



Features

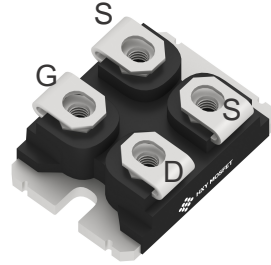
- Wide bandgap SiC MOSFET technology
- Low On-Resistance with High Blocking Voltage
- Low Capacitances with High-Speed switching
- Low reverse recovery(Qrr)
- Halogen free, RoHs compliant

Benefits

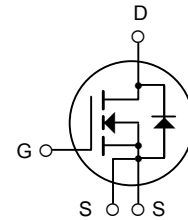
- Reduce switching losses
- Increased system Switching Frequency
- Increased power density
- Reduction of heat sink requirements

Applications

- Switch mode power supplies
- Renewable energy
- On Board Charger
- High Voltage DC/DC Converters



SOT-227



| Ordering Part Number | Package | Brand |
|----------------------|---------|------------|
| IXFN170N65X2 | SOT-227 | HXY MOSFET |

Maximum Ratings (T_c = 25 °C unless otherwise specified)

| Symbol | Parameter | Test conditions | Value | Unit | Note |
|----------------------|--------------------------------|--|------------|------|---------|
| V _{DSmax} | Drain-Source Voltage | V _{GS} = 0V, I _D = 100μA | 750 | V | |
| V _{GSmax} | Gate-Source voltage | AC (f > 1 Hz) | -10/+25 | V | |
| V _{GSop} | Recommend Gate-Source Voltage | Static | -4/+18 | V | |
| I _D | Continuous Drain current | V _{GS} = 18V, T _C = 25°C | 165 | A | Fig. 14 |
| | | V _{GS} = 18V, T _C = 100°C | 117 | | |
| I _{D,pulse} | Pulsed Drain Current | Pulse with t _p limited by T _{jmax} at 1 ms Pulse with t _p limited by T _{jmax} at 100 μs | 350 703 | A | |
| P _D | Power Dissipation | T _C = 25°C, T _j = 175°C | 417 | W | Fig.16 |
| T _j | Operating junction temperature | | -55~175 | °C | |
| T _{stg} | Storage temperature | | -55~175 | °C | |



Thermal Characteristics

| Symbol | Parameter | Value | | | Unit | Note |
|--------------|---|-------|------|------|------|---------|
| | | Min. | Typ. | Max. | | |
| $R_{th(jc)}$ | Thermal resistance from Junction to Case | | 0.36 | | K/W | Fig. 15 |
| $R_{th(ja)}$ | Thermal resistance from Junction to Ambient | | 40 | | K/W | |

Electrical Characteristics (T_c = 25°C unless other wise specified)

Static Characteristics

| Symbol | Parameter | Test conditions | Value | | | Unit | Note |
|---------------|----------------------------------|--|-------|------|------|------------|--------------|
| | | | Min. | Typ. | Max. | | |
| $V_{(BR)DSS}$ | Drain-Source Breakdown voltage | $V_{GS} = 0V, I_D = 100\mu A$ | 750 | | | V | |
| $V_{GS(th)}$ | Gate Threshold voltage | $V_{GS} = V_{DS}, I_D = 36mA$ | | 2.7 | | V | Fig. 9 |
| | | $V_{GS} = V_{DS}, I_D = 36mA, T_j = 175^\circ C$ | | 1.8 | | | |
| I_{GSS} | Gate-Source Leakage current | $V_{GS} = 18V, V_{DS} = 0V$ | | | 250 | nA | |
| I_{DSS} | Zero Gate Voltage Drain Current | $V_{DS} = 750V, V_{GS} = 0V, T_j = 25^\circ C$ | | 1 | 50 | μA | |
| $R_{DS(on)}$ | Drain-Source On-state Resistance | $V_{GS} = 18V, I_D = 80A$ | | 11 | 15 | m Ω | Fig. 3, 4, 5 |
| | | $V_{GS} = 18V, I_D = 80A, T_j = 175^\circ C$ | | 15 | | | |
| g_{fs} | Transconductance | $V_{DS} = 18V, I_D = 80A$ | | 83 | | S | Fig. 6 |
| | | $V_{DS} = 18V, I_D = 80A, T_j = 175^\circ C$ | | 66 | | | |



