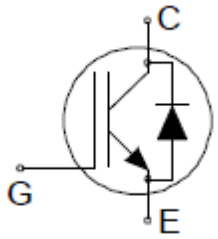
上海贝岭
SHANGHAI BELLING

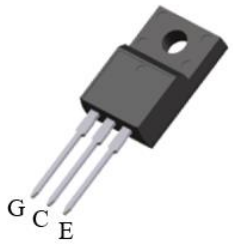
# BLG15T65FUL

IGBT

## 1. Description

BLG15T65FUL is obtained by advanced Trench Field Stop (T-FS) technology which is characteristic with low $V_{CE(sat)}$ , optimized switching performance and low gate charge $Q_g$. The IGBT is suitable device for BLDC, UPS, and low $V_{CE(sat)}$ applications.




TO-220F-3

### KEY CHARACTERISTICS

| Parameter | Value | Unit |
|---|---|---|
| $V_{CES}$ | 650 | V |
| $I_C$ | 15 | A |
| $V_{CE(sat).typ}$ | 1.4 | V |
| $P_D$ ($T_C$=25℃) | 35 | W |

### FEATURES

- Fast Switching
- Low $V_{CE(sat)}$
- Positive temperature coefficient
- Very soft, fast recovery anti-parallel diode
- RoHS product

### APPLICATIONS

- UPS
- Air condition
- Motor drives
- PFC

### ORDERING INFORMATION

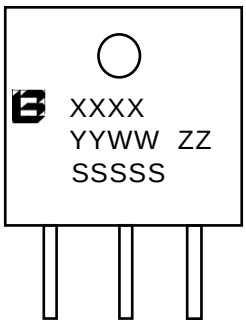
| Ordering Codes | Package | Product Code | Packing |
|---|---|---|---|
| BLG15T65FUL-A | TO-220F | G1565FUL | Tube |

BLG15T65FUL-A

(2) Package type

(1) Chip name

(1) BLG15T65FUL: 650V 15A
(2) A:TO-220F




XXXX：Product Code

YYWW：Year & Week

ZZ：Assembly Code

SSSSS：Lot Code

## 2. ABSOLUTE RATINGS

at $T_C$ = 25°C, unless otherwise specified

| Symbol | Parameter | Rating | Units |
|---|---|---|---|
| $V_{CES}$ | Collector-Emitter Voltage | 650 | V |
| $I_C$ | Collector Current @$T_C$=25°C | 30 | A |
| | Collector Current @$T_C$=100°C | 15 | A |
| $I_{CM}$ | Pulsed Collector Current (Note1) @$T_C$=25°C | 60 | A |
| $I_F$ | Diode Continuous Forward Current @$T_C$=25°C | 30 | A |
| | Diode Continuous Forward Current @$T_C$=100°C | 15 | A |
| $I_{FM}$ | Diode Maximum Forward Current @$T_C$=25°C | 60 | A |
| $V_{GES}$ | Gate-Emitter Voltage | ±30 | V |
| $P_D$ | Power Dissipation @$T_C$=25°C | 35 | W |
| $T_{Jmax}$, $T_{stg}$ | Operating Junction and Storage Temperature Range | 150, –55 to 175 | ℃ |
| $T_L$ | Maximum Temperature for Soldering | 270 | ℃ |

## 3. Thermal characteristics

| Symbol | Parameter | RATINGS | Units |
|---|---|---|---|
| $R_{\theta JC}$ | Junction-to-Case (IGBT) | 4.2 | ℃/W |
| $R_{\theta JC}$ | Junction-to-Case (Diode) | 6.5 | ℃/W |
| $R_{\theta JA}$ | Junction-to-Ambient | 62.5 | ℃/W |

## 4. Electrical Characteristics

at $T_C$ = 25°C, unless otherwise specified

**OFF Characteristics**

| Symbol | Parameter | Test Conditions | Values | | | Units |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $V_{CES}$ | Collector-Emitter Breakdown Voltage | $V_{GE}$ = 0V, $I_C$ = 250μA | 650 | -- | -- | V |
| $I_{CES}$ | Collector-Emitter Leakage Current | $V_{CE}$ = 650V, $V_{GE}$ = 0V | -- | -- | 4 | μA |
| $I_{GES(F)}$ | Gate-Emitter Leakage Current | $V_{GE}$ = +30V | -- | -- | 200 | nA |
| $I_{GES(R)}$ | Gate-Emitter Reverse Leakage | $V_{GE}$ = -30V | -- | -- | -200 | nA |

