

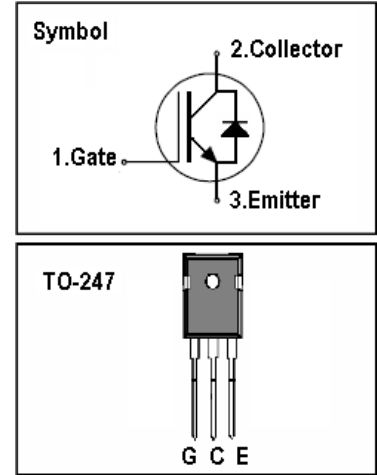
IGBT

Features

- 1200V,15A
- $V_{CE(sat)(typ.)}=1.95V @V_{GE}=15V,I_C=15A$
- High speed switching
- Higher system efficiency
- Soft current turn-off waveforms
- Square RBSOA

General Description

JIAEN Trench IGBTs offer lower losses and higher energy efficiency for application such as IH (induction heating),UPS, general inverter and other soft switching applications.



Absolute Maximum Ratings

| Symbol | Parameter | Value | Units |
|-----------|--|-------------|------------|
| V_{CES} | Collector-Emitter Voltage | 1200 | V |
| V_{GES} | Gate-Emitter Voltage | ± 30 | V |
| I_C | Continuous Collector Current ($T_C=25^\circ C$) | 30 | A |
| | Continuous Collector Current ($T_C=100^\circ C$) | 15 | A |
| I_{CM} | Pulsed Collector Current (Note 1) | 45 | A |
| I_F | Diode Continuous Forward Current ($T_C=100^\circ C$) | 15 | A |
| I_{FM} | Diode Maximum Forward Current (Note 1) | 45 | A |
| t_{sc} | Short Circuit Withstand Time | 10 | us |
| P_D | Maximum Power Dissipation ($T_C=25^\circ C$) | 108 | W |
| | Maximum Power Dissipation ($T_C=100^\circ C$) | 43 | W |
| T_J | Operating Junction Temperature Range | -40 to +155 | $^\circ C$ |
| T_{STG} | Storage Temperature Range | -55 to +155 | $^\circ C$ |

Thermal Characteristics

| Symbol | Parameter | Max. | Units |
|---------------|--|------|--------------|
| $R_{th\ j-c}$ | Thermal Resistance, Junction to case for IGBT | 1.15 | $^\circ C/W$ |
| $R_{th\ j-c}$ | Thermal Resistance, Junction to case for Diode | 1.5 | $^\circ C/W$ |
| $R_{th\ j-a}$ | Thermal Resistance, Junction to Ambient | 40 | $^\circ C/W$ |

Electrical Characteristics ($T_C=25^\circ\text{C}$ unless otherwise noted)

| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Units |
|---------------|--------------------------------------|--|------|------|------|---------|
| BV_{CES} | Collector-Emitter Breakdown Voltage | $V_{GE}=0V, I_C=250\mu A$ | 1200 | - | - | V |
| I_{CES} | Collector-Emitter Leakage Current | $V_{CE}=1200V, V_{GE}=0V$ | - | - | 100 | μA |
| I_{GES} | Gate Leakage Current, Forward | $V_{GE}=30V, V_{CE}=0V$ | - | - | 100 | nA |
| | Gate Leakage Current, Reverse | $V_{GE}=-30V, V_{CE}=0V$ | - | - | 100 | nA |
| $V_{GE(th)}$ | Gate Threshold Voltage | $V_{GE}=V_{CE}, I_C=250\mu A$ | 4.5 | - | 6.5 | V |
| $V_{CE(sat)}$ | Collector-Emitter Saturation Voltage | $V_{GE}=15V, I_C=15A$ | - | 1.95 | 2.4 | V |
| Q_g | Total Gate Charge | $V_{CC}=600V$ $V_{GE}=15V$ $I_C=15A$ | - | 120 | - | nC |
| Q_{ge} | Gate-Emitter Charge | | - | 50 | - | nC |
| Q_{gc} | Gate-Collector Charge | | - | 15 | - | nC |
| $t_{d(on)}$ | Turn-on Delay Time | $V_{CC}=600V$ $V_{GE}=15V$ $I_C=15A$ $R_G=15\Omega$ Inductive Load $T_C=25^\circ\text{C}$ | - | 37 | - | ns |
| t_r | Turn-on Rise Time | | - | 74 | - | ns |
| $t_{d(off)}$ | Turn-off Delay Time | | - | 83 | - | ns |
| t_f | Turn-off Fall Time | | - | 93 | - | ns |
| E_{on} | Turn-on Switching Loss | | - | 1.24 | - | mJ |
| E_{off} | Turn-off Switching Loss | | - | 0.48 | - | mJ |
| E_{ts} | Total Switching Loss | | - | 1.72 | - | mJ |
| C_{ies} | Input Capacitance | $V_{CE}=25V$ $V_{GE}=0V$ $f=1\text{MHz}$ | - | 2460 | - | pF |
| C_{oes} | Output Capacitance | | - | 95 | - | pF |
| C_{res} | Reverse Transfer Capacitance | | - | 45 | - | pF |