Gate Charge Characteristics

| Symbol | Parameter | Test conditions | Value | | | Unit | Note |
|----------|-----------------------|--|-------|------|------|------|---------|
| | | | Min. | Typ. | Max. | | |
| Q_{GS} | Gate to Source Charge | $V_{DS} = 400V$ $I_D = 80A$ $V_{GS} = -4V/18V$ | | 125 | | nC | Fig. 10 |
| Q_{GD} | Gate to Drain Charge | | | 52 | | | |
| Q_G | Total Gate Charge | | | 268 | | | |

AC Characteristics

| Symbol | Parameter | Test conditions | Value | | | Unit | Note |
|--------------|------------------------------|---|-------|------|------|----------|---------|
| | | | Min. | Typ. | Max. | | |
| C_{iss} | Input Capacitance | $V_{GS} = 0V, V_{DS} = 600V$ $f = 1\text{ MHz}$ $V_{AC} = 25mV$ | | 6220 | | pF | Fig. 13 |
| C_{oss} | Output Capacitance | | | 482 | | pF | |
| C_{rss} | Reverse Transfer Capacitance | | | 37 | | pF | |
| $R_{G(int)}$ | Internal Gate Resistance | $f = 1\text{ MHz}, V_{AC} = 25mV$ | | 1 | | Ω | |



Reverse Diode Characteristics

| Symbol | Parameter | Test conditions | Value | | | Unit | Note |
|----------------|----------------------------------|--|-------|------|------|------|----------|
| | | | Min. | Typ. | Max. | | |
| V_{SD} | Diode Forward Voltage | $V_{GS} = -4V, I_{SD} = 20A$ | | 3.5 | | V | Fig. 7,8 |
| | | $V_{GS} = -4V, I_{SD} = 20A, T_j = 175^{\circ}C$ | | 3.1 | | | |
| I_S | Continuous Diode Forward Current | $V_{GS} = -4V, T_C = 25^{\circ}C$ | | 103 | | A | |
| $I_{S, pulse}$ | Diode pulse Current | $V_{GS} = -4V, \text{pulse width } t_p \text{ limited by } T_{jmax}$ | | 350 | | A | |

Module Characteristic

| Symbol | Parameter | Test conditions | Value | | | Unit | Note |
|------------|----------------------------|---|-------|------|------|-------------|------|
| | | | Min. | Typ. | Max. | | |
| V_{ISOL} | Isolation Test Voltage | RMS, $f = 50Hz, t = 60sec,$ $I_{ISOL} \leq 10mA$ | | 4.3 | | kV | |
| T_{STG} | Storage Temperature | | -55 | | 150 | $^{\circ}C$ | |
| M | Terminal Connection Torque | Screw M4 | 1 | | 1.5 | Nm | |
| | Mounting Torque | Screw M4 | 1 | | 1.5 | | |
| G | Weight of Module | | | 29 | | g | |
| | Creepage Distance | Terminal to Heatsink | | 11.5 | | mm | |
| | | Terminal to Terminal | | 12 | | | |
| | Clearance Distance | Terminal to Heatsink | | 9.6 | | mm | |
| | | Terminal to Terminal | | 7 | | | |



