |
| Base Current | $I_B$ | -0.5 | A |

## Thermal Characteristics

| Parameter | Symbol | Value | Unit |
|---|---|---|---|
| Power Dissipation | $P_D$ | 0.35 | W |
| Thermal Resistance Junction-to-Air *1 | $R_{\theta JA}$ | 210 | °C/W |
| Thermal Resistance Junction-to-Case *1 | $R_{\theta JC}$ | 120 | °C/W |
| Thermal Resistance Junction-to-Lead *1 | $R_{\theta JL}$ | 180 | °C/W |
| Junction Temperature Range | $T_J$ | -55 ~ +150 | °C |
| Storage Temperature Range | $T_{STG}$ | -55 ~ +150 | °C |

Note 1: The data tested by surface mounted on a 1 inch$^2$ FR-4 board with 2OZ copper

## Electrical Characteristics (@ $T_A$ = 25°C unless otherwise specified)

| Parameter | Symbol | Test Condition | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| Collector-Base Breakdown Voltage | $V_{(BR)CBO}$ | $I_C$ = -100μA, $I_E$ = 0 | -40 | - | - | V |
| Collector-Emitter Breakdown Voltage | $V_{(BR)CEO}$ | $I_C$ = -10mA, $I_B$ = 0 | -40 | - | - | V |
| Emitter-Base Breakdown Voltage | $V_{(BR)EBO}$ | $I_E$ = -100μA, $I_C$ = 0 | -5 | - | - | V |
| Collector Cut-off Current | $I_{CBO}$ | $V_{CB}$ = -35V, $I_E$ = 0 | - | - | -0.1 | μA |
| Emitter Cut-off Current | $I_{EBO}$ | $V_{EB}$ = -4V, $I_C$ = 0 | - | - | -0.1 | μA |
| DC Current Gain | $h_{FE}$ | $V_{CE}$ = -2V, $I_C$ = -10mA | 300 | - | - | - |
| | | $V_{CE}$ = -2V, $I_C$ = -100mA | 300 | - | - | - |
| | | $V_{CE}$ = -2V, $I_C$ = -1A | 180 | - | - | - |
| | | $V_{CE}$ = -2V, $I_C$ = -1.5A | 60 | | | |
| | | $V_{CE}$ = -2V, $I_C$ = -3A | 12 | - | - | - |
| Collector-emitter Saturation Voltage | $V_{CE(sat)}$ | $I_C$ = -0.1A, $I_B$ = -10mA | - | - | -0.040 | V |
| | | $I_C$ = -1A, $I_B$ = -50mA | - | - | -0.220 | V |
| | | $I_C$ = -1.5A, $I_B$ = -100mA | - | - | -0.330 | V |
| Base-emitter Saturation Voltage | $V_{BE(sat)}$ | $I_C$ = -1.5A, $I_B$ = -75mA | - | - | -1.00 | V |
| Base-emitter Voltage | $V_{BE(on)}$ | $I_C$ = -1.5A, $V_{CE}$ = -2V | - | - | -1.2 | V |
| Transition Frequency | $f_T$ | $V_{CE}$ = -10V, $I_C$ = -50mA<br>f = 100MHz | 150 | 190 | - | MHz |
| Output Capacitance | $C_{ob}$ | $V_{CB}$ = -10V, f = 1MHz | - | 22 | 25 | pF |
| Turn-On Time | $t_{(on)}$ | $V_{CC}$ = -15V, $I_C$ = -0.75A<br>$I_{B1}$ = $I_{B2}$ = -15mA | - | 40 | - | ns |
| Turn-Off Time | $t_{(off)}$ | | - | 435 | - | |

