

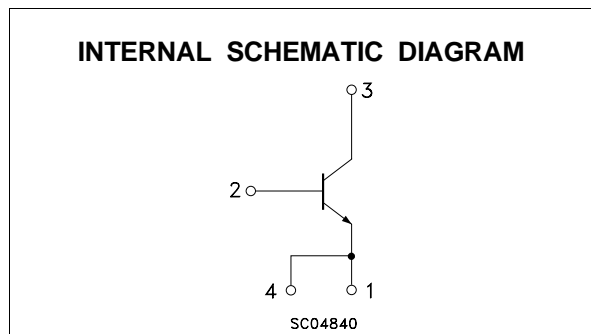
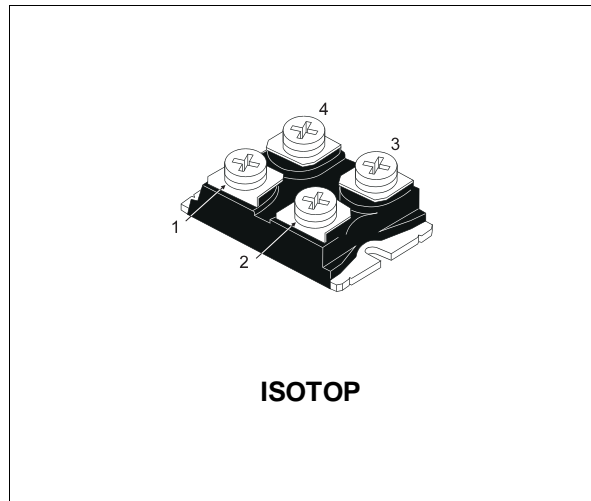


NPN TRANSISTOR POWER MODULE

- EASY TO DRIVE TECHNOLOGY (ETD)
- HIGH CURRENT POWER BIPOLAR MODULE
- VERY LOW R_{th} JUNCTION CASE
- SPECIFIED ACCIDENTAL OVERLOAD AREAS
- FULLY INSULATED PACKAGE (U.L. COMPLIANT) FOR EASY MOUNTING
- LOW INTERNAL PARASITIC INDUCTANCE

APPLICATIONS:

- MOTOR CONTROL
- SMPS & UPS
- WELDING EQUIPMENT



ABSOLUTE MAXIMUM RATINGS

| Symbol | Parameter | Value | Unit |
|----------------|---|------------|------|
| V_{CEV} | Collector-Emitter Voltage ($V_{BE} = -5$ V) | 1000 | V |
| $V_{CEO(sus)}$ | Collector-Emitter Voltage ($I_B = 0$) | 450 | 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) | 160 | A |
| I_B | Base Current | 18 | A |
| I_{BM} | Base Peak Current ($t_p = 10$ ms) | 27 | A |
| P_{tot} | Total Dissipation at $T_c = 25$ °C | 270 | W |
| V_{isol} | Insulation Withstand Voltage (RMS) from All Four Terminals to External Heatsink | 2500 | |
| T_{stg} | Storage Temperature | -65 to 150 | °C |
| T_j | Max Operation Junction Temperature | 150 | °C |

BUF460AV

THERMAL DATA

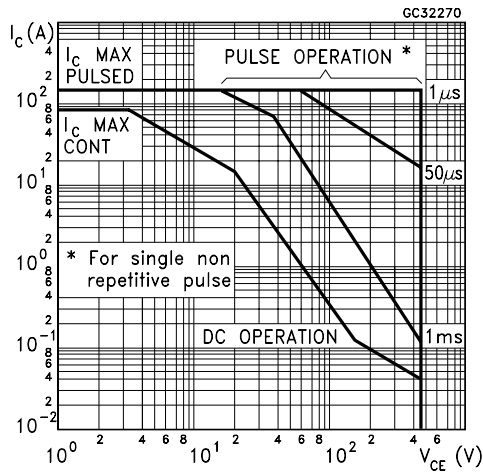
| | | | | |
|----------------|--|-----|------|------|
| $R_{thj-case}$ | Thermal Resistance Junction-case | Max | 0.41 | °C/W |
| R_{thc-h} | Thermal Resistance Case- heatsink With Conductive Grease Applied | Max | 0.05 | °C/W |