Typical Performance

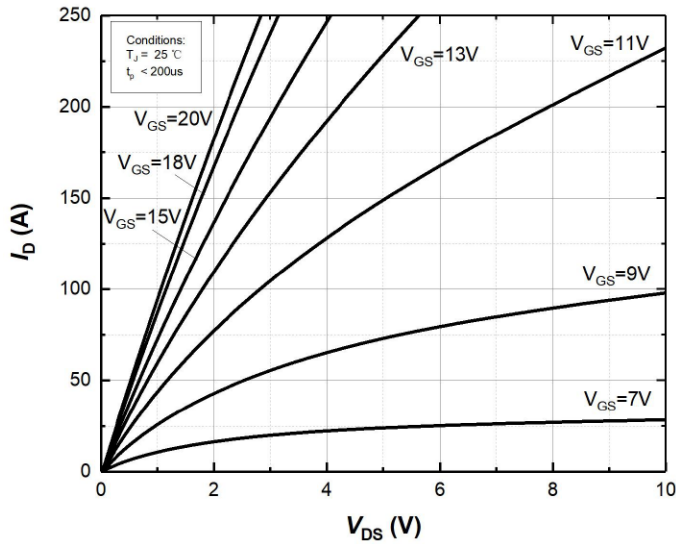


Figure 1. Output characteristics at $T_j=25^\circ\text{C}$

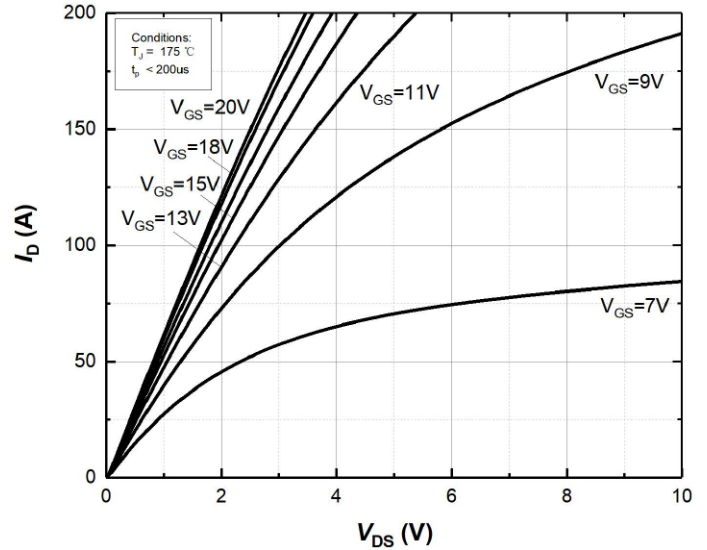


Figure 2. Output characteristics at $T_j=175^\circ\text{C}$

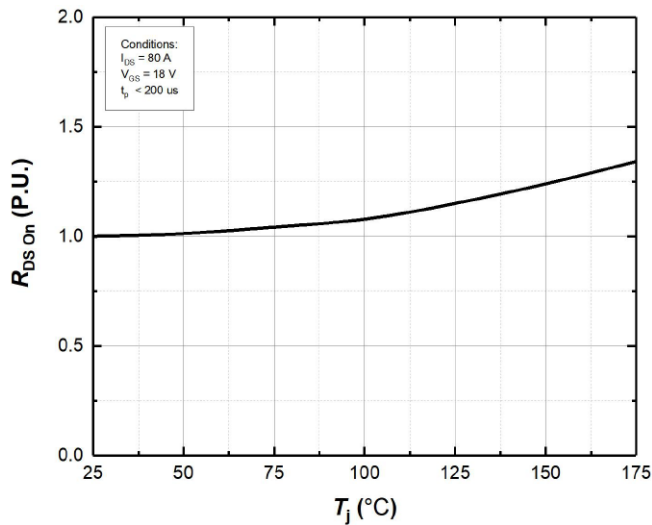


Figure 3. Normalized On-Resistance vs. Temperature

