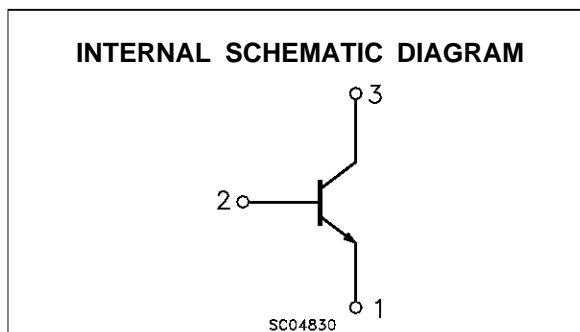
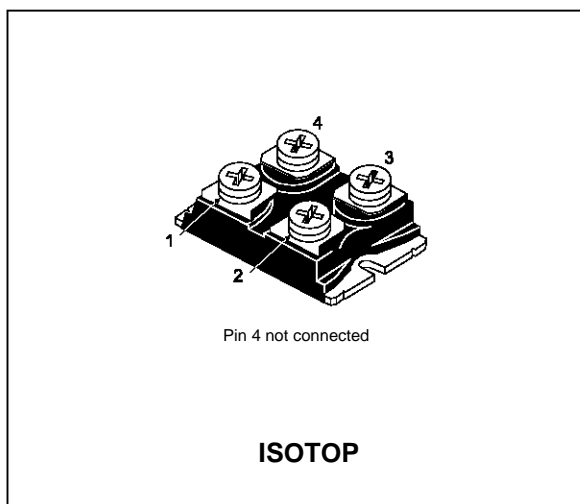


NPN TRANSISTOR POWER MODULE

- HIGH CURRENT POWER BIPOLAR MODULE
- VERY LOW R_{th} JUNCTION CASE
- SPECIFIED ACCIDENTAL OVERLOAD AREAS
- ISOLATED CASE (2500V RMS)
- EASY TO MOUNT
- LOW INTERNAL PARASITIC INDUCTANCE

INDUSTRIAL APPLICATIONS:

- MOTOR CONTROL
- SMPS & UPS
- DC/DC & DC/AC CONVERTERS



ABSOLUTE MAXIMUM RATINGS

| Symbol | Parameter | Value | Unit |
|----------------|----------------------------------------------|------------|------|
| V_{CEV} | Collector-Emitter Voltage ($V_{BE} = -5$ V) | 400 | V |
| $V_{CEO(sus)}$ | Collector-Emitter Voltage ($I_B = 0$) | 300 | V |
| V_{EBO} | Emitter-Base Voltage ($I_C = 0$) | 7 | V |
| I_C | Collector Current | 80 | A |
| I_{CM} | Collector Peak Current ($t_p = 10$ ms) | 120 | A |
| I_B | Base Current | 16 | A |
| I_{BM} | Base Peak Current ($t_p = 10$ ms) | 24 | A |
| P_{tot} | Total Dissipation at $T_C = 25$ °C | 250 | W |
| T_{stg} | Storage Temperature | -55 to 150 | °C |
| T_j | Max. Operating Junction Temperature | 150 | °C |
| V_{ISO} | Insulation Withstand Voltage (AC-RMS) | 2500 | °C |

BUT32V

THERMAL DATA

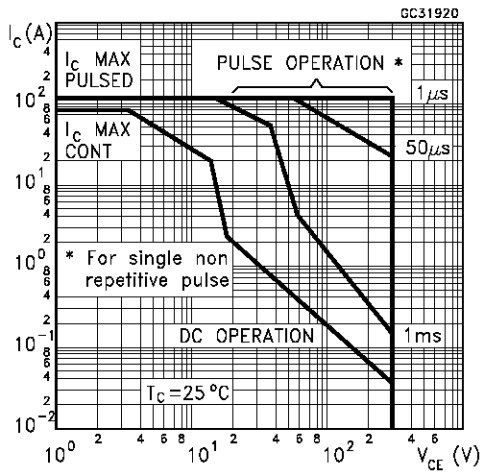
| | | | | |
|----------------|-----------------------------------------------------------------|-----|------|-----------------------------|
| $R_{thj-case}$ | Thermal Resistance Junction-case | Max | 0.5 | $^{\circ}\text{C}/\text{W}$ |
| R_{thc-h} | Thermal Resistance Case-heatsink With Conductive Grease Applied | Max | 0.05 | $^{\circ}\text{C}/\text{W}$ |

