

**CGWT80N65F2KAD**

| | | |
|----------|-------------------------------|---------------|
| V_{CE} | $I_c (T_c=100^\circ\text{C})$ | $V_{CE(sat)}$ |
| 650V | 80A | 1.7V |

TO-247**DESCRIPTION**

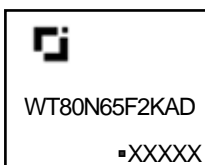
The CGWT80N65F2KAD is used JSCJ's second generation IGBT technology, has advanced Trench and FS(Field Stop) Structure, it's with high application frequent, low Collector-Emitter Saturation Voltage and switching loss, can easy to use in parallel.

Features

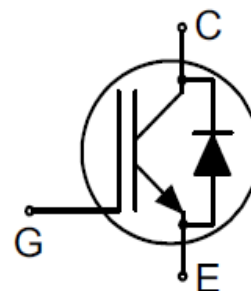
- 650V breakdown Voltage
- Low $V_{ce(sat)}$ and positive temperature coefficient
- High speed switching, Low switching loss
- With fast and soft recovery freewheeling diode
- Good EMI behavior

Application

- UPS & FPC applications
- Solar Inverter
- EV Charger
- Power Storage
- Welder

MARKING

WT80N65F2KAD = Device code
Solid dot = Green molding compound device, if none, the normal device
XXXX = Code

EQUIVALENT CIRCUIT

| Order Code | Package | Marking | Parking |
|----------------|---------|--------------|---------|
| CGWT80N65F2KAD | TO-247 | WT80N65F2KAD | Tube |

Absolute Maximum Ratings ($T_C=25^\circ\text{C}$ unless otherwise noted)

| Symbol | Parameter | Value | Units |
|----------------|--|------------|------------------|
| V_{CES} | Collector-Emitter Voltage | 650 | V |
| V_{GES} | Gate-Emitter Voltage | ± 20 | V |
| | Gate-Emitter transient voltage | ± 30 | V |
| I_C | Collector Current ⁽²⁾ | 100 | A |
| | Collector Current @ $T_C=100^\circ\text{C}$ | 80 | |
| I_{Cpluse} | Plused Collector Current, tp limited by T_{Jmax} | 240 | A |
| $I_{LM}^{(1)}$ | Turn-off latching current | 240 | A |
| I_F | Continuous Diode Forward Current ⁽²⁾ | 100 | A |
| | Continuous Diode Forward Current @ $T_C=100^\circ\text{C}$ | 80 | A |
| I_{FM} | Diode Pulsed Current, Limited by T_{Jmax} | 240 | A |
| P_D | Power Dissipation @ $T_C=25^\circ\text{C}$ | 390 | W |
| | Power Dissipation @ $T_C=100^\circ\text{C}$ | 156 | |
| T_J | Operating junction temperature | -55 to 175 | $^\circ\text{C}$ |
| T_{STG} | Storage temperature | -55 to 150 | $^\circ\text{C}$ |
| T_L | Maximum lead temperature for soldering | 260 | $^\circ\text{C}$ |

(1) $V_{oc}=400\text{V}$, $V_{GE}=15\text{V}$, $T_J \leq 150^\circ\text{C}$.

(2) value limited by bondwire

Thermal Characteristics

| Symbol | Parameter | Value | Units |
|----------------|--------------------------------|-------|---------------------------|
| $R\theta_{JC}$ | Maximum IGBT Junction-to-Case | 0.32 | $^\circ\text{C}/\text{W}$ |
| $R\theta_{JC}$ | Maximum Diode Junction-to-Case | 0.6 | $^\circ\text{C}/\text{W}$ |
| $R\theta_{JA}$ | Maximum Junction-to-Ambient | 40 | $^\circ\text{C}/\text{W}$ |