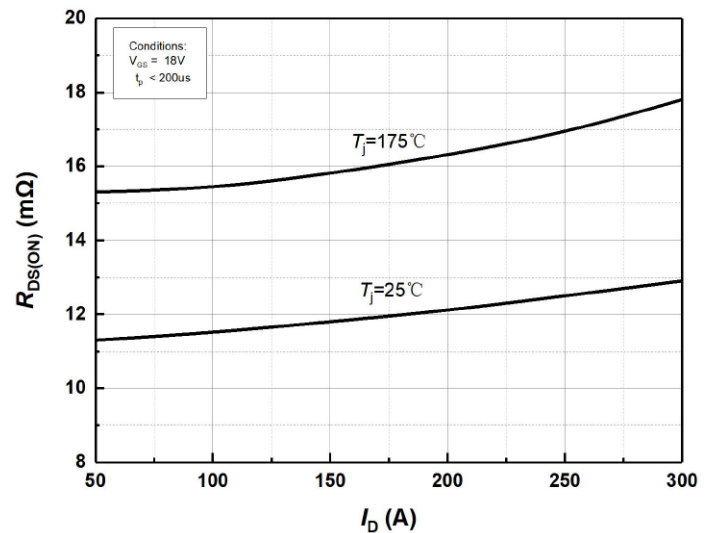


Figure 4. On-Resistance vs. Drain current for Various Temperature

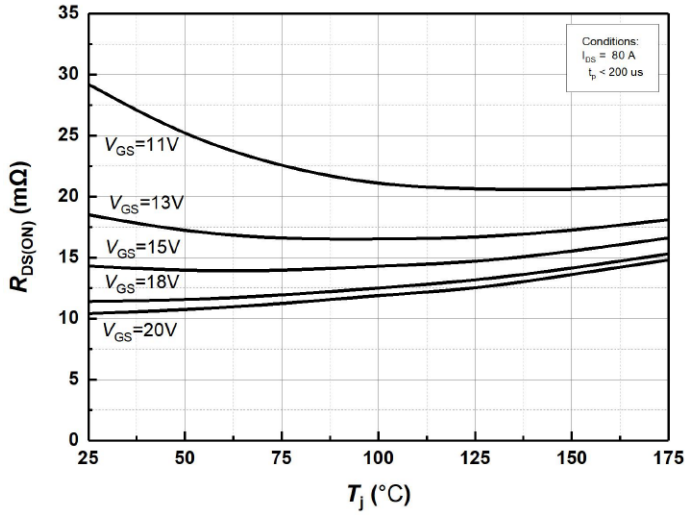


Figure 5. On-Resistance vs. Temperature for Various Gate Voltage

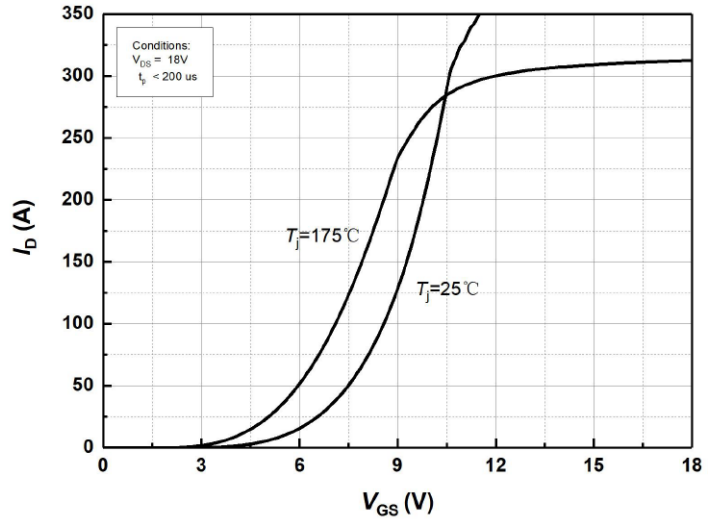


Figure 6. Transfer Characteristics for Various Junction Temperatures

