

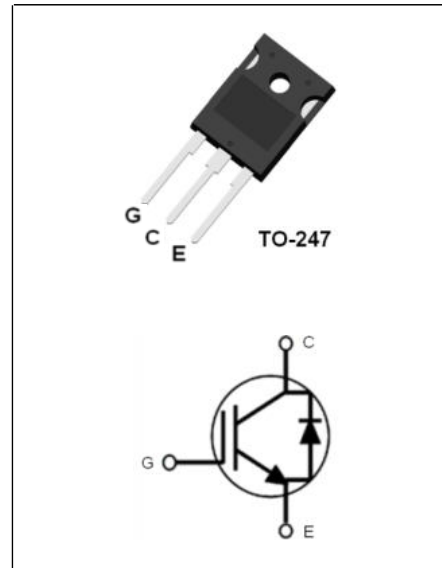
350V 50A IGBT

Description

The device is designed by advanced technology process. This IGBT have excellent quality for applications such as AC/DC square wave welder and other switching .

Features

- $V_{CE(sat)}=1.35V$ (typ.) @ $I_C=50A$
- $t_{rr}=36ns$ (typ.)
- High Input Impedance



Applications

- AC/DC square wave welder, Low speed switch

Absolute Maximum Ratings

| Symbol | Parameter | Ratings | Unit | |
|-----------|--------------------------------------|-------------------|------------|---|
| V_{CES} | Collector to Emitter Voltage | 350 | V | |
| V_{GES} | Gate to Emitter Voltage | ± 20 | V | |
| I_C | Collector Current | $T_C=25^\circ C$ | 80 | A |
| | | $T_C=100^\circ C$ | 50 | A |
| I_{CM} | Pulsed Collector Current | 150 | A | |
| I_F | Diode Continuous Forward Current | $T_C=100^\circ C$ | 30 | A |
| I_{FM} | Diode Maximum Forward Current | 180 | A | |
| P_D | Maximum Power Dissipation | $T_C=25^\circ C$ | 325 | W |
| | | $T_C=100^\circ C$ | 162 | W |
| T_J | Operating Junction Temperature Range | -55~+150 | $^\circ C$ | |
| T_{STG} | Storage Temperature Range | -55~+150 | $^\circ C$ | |

Thermal Characteristics

| Symbol | Parameter | Ratings | Unit |
|-----------------------|--|---------|--------------|
| $R_{th(J-C)}$ (IGBT) | Thermal Resistance, Junction to case for IGBT | 0.39 | $^\circ C/W$ |
| $R_{th(J-C)}$ (Diode) | Thermal Resistance, Junction to case for Diode | 1.0 | $^\circ C/W$ |
| $R_{th(J-A)}$ | Thermal Resistance, Junction to Ambient | 40 | $^\circ C/W$ |

Electrical Characteristics of IGBT @ $T_C=25\text{ }^\circ\text{C}$ unless otherwise noted

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|---------------|---|--|------|------|-----------|------|
| BV_{CES} | Collector to Emitter Breakdown Voltage | $V_{GE}=0V, I_C=250\mu A$ | 350 | - | - | V |
| $V_{CE(sat)}$ | Collector to Emitter Saturation Voltage | $I_C=50A, V_{GE}=15V$ | - | 1.35 | 1.7 | V |
| | | $I_C=50A, V_{GE}=15V, T_C=125\text{ }^\circ\text{C}$ | - | 1.40 | - | V |
| $V_{GE(th)}$ | Gate Threshold Voltage | $V_{CE}=V_{GE}, I_C=250\mu A$ | - | 4.0 | - | V |
| I_{CES} | Zero Gate Voltage Collector Current | $V_{CE}=V_{CES}, V_{GE}=0V$ | - | - | 1 | mA |
| I_{GES} | Gate to Emitter Leakage Current | $V_{GE}=V_{GES}, V_{CE}=0V$ | - | - | ± 250 | nA |

Electrical Characteristics of Diode @ $T_C=25\text{ }^\circ\text{C}$ unless otherwise noted

