# MOSFET - SiC Power, Single N-Channel

## 1200 V, 65 mΩ, 49 A

# KXMW120R65T3

**Features**

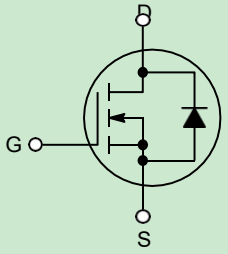
- Typ. $R_{DS(on)}$ = 65 mΩ
- Ultra Low Gate Charge ($Q_{G(tot)}$ = 46 nC)
- Capacitance ($C_{oss}$ = 83 pF)
- 100% UIL Tested

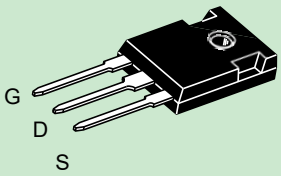
**Typical Applications**

- UPS
- DC/DC Converter
- Boost Inverter

| $V_{(BR)DSS}$ | $R_{DS(on)}$ MAX | $I_D$ MAX |
|---|---|---|
| 1200 V | 65mΩ | 49 A |

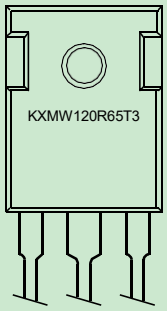
**N−CHANNEL MOSFET**




**TO−247−3L**
**CASE 340CX**

**MARKING DIAGRAM**




**MAXIMUM RATINGS** ($T_J$ = 25°C unless otherwise noted)

| Parameter | | | Symbol | Value | Unit |
|---|---|---|---|---|---|
| Drain−to−Source Voltage | | | $V_{DSS}$ | 1200 | V |
| Gate−to−Source Voltage | | | $V_{GS}$ | -7/23 | V |
| Recommended turn on Gate−to−Source Voltage | | $T_C$ < 175°C | $V_{GS, on}$ | 15-18 | V |
| Recommended turn off Gate−to−Source Voltage | | | $V_{GS, off}$ | 0 | V |
| Continuous Drain Current $R_{\theta JC}$ | Steady State | $T_C$ = 25°C | $I_D$ | 49 | A |
| | | $T_C$ = 100°C | | 35 | A |
| Power Dissipation $R_{\theta JC}$ | Steady State | $T_C$ = 25°C | $P_D$ | 251 | W |
| | | $T_C$ = 150°C | | 42 | |
| Pulsed Drain Current (Note 2) | | $T_A$ = 25°C | $I_{DM}$ | 109 | A |
| Operating Junction and Storage Temperature Range | | | $T_J$, $T_{stg}$ | −55 to +175 | °C |
| Source Current (Body Diode) | | | $I_S$ | 49 | A |

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

**THERMAL RESISTANCE MAXIMUM RATINGS**

| Parameter | Symbol | Value | Unit |
|---|---|---|---|
| Junction−to−Case (Note 1) | $R_{\theta JC}$ | 0.6 | °C/W |
| Junction−to−Ambient (Note 1) | $R_{\theta JA}$ | 33.62 | °C/W |

1. The entire application environment impacts the thermal resistance values shown, they are not constants and are only valid for the particular conditions noted.
2. Repetitive rating, limited by max junction temperature.

Publication Order Number:
**KXMW120R65T3**

## Static Electrical Characteristics

| Parameter | Symbol | Test Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| Drain-to-Source Breakdown Voltage | $V_{(BR)DSS}$ | $V_{GS}$ =0 V, $I_D$ = 100 uA | | 1200 | 1480 | V |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | $V_{GS}$ = 0 V, $V_{DS}$ = 1200 V, $T_J$ = 25 °C | | 0.5 | 100 | μA |
| | | $V_{GS}$ = 0 V, $V_{DS}$ = 1200 V, $T_J$ = 175 °C | | 3 | 100 | |
| Gate-Source Leakage Current | $I_{GSS}$ | $V_{GS}$ = -10V, $V_{DS}$ = 0V | | -0.3 | -100 | nA |
| | | $V_{GS}$ = 25V, $V_{DS}$ = 0V | | 4 | 100 | |
| Transconductance | $g_{fs}$ | $V_{DS}$ = 20V, $I_D$ = 15 A, $T_J$ = 25 °C | | 7.89 | | S |
| | | $V_{DS}$ = 20 V, $I_D$ = 15 A, $T_J$ = 175 °C | | 7.75 | | |
| Drain-Source On Resistance | $R_{DS(on)}$ | $V_{GS}$ = 20V, $I_D$ = 15 A, $T_J$ = 25 °C | | 65 | | mΩ |
| | | $V_{GS}$ = 20 V, $I_D$ = 15 A, $T_J$ = 175 °C | | 103 | | |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{GS}$ = $V_{DS}$ = 20 V, $I_D$ = 5 mA, $T_J$ = 25 °C | | 2.9 | | V |
| | | $V_{GS}$ = $V_{DS}$ = 20 V, $I_D$ = 5 mA, $T_J$ = 175 °C | | 2 | | |

