

Description

The DFI600SU17DF1 offer lower losses and higher energy for soft switching applications.



Features

- 1700V600 A, VCE (sat)(typ.) = 2.50V
- Lower losses and higher energy
- Excellent short-circuit capability
- 62mm single module

Applications

- Motor drive
- Inverter
- Power supply
- Wind Turbines

Circuit diagram

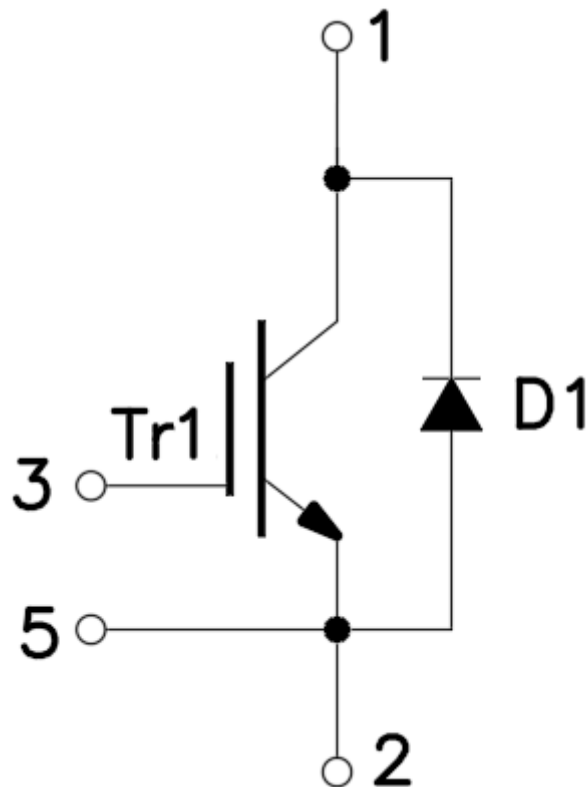


Figure 1. Out drawing & circuit diagram for DFI600SU17DF1

Pin Configuration and Marking Information

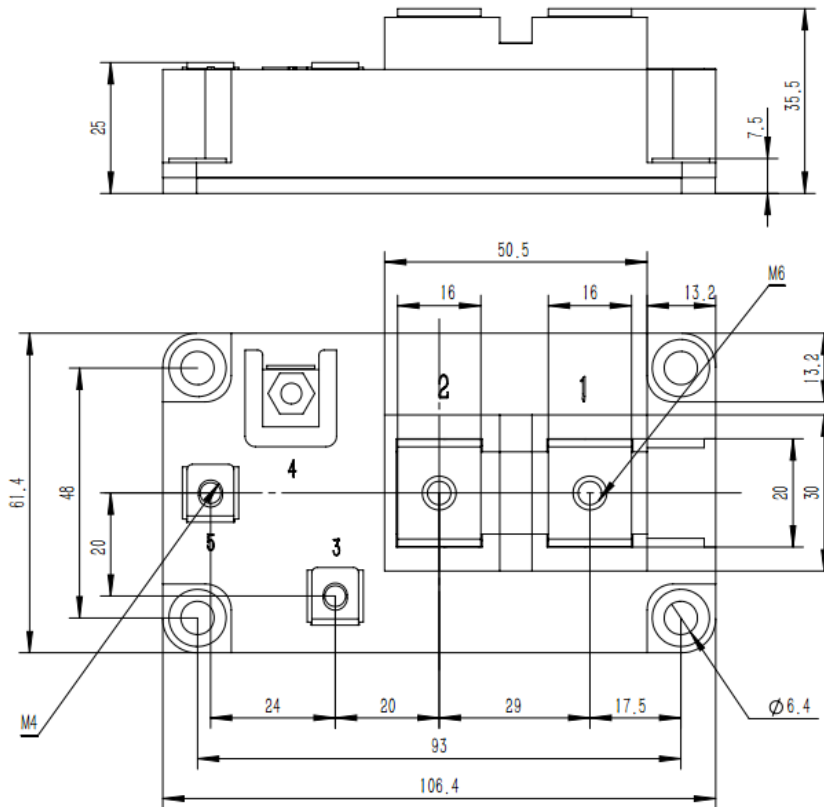


Figure 2. Pin configuration

Module

| Parameter | Conditions | Value | Unit |
|--|--|----------|------|
| Isolation Voltage | RMS, f = 50Hz, t = 1min | 4.0 | KV |
| Material of module baseplate | - | Cu | - |
| Creepage distance | terminal to heatsink terminal to terminal | 47 26 | mm |
| Clearance | terminal to heatsink terminal to terminal | 29 14 | mm |
| CTI | - | >200 | - |
| Module lead resistance, terminals – chip | T _c = 25°C | 0.8 | mΩ |
| Mounting torque for module mounting | M6 | 3 to 6 | Nm |
| Weight | - | 315 | g |

Maximum Ratings (IGBT, $T_j=25^\circ\text{C}$ unless otherwise specified)

| Symbol | Parameter | Conditions | Ratings | Unit |
|-----------|---------------------------------|---|------------------|------------------|
| V_{CES} | Collector-Emitter Voltage | G-E Short | 1700 | V |
| V_{GES} | Gate-Emitter Voltage | C-E Short | $\pm 30\text{V}$ | V |
| I_C | DC Continuous Collector Current | $T_C=100^\circ\text{C}$ | 600 | A |
| I_{CM} | Pulse Collector Current | $t_p=1\text{ms}$, Note1 | 1200 | A |
| P_C | Maximum Power Dissipation | $T_C=25^\circ\text{C}$, $T_j=150^\circ\text{C}$ (IGBT) | 2193 | W |
| T_{jop} | junction temperature | - | -40 to 150 | $^\circ\text{C}$ |
| T_{stg} | Storage temperature | - | -40 to 125 | $^\circ\text{C}$ |

Note1: Pulse width limited by maximum junction temperature

Maximum Ratings (Freewheeling diode, $T_j=25^\circ\text{C}$ unless otherwise specified)

| Symbol | Parameter | Conditions | Ratings | Unit |
|-----------|---------------------------------|---------------------------|------------|------------------|
| V_{RRM} | Peak Repetitive Revers Voltage | - | 1700 | V |