## Ratings and Characteristic Curves (@ $T_A$ = 25°C unless otherwise specified)

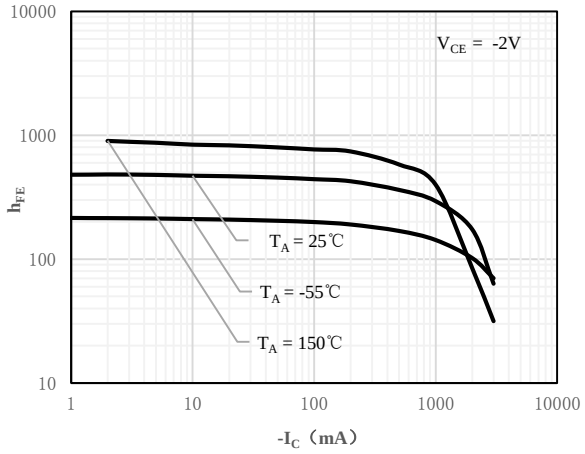



Fig 1 $h_{FE}$ vs. $I_C$

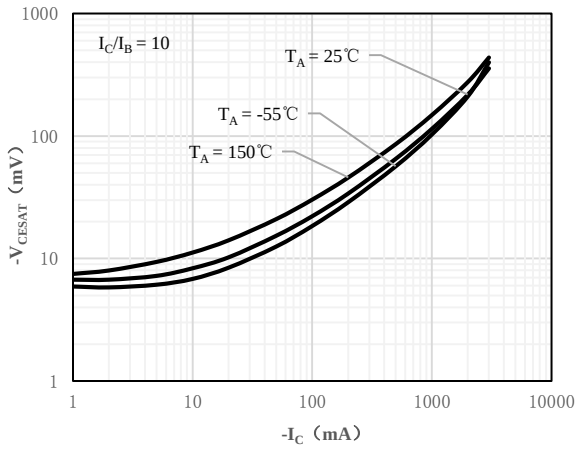



Fig 2 $V_{CE(sat)}$ vs. $I_C$

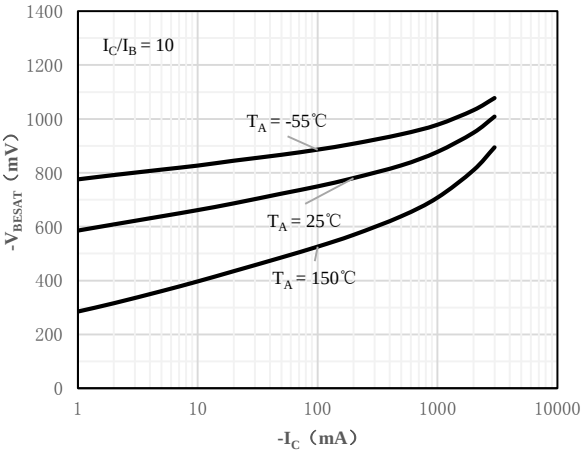



Fig 3 $V_{BE(sat)}$ vs. $I_C$

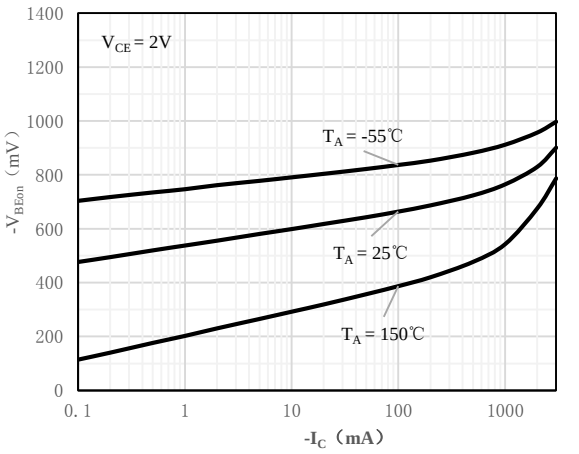



Fig 4 $V_{BE(ON)}$ vs. $I_C$

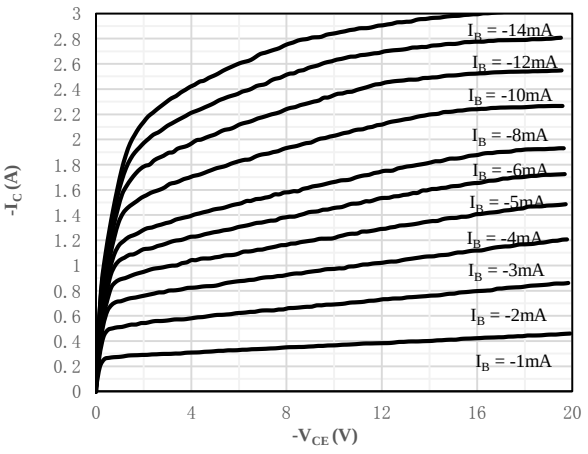



Fig 5 $I_C$ vs. $V_{CE}$

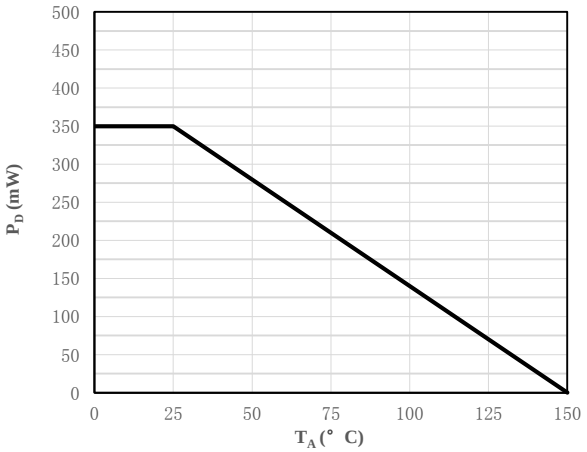



Fig 6 $P_D$ vs. $T_A$

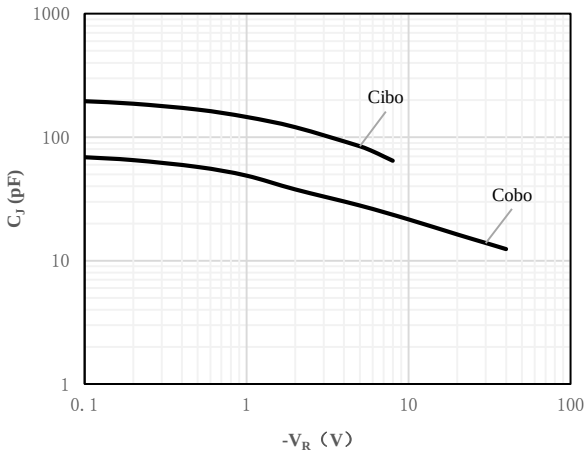
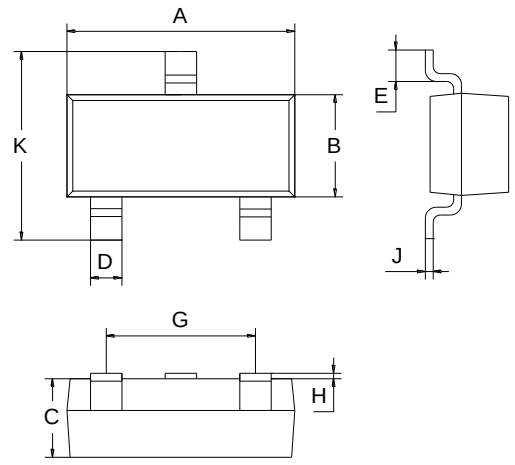
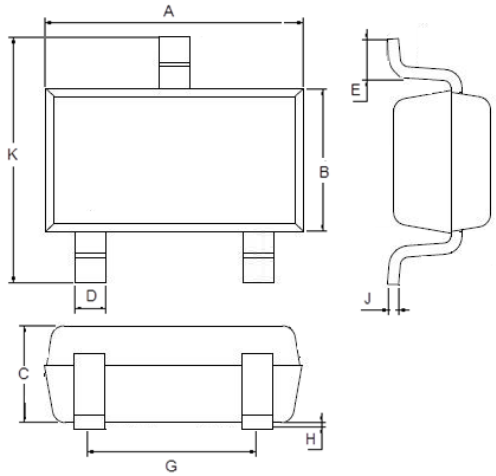



Fig 7 $C_J$ vs. $V_R$