## ON Characteristics

| Symbol | Parameter | Test Conditions | Values | | | Units |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $V_{CE(sat)}$ | Collector-Emitter Saturation Voltage | $V_{GE}$ = 15V, $I_C$ = 15A | -- | 1.4 | 1.8 | V |
| $V_{GE(TH)}$ | Gate Threshold Voltage | $V_{CE}$ = $V_{GE}$, $I_C$ = 1mA | 5.1 | 5.8 | 6.5 | V |
| Pulse width tp≤300μs, δ≤2% | | | | | | |

## Dynamic Characteristics

| Symbol | Parameter | Test Conditions | Values | | | Units |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $C_{iss}$ | Input Capacitance | $V_{GE}$=0V<br>$V_{CE}$=25V<br>f =1.0MHz | -- | 890 | -- | pF |
| $C_{oss}$ | Output Capacitance | | -- | 45 | -- | |
| $C_{rss}$ | Reverse Transfer Capacitance | | -- | 10 | -- | |
| Qg | Total Gate Charge | $I_C$=15A<br>$V_{CE}$=520V<br>$V_{GE}$=15V | -- | 45 | -- | nC |

## Switching Characteristics

| Symbol | Parameter | Test Conditions | Values | | | Units |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $t_{d(ON)}$ | Turn-on Delay Time | $I_C$ =15A<br>$V_{CE}$ = 400V<br>$V_{GE}$ = 15V<br>$R_G$ =10Ω<br>$T_J$=25°C<br>Inductive Load | -- | 16 | -- | ns |
| tr | Rise Time | | -- | 30 | -- | |
| $t_{d(OFF)}$ | Turn-Off Delay Time | | -- | 50 | -- | |
| $t_f$ | Fall Time | | -- | 95 | -- | |
| $E_{on}$ | Turn-On Switching Loss | | -- | 0.46 | -- | mJ |
| $E_{off}$ | Turn-Off Switching Loss | | -- | 0.26 | -- | |
| $E_{ts}$ | Total Switching Loss | | -- | 0.72 | -- | |

## Diode Characteristics

| Symbol | Parameter | Test Conditions | Values | | | Units |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $V_F$ | Diode Forward Voltage | $I_F$=15A | -- | 1.8 | 2.2 | V |
| $T_{rr}$ | Reverse Recovery Time | $I_F$=15A,<br>di/dt=200A/us,<br>$T_J$=25°C | -- | 50 | -- | ns |
| $Q_{rr}$ | Reverse Recovery Charge | | -- | 105 | -- | nC |
| $I_{rrm}$ | Reverse Recovery Current | | -- | 4.0 | -- | A |