| I_F | Diode forward Current | - $T_C=100^\circ\text{C}$ | 600 | A |
| I_{FRM} | Repetitive peak forward Current | $t_p=1\text{ms}$, Note1 | 1200 | A |
| T_{jop} | junction temperature | - | -40 to 150 | $^\circ\text{C}$ |
| T_{stg} | Storage temperature | - | -40 to 125 | $^\circ\text{C}$ |

Note1: Pulse width limited by maximum junction temperature

IGBT Electrical characteristics ($T_j=25^\circ\text{C}$ unless otherwise specified, chip)

| Symbol | Item | Condition | Value | | | Unit | |
|---------------|--------------------------------------|--|-------------------------|-------------------------|------|------|----------|
| | | | Min. | Typ. | Max | | |
| $V_{CE(sat)}$ | Collector-Emitter Saturation Voltage | $I_C=600\text{A}$ | $T_j=25^\circ\text{C}$ | - | 2.50 | 2.70 | V |
| | | $V_{GE}=15\text{V}$ | | $T_j=125^\circ\text{C}$ | - | 2.80 | 3.0 |
| $V_{GE(th)}$ | Gate-Emitter threshold Voltage | $I_C=25\text{mA}$, $V_{CE}=V_{GE}$ | | 4.5 | - | 5.7 | V |
| Q_G | Gate charge | $V_{GE}=-15\text{V}$ to $+15\text{V}$ | | - | 5500 | - | nC |
| R_{Gint} | Internal gate resistor | $f=1\text{M}$, $V_{pp}=1\text{V}$ | $T_j=25^\circ\text{C}$ | - | 1.76 | - | Ω |
| C_{ies} | Input Capacitance | $V_{CE}=25\text{V}$, $V_{GE}=0\text{V}$ $f=1\text{MHz}$ | $T_j=25^\circ\text{C}$ | - | 50 | - | nF |
| C_{oes} | Output Capacitance | | | - | 5.9 | - | nF |
| C_{res} | Reverse transfer Capacitance | | | - | 4.6 | - | nF |
| I_{CES} | Collector- Emitter Cut off Current | $V_{CE}=1700\text{V}$, $V_{GE}=0\text{V}$ | $T_j=25^\circ\text{C}$ | - | - | 5 | mA |
| I_{GES} | Gate-Emitter Leakage Current | $V_{GE}=\pm 30\text{V}$, $V_{CE}=0\text{V}$ | $T_j=25^\circ\text{C}$ | - | - | 500 | nA |
| $t_{d(on)}$ | Turn-on delay time | $V_{CC}=900\text{V}$ $I_C=600\text{A}$ $R_G=1.5\Omega$ | $T_j=25^\circ\text{C}$ | - | 290 | - | ns |
| | | | $T_j=125^\circ\text{C}$ | - | 105 | - | |
| t_r | Rise time | $V_{GE}=\pm 15\text{V}$ Inductive Load | $T_j=25^\circ\text{C}$ | - | 82 | - | ns |
| | | | $T_j=125^\circ\text{C}$ | - | 71 | - | |
| $t_{d(off)}$ | Turn-off delay time | | $T_j=25^\circ\text{C}$ | - | 660 | - | ns |
| | | | $T_j=125^\circ\text{C}$ | - | 720 | - | |