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|----------|-------------------------------------|--|------|------|------|------|
| V_F | Diode Forward Voltage | $I_F=30A$ | - | 1.0 | 2.0 | V |
| | | $I_F=30A, T_C=125\text{ }^\circ\text{C}$ | - | 0.9 | - | V |
| t_{rr} | Diode Reverse Recovery Time | $I_F=30A, di/dt=-200A/\mu s$ | - | 36 | - | ns |
| I_{rr} | Diode Peak Reverse Recovery Current | | - | 5.0 | - | A |
| Q_{rr} | Diode Reverse Recovery Charge | | - | 120 | - | nC |

Switching Characteristics @ $T_C=25\text{ }^\circ\text{C}$ unless otherwise noted

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit | |
|--------------|------------------------------|---|--|------|------|------|----|
| $t_{d(on)}$ | Turn-on Delay Time | $I_C=50A, V_{CC}=175V, V_{GE}=15V, R_G=14\Omega$ Inductive Load, $T_C=25\text{ }^\circ\text{C}$ | - | 19 | - | ns | |
| t_r | Rising Time | | - | 63 | - | ns | |
| $t_{d(off)}$ | Turn-off Delay Time | | - | 810 | - | ns | |
| t_f | Falling Time | | - | 2000 | - | ns | |
| E_{on} | Turn-on Switching Loss | | - | 1.2 | - | mJ | |
| E_{off} | Turn-off Switching Loss | | - | 15.3 | - | mJ | |
| E_{ts} | Total Switching Loss | | - | 16.5 | - | mJ | |
| $t_{d(on)}$ | Turn-on Delay Time | | $I_C=50A, V_{CC}=175V, V_{GE}=15V, R_G=14\Omega$ Inductive Load, $T_C=125\text{ }^\circ\text{C}$ | - | 19 | - | ns |
| t_r | Rising Time | | | - | 63 | - | ns |
| $t_{d(off)}$ | Turn-off Delay Time | | | - | 980 | - | ns |
| t_f | Falling Time | - | | 3650 | - | ns | |
| E_{on} | Turn-on Switching Loss | - | | 1.4 | - | mJ | |
| E_{off} | Turn-off Switching Loss | - | | 21.5 | - | mJ | |
| E_{ts} | Total Switching Loss | - | | 22.9 | - | mJ | |
| C_{ies} | Input Capacitance | $V_{GE}=0V, V_{CE}=30V, f=1.0MHz$ | - | 5100 | - | pF | |
| C_{res} | Reverse Transfer Capacitance | | - | 215 | - | pF | |
| C_{oes} | Output Capacitance | | - | 93 | - | pF | |
| Q_g | Total Gate Charge | $I_C=50A, V_{CC}=175V, V_{GE}=15V$ | - | 215 | - | nC | |
| Q_{ge} | Gate to Emitter Charge | | - | 28 | - | nC | |
| Q_{gc} | Gate to Collector Charge | | - | 157 | - | nC | |
| t_{sc} | Short Circuit Withstand Time | | $V_{CC}=175V, V_{GE}=15V$ | 5 | - | - | us |