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

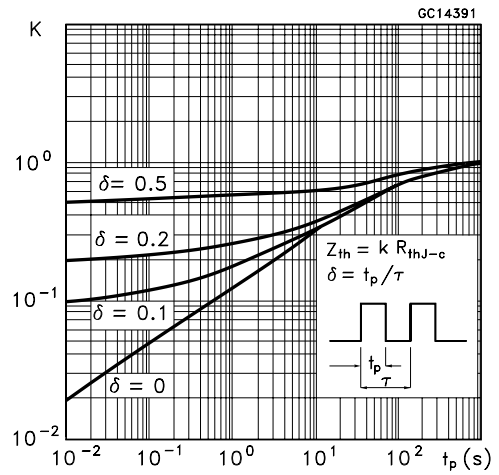
| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Unit |
|----------------------|--|--|------|-------------|----------|------------------|
| I_{CER} | Collector Cut-off Current ($R_{BE} = 5\ \Omega$) | $V_{CE} = V_{CEV}$ $V_{CE} = V_{CEV}$ $T_j = 100\text{ °C}$ | | | 0.2 2 | mA mA |
| I_{CEV} | Collector Cut-off Current ($V_{BE} = -1.5V$) | $V_{CE} = V_{CEV}$ $V_{CE} = V_{CEV}$ $T_j = 100\text{ °C}$ | | | 0.2 2 | mA mA |
| I_{EBO} | Emitter Cut-off Current ($I_C = 0$) | $V_{EB} = 5\ V$ | | | 1 | mA |
| $V_{CEO(sus)}^*$ | Collector-Emitter Sustaining Voltage ($I_B = 0$) | $I_C = 0.2\ A$ $L = 25\ mH$ $V_{clamp} = 450\ V$ | 450 | | | V |
| h_{FE}^* | DC Current Gain | $I_C = 60\ A$ $V_{CE} = 5\ V$ | | 15 | | |
| $V_{CE(sat)}^*$ | Collector-Emitter Saturation Voltage | $I_C = 30\ A$ $I_B = 3\ A$ $I_C = 30\ A$ $I_B = 3\ A$ $T_j = 100\text{ °C}$ $I_C = 60\ A$ $I_B = 12\ A$ $I_C = 60\ A$ $I_B = 12\ A$ $T_j = 100\text{ °C}$ | | 0.35 0.5 | 2 2 | V V V V |
| $V_{BE(sat)}^*$ | Base-Emitter Saturation Voltage | $I_C = 60\ A$ $I_B = 12\ A$ $I_C = 60\ A$ $I_B = 12\ A$ $T_j = 100\text{ °C}$ | | 1.1 | 1.5 | V V |
| di_c/dt | Rate of Rise of On-state Collector | $V_{CC} = 300\ V$ $R_C = 0$ $t_p = 3\ \mu s$ $I_{B1} = 18\ A$ $T_j = 100\text{ °C}$ | 150 | | | A/ μs |
| $V_{CE(3\ \mu s)}^*$ | Collector-Emitter Dynamic Voltage | $V_{CC} = 300\ V$ $R_C = 30\ \Omega$ $I_{B1} = 18\ A$ $T_j = 100\text{ °C}$ | | 4 | 6 | V |
| $V_{CE(5\ \mu s)}^*$ | Collector-Emitter Dynamic Voltage | $V_{CC} = 300\ V$ $R_C = 30\ \Omega$ $I_{B1} = 18\ A$ $T_j = 100\text{ °C}$ | | 2 | 3 | V |
| t_s | Storage Time | $I_C = 30\ A$ $V_{CC} = 50\ V$ | | 4.5 | 5 | μs |
| t_f | Fall Time | $V_{BB} = -5\ V$ $R_{BB} = 0.2\ \Omega$ | | 0.1 | 0.2 | μs |
| t_c | Cross-over Time | $V_{clamp} = 400\ V$ $I_{B1} = 3\ A$ $L = 25\ \mu H$ $T_j = 100\text{ °C}$ | | 0.3 | 5 | μs |
| V_{CEW} | Maximum Collector Emitter Voltage Without Snubber | $I_{C\ woff} = 80\ A$ $I_{B1} = 16\ A$ $V_{BB} = -5\ V$ $V_{CC} = 50\ V$ $L = 80\ \mu H$ $R_{BB} = 0.2\ \Omega$ $T_j = 125\text{ °C}$ | 400 | | | V |