| | | | | | | | |
|----------------------|---|--|------------------------|---|-----|-------|------|
| t _f | Fall time | V _{CC} = 900V | T _j = 25°C | - | 220 | - | ns |
| | | | T _j = 125°C | - | 380 | - | |
| E _{on} | Turn-on power dissipation | I _C = 600A R _G = 1.5Ω | T _j = 25°C | - | 108 | - | mJ |
| | | | T _j = 125°C | - | 120 | - | |
| E _{off} | Turn-off power dissipation | V _{GE} = ±15V Inductive Load | T _j = 25°C | - | 92 | - | mJ |
| | | | T _j = 125°C | - | 158 | - | |
| R _{th(j-c)} | Thermal Resistance, Junction to Case (IGBT) | | - | - | - | 0.057 | °C/W |

Freewheeling Diode Electrical characteristics (T_j = 25°C unless otherwise specified, chip)

| Symbol | Item | Condition | Value | | | Unit | |
|----------------------|--|---|------------------------|------|-----|-------|------|
| | | | Min. | Typ. | Max | | |
| V _F | Diode Forward Voltage | I _F = 600A, V _{GE} = 0V | T _j = 25°C | - | 2.5 | 2.7 | V |
| | | | T _j = 125°C | - | 2.4 | - | |
| t _{rr} | Diode Reverse Recovery Time | I _F = 600A, di/dt = 6000A/μs, V _R = 900V, V _{GE} = -15V | T _j = 25°C | - | 142 | - | nS |
| | | | T _j = 125°C | - | 250 | - | |
| I _{rr} | Peak reverse recovery Current | I _F = 600A, di/dt = 6000A/μs, V _R = 900V, V _{GE} = -15V | T _j = 25°C | - | 420 | - | A |
| | | | T _j = 125°C | - | 510 | - | |
| Q _{rr} | Recovered charge | I _F = 600A, di/dt = 6000A/μs, V _R = 900V, V _{GE} = -15V | T _j = 25°C | - | 39 | - | uC |
| | | | T _j = 125°C | - | 72 | - | |
| E _{rr} | Reverse recovered energy | I _F = 600A, di/dt = 6000A/μs, V _R = 900V, V _{GE} = -15V | T _j = 25°C | - | 23 | - | mJ |
| | | | T _j = 125°C | - | 45 | - | |
| R _{th(j-c)} | Thermal Resistance, Junction to Case (Diode) | | - | - | - | 0.074 | °C/W |