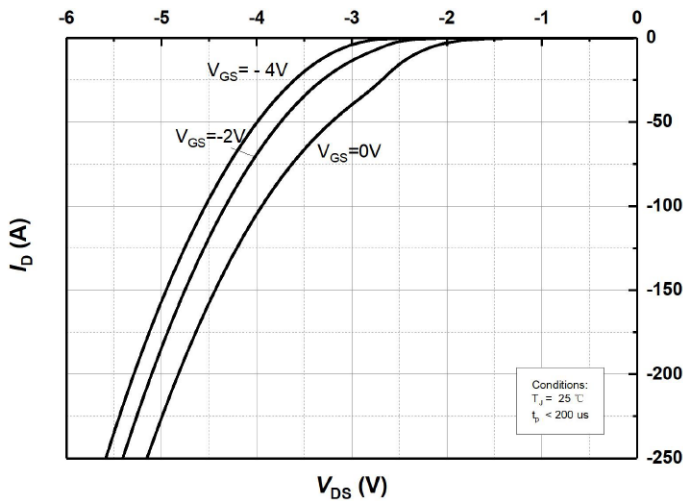


Figure 7. Body Diode Characteristics at $T_J=25^{\circ}C$

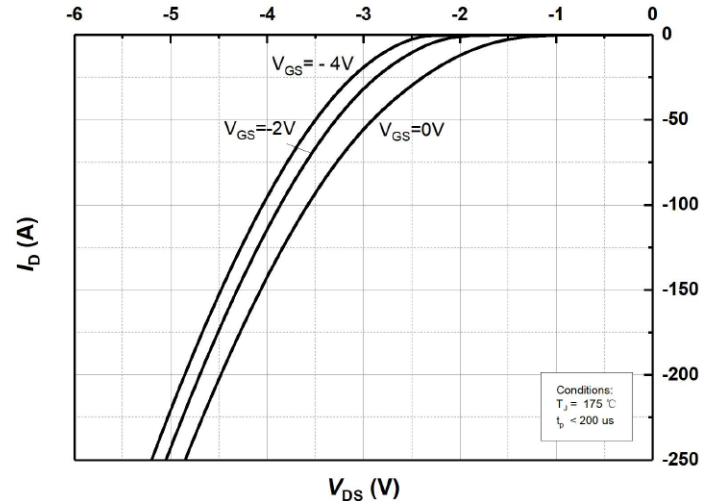


Figure 8. Body Diode Characteristics at $T_J=175^{\circ}C$

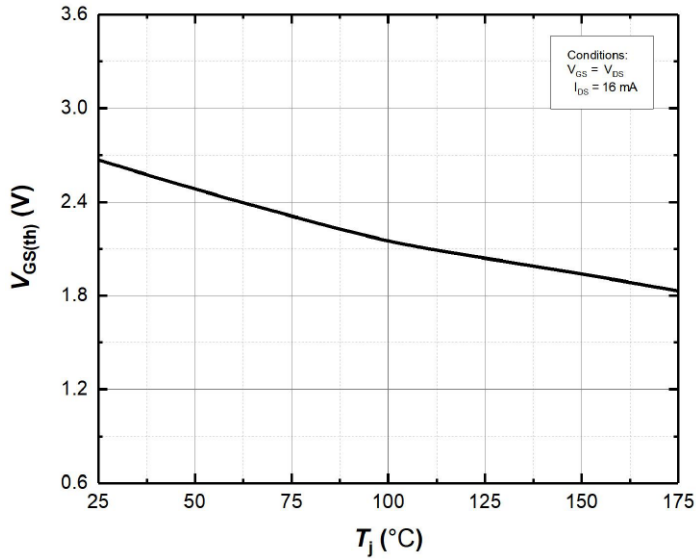


Figure 9. Threshold Voltage vs. Temperature

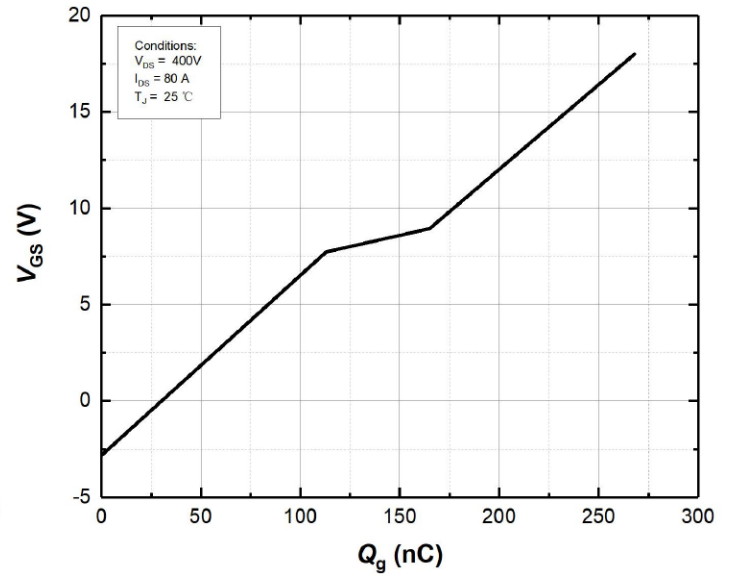


