

TOSHIBA POWER TRANSISTOR MODULE SILICON PNP EPITAXIAL TYPE (DARLINGTON POWER TRANSISTOR 4 IN 1)

MP4305

HIGH POWER SWITCHING APPLICATIONS.

HAMMER DRIVE, PULSE MOTOR DRIVE AND INDUCTIVE LOAD SWITCHING.

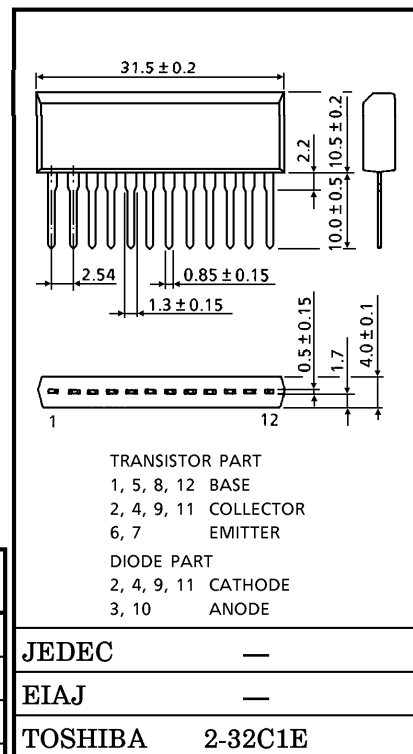
- Small Package by Full Molding (SIP 12 Pin)
- High Collector Power Dissipation (4 Devices Operation)
: $P_T = 4.4W$ ($T_a = 25^\circ C$)
- High Collector Current : I_C (DC) = -5A (Max.)
- High DC Current Gain : $h_{FE} = 2000$ (Min.)
($V_{CE} = -5V, I_C = -3A$)
- Diode Included for Absorbing Fly-Back Voltage.

MAXIMUM RATINGS ($T_a = 25^\circ C$)

| CHARACTERISTIC | | SYMBOL | RATING | UNIT |
|--|-------|-----------|---------|------------|
| Collector-Base Voltage | | V_{CBO} | -100 | V |
| Collector-Emitter Voltage | | V_{CEO} | -100 | V |
| Emitter-Base Voltage | | V_{EBO} | -6 | V |
| Collector Current | DC | I_C | -5 | A |
| | Pulse | I_{CP} | -8 | |
| Continuous Base Current | | I_B | -0.5 | A |
| Collector Power Dissipation (1 Device Operation) | | P_C | 2.2 | W |
| Collector Power Dissipation (4 Devices Operation) | | P_T | 4.4 | W |
| Junction Temperature | | T_j | 150 | $^\circ C$ |
| Storage Temperature Range | | T_{stg} | -55~150 | $^\circ C$ |

INDUSTRIAL APPLICATIONS

Unit in mm

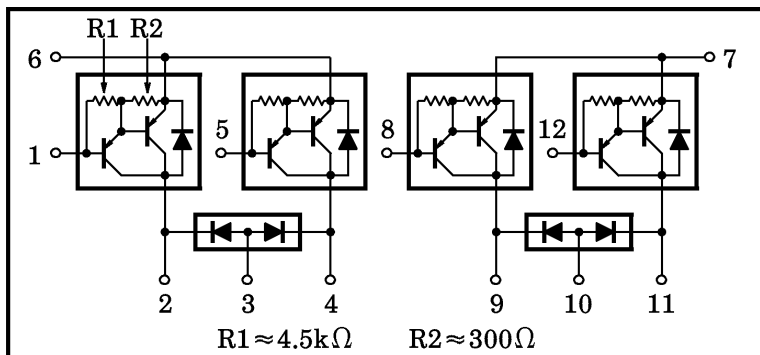


Weight : 3.9g

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ARRAY CONFIGURATION



THERMAL CHARACTERISTICS

| CHARACTERISTIC | SYMBOL | MAX. | UNIT |
|---|----------------------|------|-----------------------------|
| Thermal Resistance of Junction to Ambient (4 Devices Operation, $T_a = 25^\circ\text{C}$) | $\Sigma R_{th(j-a)}$ | 28.4 | $^\circ\text{C} / \text{W}$ |
| Maximum Lead Temperature for Soldering Purposes (3.2mm from Case for 10s) | T_L | 260 | $^\circ\text{C}$ |