Note1: Pulse width limited by maximum junction temperature

## 5. Characteristics Curves

**Figure 1. Forward Bias Safe Operating Area**

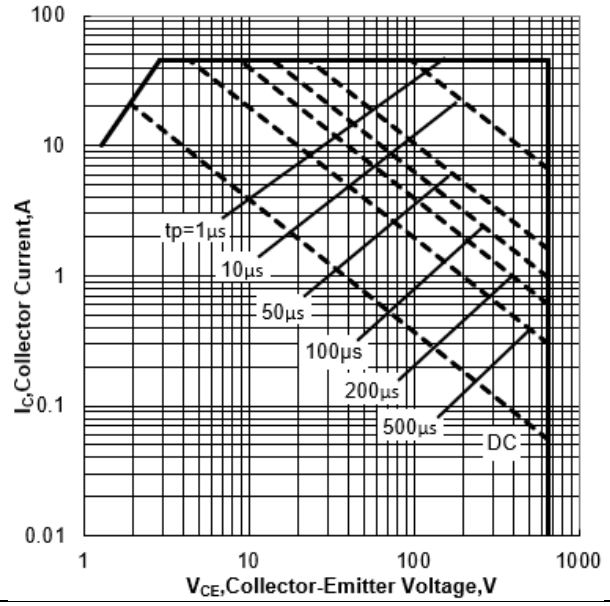



**Figure 2. Power Dissipation vs Case Temperature**

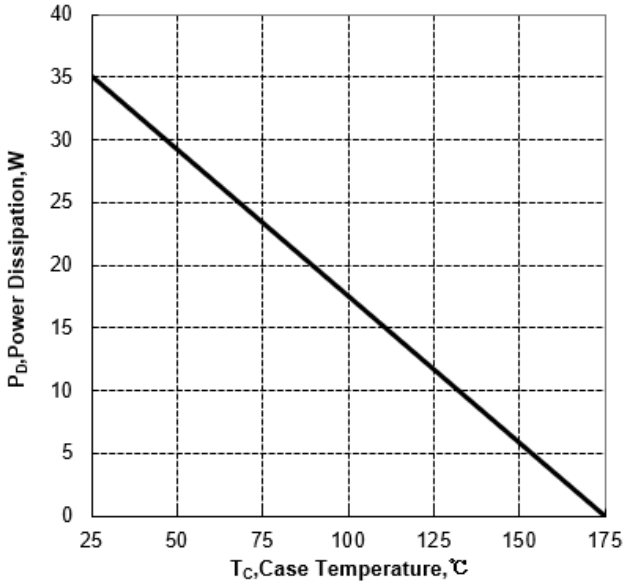



**Figure 3. Collector Current vs Case Temperature**

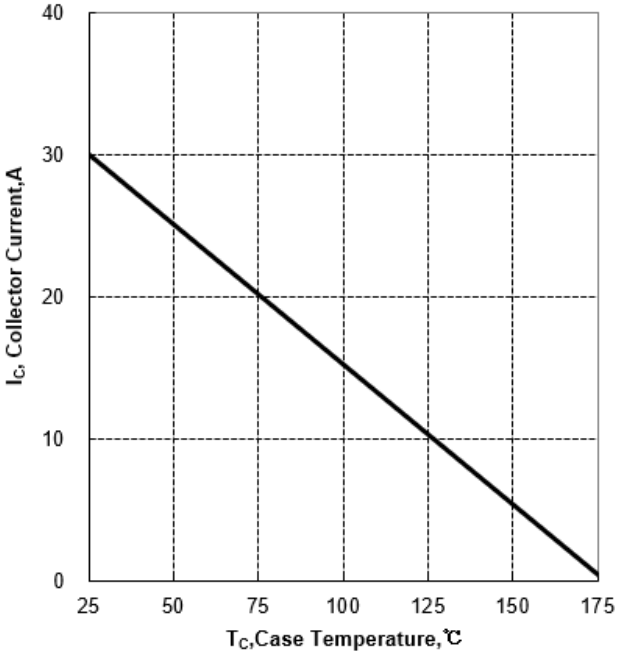