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

| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Units |
|----------|-------------------------------------|--|------|------|------|-------|
| V_F | Diode Forward Voltage | $I_F=15A$ | - | 2.1 | 3.5 | V |
| t_{rr} | Diode Reverse Recovery Time | $V_{CE}=600V$ $I_F=15A$ $R_G=15\Omega$ | - | 62 | - | ns |
| I_{rr} | Diode peak Reverse Recovery Current | | - | 15 | - | A |
| Q_{rr} | Diode Reverse Recovery Charge | | - | 470 | - | nC |

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature

Typical Performance Characteristics

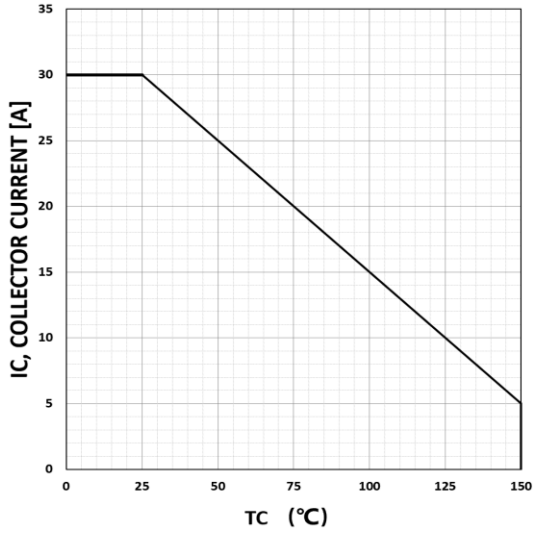


Figure 1. Maximum DC collector current VS. case temperature

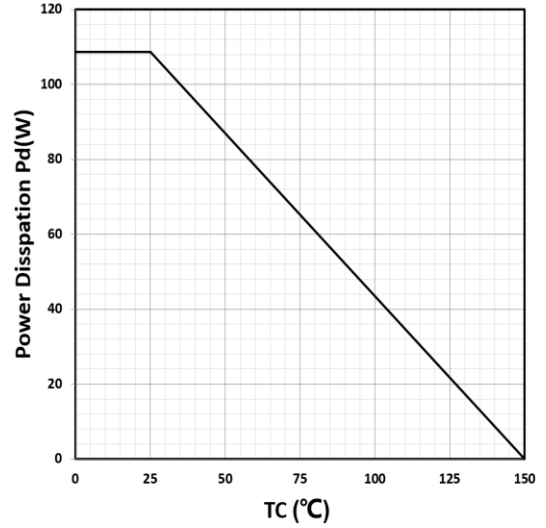


Figure 2. Power dissipation VS. case temperature

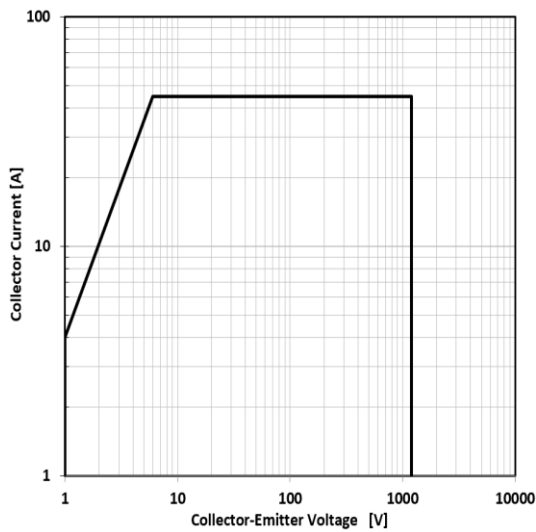


Figure 3. Reverse bias SOA, $T_j=125^{\circ}\text{C}$, $V_{ge}=15\text{V}$

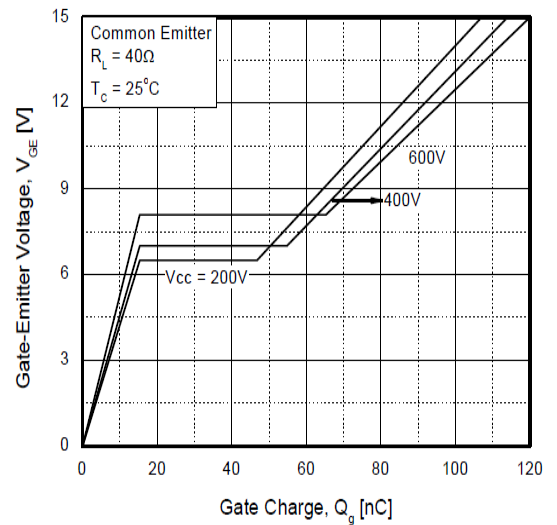


Figure 4: Typical gate charge VS. V_{GE} , $I_C=15\text{A}$