Test Conditions

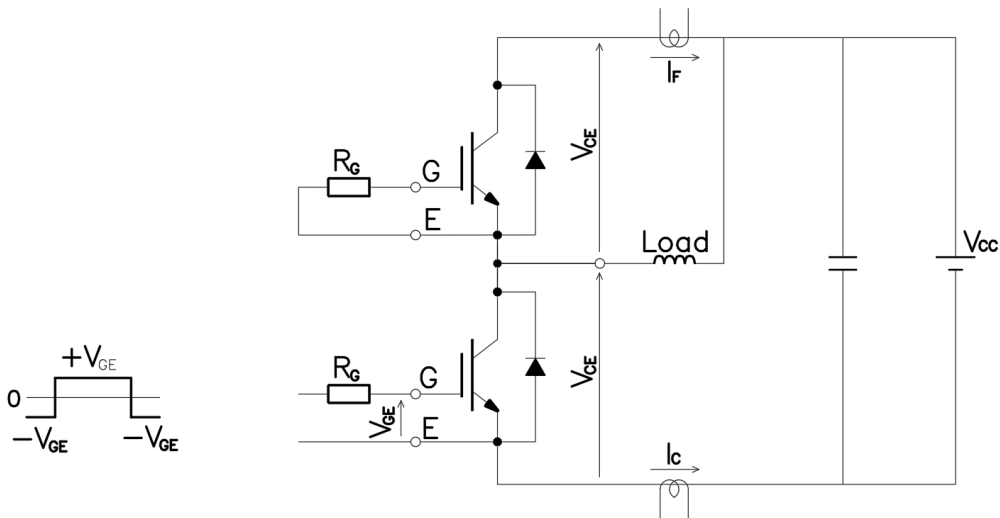


Figure 3. Switching time measure circuit

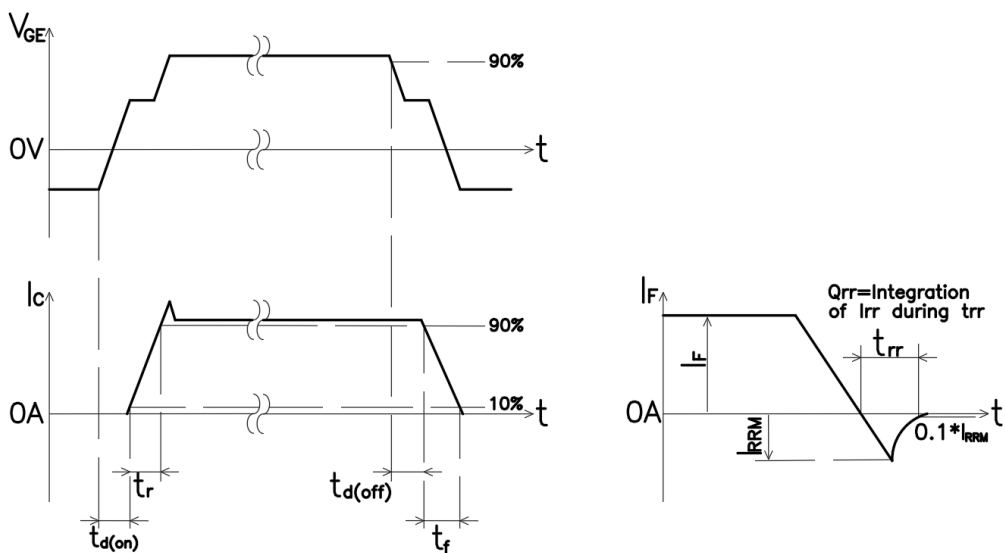


Figure 4. Switching time definition

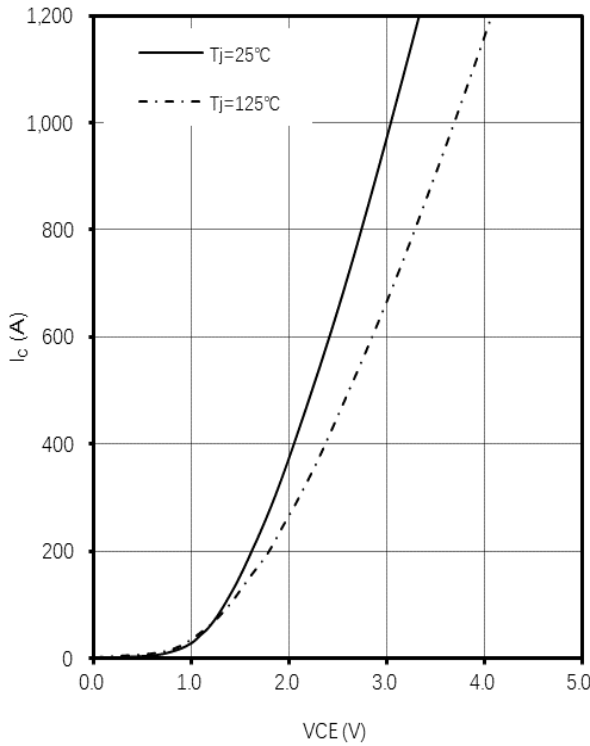


Figure 5. I_c vs V_{CE}
 $V_{GE}=15V$