## Package Outline Dimensions (Unit: mm)



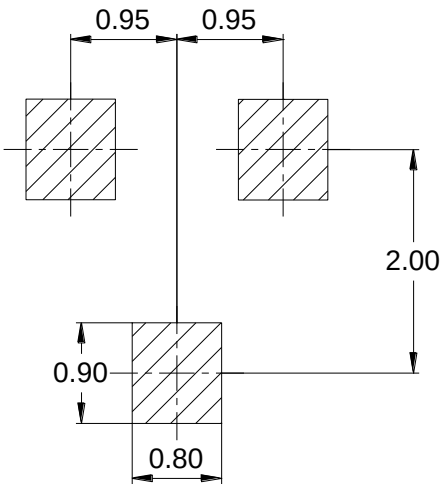

| SOT-23 | | |
|---|---|---|
| **Dimension** | **Min.** | **Max.** |
| A | 2.70 | 3.10 |
| B | 1.10 | 1.50 |
| C | 0.9 | 1.1 |
| D | 0.3 | 0.5 |
| E | 0.35 | 0.48 |
| G | 1.80 | 2.00 |
| H | 0.02 | 0.1 |
| J | 0.05 | 0.15 |
| K | 2.20 | 2.60 |




| SOT-23-3L | | |
|---|---|---|
| **Dimension** | **Min.** | **Max.** |
| A | 2.80 | 3.00 |
| B | 1.50 | 1.70 |
| C | 1.00 | 1.20 |
| D | 0.35 | 0.45 |
| E | 0.35 | 0.55 |
| G | 1.80 | 2.00 |
| H | 0.02 | 0.10 |
| J | 0.10 | 0.20 |
| K | 2.60 | 3.00 |

## Mounting Pad Layout (Unit: mm)

### SOT-23




### SOT-23-3L