Electrical Characteristics (T_J=25°C unless otherwise noted)

| Symbol | Parameter | Test Conditions | Ration | | | Unit s |
|--------------------------------|--------------------------------------|--|--------|-------|------|-----------|
| | | | Min. | Typ. | Max. | |
| STATIC PARAMETERS | | | | | | |
| V _{(BR)CES} | Collector-Emitter Breakdown Voltage | V _{GE} =0V, I _C =1mA | 650 | -- | -- | V |
| I _{CES} | Zero Gate Voltage Collector Current | V _{GE} =0V, V _{CE} =650V | -- | -- | 1.0 | mA |
| I _{GES} | Gate-Emitter leakage current | V _{GE} =±20V | -- | -- | ±250 | nA |
| | | V _{GE} =±30V | -- | -- | ±500 | nA |
| V _{GE(th)} | Gate-Emitter Threshold Voltage | I _C =1mA, V _{CE} =V _{GE} | 4 | | 6.5 | V |
| V _F | Diode Forward Voltage | I _F =80A, T _C =25°C | | 1.52 | | V |
| | | I _F =80A, T _C =125°C | | 1.27 | | V |
| | | I _F =80A, T _C =150°C | | 1.22 | | V |
| V _{CE(sat)} | Collector-Emitter Saturation Voltage | I _C =80A, V _{GE} =15V, T _J =25°C | | 1.7 | | V |
| | | I _C =80A, V _{GE} =15V, T _J =125°C | | 2 | | V |
| | | I _C =80A, V _{GE} =15V, T _J =150°C | | 2.15 | | V |
| DYNAMIC PARAMETERS | | | | | | |
| C _{ies} | Input Capacitance | V _{CE} =30V, V _{GE} =0V f=1MHz | -- | 2602 | -- | pF |
| C _{oes} | Output Capacitance | | -- | 256 | -- | |
| C _{res} | Reverse Transfer Capacitance | | -- | 30 | -- | |
| R _g | Gate resistance | V _{GE} =0V, CE short, f=1MHz | -- | 0.66 | -- | Ω |
| SWITCHING PARAMETERS | | | | | | |
| t _{d(on)} | Turn-On Delay Time | V _{CE} =400V, I _C =80A, R _g =10Ω, V _{GE} =15V, Inductive Load T _J =25°C | -- | 26 | -- | ns |
| t _r | Current Rise Time | | -- | 68 | -- | |
| t _{d(off)} | Turn-Off Delay Time | | -- | 94 | -- | |
| t _f | Current Fall Time | | -- | 26 | -- | |
| E _{on} ⁽³⁾ | Turn-On Switching Energy | | -- | 2.69 | -- | mJ |
| E _{off} | Turn-Off Switching Energy | | -- | 0.87 | -- | |
| E _{is} | Total Switching Energy | | -- | 3.56 | -- | |
| Q _G | Total Gate Charge | V _{CE} = 480 V, I _C = 80 A, V _{GE} = 15 V | | 108.8 | | nC |
| Q _{GE} | Gate to Emitter Charge | | | 27.2 | | nC |
| Q _{GC} | Gate to Collector Charge | | | 58.8 | | nC |
| t _{rr} | Diode reverse recovery time | VR = 400V, IF = 80A, diF/dt = 100A/μs | | 90 | | nS |
| Q _{rr} | Diode reverse recovery charge | | | 352 | | nC |
| I _{rm} | Diode peak reverse recovery current | | | 7 | | A |

(3) Including the reverse recovery of the diode.

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

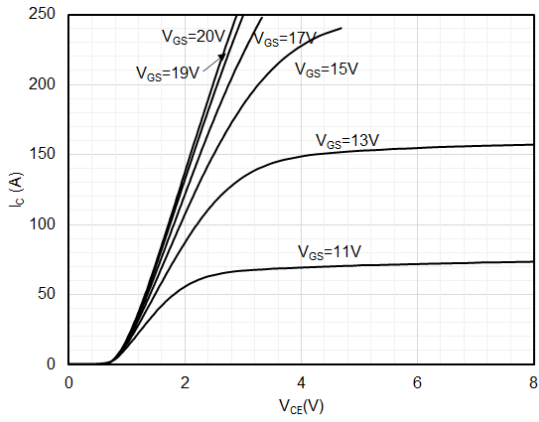


Figure 1: Output Characteristic
($T_j=25^{\circ}\text{C}$)