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

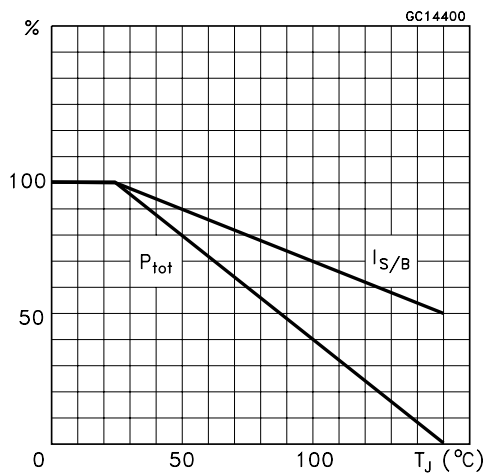
Safe Operating Area



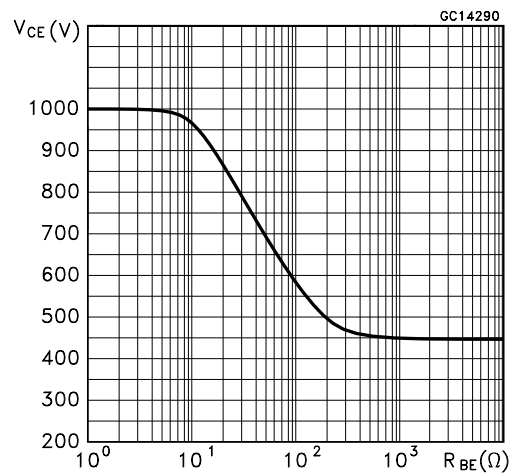
Thermal Impedance



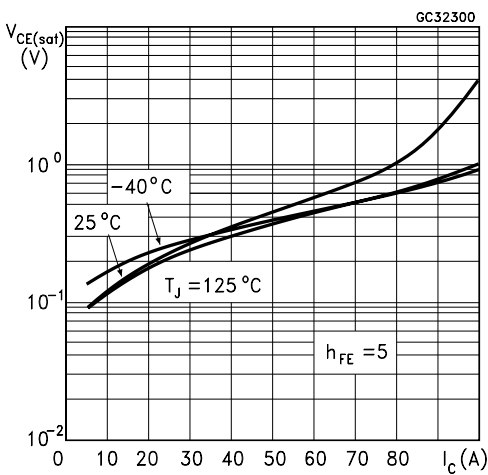
Derating Curve



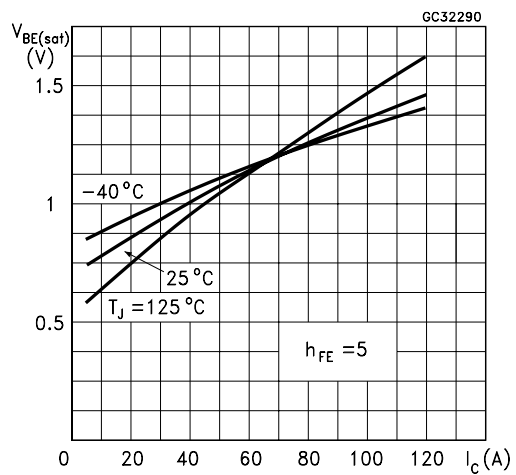
Collector-Emitter Voltage Versus Base-Emitter Resistance