ELECTRICAL CHARACTERISTICS ($T_{case} = 25^{\circ}\text{C}$ unless otherwise specified)

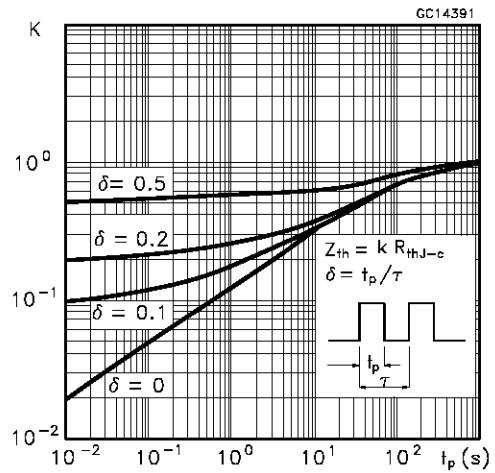
| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Unit |
|--------------------------|----------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|-------------|------------|------------------|
| I_{CER} | Collector Cut-off Current ($R_{BE} = 5\ \Omega$) | $V_{CE} = V_{CEV}$ $V_{CE} = V_{CEV}$ $T_j = 100^{\circ}\text{C}$ | | | 1 5 | mA mA |
| I_{CEV} | Collector Cut-off Current ($V_{BE} = -5$) | $V_{CE} = V_{CEV}$ $V_{CE} = V_{CEV}$ $T_j = 100^{\circ}\text{C}$ | | | 1 4 | mA mA |
| I_{EBO} | Emitter Cut-off Current ($I_C = 0$) | $V_{EB} = 5\ \text{V}$ | | | 1 | mA |
| $V_{CE0(SUS)}^*$ | Collector-Emitter Sustaining Voltage | $I_C = 0.2\ \text{A}$ $L = 25\ \text{mH}$ $V_{clamp} = 300\ \text{V}$ | 300 | | | V |
| h_{FE}^* | DC Current Gain | $I_C = 40\ \text{A}$ $V_{CE} = 5\ \text{V}$ | | 16 | | |
| $V_{CE(sat)}^*$ | Collector-Emitter Saturation Voltage | $I_C = 40\ \text{A}$ $I_B = 4\ \text{A}$ $I_C = 40\ \text{A}$ $I_B = 4\ \text{A}$ $T_j = 100^{\circ}\text{C}$ | | 0.6 1.2 | 0.9 1.9 | V V |
| $V_{BE(sat)}^*$ | Base-Emitter Saturation Voltage | $I_C = 40\ \text{A}$ $I_B = 4\ \text{A}$ $I_C = 40\ \text{A}$ $I_B = 4\ \text{A}$ $T_j = 100^{\circ}\text{C}$ | | 1.12 1.1 | 1.3 1.3 | V V |
| di_C/dt | Rate of Rise of On-state Collector | $V_{CC} = 300\ \text{V}$ $R_C = 0$ $t_p = 3\ \mu\text{s}$ $I_{B1} = 6\ \text{A}$ $T_j = 100^{\circ}\text{C}$ | 120 | 180 | | A/ μs |
| $V_{CE(3\ \mu\text{s})}$ | Collector-Emitter Dynamic Voltage | $V_{CC} = 300\ \text{V}$ $R_C = 6.2\ \Omega$ $I_{B1} = 6\ \text{A}$ $T_j = 100^{\circ}\text{C}$ | | 3 | 6 | V |
| $V_{CE(5\ \mu\text{s})}$ | Collector-Emitter Dynamic Voltage | $V_{CC} = 300\ \text{V}$ $R_C = 6.2\ \Omega$ $I_{B1} = 6\ \text{A}$ $T_j = 100^{\circ}\text{C}$ | | 1.8 | 3 | V |
| t_s | Storage Time | $I_C = 40\ \text{A}$ $V_{CC} = 250\ \text{V}$ | | 1.9 | 3 | μs |
| t_f | Fall Time | $V_{BB} = -5\ \text{V}$ $R_{BB} = 0.6\ \Omega$ | | 0.12 | 0.4 | μs |
| t_c | Cross-over Time | $V_{clamp} = 300\ \text{V}$ $I_{B1} = 4\ \text{A}$ $L = 0.3\ \text{mH}$ $T_j = 100^{\circ}\text{C}$ | | 0.35 | 0.7 | μs |
| V_{CEW} | Maximum Collector Emitter Voltage Without Snubber | $I_{C\text{Woff}} = 60\ \text{A}$ $I_{B1} = 4\ \text{A}$ $V_{BB} = -5\ \text{V}$ $V_{CC} = 50\ \text{V}$ $L = 42\ \mu\text{H}$ $R_{BB} = 0.6\ \Omega$ $T_j = 125^{\circ}\text{C}$ | 300 | | | V |

