

■ Features

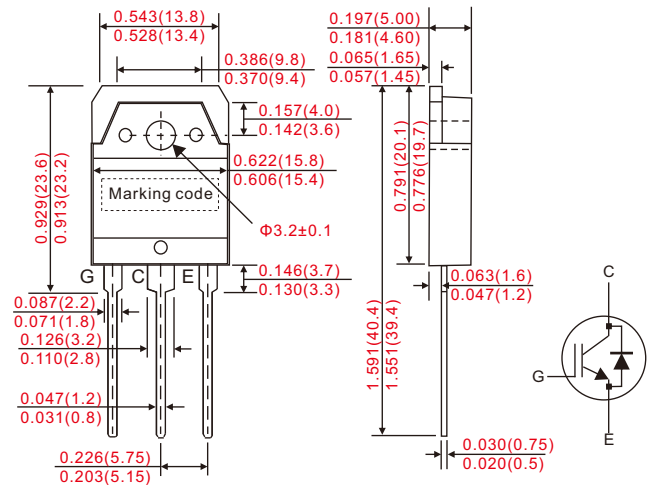
- Positive temperature Co-efficient for easy parallel operation.
- High current capability.
- High input impedance.
- Suffix "G" indicates Halogen-free part, ex. CI40T120PG.

■ Mechanical data

- Epoxy : UL94-V0 rated flame retardant.
- Case : JEDEC TO-3P molded plastic body.
- Terminals : Solder plated, solderable per MIL-STD-750, Method 2026.
- Polarity : As marked.
- Mounting Position : Any.
- Weight : Approximated 5.60 gram.

■ Outline

TO-3P



■ Maximum ratings

Rating at 25°C ambient temperature unless otherwise specified. Single phase, half wave, 60Hz, resistive or inductive load. For capacitive load, derate current by 20%.

| Parameter | Conditions | Symbol | CI40T120P | UNIT |
|--------------------------------|--|-------------|------------|------------------|
| Marking code | | | CI40T120P | |
| Collector to Emitter Voltage | | V_{CE} | 1200 | V |
| Collector Current | $T_c = 25^\circ\text{C}$ | I_C | 60 | A |
| | $T_c = 100^\circ\text{C}$ | | 40 | |
| Pulsed collector current | | I_{Cpuls} | 120 | A |
| RBSOA current | $V_{CE} < 1200\text{V}, T_J < 150^\circ\text{C}$ | I_{Cpeak} | 120 | A |
| Diode Forward Current | $T_c = 25^\circ\text{C}$ | I_F | 30 | A |
| | $T_c = 100^\circ\text{C}$ | | 30 | |
| Pulsed diode current | | I_{Fpuls} | 80 | A |
| Gate to Emitter Voltage | | V_{GE} | ± 20 | V |
| Power dissipation | $T_c = 25^\circ\text{C}$ | P_{tot} | 208 | W |
| | $T_c = 100^\circ\text{C}$ | | 83 | |
| Operating Junction Temperature | | T_J | -55 ~ +150 | $^\circ\text{C}$ |
| Storage Temperature Range | | T_{STG} | -55 ~ +150 | $^\circ\text{C}$ |