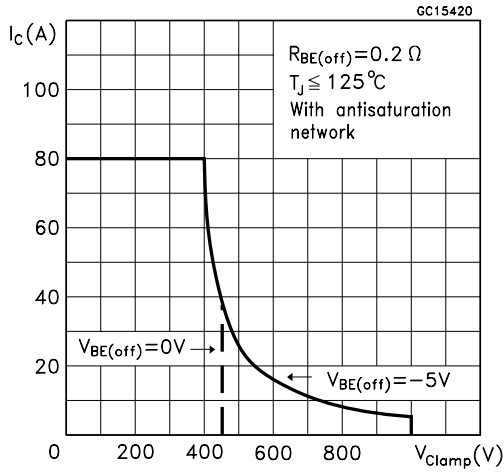
Collector-Emitter Saturation Voltage



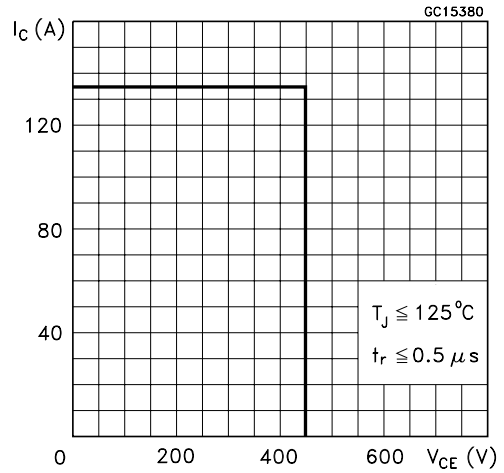
Base-Emitter Saturation Voltage



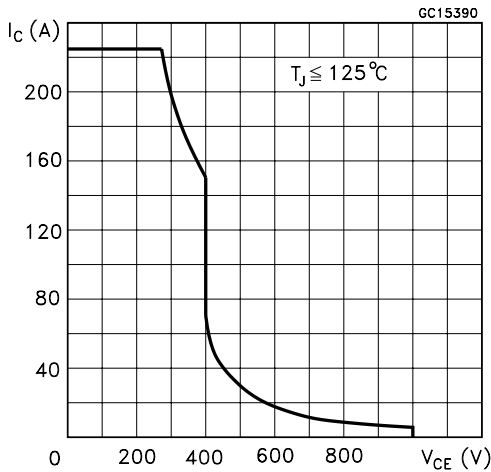
Reverse Biased SOA



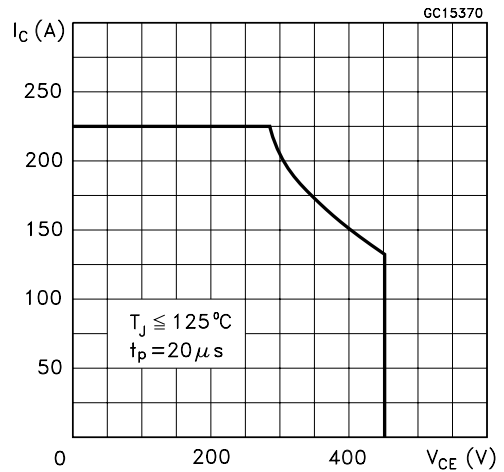
Forward Biased SOA



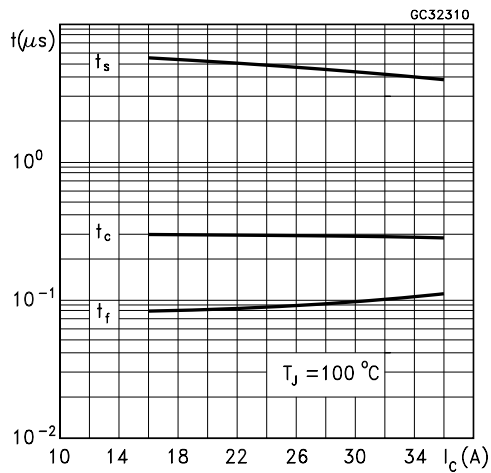
Reverse Biased SOA



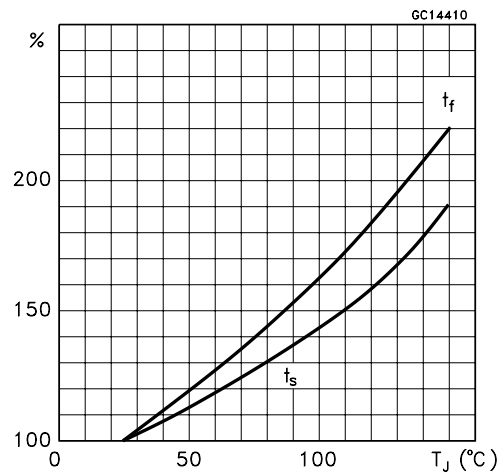
Forward Biased SOA



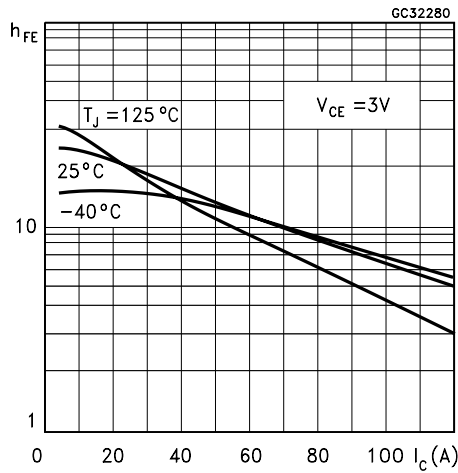
Switching Time Inductive Load



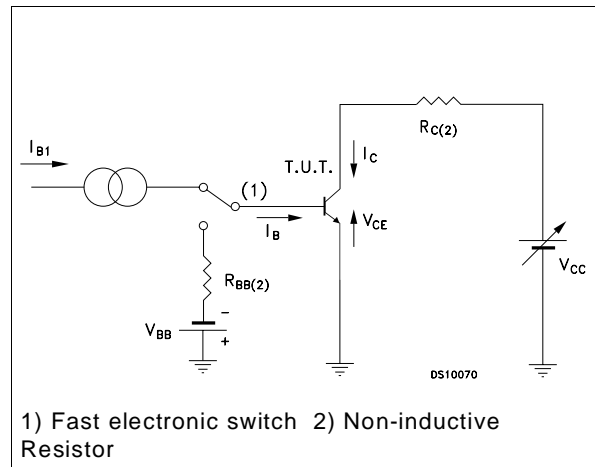
Switching Time Inductive Load Versus Temperature