* Pulsed: Pulse duration = 300 μs , duty cycle 1.5 %

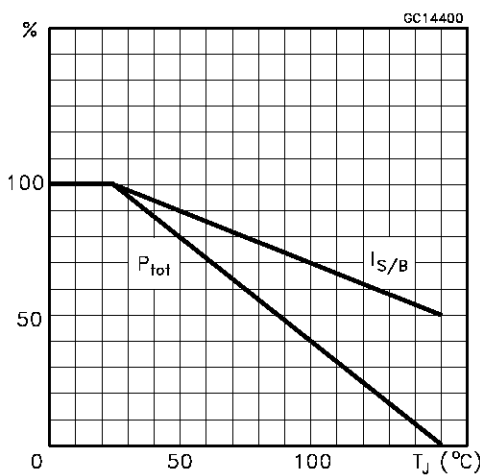
Safe Operating Areas



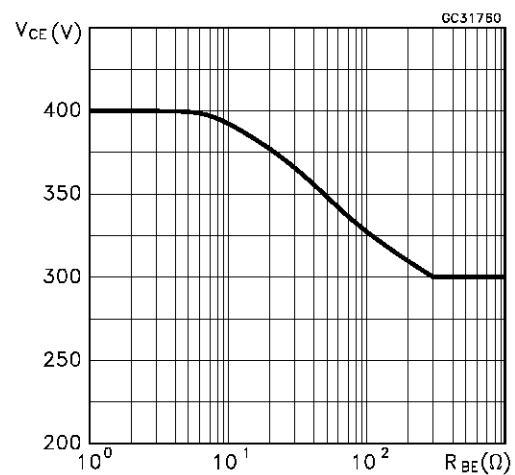
Thermal Impedance



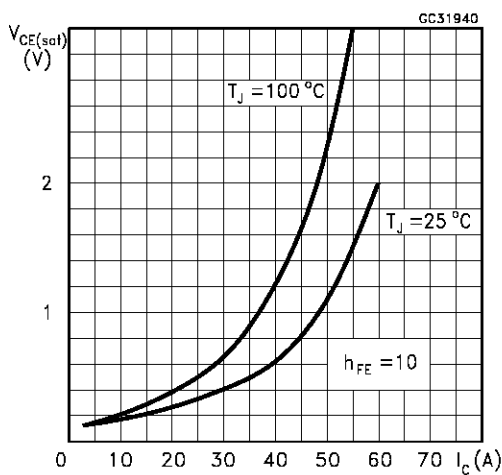
Derating Curve



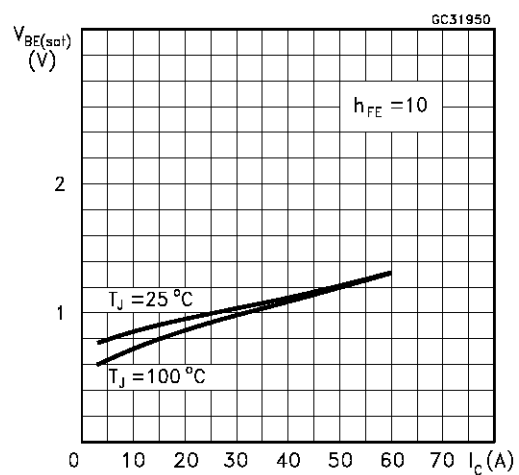
Collector-emitter Voltage Versus base-emitter Resistance