Figure 10 Gate Charge Characteristics

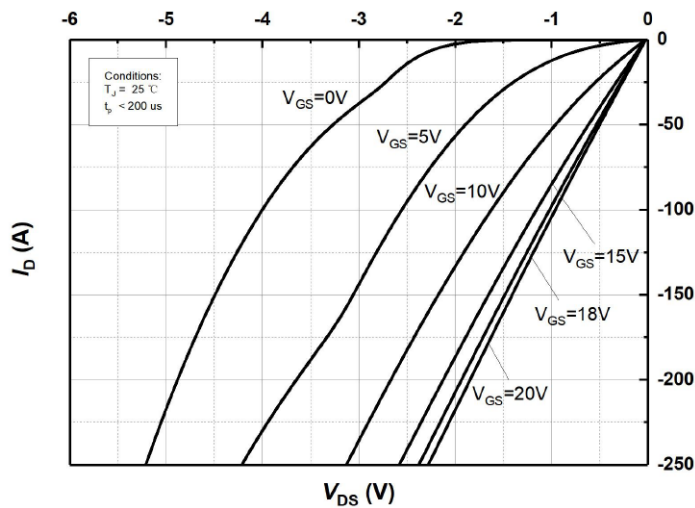


Figure 11. 3rd Quadrant Characteristic at $T_J=25\text{ °C}$

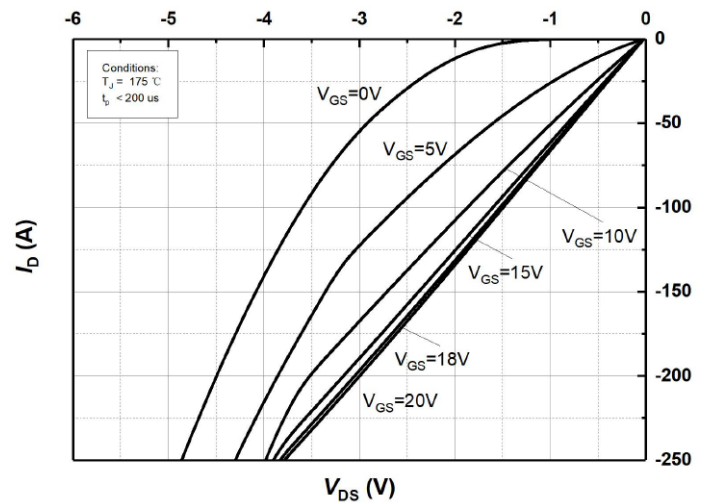


Figure 12. 3rd Quadrant Characteristic at $T_J=175\text{ °C}$

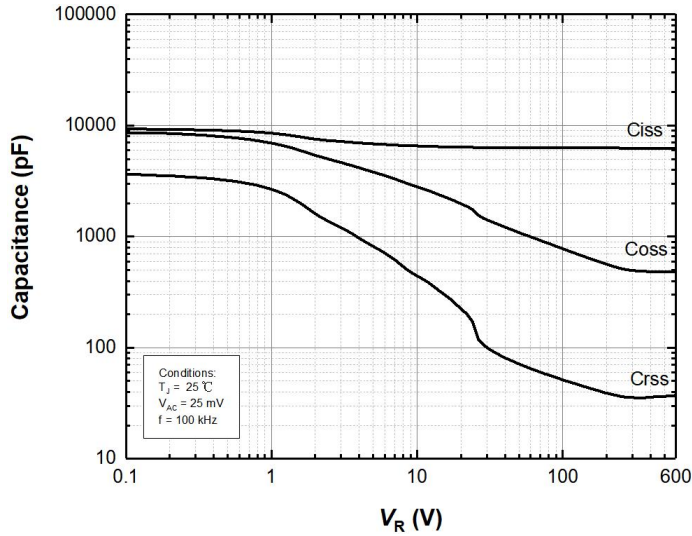


Figure 13. Capacitances vs. Drain-Source Voltage (0 – 600V)