| ■ Thermal characteristics | | | | | | |
|--|--|------------------|------|------------|-------------|---------------|
| PARAMETER | CONDITIONS | Symbol | MIN. | TYP. | MAX. | UNIT |
| Thermal Resistance | Junction to Case | $R_{\theta JC}$ | | | 0.6 | K/W |
| Diode thermal resistance | chip case | $R_{\theta JCD}$ | | | 3 | |
| Thermal Resistance | Junction to Ambient | $R_{\theta JA}$ | | | 40 | |
| ■ Electrical characteristics(AT $T_A=25^\circ\text{C}$ unless otherwise noted) | | | | | | |
| On characteristics | | | | | | |
| PARAMETER | CONDITIONS | Symbol | MIN. | TYP. | MAX. | UNIT |
| Collector to Emitter Breakdown Voltage | $V_{GE} = 0V, I_C = 0.5mA$ | $V_{(BR)CES}$ | 1200 | | | V |
| Collector to Emitter Saturation Voltage | $V_{GE} = 15V, I_C = 40A$ $T_J = 25^\circ\text{C}$ $T_J = 150^\circ\text{C}$ | $V_{CE(sat)}$ | | 2.1 2.4 | 2.3 | |
| Diode forward voltage | $V_{GE} = 0V, I_F = 40A$ $T_J = 25^\circ\text{C}$ $T_J = 150^\circ\text{C}$ | V_F | | 3.1 3.4 | | |
| Gate threshold voltage | $I_C = 1.5mA, V_{CE} = V_{GE}$ | $V_{GE(th)}$ | 4.5 | 5.5 | 6.5 | |
| Collector Cut-Off Current | $V_{CE} = 1200V, V_{GE} = 0V$ $T_J = 25^\circ\text{C}$ $T_J = 150^\circ\text{C}$ | I_{CES} | | | 400 4000 | μA |
| G-E Leakage Current | $V_{CE} = 0V, V_{GE} = 20V$ | I_{GES} | | | 200 | nA |
| Transconductance | $V_{CE} = 20V, I_C = 40A$ | gFS | | 20 | | S |
| Dynamic characteristics | | | | | | |
| PARAMETER | CONDITIONS | Symbol | MIN. | TYP. | MAX. | UNIT |
| Input Capacitance | $V_{CE} = 25V$ | C_{iss} | | tbd | | pF |
| Output Capacitance | $V_{GE} = 0V$ | C_{oss} | | tbd | | |
| Reverse Transfer Capacitance | $f = 1MHz$ | C_{fss} | | tbd | | |
| Total Gate Charge | $V_{CC} = 750V, I_C = 40A, V_{GE} = 15V$ | Q_G | | tbd | | nC |

| Switching characteristics | | | | | | | |
|---------------------------------|---|------------------------------------|-----------|------|------|------|---|
| PARAMETER | CONDITIONS | Symbol | MIN. | TYP. | MAX. | UNIT | |
| Turn-On Delay Time | $T_J = 25^\circ\text{C}$ $V_{CC} = 600\text{V}, I_C = 40\text{A}$ | $t_{d(on)}$ | | 77 | | ns | |
| Rise Time | | t_r | | 84 | | | |
| Turn-Off Delay Time | | $t_{d(off)}$ | | 350 | | | |
| Fall Time | | t_f | | 70 | | | |
| Turn-On Switching Loss | $R_G = 12\Omega$ $L_{load} = 500\mu\text{H}$ | E_{on} | | 2.55 | | mJ | |
| Turn-Off Switching Loss | | E_{off} | | 1.75 | | | |
| Total Switching Loss | | E_{ts} | | 4.3 | | | |
| Turn-On Delay Time | $T_J = 150^\circ\text{C}$ $V_{CC} = 600\text{V}, I_C = 40\text{A}$ | $t_{d(on)}$ | | 70 | | ns | |
| Rise Time | | t_r | | 86 | | | |
| Turn-Off Delay Time | | $t_{d(off)}$ | | 400 | | | |
| Fall Time | | t_f | | 220 | | | |
| Turn-On Switching Loss | $R_G = 12\Omega$ $L_{load} = 500\mu\text{H}$ | E_{on} | | 2.85 | | mJ | |
| Turn-Off Switching Loss | | E_{off} | | 3.6 | | | |
| Total Switching Loss | | E_{ts} | | 6.45 | | | |
| Switching characteristics | | | | | | | |
| PARAMETER | CONDITIONS | Symbol | MIN. | TYP. | MAX. | UNIT | |
| Reverse recovery time | $T_J = 25^\circ\text{C}$ $V_{CC} = 600\text{V}, I_F = 40\text{A}$ | t_{rr} | | 256 | | ns | |
| Reverse recovery charge | | Q_{rr} | | 5.8 | | nC | |
| Repetitive Peak Reverse Current | $diF/dt = 600\text{A}/\mu\text{s}$ | I_{rrm} | | 47.3 | | A | |
| Reverse recovery time | $T_J = 150^\circ\text{C}$ $V_{CC} = 600\text{V}, I_F = 40\text{A}$ | t_{rr} | | 280 | | ns | |
| Reverse recovery charge | | Q_{rr} | | 6.9 | | nC | |
| Repetitive Peak Reverse Current | | $diF/dt = 600\text{A}/\mu\text{s}$ | I_{rrm} | | 50.2 | | A |

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