



## Features

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

## Benefits

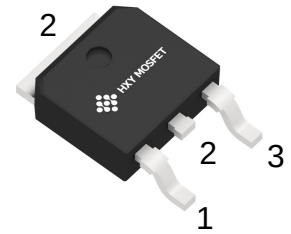
- Reduce switching losses
- Increased system Switching Frequency
- Increased power density
- Reduction of heat sink requirements

## Applications

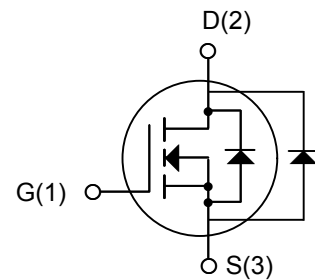
- Switch mode power supplies
- Renewable energy
- On Board Charger
- High Voltage DC/DC Converters



| Ordering Part Number | Package   | Brand      |
|----------------------|-----------|------------|
| SIHD6N65E-GE3        | TO-252-2L | HXY MOSFET |



TO-252-2L



## Maximum Ratings (T<sub>C</sub> = 25 °C unless otherwise specified)

| Symbol               | Parameter                       | Test conditions                                                                                | Value   | Unit | Note    |
|----------------------|---------------------------------|------------------------------------------------------------------------------------------------|---------|------|---------|
| V <sub>DSmax</sub>   | Drain-Source Voltage            | V <sub>GS</sub> = 0V, I <sub>D</sub> = 100μA                                                   | 800     | V    |         |
| V <sub>GS</sub>      | Gate-Source voltage (transient) | t <sub>p</sub> ≤ 500ns, duty cycle ≤ 1%                                                        | -8/+20  | V    |         |
| V <sub>GSop</sub>    | Recommend Gate-Source Voltage   | Static                                                                                         | -4/+18  | V    |         |
| EAS                  | Single pulse avalanche energy   | V <sub>DS</sub> =800V, V <sub>DD</sub> =50V, V <sub>GS</sub> =15V, L=1mH, T <sub>C</sub> =25°C | 32      | mJ   |         |
| I <sub>D</sub>       | Continuous Drain current        | V <sub>GS</sub> = 18V, T <sub>C</sub> = 25°C                                                   | 10.2    | A    | Fig. 14 |
|                      |                                 | V <sub>GS</sub> = 18V, T <sub>C</sub> = 100°C                                                  | 7.2     |      |         |
| I <sub>D,pulse</sub> | Pulsed Drain Current            | Pulse with t <sub>p</sub> limited by T <sub>jmax</sub>                                         | 14      | A    |         |
| P <sub>D</sub>       | Power Dissipation               | T <sub>C</sub> = 25°C, T <sub>j</sub> = 175°C                                                  | 44.4    | W    | Fig. 16 |
| T <sub>j</sub>       | Operating junction temperature  |                                                                                                | -55~175 | °C   |         |
| T <sub>stg</sub>     | Storage temperature             |                                                                                                | -55~175 | °C   |         |



### Thermal Characteristics

| Symbol       | Parameter                                   | Value |      |      | Unit | Note    |
|--------------|---------------------------------------------|-------|------|------|------|---------|
|              |                                             | Min.  | Typ. | Max. |      |         |
| $R_{th(jc)}$ | Thermal resistance from Junction to Case    |       | 3.38 |      | K/W  | Fig. 15 |
| $R_{th(ja)}$ | Thermal resistance from Junction to Ambient |       | 40   |      | K/W  |         |