**Figure 4. Typical Transfer Characteristics**

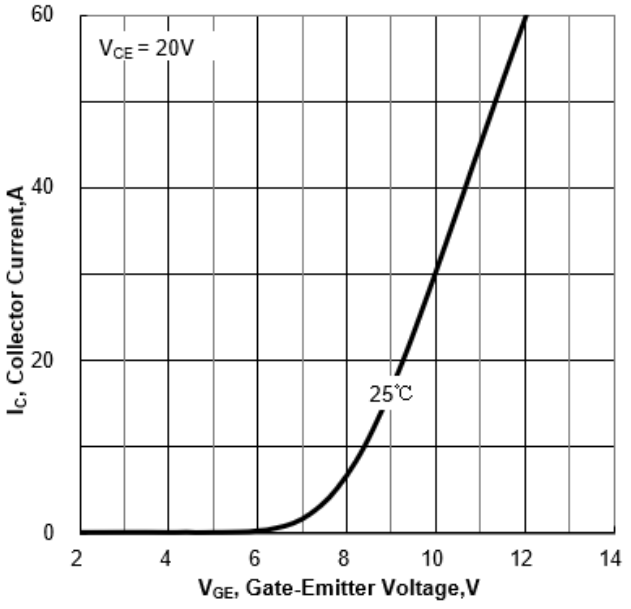


**Figure 5. Typical Output Characteristics($T_C$=25℃)**

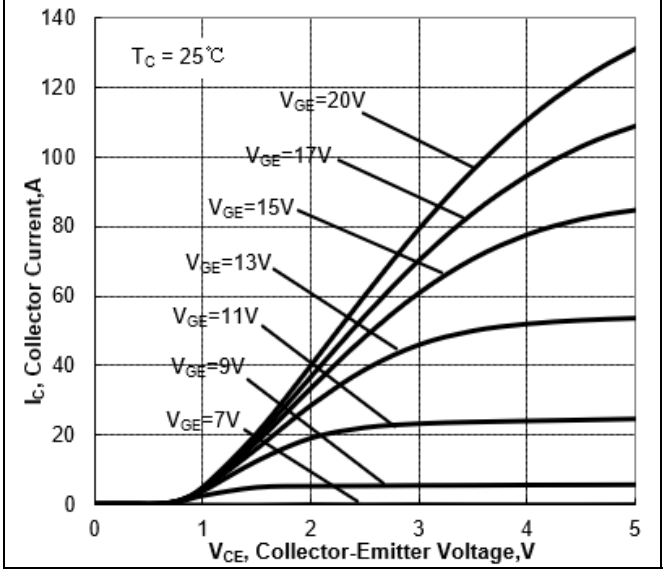



**Figure 6. Typical Gate Charge**

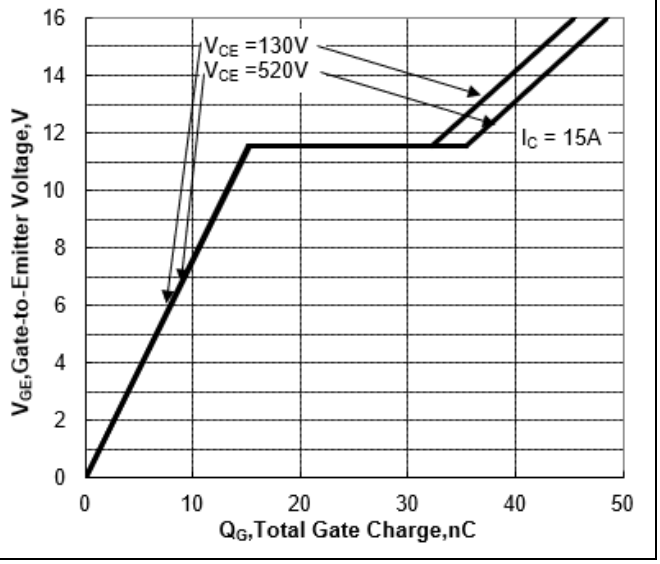