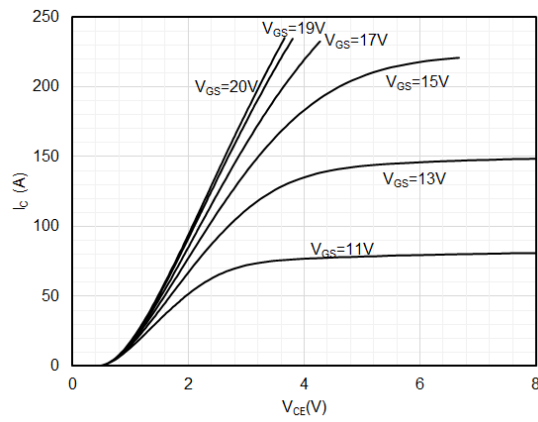


Figure 2: Output Characteristic
($T_j=125^{\circ}\text{C}$)

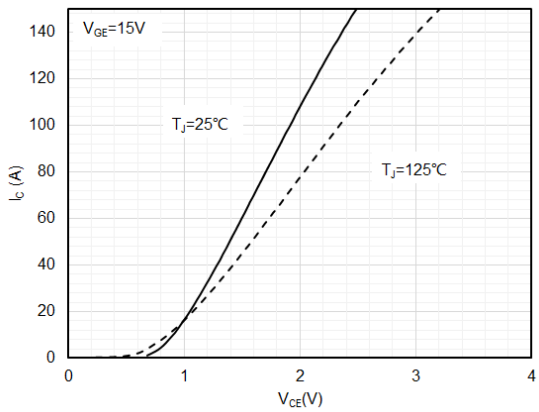


Figure 3: Collector-Emitter Saturation Voltage

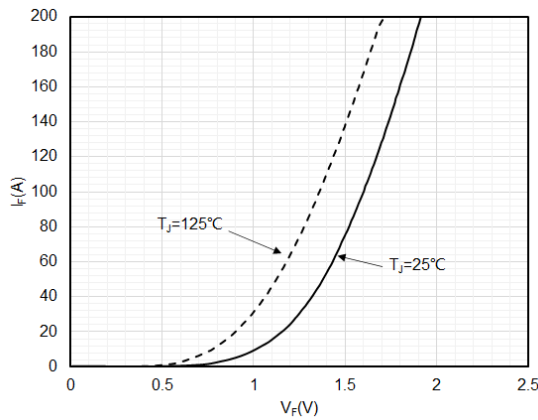


Figure 4: Diode Characteristic

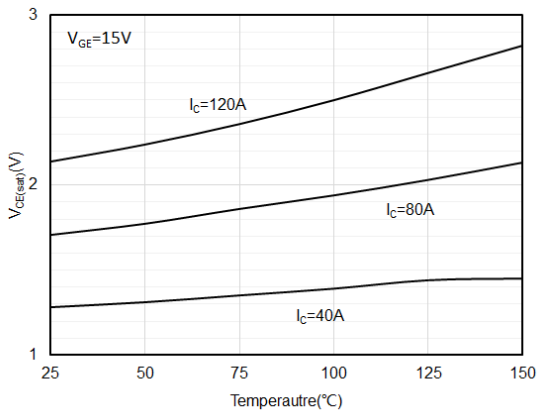


Figure 5: Collector-Emitter Saturation Voltage vs.
Junction Temperature

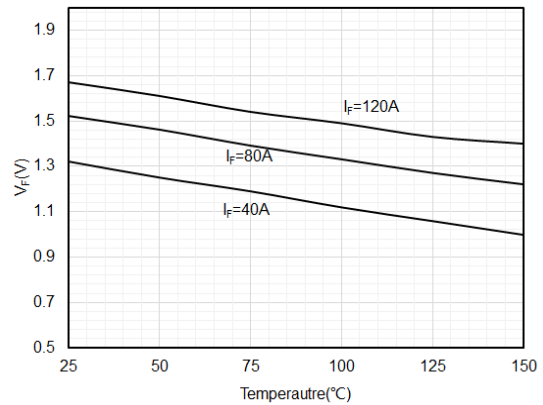