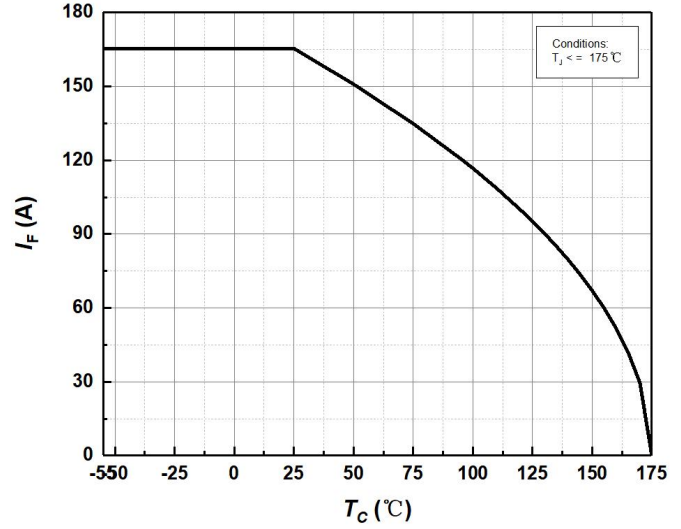


Figure 14. Continuous Drain Current Derating vs Case Temperature

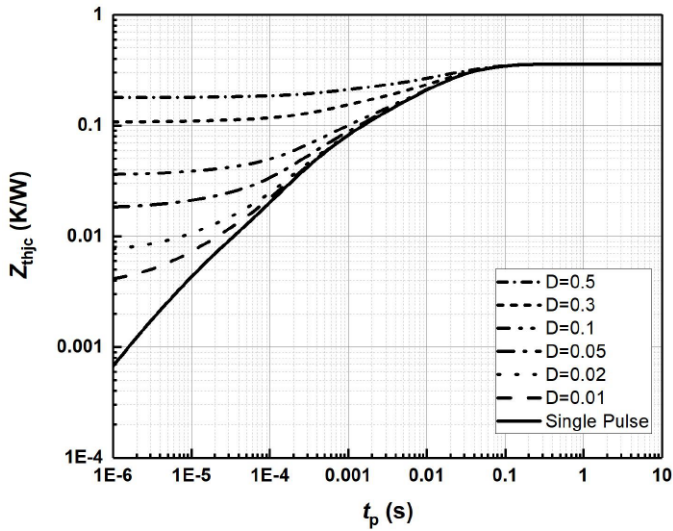


Figure 15. Transient Thermal Impedance (Junction – Case)