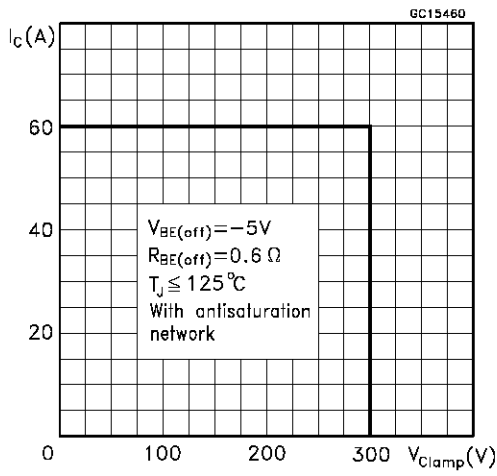
Collector Emitter Saturation Voltage



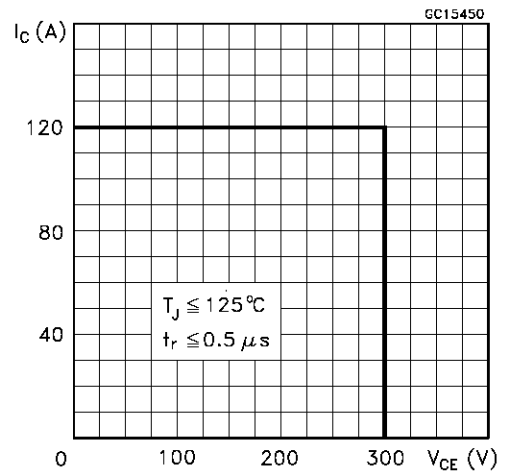
Base-Emitter Saturation Voltage



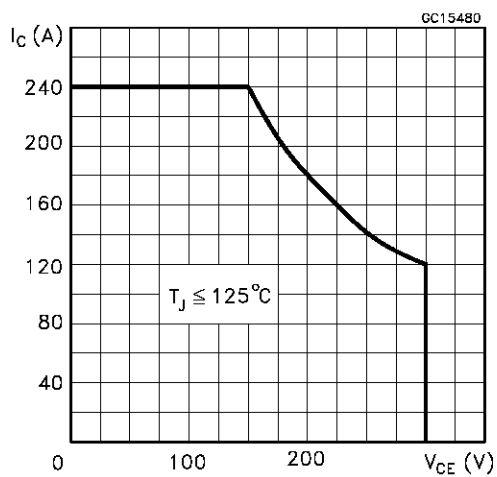
Reverse Biased SOA



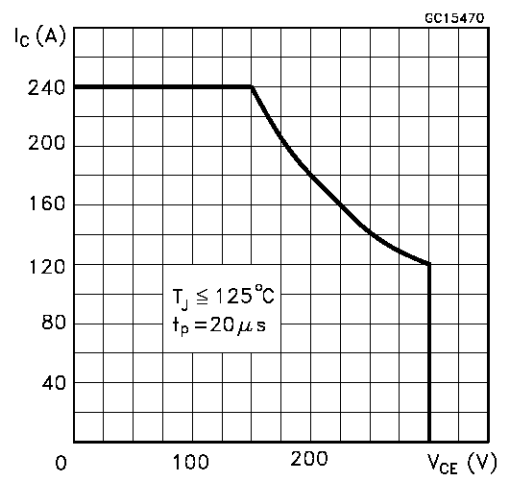
Forward Biased SOA