Typical Performance Characteristics

Fig. 1. Typical Output Characteristics

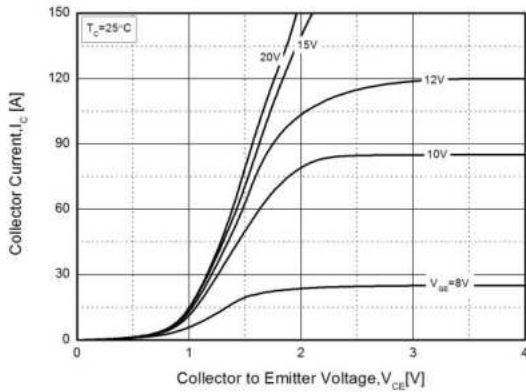


Fig. 2. Typical Saturation Voltage Characteristics

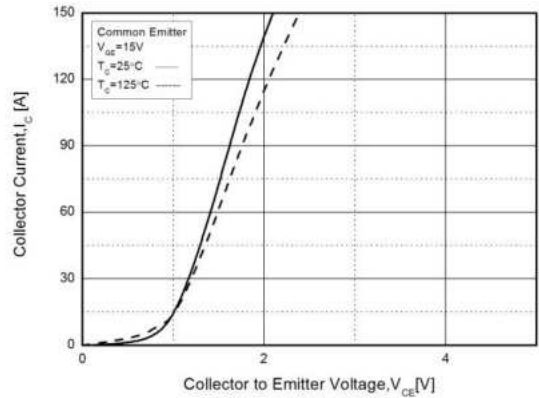


Fig. 3. Typical Saturation Voltage vs. T_C

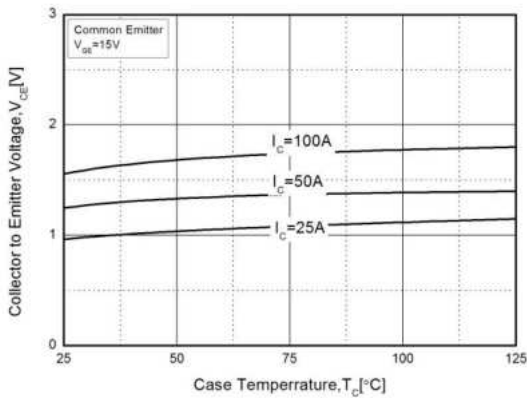


Fig. 4. Diode Forward Characteristics

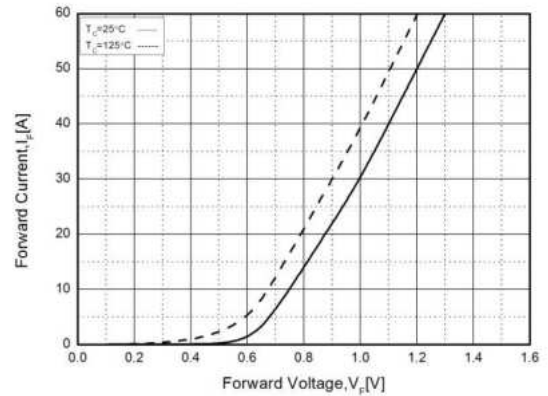


Fig. 5. Typical Capacitance Characteristics

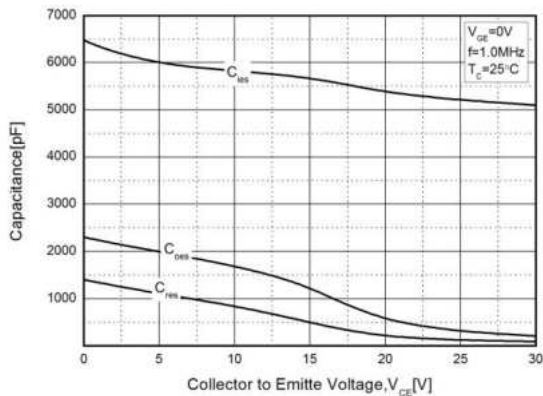
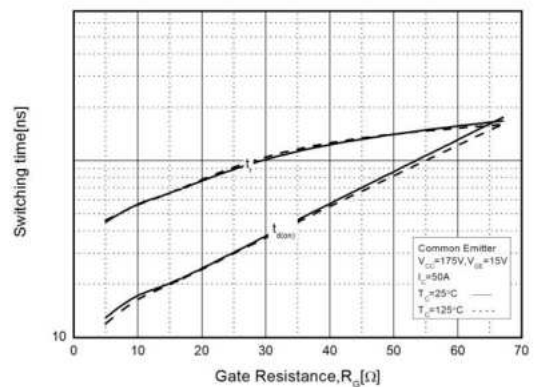