### Electrical Characteristics (T<sub>c</sub> = 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   | $V_{GS} = 0V, I_D = 100\mu A$                                                              | 800   |            |      | V          |              |
| $V_{GS(th)}$  | Gate Threshold voltage           | $V_{GS} = V_{DS}, I_D = 0.7mA$                                                             |       | 2.6        |      | V          | Fig. 9       |
|               |                                  | $V_{GS} = V_{DS}, I_D = 0.7mA, T_j = 175^\circ C$                                          |       | 1.9        |      |            |              |
| $I_{GSS}$     | Gate-Source Leakage current      | $V_{GS} = 18V, V_{DS} = 0V$                                                                |       |            | 250  | nA         |              |
| $I_{DSS}$     | Zero Gate Voltage Drain Current  | $V_{DS} = 800V, V_{GS} = 0V, T_j = 25^\circ C$                                             |       | 5          | 50   | $\mu A$    |              |
| $R_{DS(on)}$  | Drain-Source On-state Resistance | $V_{GS} = 15V, I_D = 2A$<br>$V_{GS} = 18V, I_D = 2A$                                       |       | 704<br>550 | 750  | m $\Omega$ | Fig. 3, 4, 5 |
|               |                                  | $V_{GS} = 15V, I_D = 2A, T_j = 175^\circ C$<br>$V_{GS} = 18V, I_D = 2A, T_j = 175^\circ C$ |       | 744<br>670 |      |            |              |
| $g_{fs}$      | Transconductance                 | $V_{DS} = 15V, I_D = 2A$                                                                   |       | 1.4        |      | S          | Fig. 6       |
|               |                                  | $V_{DS} = 15V, I_D = 2A, T_j = 175^\circ C$                                                |       | 1.2        |      |            |              |



### Gate Charge Characteristics

| Symbol   | Parameter             | Test conditions                                     | Value |      |      | Unit | Note    |
|----------|-----------------------|-----------------------------------------------------|-------|------|------|------|---------|
|          |                       |                                                     | Min.  | Typ. | Max. |      |         |
| $Q_{GS}$ | Gate to Source Charge | $V_{DS} = 400V$<br>$I_D = 2A$<br>$V_{GS} = -4V/18V$ |       | 1.2  |      | nC   | Fig. 10 |
| $Q_{GD}$ | Gate to Drain Charge  |                                                     |       | 3.9  |      |      |         |
| $Q_G$    | Total Gate Charge     |                                                     |       | 6.6  |      |      |         |

### AC Characteristics

| Symbol       | Parameter                    | Test conditions                                                       | Value |      |      | Unit     | Note    |
|--------------|------------------------------|-----------------------------------------------------------------------|-------|------|------|----------|---------|
|              |                              |                                                                       | Min.  | Typ. | Max. |          |         |
| $C_{iss}$    | Input Capacitance            | $V_{GS} = 0V, V_{DS} = 600V$<br>$f = 1\text{ MHz}$<br>$V_{AC} = 25mV$ |       | 89   |      | pF       | Fig. 13 |
| $C_{oss}$    | Output Capacitance           |                                                                       |       | 19   |      | pF       |         |
| $C_{rss}$    | Reverse Transfer Capacitance |                                                                       |       | 2.3  |      | pF       |         |
| $R_{G(int)}$ | Internal Gate Resistance     | $f = 1\text{ MHz}, V_{AC} = 25mV$                                     |       | 8    |      | $\Omega$ |         |

### Reverse Diode Characteristics

| Symbol         | Parameter                        | Test conditions                                          | Value |      |      | Unit | Note     |
|----------------|----------------------------------|----------------------------------------------------------|-------|------|------|------|----------|
|                |                                  |                                                          | Min.  | Typ. | Max. |      |          |
| $V_{SD}$       | Diode Forward Voltage            | $V_{GS} = -4V, I_{SD} = 1A$                              |       | 1.35 |      | V    | Fig. 7,8 |
|                |                                  | $V_{GS} = -4V, I_{SD} = 1A, T_J = 175^\circ C$           |       | 1.65 |      |      |          |
| $I_S$          | Continuous Diode Forward Current | $V_{GS} = -4V, T_C = 25^\circ C$                         |       | 8.3  |      | A    |          |
| $I_{S, pulse}$ | Diode pulse Current              | $V_{GS} = -4V$ , pulse width $t_p$ limited by $T_{Jmax}$ |       | 14   |      | A    |          |