Figure 6: Diode Forward voltage vs. Junction
Temperature

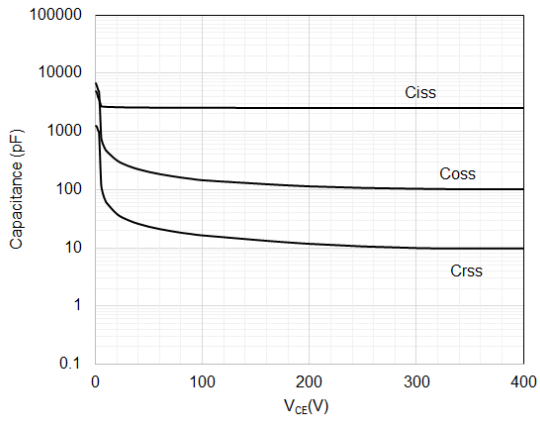


Figure 7: Capacitance Characteristic

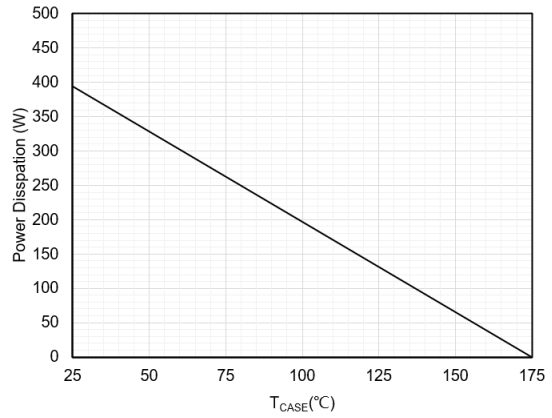


Figure 8: Power Dissipation as a Function of Case

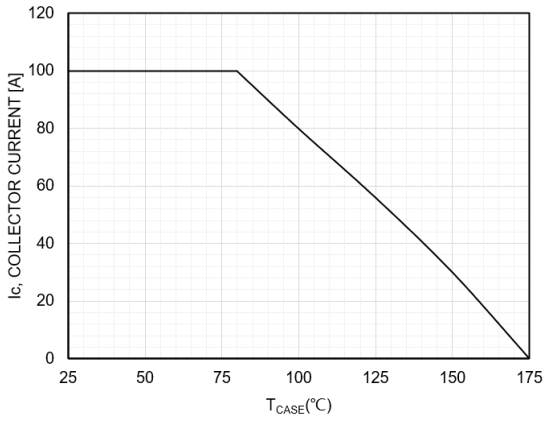


Figure 9: Collector Current as a Function of Case

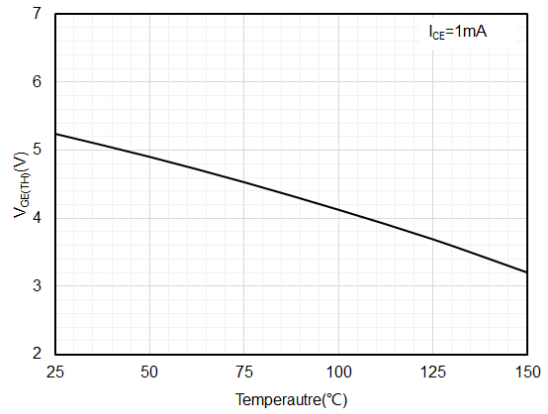


Figure 10: VGE(TH) vs. T_J

