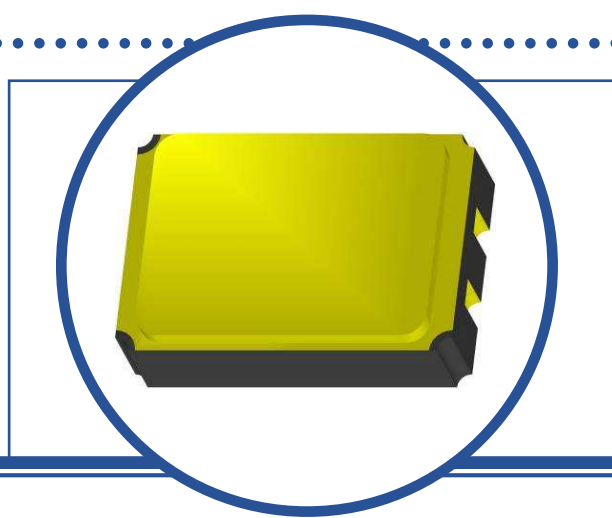


SILICON PLANAR EPITAXIAL NPN TRANSISTOR

2N3439CSM4 / 2N3439CSM4R 2N3440CSM4 / 2N3440CSM4R

- High Voltage
- Hermetic Ceramic Surface Mount Package.
- Ideally suited for drivers in high-voltage low current inverters, switching and series regulators.
- Screening Options Available



ABSOLUTE MAXIMUM RATINGS (T_A = 25°C unless otherwise stated)

| Symbols | Parameters | 2N3439 | 2N3440 |
|------------------|---|---------------|--------|
| V _{CBO} | Collector – Base Voltage | 450V | 300V |
| V _{CEO} | Collector – Emitter Voltage | 350V | 250V |
| V _{EBO} | Emitter – Base Voltage | 7V | |
| I _C | Collector Current – Continuous | 1.0A | |
| I _B | Base Current | 0.5A | |
| P _D | Total Power Dissipation at T _A = 25°C | 800mW | |
| | Derate Above 25°C | 4.6mW/°C | |
| P _D | Total Power Dissipation at T _{SP} = 25°C | 1.5W | |
| | Derate Above 25°C | 8.6mW/°C | |
| T _J | Junction Temperature Range | -65 to +200°C | |
| T _{stg} | Storage Temperature Range | -65 to +200°C | |

THERMAL PROPERTIES

| Symbols | Parameters | Max. | Units |
|-------------------|---|-------|-------|
| R _{θJA} | Thermal Resistance, Junction To Ambient | 218.7 | °C/W |
| R _{θJSP} | Thermal Resistance, Junction To Solder Pads | 116.7 | °C/W |

Semelab Limited reserves the right to change test conditions, parameter limits and package dimensions without notice. Information furnished by Semelab is believed to be both accurate and reliable at the time of going to press. However Semelab assumes no responsibility for any errors or omissions discovered in its use. Semelab encourages customers to verify that datasheets are current before placing orders.