**Figure 7. Typical Capacitance vs Collector-Emitter Voltage**

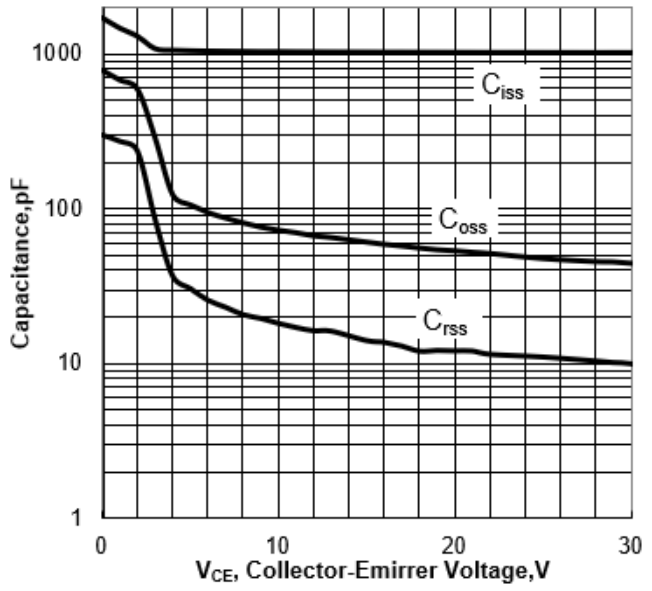



**Figure 8. IGBT Transient Thermal Impedance vs Pulse Width**

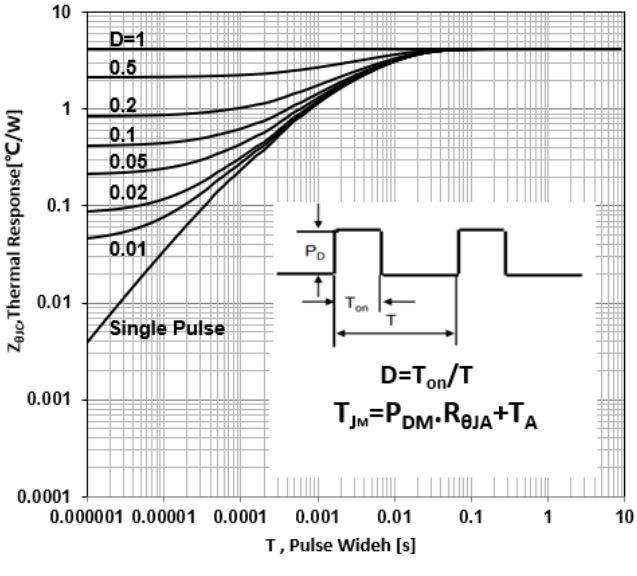


**Figure 9. Diode Transient Thermal Impedance vs Pulse Width**

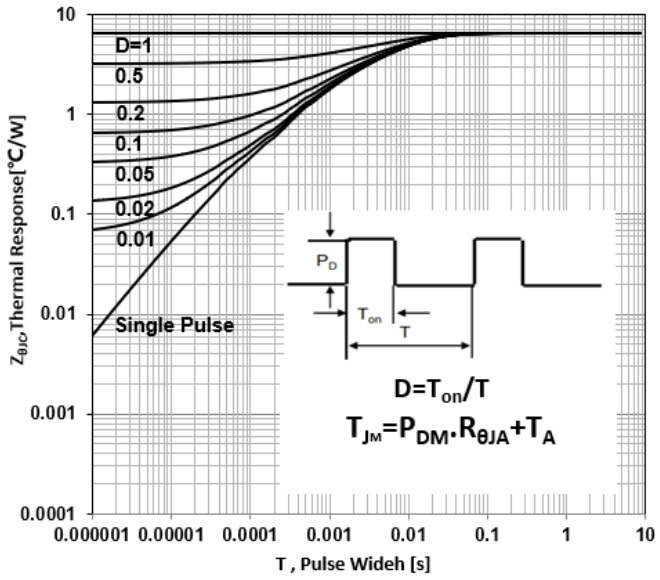
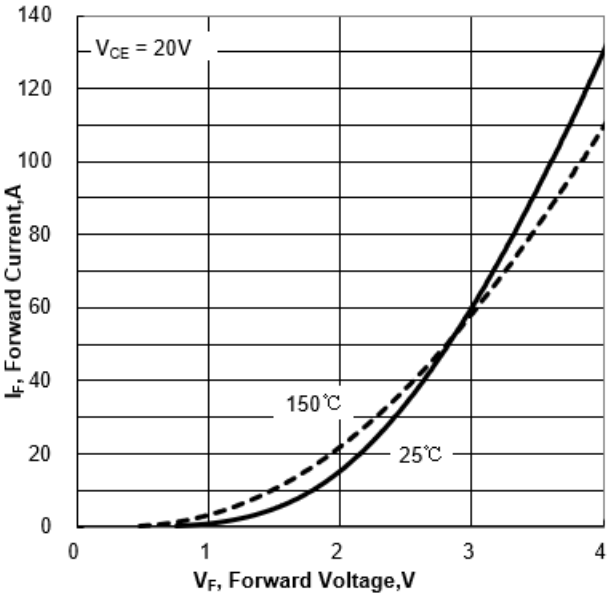