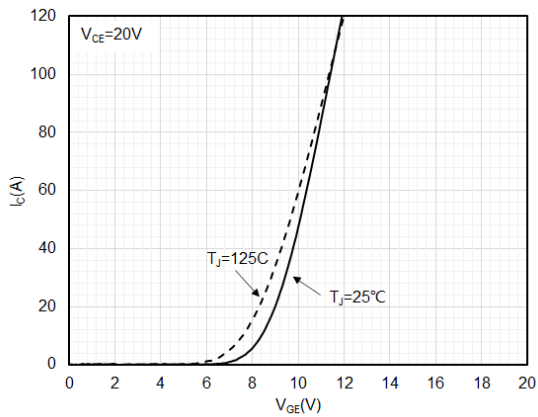


Figure 11: Transfer Characteristic

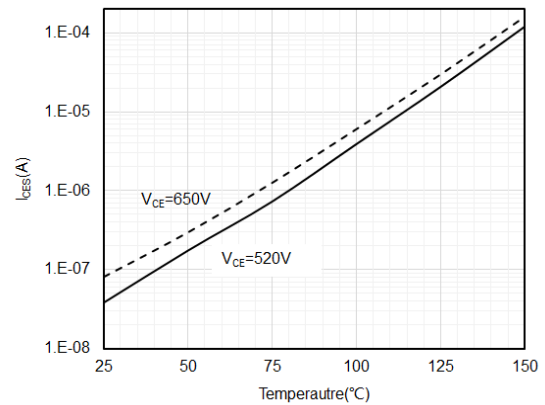


Figure 12: Reverse Leakage Current vs. T_J

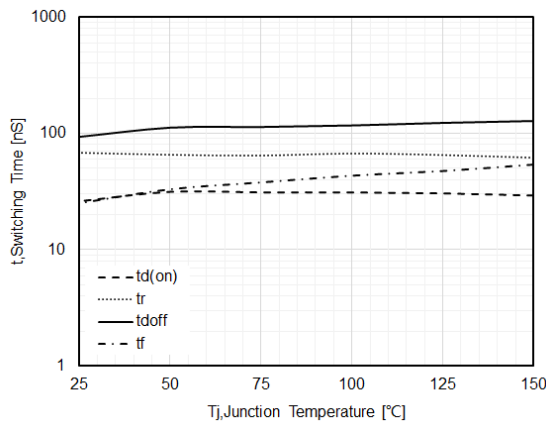


Figure 13 Typical switching times as a function of junction temperature

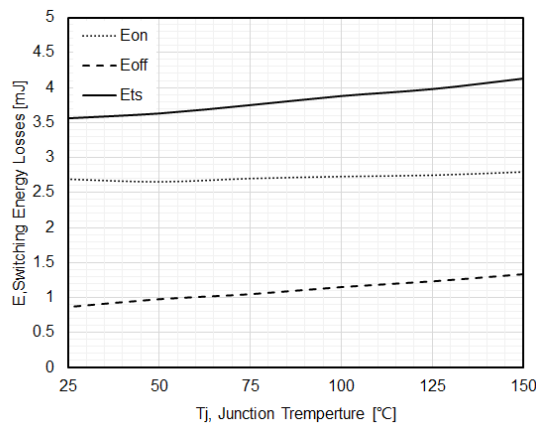
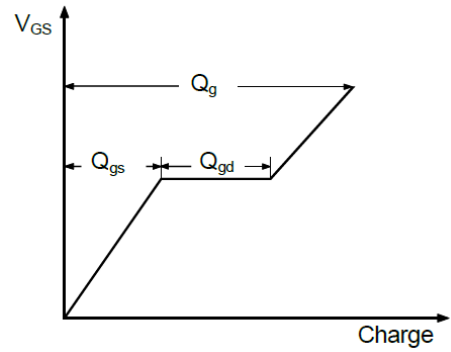
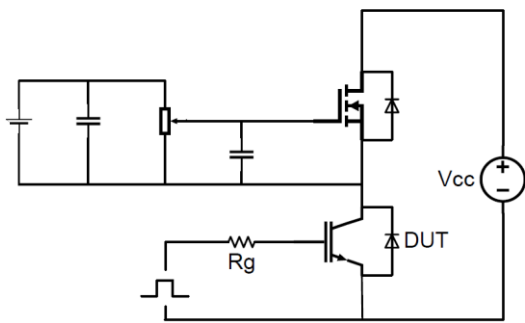