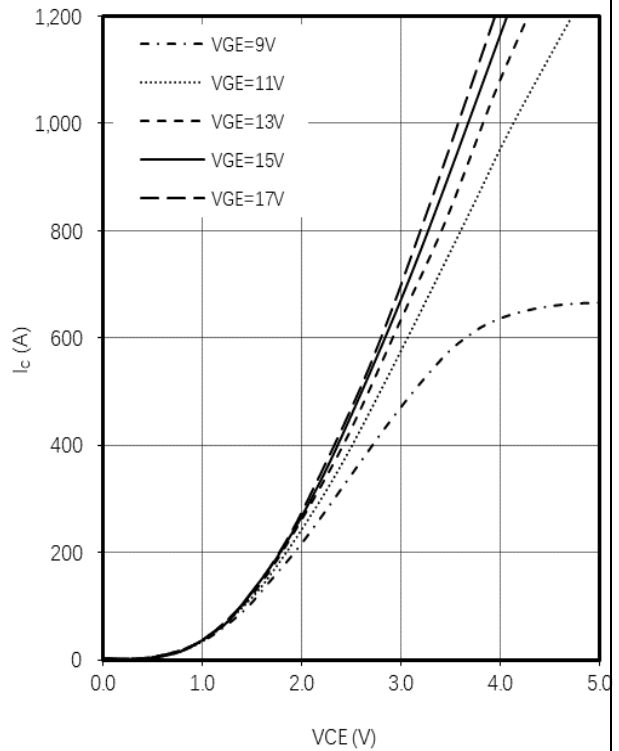


Figure 6. I_c vs V_{CE}
 $T_j=125^\circ C$

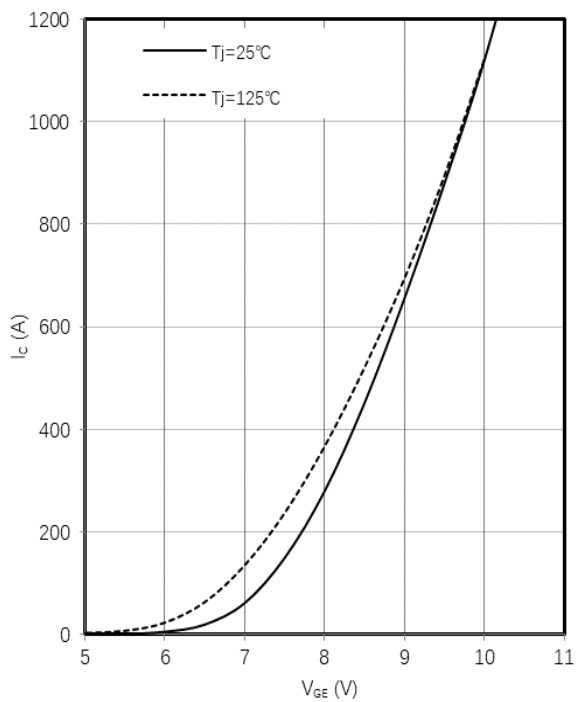


Figure 7. I_c vs V_{GE}
 $V_{CE}=20V$

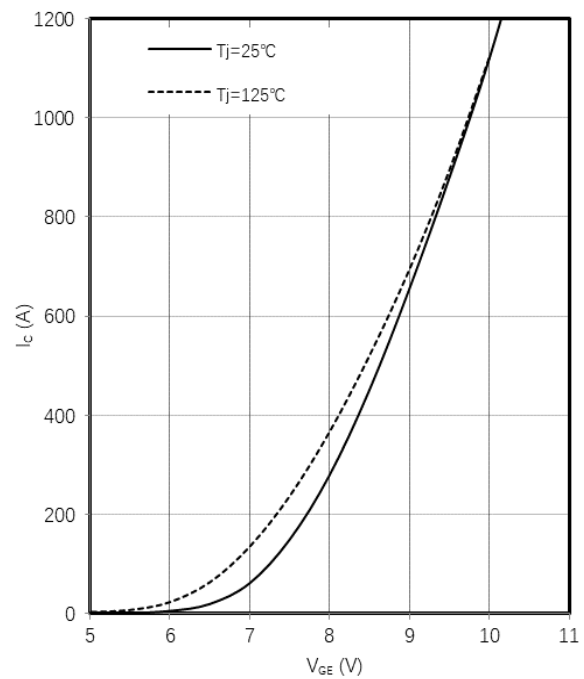


Figure 8. E_{on}, E_{off} vs $I_c(Typ)$
 $V_{CC}=900V, V_{GE}=+15V/-15V, R_G=1.5\Omega$