## Typical Performance

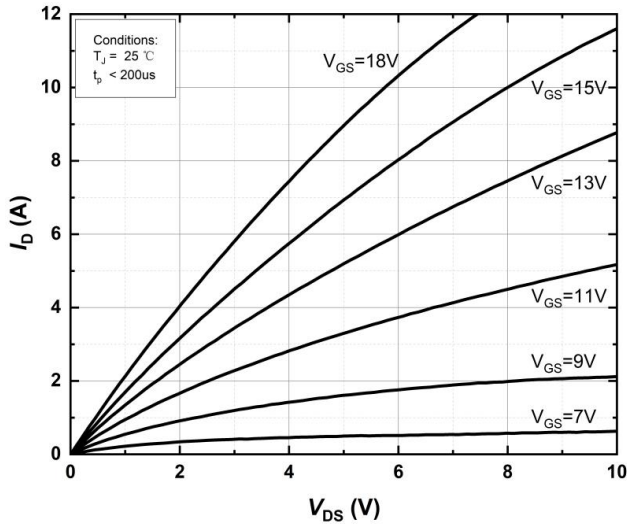


Figure 1. Output characteristics at  $T_j=25^\circ\text{C}$

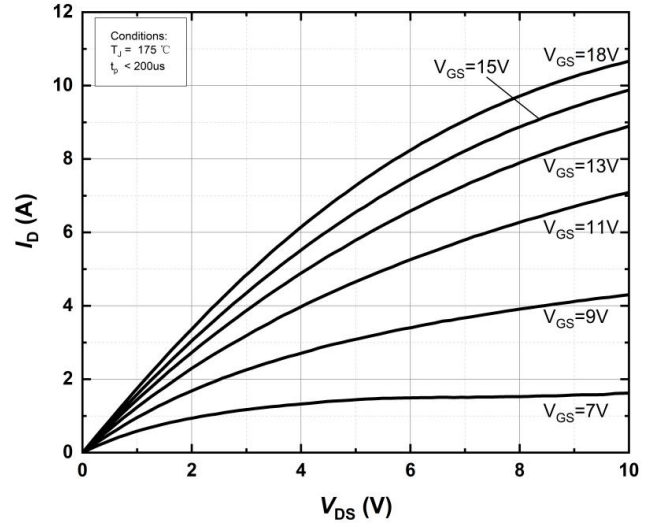


Figure 2. Output characteristics at  $T_j=175^\circ\text{C}$

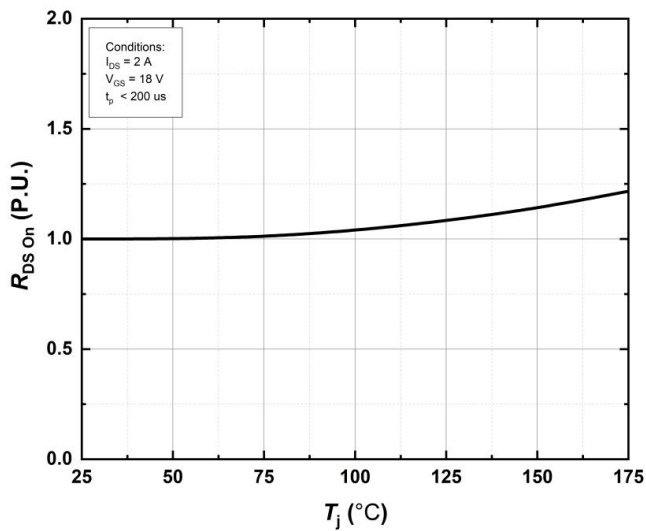


Figure 3. Normalized On-Resistance vs. Temperature

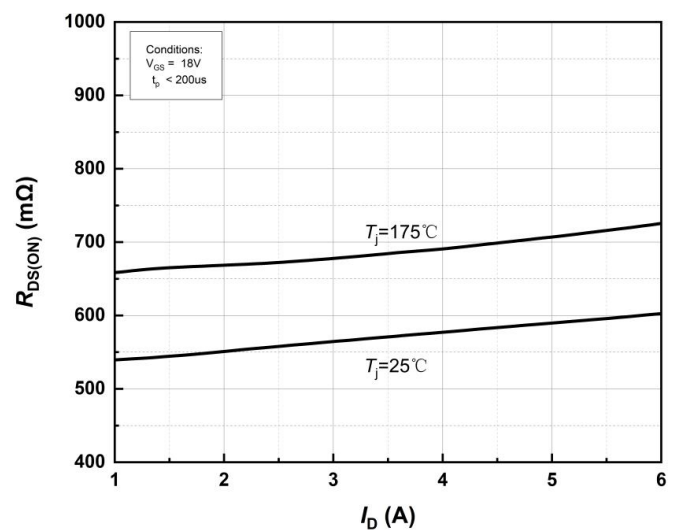


Figure 4. On-Resistance vs. Drain current for Various Temperature