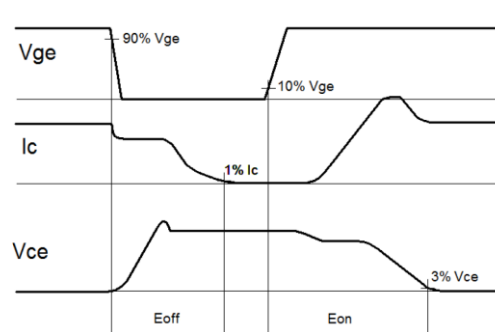
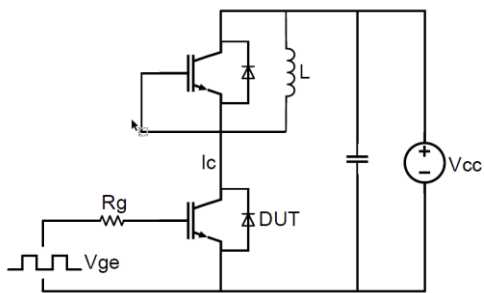
Figure 14 Typical switching energy losses as a function of junction temperature

TEST CIRCUIT AND WAVEFORMS

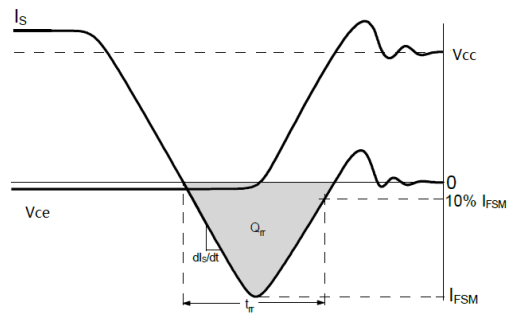
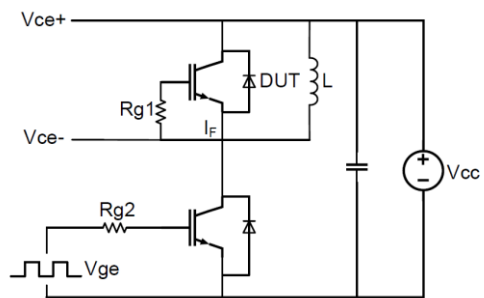
Gate Charge