Fig. 6. Turn-on Characteristics vs. R_G



Typical Performance Characteristics

Fig. 7. Turn-off Characteristics vs. R_G

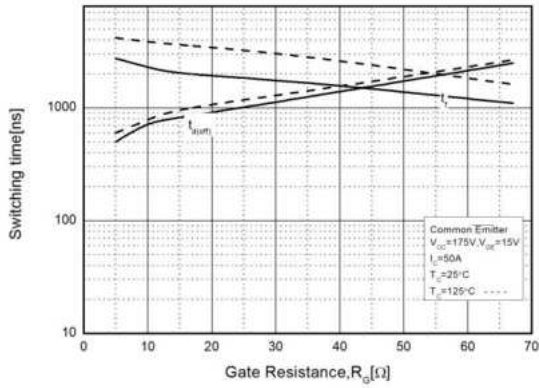


Fig. 8. Switching Loss vs. R_G

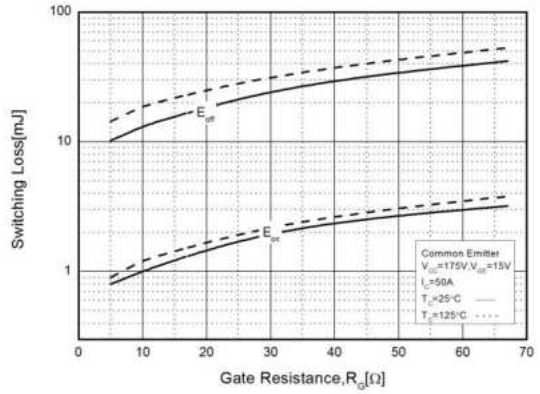


Fig. 9. Turn-on Characteristics vs. I_C

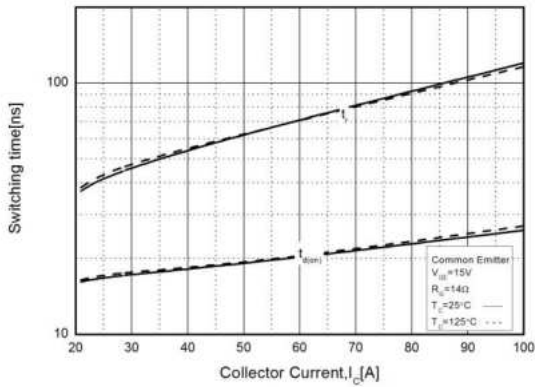


Fig. 10. Turn-off Characteristics vs. I_C

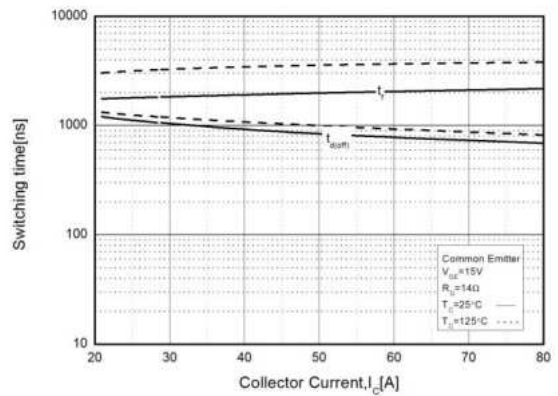
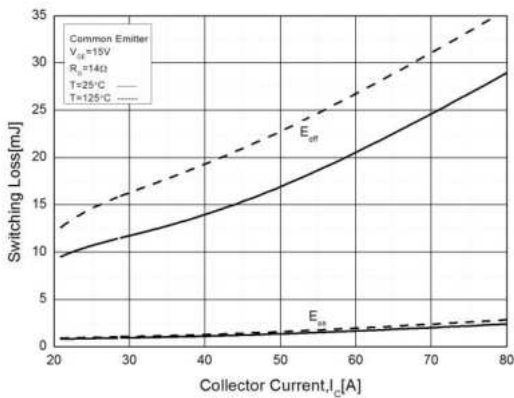


Fig. 11. Switching Loss vs. I_C



Package Dimensions

TO-247

(Dimensions in Millimeters)