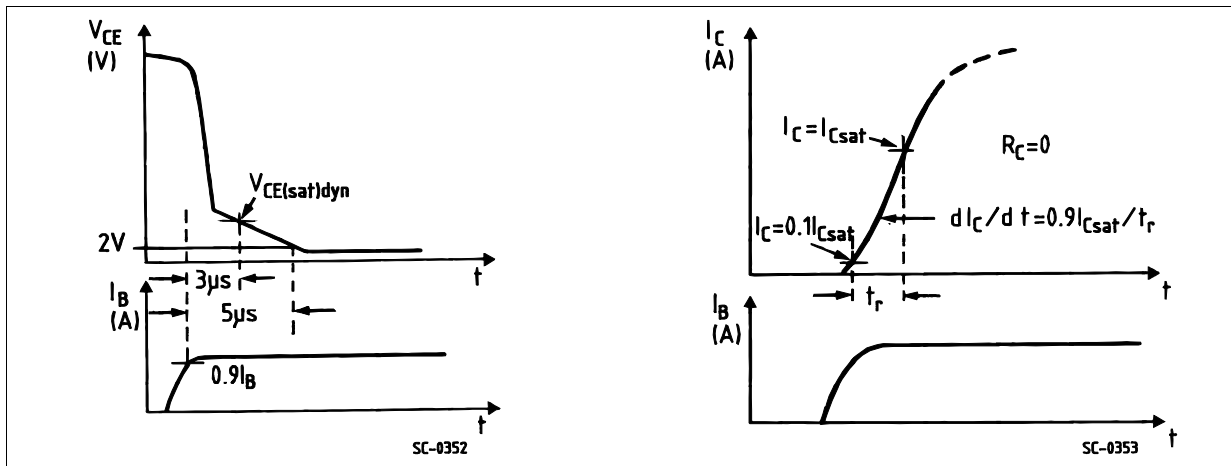
DC Current Gain



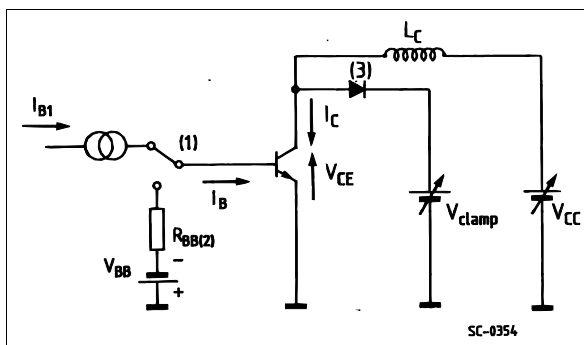
Turn-off Switching Test Circuit



Turn-on Switching Waveforms.