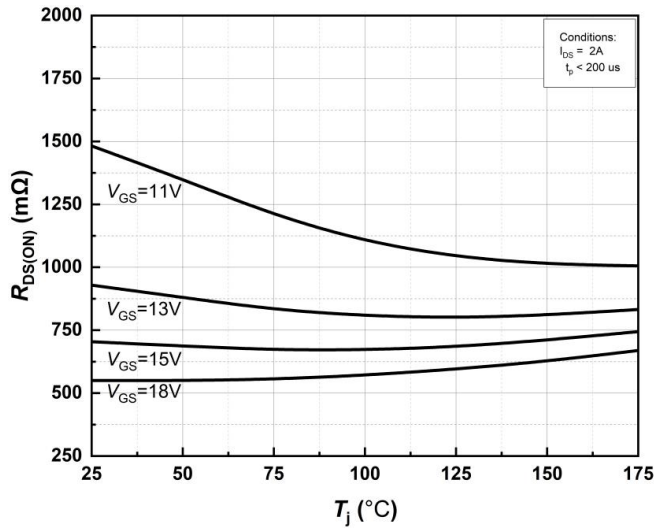


Figure 5. On-Resistance vs. Temperature for Various Gate Voltage

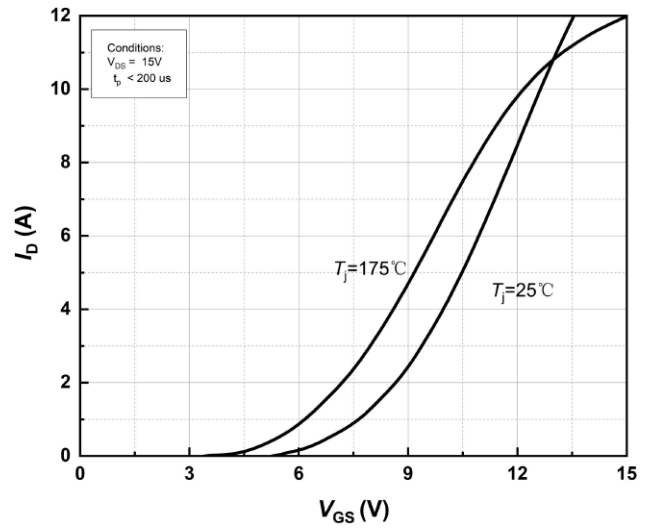


Figure 6. Transfer Characteristics for Various Junction Temperatures

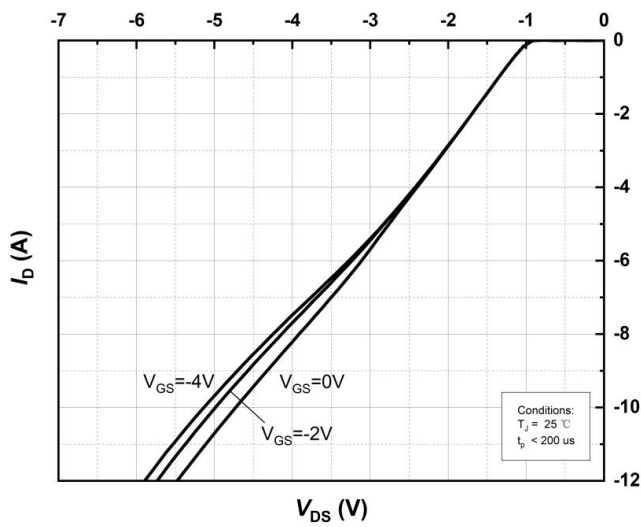


Figure 7. Body Diode Characteristics at  $T_j=25^{\circ}C$

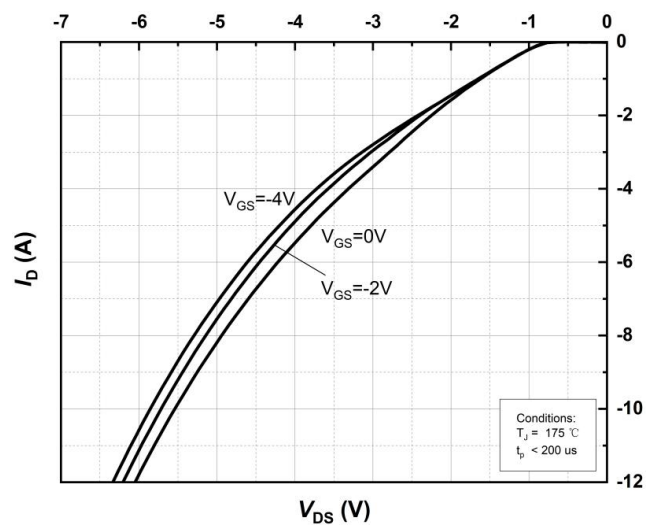


Figure 8. Body Diode Characteristics at  $T_j=175^{\circ}C$

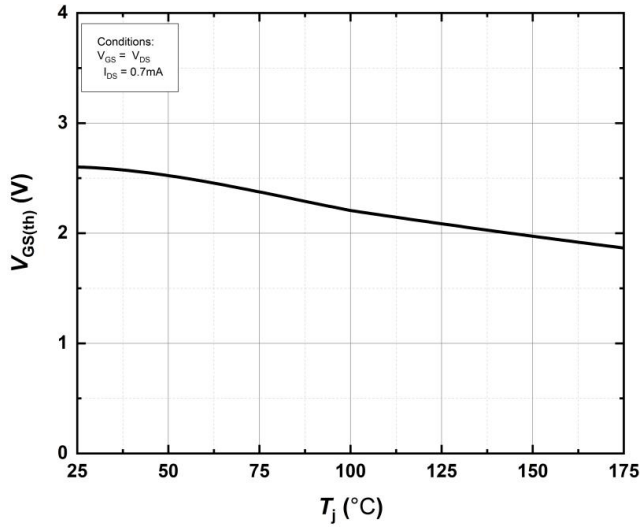