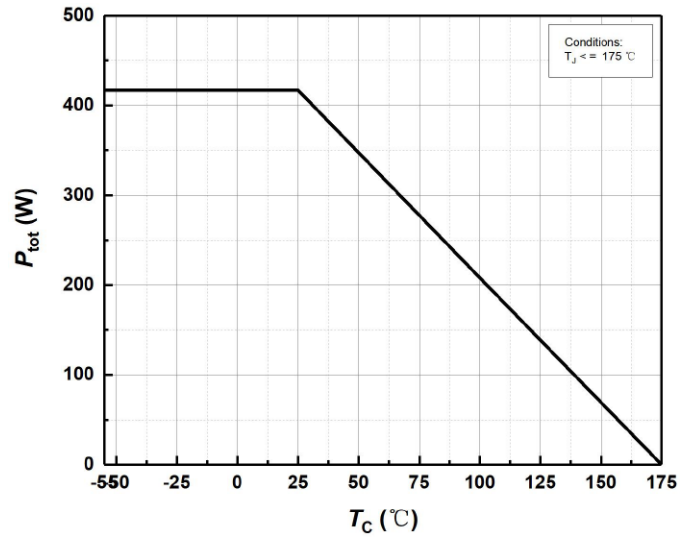


Figure 16. Maximum Power Dissipation Derating vs. Case Temperature

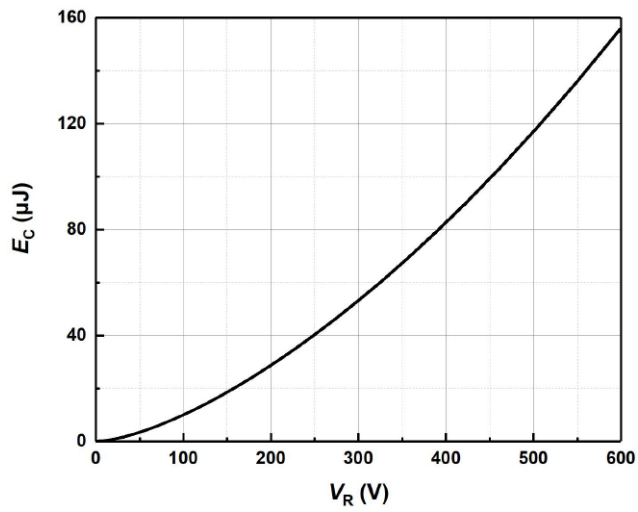


Figure 17. Output Capacitor Stored Energy

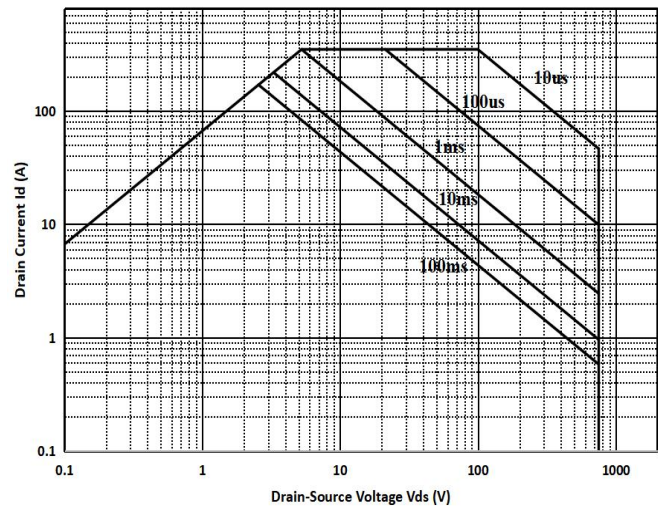
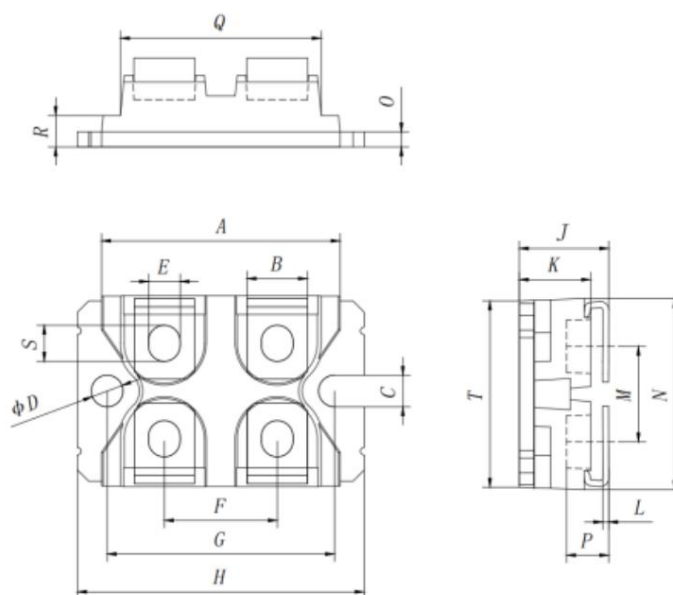


Figure 18. Safe Operating Area



Package Dimensions

Package SOT-227



| SYMBOLS | DIMENSION IN MM | | |
|---------|-----------------|-------|-------|
| | MIN | NOM | MAX |
| A | 31.60 | 31.80 | 32.60 |
| B | 7.90 | 8.10 | 8.30 |
| C | 4.10 | 4.20 | 4.30 |
| D | 4.10 | 4.20 | 4.30 |
| E | 4.10 | 4.20 | 4.30 |
| F | 14.80 | 15.00 | 15.20 |
| G | 30.00 | 30.20 | 30.40 |
| H | 37.90 | 38.10 | 38.30 |
| J | 11.75 | 11.95 | 12.15 |
| K | 9.40 | 9.60 | 9.80 |
| L | 0.75 | 0.80 | 0.85 |
| M | 12.40 | 12.70 | 13.00 |
| N | 25.50 | 25.70 | 25.90 |
| O | 1.90 | 2.00 | 2.10 |
| P | 5.30 | 5.60 | 5.90 |
| Q | 26.50 | 26.70 | 27.20 |
| R | 3.90 | 4.20 | 4.50 |
| S | 4.55 | 4.75 | 4.95 |
| T | 24.70 | 25.00 | 25.30 |



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