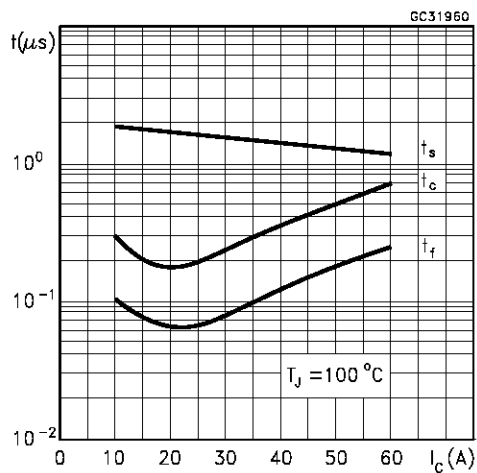
Reverse Biased AOA



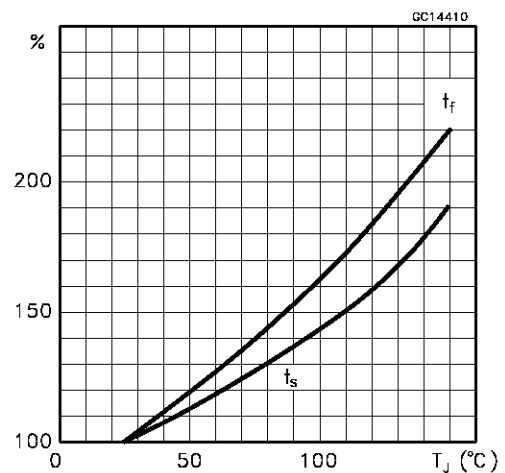
Forward Biased AOA



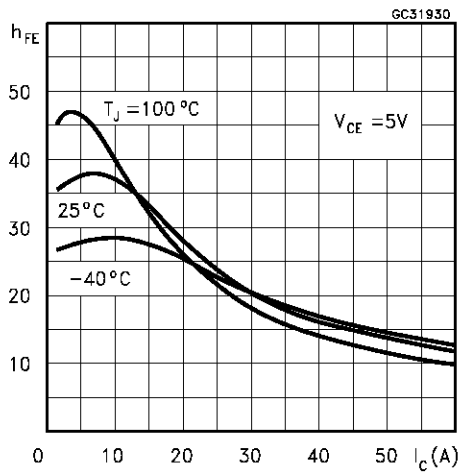
Switching Times Inductive Load



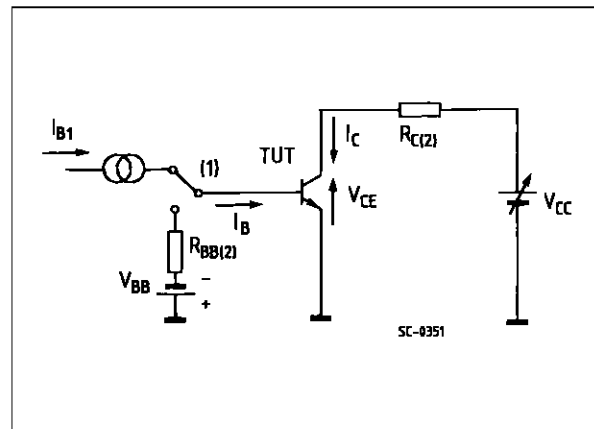
Switching Times Inductive Load Versus Temperature