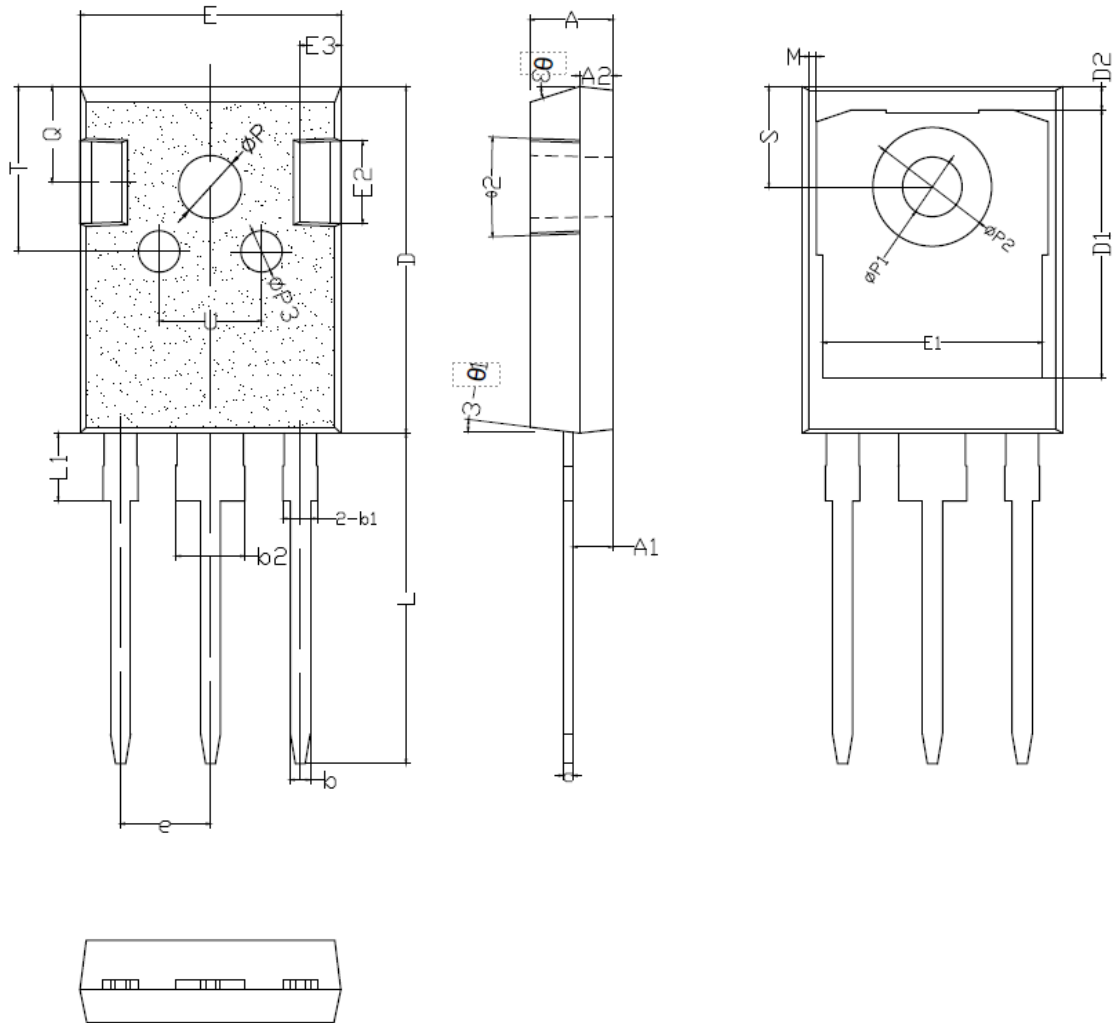
Inductive Switching Test Circuit



Diode Reverse Recovery



TO-247 PACKAGE OUTLINE DIMENSIONS



| SYMBOL | mm | | |
|--------|-------|-------|-------|
| | MIN | NOM | MAX |
| *A | 4.90 | 5.00 | 5.10 |
| *A1 | 2.31 | 2.41 | 2.51 |
| A2 | 1.90 | 2.00 | 2.10 |
| *b | 1.15 | 1.20 | 1.25 |
| *b1 | 1.95 | 2.10 | 2.25 |
| *b2 | 2.95 | 3.10 | 3.25 |
| *c | 0.55 | 0.60 | 0.65 |
| *D | 20.90 | 21.00 | 21.10 |
| D1 | 16.35 | 16.55 | 16.75 |
| D2 | 1.05 | 1.20 | 1.35 |
| *E | 15.70 | 15.80 | 15.90 |

JIANGSU CHANGJING ELECTRONICS TECHNOLOGY CO., LTD

| | | | |
|--------|-------|-------|-------|
| E1 | 13.10 | 13.25 | 13.40 |
| E2 | 4.85 | 4.95 | 5.10 |
| E3 | 2.40 | 2.50 | 2.60 |
| *e | 5.40 | 5.44 | 5.48 |
| *L | 19.80 | 19.98 | 20.15 |
| *L1 | - | - | 4.30 |
| *ΦP | 3.40 | 3.50 | 3.60 |
| *ΦP1 | 6.90 | 7.10 | 7.30 |
| ΦP2 | 2.40 | 2.50 | 2.60 |
| ΦP3 | 2.40 | 2.50 | 2.60 |
| Q | 5.60 | 5.80 | 6.00 |
| *S | 6.05 | 6.15 | 6.25 |
| T | 9.80 | 10.00 | 10.20 |
| U | 6.00 | 6.20 | 6.40 |
| θ1 | 5° | 7° | 9° |
| θ2 | 1° | 3° | 5° |
| θ3 | 13° | 15° | 17° |
| *为管控尺寸 | | | |