Figure 9. Threshold Voltage vs. Temperature

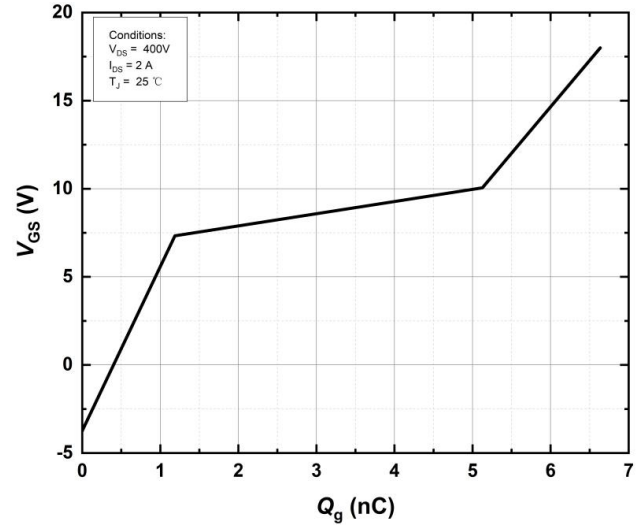


Figure 10 Gate Charge Characteristics

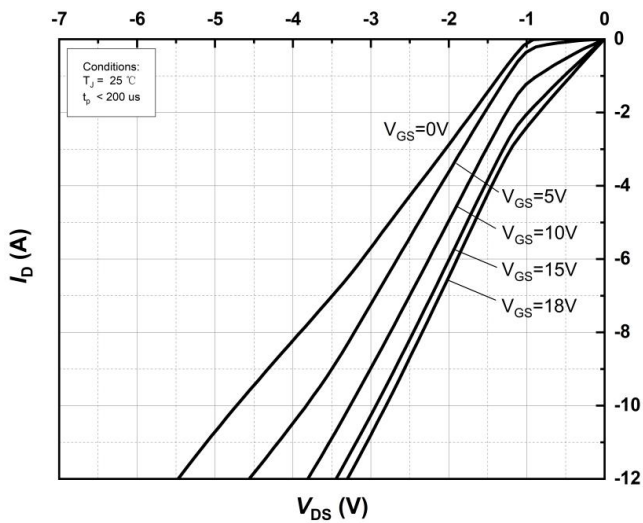


Figure 11. 3rd Quadrant Characteristic at  $T_J=25^\circ C$

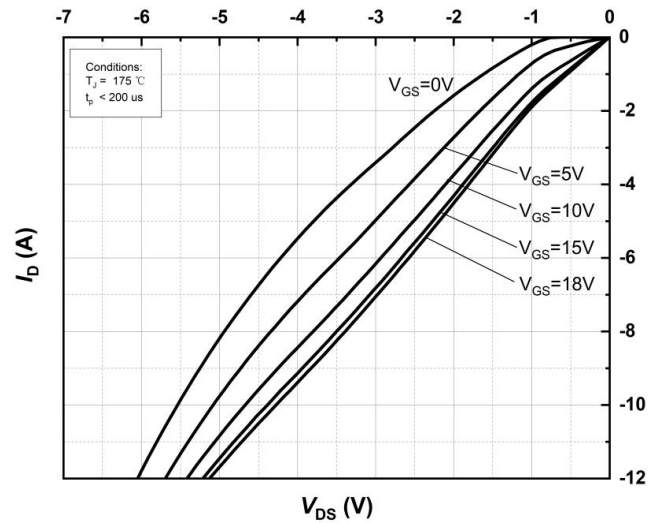


Figure 12. 3rd Quadrant Characteristic at  $T_J=175^\circ C$

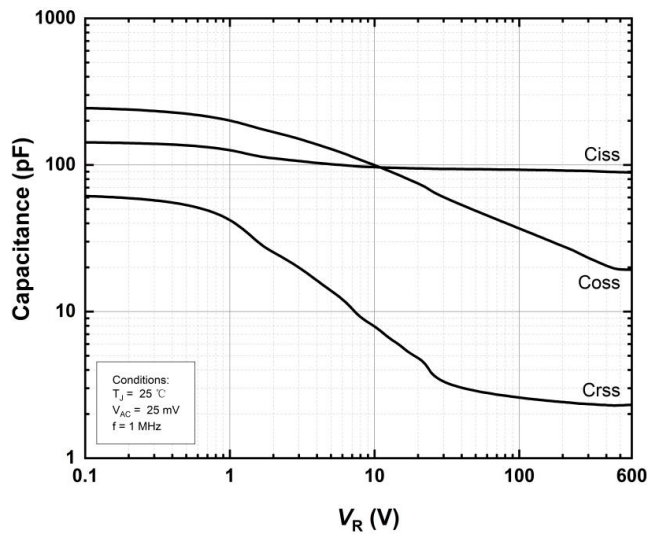


Figure 13. Capacitances vs. Drain-Source Voltage (0 – 600V)