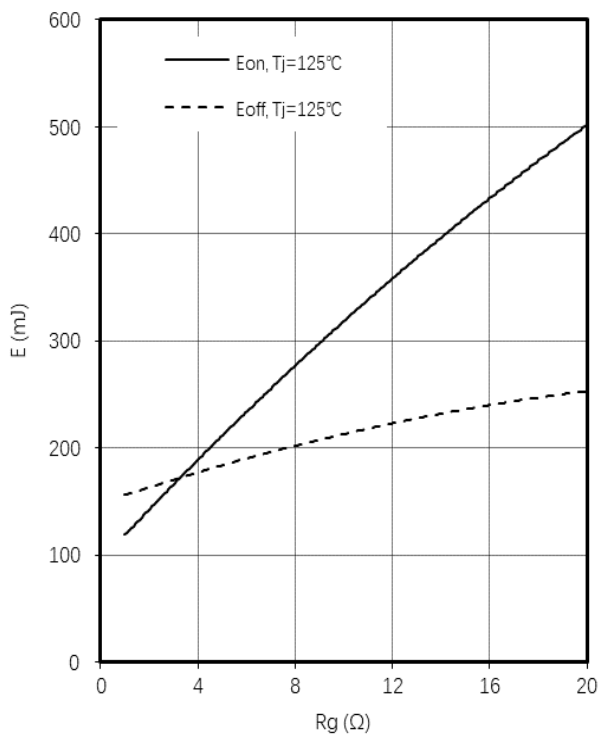


Figure 9. E_{on}, E_{off} vs R_g(Typ)
 $V_{CC}=900V, V_{GE}=+15V/-15V, I_C=600A$

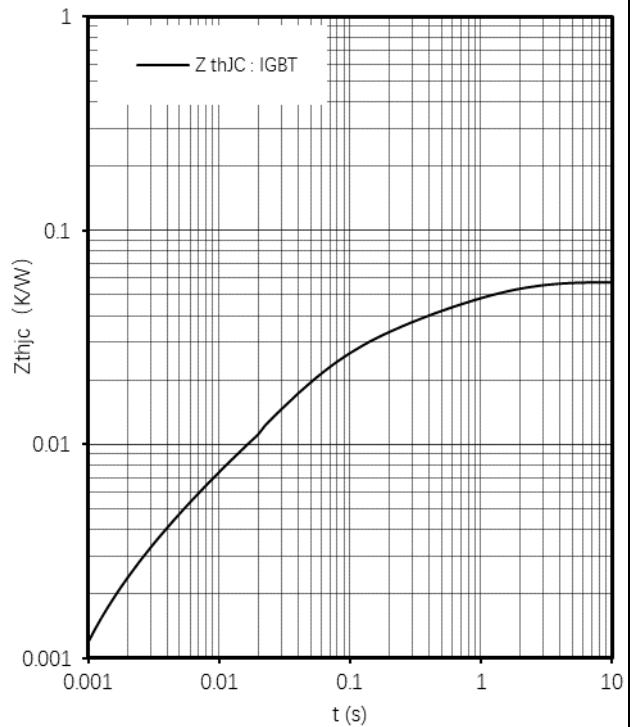


Figure 10. Transient thermal impedance IGBT ,
 $Z_{thjc}=f(t)$

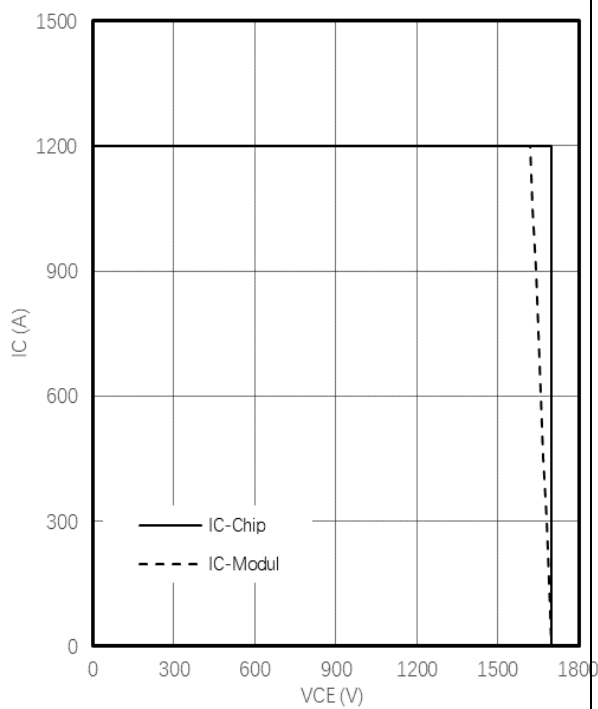


Figure 11. Reverse bias safe operating area IGBT,
 $I_C=f(V_{CE}), V_{GE}=\pm 15V, R_{Goff}=1.5\Omega, T_{vj}=125^\circ C$