ELECTRICAL CHARACTERISTICS ($T_a = 25^\circ\text{C}$)

| CHARACTERISTIC | SYMBOL | TEST CONDITION | MIN. | TYP. | MAX. | UNIT | |
|-------------------------------------|-------------------|--|--|--|-------|---------------|---------------|
| Collector Cut-off Current | I_{CBO} | $V_{CB} = -100\text{V}, I_E = 0$ | — | — | -10 | μA | |
| Collector Cut-off Current | I_{CEO} | $V_{CE} = -100\text{V}, I_B = 0$ | — | — | -10 | μA | |
| Emitter Cut-off Current | I_{EBO} | $V_{EB} = -6\text{V}, I_C = 0$ | -0.6 | — | -2.0 | mA | |
| Collector-Base Breakdown Voltage | $V_{(BR)CBO}$ | $I_C = -1\text{mA}, I_E = 0$ | -100 | — | — | V | |
| Collector-Emitter Breakdown Voltage | $V_{(BR)CEO}$ | $I_C = -10\text{mA}, I_B = 0$ | -100 | — | — | V | |
| DC Current Gain | $h_{FE(1)}$ | $V_{CE} = -5\text{V}, I_C = -3\text{A}$ | 2000 | — | 15000 | | |
| | $h_{FE(2)}$ | $V_{CE} = -5\text{V}, I_C = -5\text{A}$ | 1000 | — | — | | |
| Saturation Voltage | Collector-Emitter | $V_{CE(sat)}$ | $I_C = -3\text{A}, I_B = -6\text{mA}$ | — | — | -1.5 | V |
| | Base-Emitter | $V_{BE(sat)}$ | $I_C = -3\text{A}, I_B = -6\text{mA}$ | — | — | -2.0 | |
| Transition Frequency | f_T | $V_{CE} = -2\text{V}, I_C = -0.5\text{A}$ | — | 40 | — | MHz | |
| Collector Output Capacitance | C_{ob} | $V_{CB} = -10\text{V}, I_E = 0, f = 1\text{MHz}$ | — | 55 | — | pF | |
| Switching Time | Turn-on Time | t_{on} | <p style="text-align: center;">$V_{CC} = -30\text{V}$</p> | — | 0.3 | — | μs |
| | Storage Time | t_{stg} | | — | 2.0 | — | |
| | Fall Time | t_f | | $-I_{B1} = I_{B2} = 6\text{mA}$, DUTY CYCLE $\leq 1\%$ | — | 0.4 | |

EMITTER-COLLECTOR DIODE RATINGS AND CHARACTERISTICS (Ta = 25°C)

| CHARACTERISTIC | SYMBOL | TEST CONDITION | MIN. | TYP. | MAX. | UNIT |
|-------------------------|-----------|--|------|------|------|---------|
| Maximum Forward Current | I_{FM} | — | — | — | 3 | A |
| Surge Current | I_{FSM} | t = 1s, 1 shot | — | — | 6 | A |
| Forward Voltage | V_F | $I_F = 1A, I_B = 0$ | — | — | 2.0 | V |
| Reverse Recovery Time | t_{rr} | $I_F = 3A, V_{BE} = 3V,$ $dI_F / dt = -50A / \mu s$ | — | 1.0 | — | μs |
| Reverse Recovery Charge | Q_{rr} | | — | 8 | — | μC |

FLYBACK-DIODE RATINGS AND CHARACTERISTICS (Ta = 25°C)

| CHARACTERISTIC | SYMBOL | TEST CONDITION | MIN. | TYP. | MAX. | UNIT |
|-------------------------|----------|------------------|------|------|------|---------|
| Maximum Forward Current | I_{FM} | — | — | — | 5 | A |
| Reverse Current | I_R | $V_R = 110V$ | — | — | 0.4 | μA |
| Reverse Voltage | V_R | $I_R = 100\mu A$ | 100 | — | — | V |
| Forward Voltage | V_F | $I_F = 1A$ | — | — | 1.5 | V |