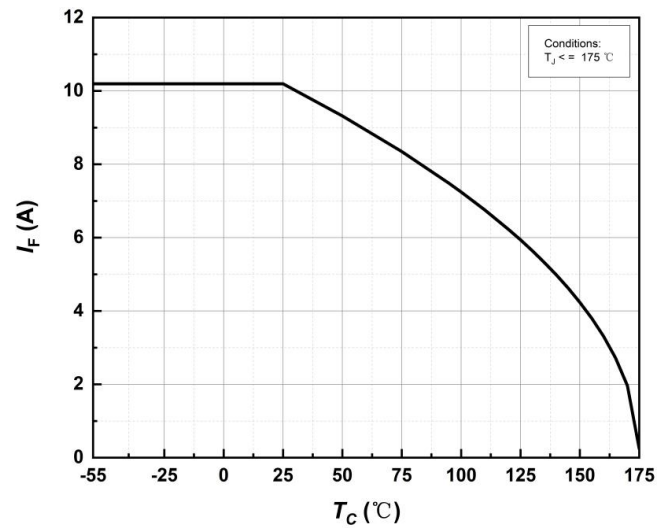


Figure 14. Continuous Drain Current Derating vs Case Temperature

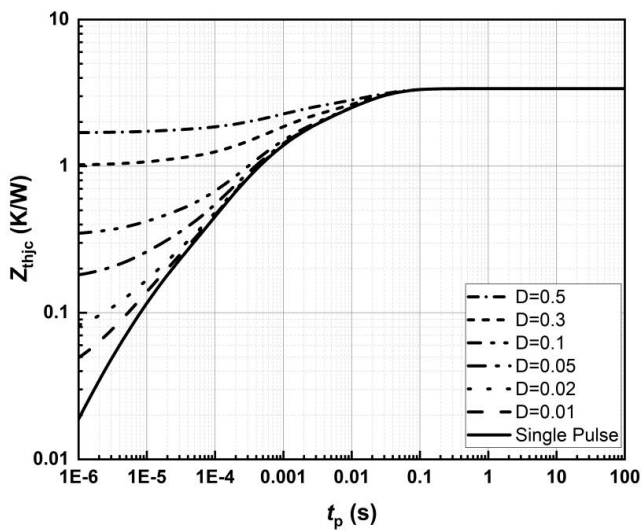


Figure 15. Transient Thermal Impedance (Junction – Case)