SILICON PLANAR EPITAXIAL NPN TRANSISTOR

2N3439CSM4 / 2N3439CSM4R
2N3440CSM4 / 2N3440CSM4R

| 2N3439CSM4, 2N3439CSM4R ($T_A = 25^\circ\text{C}$ unless otherwise stated) | | | | | | | |
|---|--|---|---------------------------|-----|------|---------------|--|
| ELECTRICAL CHARACTERISTICS | | | | | | | |
| Symbols | Parameters | Test Conditions | Min. | Typ | Max. | Units | |
| I_{CEO} | Collector Cut-Off Current | $V_{CE} = 300\text{V}$ $I_B = 0$ | | | 2 | μA | |
| I_{CBO} | Collector Cut-Off Current | $V_{CB} = 450\text{V}$ $I_E = 0$ | | | 5 | | |
| | | $V_{CB} = 360\text{V}$ $I_E = 0$ | | | 2 | | |
| | | | $T_A = 150^\circ\text{C}$ | | | | |
| I_{CEX} | Collector Cut-Off Current | $V_{CE} = 450\text{V}$ $V_{BE} = -1.5\text{V}$ | | | 5 | | |
| I_{EBO} | Emitter Cut-Off Current | $V_{EB} = 7\text{V}$ $I_C = 0$ | | | 10 | | |
| $V_{CE(sat)}^{(1)}$ | Collector-Emitter Saturation Voltage | $I_C = 50\text{mA}$ $I_B = 4\text{mA}$ | | | 0.5 | | |
| $V_{BE(sat)}^{(1)}$ | Base-Emitter Saturation Voltage | $I_C = 50\text{mA}$ $I_B = 4\text{mA}$ | | | 1.3 | | |
| $h_{FE}^{(1)}$ | Forward-current transfer ratio | $I_C = 0.2\text{mA}$ $V_{CE} = 10\text{V}$ | 10 | | | | |
| | | $I_C = 2\text{mA}$ $V_{CE} = 10\text{V}$ | 30 | | | | |
| | | $I_C = 20\text{mA}$ $V_{CE} = 10\text{V}$ | 40 | | 160 | | |
| | | | $T_A = -55^\circ\text{C}$ | 15 | | | |
| DYNAMIC CHARACTERISTICS | | | | | | | |
| h_{fe} | Small signal forward-current transfer ratio | $I_C = 5\text{mA}$ $V_{CE} = 10\text{V}$ $f = 1.0\text{KHz}$ | 25 | | | | |
| $ h_{fe} $ | Magnitude of Common-Emitter Small-Signal Short-Circuit forward Current, Transfer Ratio | $I_C = 10\text{mA}$ $V_{CE} = 10\text{V}$ $f = 5\text{MHz}$ | 3 | | 15 | MHz | |
| C_{obo} | Output Capacitance | $V_{CB} = 10\text{V}$ $I_E = 0$ $f = 1.0\text{MHz}$ | | | 10 | pF | |
| C_{ibo} | Input Capacitance | $V_{EB} = 5\text{V}$ $I_C = 0$ $f = 1.0\text{MHz}$ | | | 75 | pF | |
| t_{on} | Turn-On Time | $I_C = 20\text{mA}$ $V_{CC} = 200\text{V}$ $I_{B1} = 2\text{mA}$ | | | 1.0 | μs | |
| t_{off} | Turn-Off Time | $I_C = 20\text{mA}$ $V_{CC} = 200\text{V}$ $I_{B1} = -I_{B2} = 2\text{mA}$ | | | 10 | | |

Notes

(1) Pulse Width $\leq 380\mu\text{s}$, $\delta \leq 2\%$

SILICON PLANAR EPITAXIAL NPN TRANSISTOR

2N3439CSM4 / 2N3439CSM4R
2N3440CSM4 / 2N3440CSM4R

| 2N3440CSM4, 2N3440CSM4R ($T_A = 25^\circ\text{C}$ unless otherwise stated) | | | | | | | |
|---|--|---|---------------------------|-----|------|---------------|--|
| ELECTRICAL CHARACTERISTICS | | | | | | | |
| Symbols | Parameters | Test Conditions | Min. | Typ | Max. | Units | |
| I_{CEO} | Collector Cut-Off Current | $V_{CE} = 200\text{V}$ $I_B = 0$ | | | 2 | μA | |
| I_{CBO} | Collector Cut-Off Current | $V_{CB} = 300\text{V}$ $I_E = 0$ | | | 5 | | |
| | | $V_{CB} = 250\text{V}$ $I_E = 0$ | | | 2 | | |
| | | | $T_A = 150^\circ\text{C}$ | | | | |
| I_{CEX} | Collector Cut-Off Current | $V_{CE} = 300\text{V}$ $V_{BE} = -1.5\text{V}$ | | | 5 | | |
| I_{EBO} | Emitter Cut-Off Current | $V_{EB} = 7\text{V}$ $I_C = 0$ | | | 10 | | |
| $V_{CE(sat)}^{(1)}$ | Collector-Emitter Saturation Voltage | $I_C = 50\text{mA}$ $I_B = 4\text{mA}$ | | | 0.5 | V | |
| $V_{BE(sat)}^{(1)}$ | Base-Emitter Saturation Voltage | $I_C = 50\text{mA}$ $I_B = 4\text{mA}$ | | | 1.3 | | |
| $h_{FE}^{(1)}$ | Forward-current transfer ratio | $I_C = 0.2\text{mA}$ $V_{CE} = 10\text{V}$ | 10 | | | | |
| | | $I_C = 2\text{mA}$ $V_{CE} = 10\text{V}$ | 30 | | | | |
| | | $I_C = 20\text{mA}$ $V_{CE} = 10\text{V}$ | 40 | | 160 | | |
| | | | $T_A = -55^\circ\text{C}$ | 15 | | | |
| DYNAMIC CHARACTERISTICS | | | | | | | |
| h_{fe} | Small signal forward-current transfer ratio | $I_C = 5\text{mA}$ $V_{CE} = 10\text{V}$ $f = 1.0\text{KHz}$ | 25 | | | | |
| $ h_{fe} $ | Magnitude of Common-Emitter Small-Signal Short-Circuit forward Current, Transfer Ratio | $I_C = 10\text{mA}$ $V_{CE} = 10\text{V}$ $f = 5\text{MHz}$ | 3 | | 15 | MHz | |
| C_{obo} | Output Capacitance | $V_{CB} = 10\text{V}$ $I_E = 0$ $f = 1.0\text{MHz}$ | | | 10 | μF | |
| C_{ibo} | Input Capacitance | $V_{EB} = 5\text{V}$ $I_C = 0$ $f = 1.0\text{MHz}$ | | | 75 | μF | |
| t_{on} | Turn-On Time | $I_C = 20\text{mA}$ $V_{CC} = 200\text{V}$ $I_{B1} = 2\text{mA}$ | | | 1.0 | μs | |
| t_{off} | Turn-Off Time | $I_C = 20\text{mA}$ $V_{CC} = 200\text{V}$ $I_{B1} = -I_{B2} = 2\text{mA}$ | | | 10 | | |