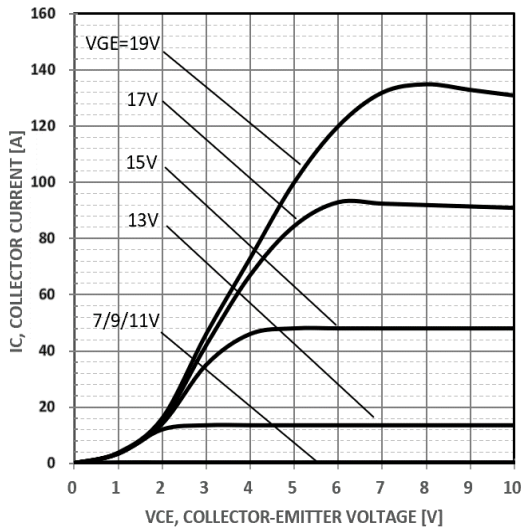


Figure 5. Typical output characteristics
 $t_p=300\mu s$ $T_c=25^\circ C$

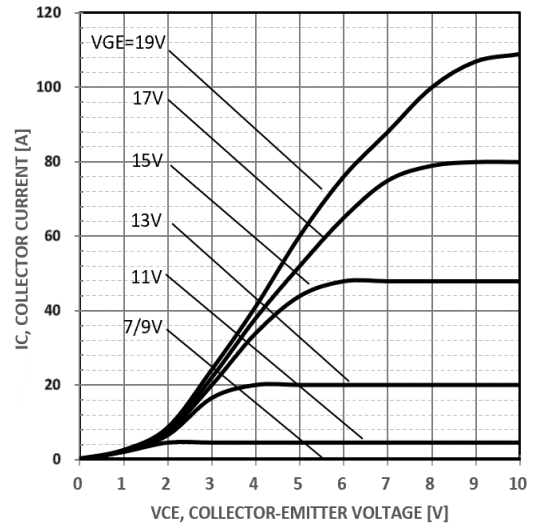


Figure 6. Typical output characteristics
 $t_p=300\mu s$ $T_c=150^\circ C$

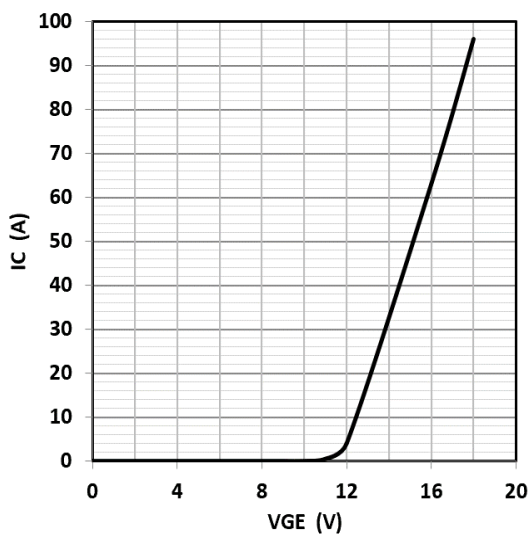


Figure 7. Typical gate threshold voltage

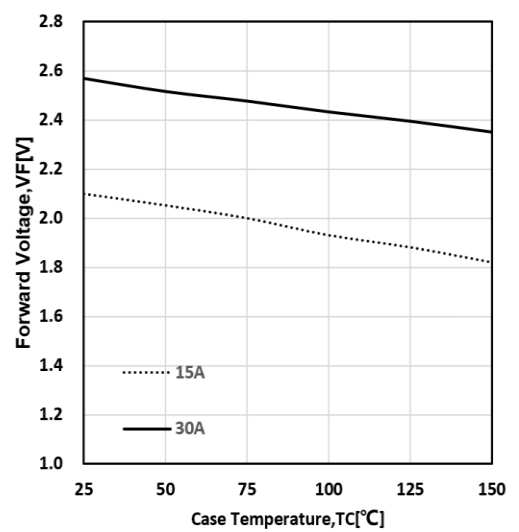


Figure 8. Typical forward voltage vs T_c

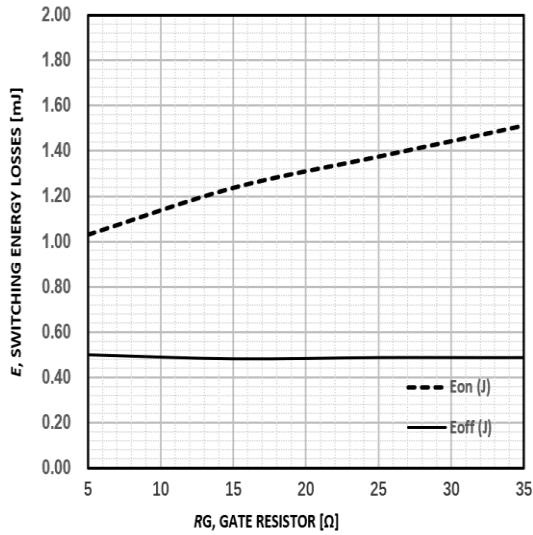


Figure9: Typical energy loss VS. Rg,TC=25°C,