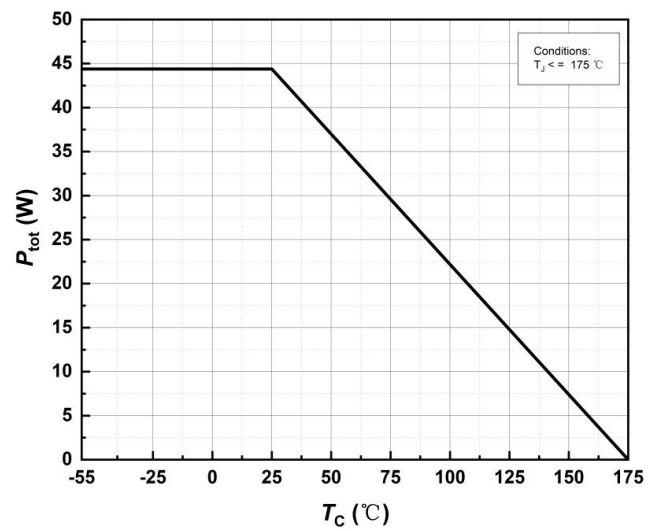


Figure 16. Maximum Power Dissipation Derating vs. Case Temperature

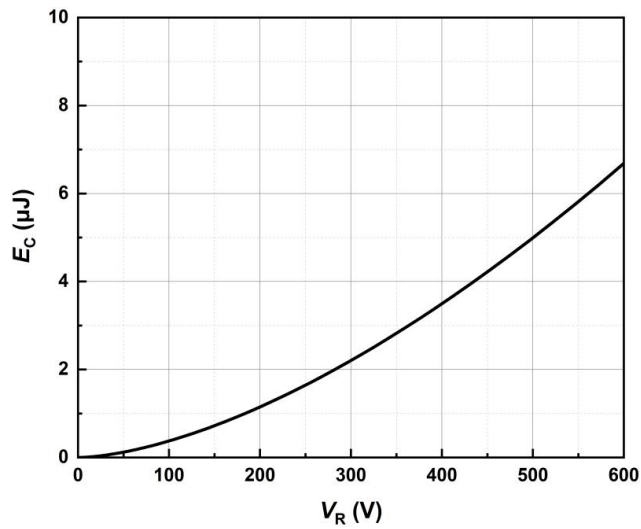


Figure 17. Output Capacitor Stored Energy

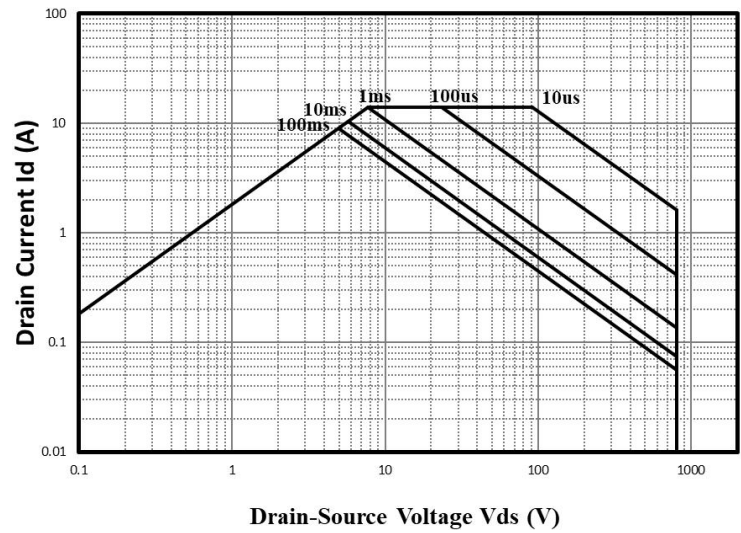


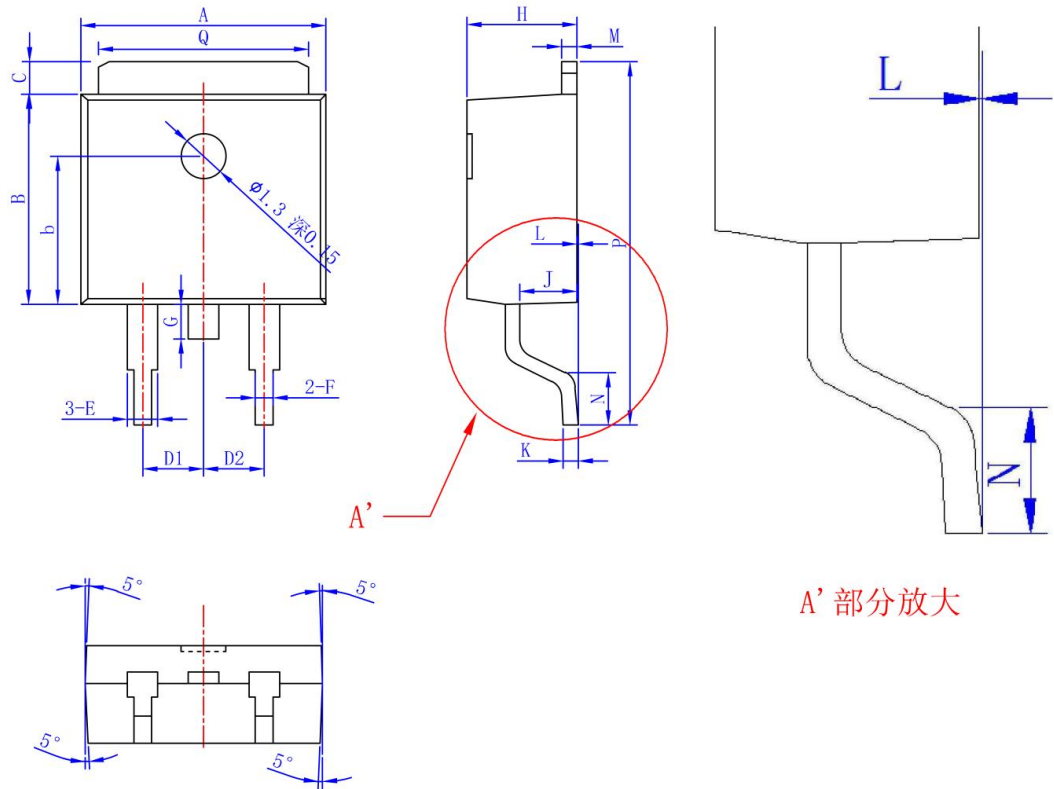
Figure 18. Safe Operating Area





Package Dimensions

Package TO-252-2L



A' 部分放大

| SYMBOL    | MM   |         |       |
|-----------|------|---------|-------|
|           | MIN  | NOM     | MAX   |
| *A        | 6.30 | 6.55    | 6.90  |
| *B        | 5.90 | 6.10    | 6.30  |
| b         | 4.10 | 4.30    | 4.50  |
| C         | 0.90 | 1.00    | 1.10  |
| *D1       |      | 2.29BSC |       |
| *D2       |      | 2.29BSC |       |
| *E        | 0.61 | 0.76    | 0.91  |
| *F        | 0.50 | 0.60    | 0.70  |
| G         | 0.60 | 0.80    | 1.00  |
| *H        | 2.10 | 2.30    | 2.50  |
| *J        | 0.90 | 1.00    | 1.10  |
| *K        | 0.40 | 0.50    | 0.60  |
| *L        | 0.00 | 0.05    | 0.127 |
| *M        | 0.45 | 0.50    | 0.55  |
| *N        | 1.39 |         | 1.77  |
| *P        | 9.60 | 9.90    | 10.30 |
| Q         | 5.10 | 5.30    | 5.50  |
| 带*为必须检验尺寸 |      |         |       |



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