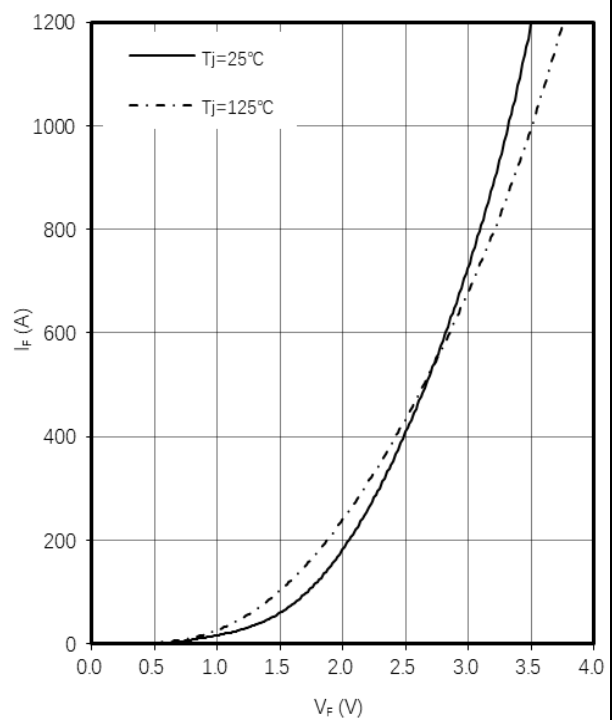
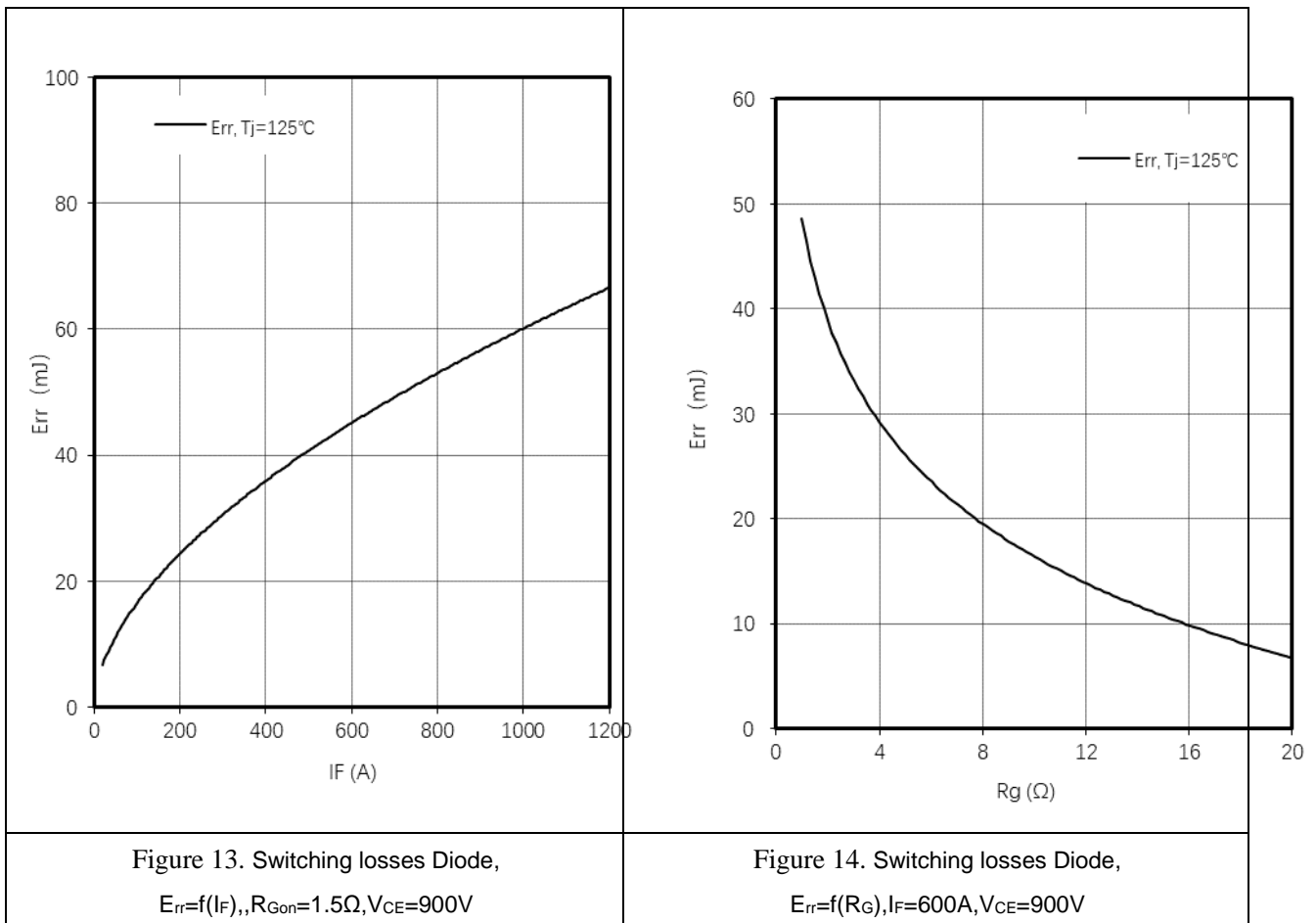


Figure 12. Forward characteristic of Diode ,
 $I_F=f(V_F)$



IMPORTANT NOTICE:

This product data sheet describes the characteristics of this product for which a warranty is granted. Any such warranty is granted exclusively under the terms and conditions of the supply agreement. There will be no guarantee or of any kind for the product and its characteristics.

The data contained in this document is exclusively intended for technically trained staff. You and your technical departments will have to evaluate the product's suitability for the intended application and the completeness of the product data concerning such application.

Due to technical requirements, our product may contain dangerous substances. For information on the types in question, please contact the sales staff responsible for you.

Changes to this product data sheet are reserved.

Please contact the sales staff (Sales@leapers-power.com) for further information on the product, technology, delivery terms, conditions and prices.