VCE=600V, VGE=15V ,IC=15A

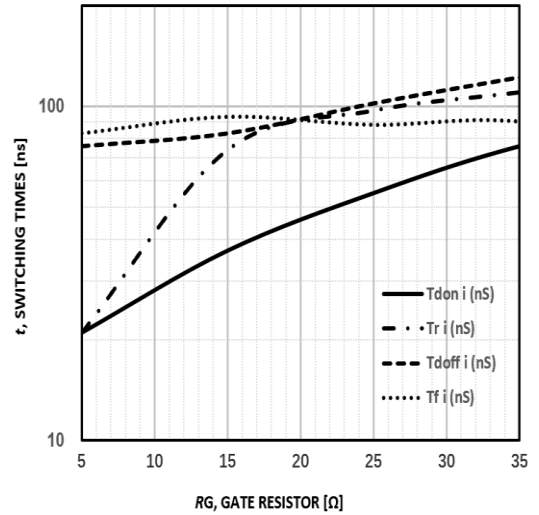


Figure10: Typical switching time VS. Rg,TC=25°C,
VCE=600V, VGE=15V ,IC=15A

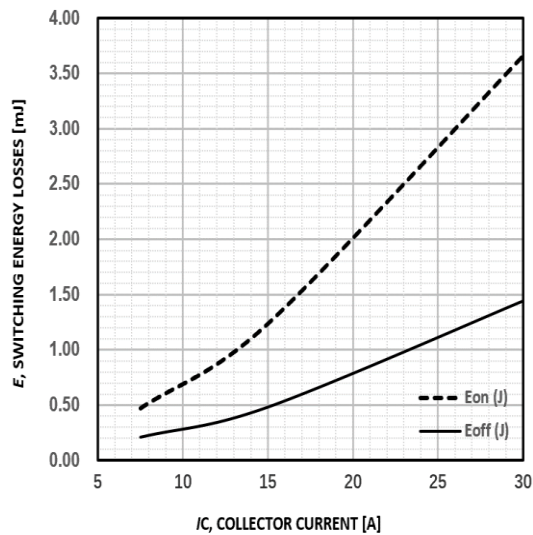


Figure11: Typical energy loss VS. IC, TC=25°C,
VCE=600V, VGE=15V ,RG=15Ω

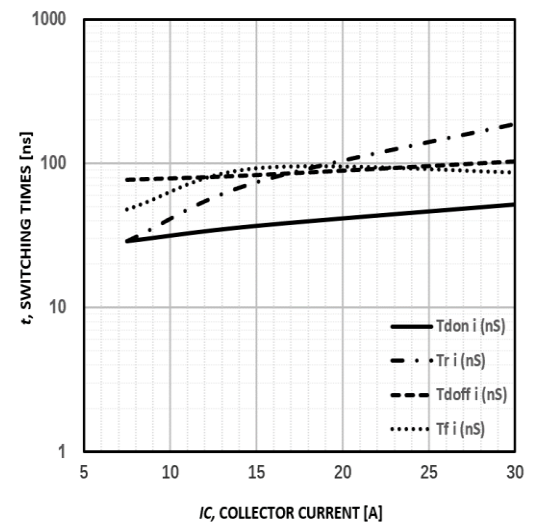


Figure12: Typical switching time VS. IC, TC=25°C,
VCE=600V, VGE=15V, RG=15Ω

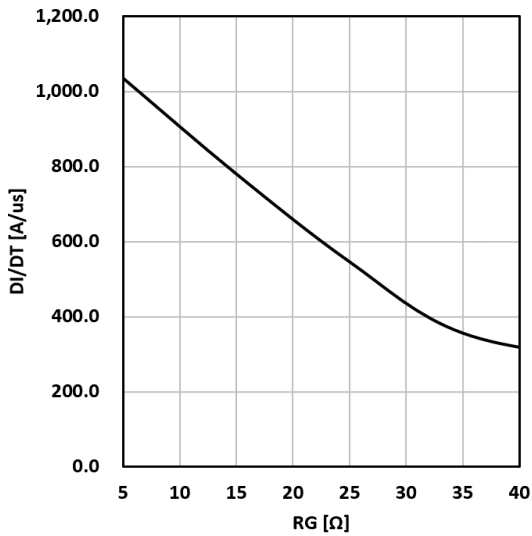


Figure 13. Typical diode di/dt vs rg Tc=25°C
VCE=600V VGE=15V IF=15A