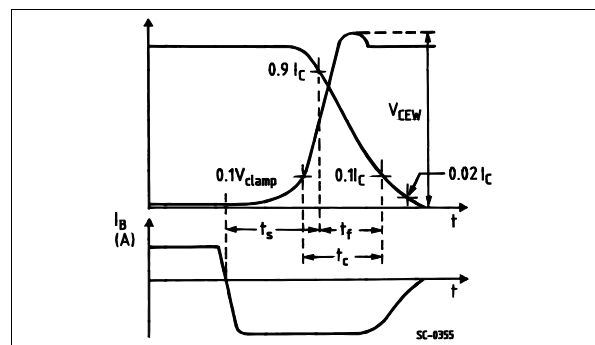


Turn-off Switching Test Circuit



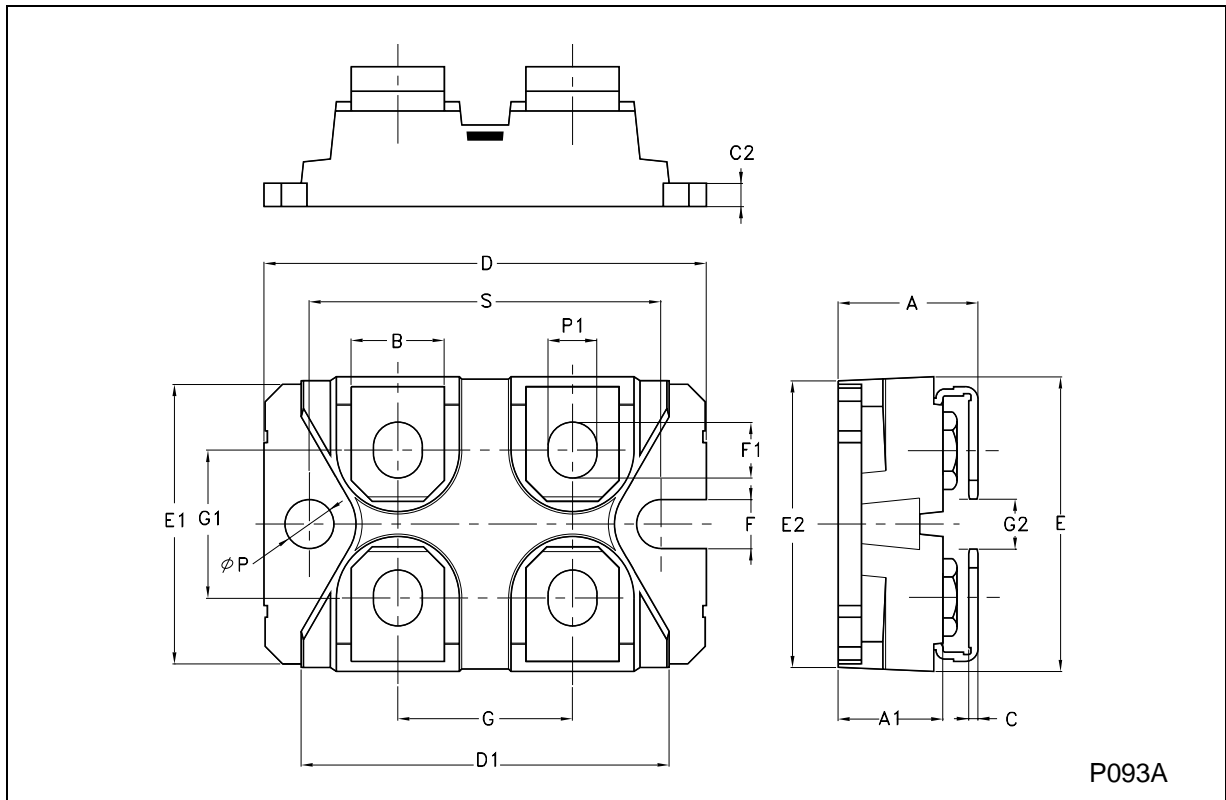
- 1) Fast electronic switch
- 2) Non-inductive Resistor
- 3) Fast recovery rectifier

Turn-off Switching Waveforms.



ISOTOP MECHANICAL DATA

| DIM. | mm | | | inch | | |
|------|-------|------|-------|-------|-------|-------|
| | MIN. | TYP. | MAX. | MIN. | TYP. | MAX. |
| A | 11.8 | | 12.2 | 0.465 | | 0.480 |
| A1 | 8.9 | | 9.1 | 0.350 | | 0.358 |
| B | 7.8 | | 8.2 | 0.307 | | 0.322 |
| C | 0.75 | | 0.85 | 0.029 | | 0.033 |
| C2 | 1.95 | | 2.05 | 0.076 | | 0.080 |
| D | 37.8 | | 38.2 | 1.488 | | 1.503 |
| D1 | 31.5 | | 31.7 | 1.240 | | 1.248 |
| E | 25.15 | | 25.5 | 0.990 | | 1.003 |
| E1 | 23.85 | | 24.15 | 0.938 | | 0.950 |
| E2 | | 24.8 | | | 0.976 | |
| G | 14.9 | | 15.1 | 0.586 | | 0.594 |
| G1 | 12.6 | | 12.8 | 0.496 | | 0.503 |
| G2 | 3.5 | | 4.3 | 0.137 | | 1.169 |
| F | 4.1 | | 4.3 | 0.161 | | 0.169 |
| F1 | 4.6 | | 5 | 0.181 | | 0.196 |
| P | 4 | | 4.3 | 0.157 | | 0.169 |
| P1 | 4 | | 4.4 | 0.157 | | 0.173 |
| S | 30.1 | | 30.3 | 1.185 | | 1.193 |



P093A

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