Dc Current Gain

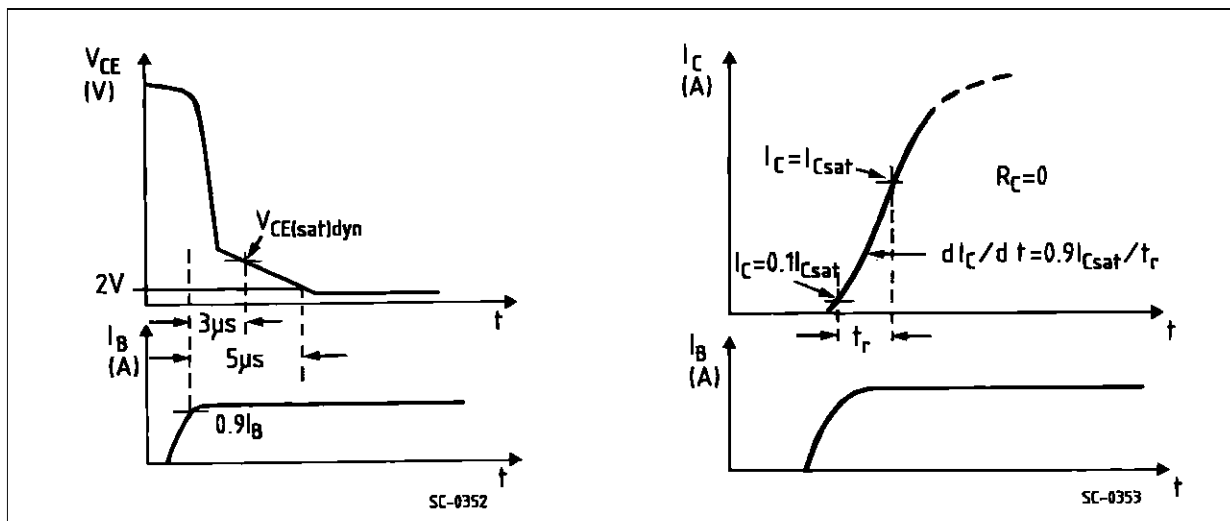


Turn-on Switching Test Circuit

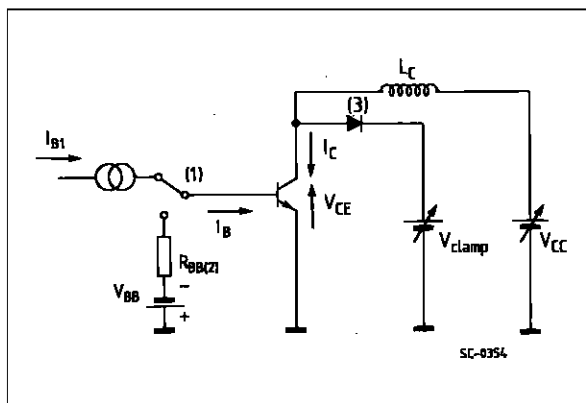


(1) Fast electronics switch (2) Non-inductive load

Turn-on Switching Waveforms

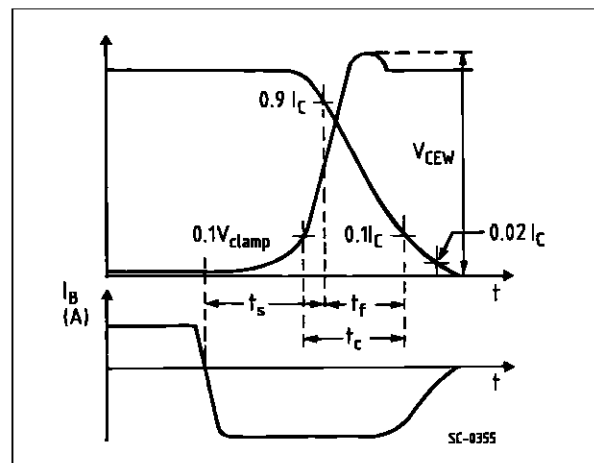


Turn-off Switching Test Circuit



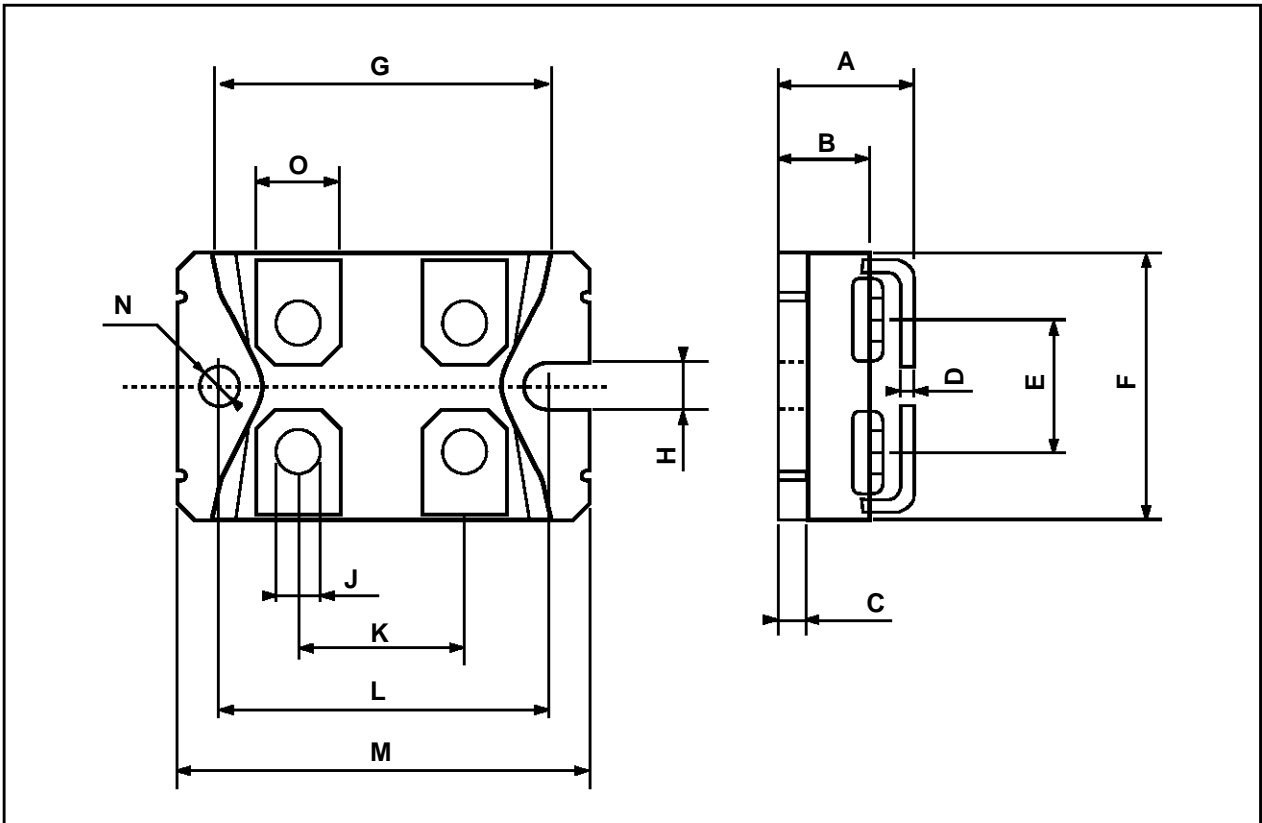
(1) Fast electronic switch (2) Non-inductive load (3) Fast recovery rectifier

Turn-off Switching Waveforms



ISOTOP MECHANICAL DATA

| DIM. | mm | | | inch | | |
|------|-------|------|------|-------|------|-------|
| | MIN. | TYP. | MAX. | MIN. | TYP. | MAX. |
| A | 11.8 | | 12.2 | 0.466 | | 0.480 |
| B | 8.9 | | 9.1 | 0.350 | | 0.358 |
| C | 1.95 | | 2.05 | 0.076 | | 0.080 |
| D | 0.75 | | 0.85 | 0.029 | | 0.033 |
| E | 12.6 | | 12.8 | 0.496 | | 0.503 |
| F | 25.15 | | 25.5 | 0.990 | | 1.003 |
| G | 31.5 | | 31.7 | 1.240 | | 1.248 |
| H | 4 | | | 0.157 | | |
| J | 4.1 | | 4.3 | 0.161 | | 0.169 |
| K | 14.9 | | 15.1 | 0.586 | | 0.594 |
| L | 30.1 | | 30.3 | 1.185 | | 1.193 |
| M | 37.8 | | 38.2 | 1.488 | | 1.503 |
| N | 4 | | | 0.157 | | |
| O | 7.8 | | 8.2 | 0.307 | | 0.322 |



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