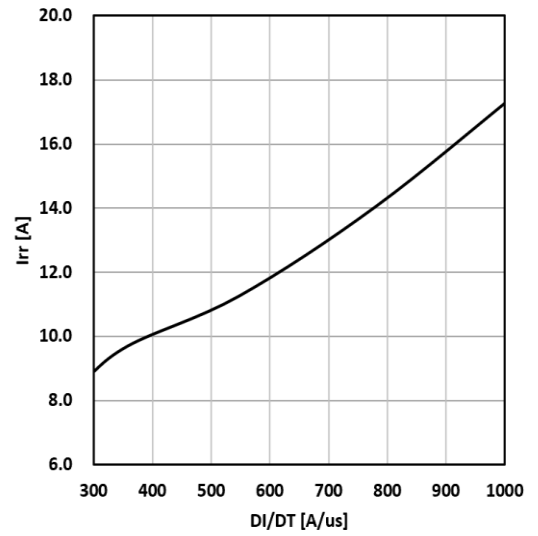


Figure 14. Typical diode Irr vs di/dt Tc=25°C
VCE=600V VGE=15V IF=15A

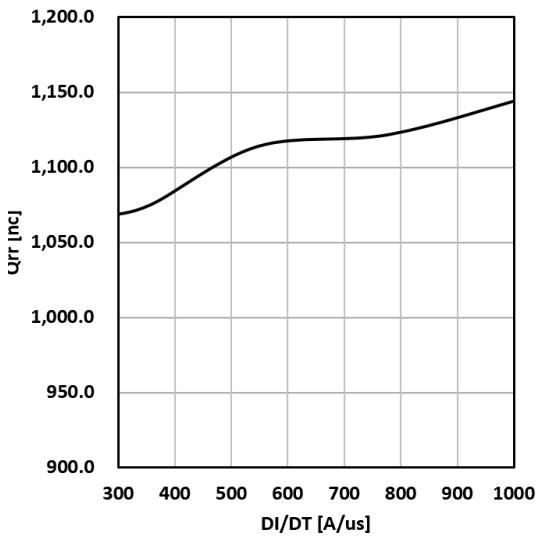


Figure 15. Typical diode Qrr vs di/dt Tc=25°C
VCE=600V VGE=15V IF=15A

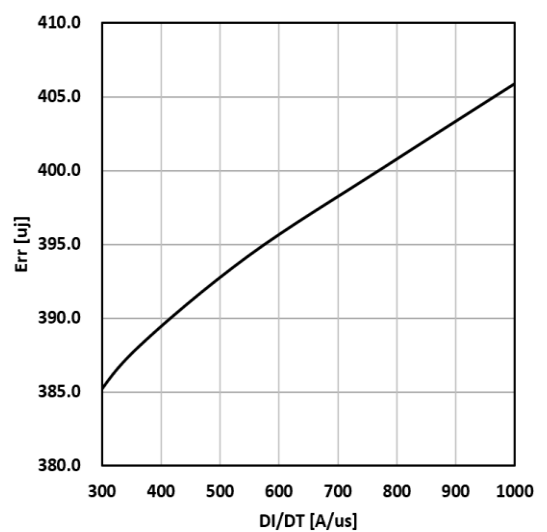


Figure 16. Typical diode Err vs di/dt Tc=25°C
VCC=600V VGE=15V IF=15A

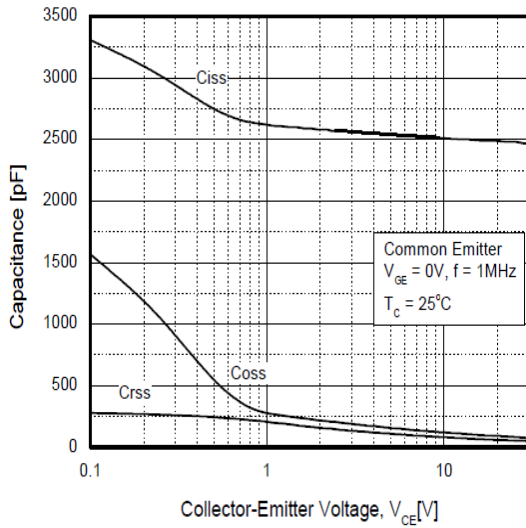


Figure17: Typical capacitance VS. VCE,
VGE=0V, f=1MHz

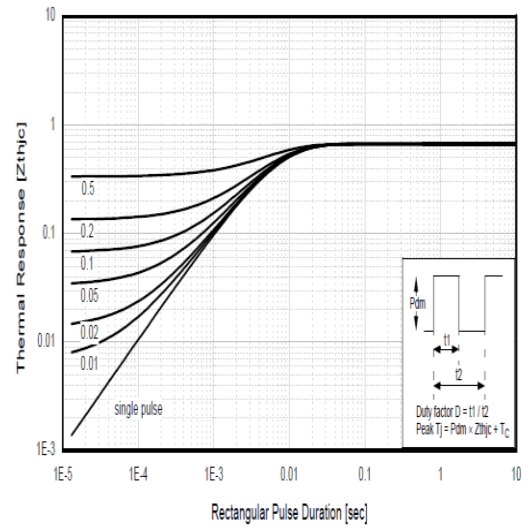