Notes

(1) Pulse Width $\leq 380\mu\text{s}$, $\delta \leq 2\%$

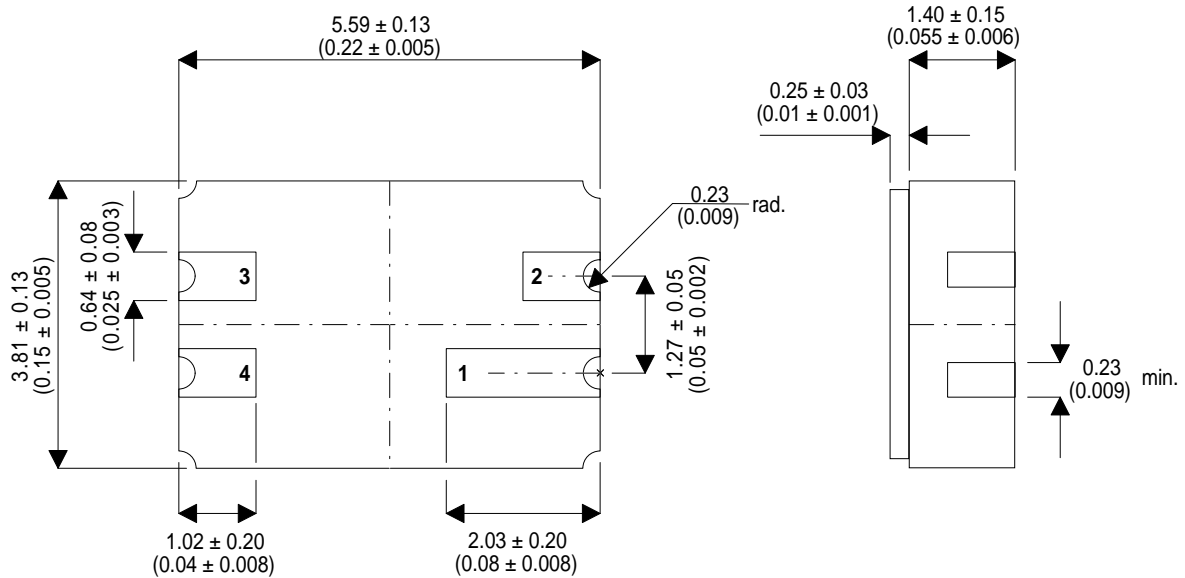
SILICON PLANAR EPITAXIAL NPN TRANSISTOR

2N3439CSM4 / 2N3439CSM4R

2N3440CSM4 / 2N3440CSM4R

MECHANICAL DATA

Dimensions in mm (inches)



LCC3 (MO-041BA)

Underside View

Part Variant Table

| Part | Pad 1 | Pad 2 | Pad 3 | Pad 4 |
|-------------|-----------|---------|---------|-------|
| 2N3439CSM4 | Collector | N/C | Emitter | Base |
| 2N3439CSM4R | Collector | Emitter | N/C | Base |
| 2N3440CSM4 | Collector | N/C | Emitter | Base |
| 2N3440CSM4R | Collector | Emitter | N/C | Base |

N/C = No Connection