**Figure 10. Typical Diode Forward Current vs Forward Voltage**



## 6. Test Circuit and Waveform

**Figure 11. Inductive Switching Test Circuit**

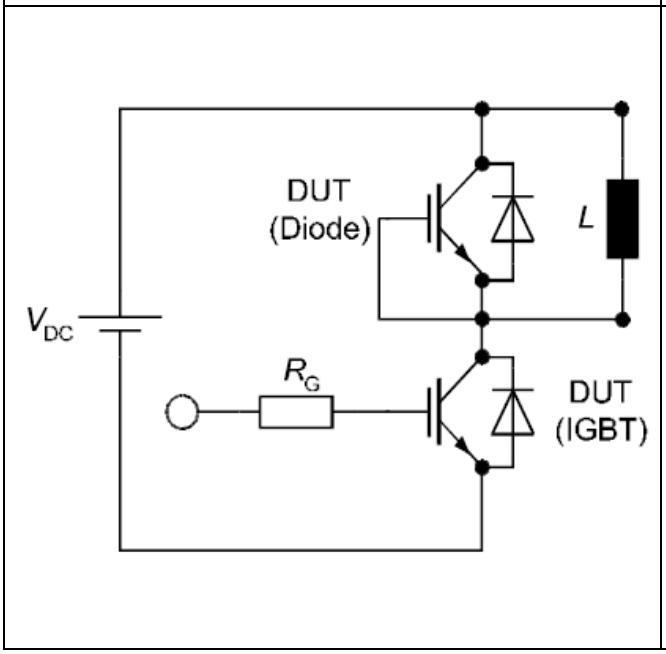



**Figure 12. Definition of switching times**

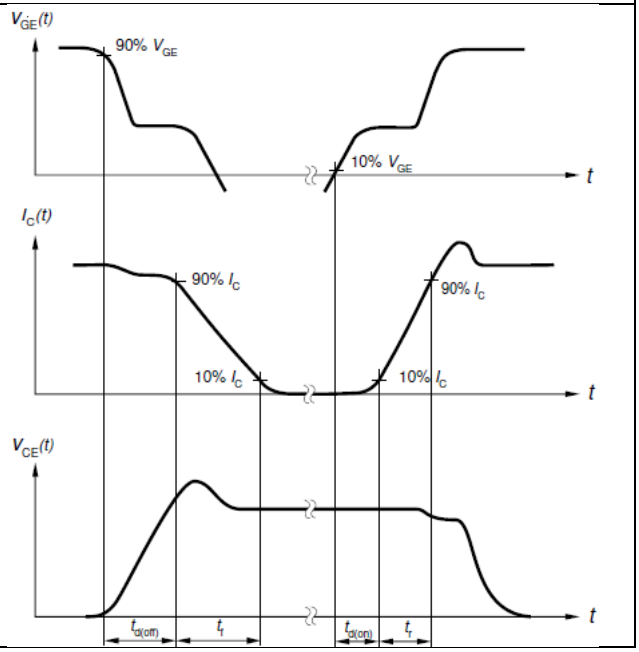



**Figure 13. Definition of switching losses**

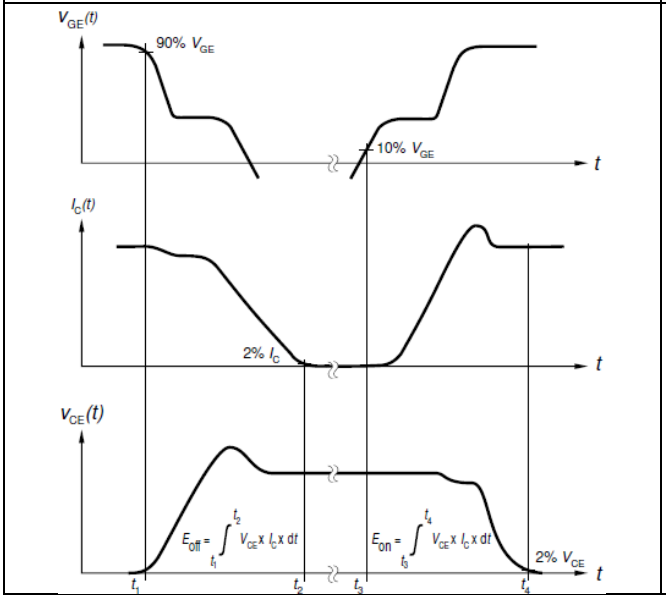
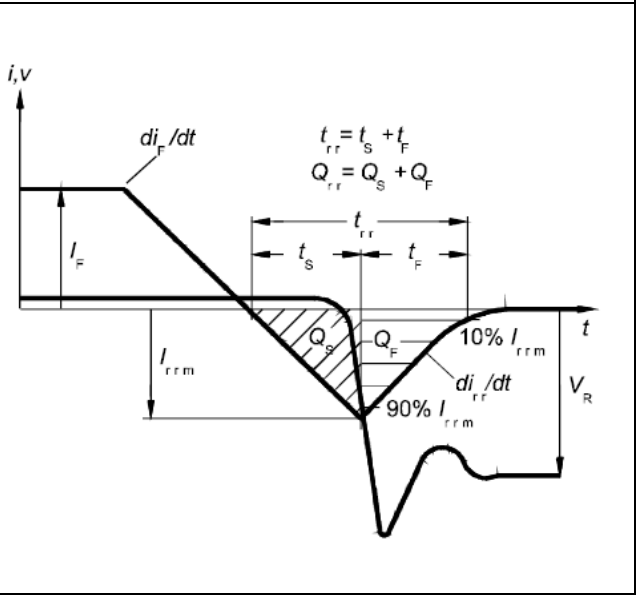
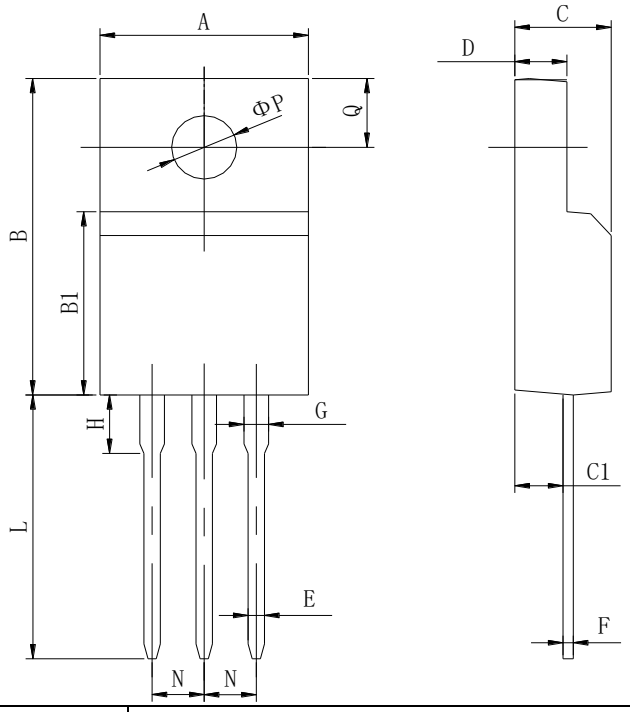



**Figure 14. Definition of diode switching characteristics**



## 7. Package Description




| Items | Values(mm) | |
|---|---|---|
| | MIN | MAX |
| A | 9.60 | 10.4 |
| B | 15.4 | 16.2 |
| B1 | 8.90 | 9.50 |
| C | 4.30 | 4.90 |
| C1 | 2.10 | 3.00 |
| D | 2.40 | 3.00 |
| E | 0.60 | 1.00 |
| F | 0.30 | 0.60 |
| G | 1.12 | 1.42 |
| H | 3.40 | 3.80 |
| | 1.60 | 2.90 |
| L | 12.0 | 14.0 |
| N | 2.34 | 2.74 |
| Q | 3.15 | 3.55 |
| ΦP | 2.90 | 3.30 |

TO-220F Package

## NOTE:

1. Exceeding the maximum ratings of the device in performance may cause damage to the device, even the permanent failure, which may affect the dependability of the machine. Please do not exceed the absolute maximum ratings of the device when circuit designing.
2. When installing the heat sink, please pay attention to the torsional moment and the smoothness of the heat sink.
3. MOSFETs is the device which is sensitive to the static electricity, it is necessary to protect the device from being damaged by the static electricity when using it.
4. Shanghai Belling reserves the right to make changes in this specification sheet and is subject to change without prior notice.

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