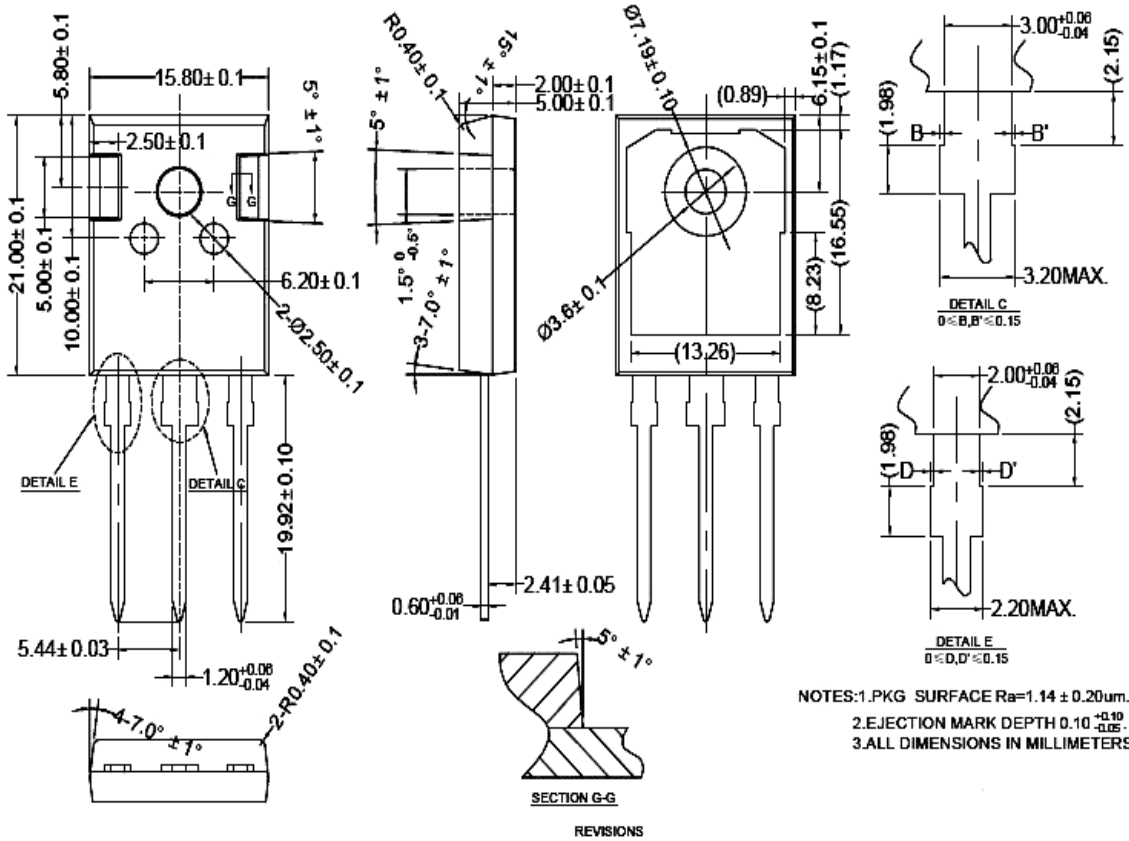


Figure18. normalized transient thermal impedance,
junction-to-case

TO247 PACKAGE OUTLINE



| 公差标注 | 公差值 | 表面粗糙度 |
|--------|--------|-----------|
| 0 | ±0.2 | Ra3.2~6.3 |
| 0.0 | ±0.1 | Ra1.6~3.2 |
| 0.00 | ±0.01 | Ra0.8~1.6 |
| 0.000 | ±0.005 | Ra0.4~0.8 |
| 0.0000 | ±0.002 | Ra0.2~0.4 |

0≤D,D'≤0.15

NOTES: 1.PKG SURFACE Ra=1.14 ± 0.20um.
2.EJECTION MARK DEPTH 0.10 ^{+0.10}/_{-0.05}.
3.ALL DIMENSIONS IN MILLIMETERS.

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