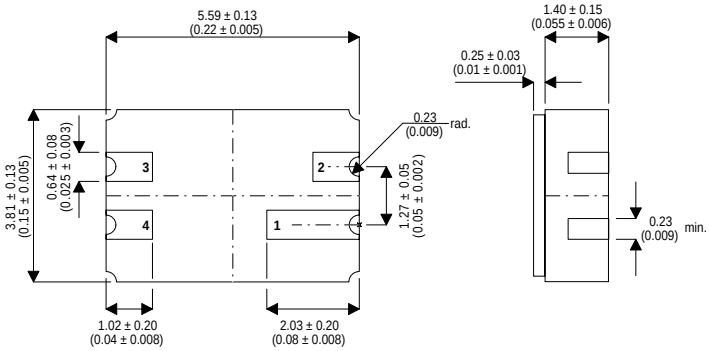
# 2N2222ACSM4

# HIGH SPEED, MEDIUM POWER, NPN SWITCHING TRANSISTOR IN A HERMETICALLY SEALED CERAMIC SURFACE MOUNT PACKAGE FOR HIGH RELIABILITY APPLICATIONS

**MECHANICAL DATA**
Dimensions in mm (inches)




**LCC3 PACKAGE**
**Underside View**

| | |
|---|---|
| PAD 1 – Collector | PAD 3 – Emitter |
| PAD 2 – N/C | PAD 4 – Base |

## FEATURES

- **SILICON PLANAR EPITAXIAL NPN TRANSISTOR**
- **HERMETIC CERAMIC SURFACE MOUNT PACKAGE**
- **CECC SCREENING OPTIONS**
- **SPACE QUALITY LEVELS OPTIONS**
- **HIGH SPEED SATURATED SWITCHING**

## APPLICATIONS:

**Hermetically sealed surface mount version of the popular 2N2222A for high reliability / space applications requiring small size and low weight devices.**

## ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C unless otherwise stated)

| | | |
|---|---|---|
| $V_{CBO}$ | Collector – Base Voltage | 75V |
| $V_{CEO}$ | Collector – Emitter Voltage ($I_B$ = 0) | 40V |
| $V_{EBO}$ | Emitter – Base Voltage ($I_B$ = 0) | 6V |
| $I_C$ | Collector Current | 800mA |
| $P_D$ | Total Device Dissipation | 350mW |
| $P_D$ | Derate above 50°C | 2.0mW / °C |
| $R_{ja}$ | Thermal Resistance Junction to Ambient | 350°C/W |
| $T_{stg}$ | Storage Temperature | –55 to 200°C |

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SEME LAB

# 2N2222ACSM4

## ELECTRICAL CHARACTERISTICS ($T_{case}$ = 25°C unless otherwise stated)

| | Parameter | Test Conditions | | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|---|
| $V_{CEO(sus)}$* | Collector – Emitter Sustaining Voltage | $I_C$ = 10mA | | 40 | | | V |
| $V_{(BR)CBO}$* | Collector – Base Breakdown Voltage | $I_C$ = 10µA | | 75 | | | V |
| $V_{(BR)EBO}$* | Emitter – Base Breakdown Voltage | $I_E$ = 10µA | $I_C$ = 0 | 6 | | | V |
| $I_{CEX}$* | Collector Cut-off Current ($I_C$ = 0) | $I_B$ = 0 | $V_{CE}$ = 60V | | | 10 | nA |
| $I_{CBO}$* | Collector – Base Cut-off Current | $I_E$ = 0 | $V_{CB}$ = 60V | | | 10 | nA |
| | | $T_C$ = 125°C | | | | 10 | µA |
| $I_{EBO}$* | Emitter Cut-off Current ($I_C$ = 0) | $I_C$ = 0 | $V_{EB}$ = 3V (off) | | | 10 | nA |
| $I_{BL}$* | Base Current | $V_{CE}$ = 60V | $V_{EB}$ = 3V (off) | | | 20 | nA |
| $V_{CE(sat)}$* | Collector – Emitter Saturation Voltage | $I_C$ = 150mA | $I_B$ = 15mA | | | 0.3 | V |
| | | $I_C$ = 500mA | $I_B$ = 50mA | | | 1 | |
| $V_{BE(sat)}$* | Base – Emitter Saturation Voltage | $I_C$ = 150mA | $I_B$ = 15mA | 0.6 | | 1.2 | V |
| | | $I_C$ = 500mA | $I_C$ = 50mA | | | 2 | |
| $h_{FE}$* | DC Current Gain | $I_C$ = 0.1mA | $V_{CE}$ = 10V | 35 | | | — |
| | | $I_C$ = 1mA | $V_{CE}$ = 10V | 50 | | | |
| | | $I_C$ = 10mA | $V_{CE}$ = 10V | 75 | | | |
| | $T_A$ = –55°C | $I_C$ = 10mA | $V_{CE}$ = 10V | 35 | | | |
| | | $I_C$ = 150mA | $V_{CE}$ = 10V | 100 | | 300 | |
| | | $I_C$ = 150mA | $V_{CE}$ = 1V | 50 | | | |
| | | $I_C$ = 500mA | $V_{CE}$ = 10V | 40 | | | |

* Pulse test $t_p$ = 300µs , $\delta \leq 2\%$

## DYNAMIC CHARACTERISTICS ($T_{case}$ = 25°C unless otherwise stated)

| | Parameter | Test Conditions | | | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|---|---|
| $f_T$ | Transition Frequency | $I_C$ = 20mA | $V_{CE}$ = 20V | f = 100MHz | 300 | | | MHz |
| $C_{ob}$ | Output Capacitance | $V_{CB}$ = 10V | $I_E$ = 0 | f = 1.0MHz | | | 8 | pF |
| $C_{ib}$ | Input Capacitance | $V_{BE}$ = 0.5V | $I_C$ = 0 | f = 1.0MHz | | | 30 | pF |
| $h_{fe}$ | Small Signal Current Gain | $I_C$ = 1mA | $V_{CE}$ = 10V | f = 1kHz | 50 | | 300 | |
| | | $I_C$ = 10mA | $V_{CE}$ = 10V | f = 1kHz | 75 | | 375 | |

## SWITCHING CHARACTERISTICS (RESISTIVE LOAD) ($T_{case}$ = 25°C unless otherwise stated)

| | Parameter | Test Conditions | | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|---|
| $t_d$ | Delay Time | $V_{CC}$ = 30V | $V_{BE}$ = 0.5V (off) | | | 10 | ns |
| $t_r$ | Rise Time | $I_{C1}$ = 150mA | $I_{B1}$ = 15mA | | | 25 | ns |
| $t_s$ | Storage Time | $V_{CC}$ = 30V | $I_C$ = 150mA | | | 225 | ns |
| $t_f$ | Fall Time | $I_{B1} = I_{B2}$ = 15mA | | | | 60 | ns |

$f_T$ is defined as the frequency at which $h_{FE}$ extrapolates to unity.

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