## Dynamic Electrical Characteristics

| Parameter | Symbol | Test Conditions | Typ | Unit |
|---|---|---|---|---|
| Input Capacitance | $C_{ISS}$ | $V_{GS}$ = 0 V, $V_{DS}$ = 1000 V, f = 1 MHz, $V_{AC}$ = 25 mV | 1083 | pF |
| Output Capacitance | $C_{OSS}$ | | 83 | |
| Reverse Transfer Capacitance | $C_{RSS}$ | | 3 | |
| $C_{OSS}$ Stored Energy | $E_{OSS}$ | | 83 | μJ |
| Turn-On Switching Loss | $E_{ON}$ | $V_{GS}$ = -4/20 V, $V_{DS}$ = 800 V, $I_D$ = 20A, $R_G$ = 2 Ω, Inductive Load $T_J$ = 25 °C | 376 | μJ |
| | | $T_J$ = 175 °C | 380 | |
| Turn-Off Switching Loss | $E_{OFF}$ | $V_{GS}$ = -4/20 V, $V_{DS}$ = 800 V, $I_D$ = 20A, $R_G$ = 2 Ω, Inductive Load $T_J$ = 25 °C | 408 | |
| | | $T_J$ = 175 °C | 441 | |
| Total Gate Charge | $Q_{G(tot)}$ | $V_{GS}$ = -4/20 V, $V_{DS}$ = 800 V, $I_D$ = 15 A | 46 | nC |
| Gate-Source Charge | $Q_{GS}$ | | 15 | |
| Gate-Drain Charge | $Q_{GD}$ | | 15 | |
| Gate Resistance | $R_G$ | f = 1 MHz, $V_{AC}$ = 25 mV | 3.4 | Ω |
| Turn-On Delay Time | $t_{d(on)}$ | $V_{GS}$ = -4/20 V, $V_{DS}$ = 800 V, $I_D$ = 15A, $R_G$ = 2 Ω, $T_J$ = 175 °C Inductive Load | 12 | ns |
| Rise Time | $t_r$ | | 8 | |
| Turn-Off Delay Time | $t_{d(off)}$ | | 18 | |
| Fall Time | $t_f$ | | 46 | |

## Reverse Diode Characteristic

| Parameter | Symbol | Test Conditions | Typ | Unit |
|---|---|---|---|---|
| Continuous Drain−to−Source Diode Forward Current | $I_{SD}$ | $V_{GS}$ = 0 V, $T_J$ = 25 °C | 49 | A |
| Forward Diode Voltage | $V_{SD}$ | $V_{GS}$ = 0 V, $I_{SD}$ = 15 A, $T_J$ = -55 °C | 5.1 | V |
| | | $V_{GS}$ = 0 V, $I_{SD}$ = 15 A, $T_J$ = 25 °C | 4.2 | |
| | | $V_{GS}$ = 0 V, $I_{SD}$ = 15 A, $T_J$ = 175 °C | 4.2 | |
| Pulsed Drain−to−Source Diode For- ward Current (Note 2) | $I_{SDM}$ | $T_J$ = 25 °C | 508<br>512 | A |
| Reverse Recovery Time | $t_{RR}$ | $V_{GS}$ =-4V, $I_{SD}$ = 20A, $V_{DS}$ = 800 V, $dI_S/dt$ = 1000 A/μs, $T_J$ = 25 °C<br>$Q_{fr}$ includes also $Q_C$ | 15 | ns |
| Reverse Recovery Charge | $Q_{RR}$ | | 77 | nC |
| Peak Reverse Recovery Current | $I_{RRM}$ | | 9.5 | A |
| Reverse Recovery Energy | $E_{RR}$ | | 58 | μJ |

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

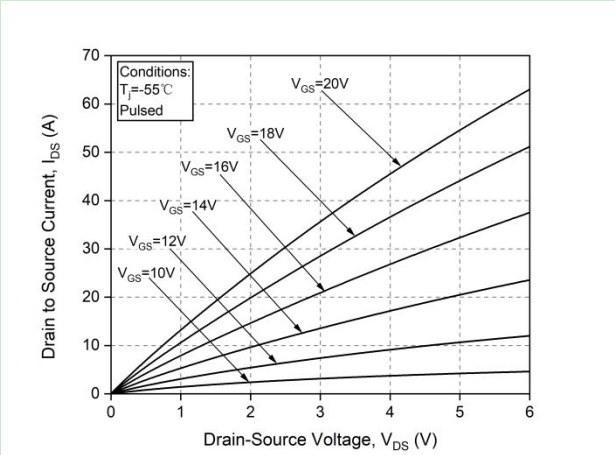



**Figure 1. Output characteristics, $T_J$= -55ºC**

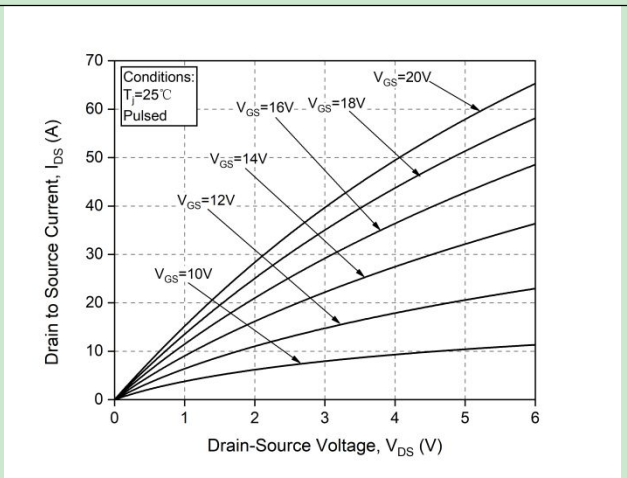



**Figure 2. Output characteristics, $T_J$= 25ºC**

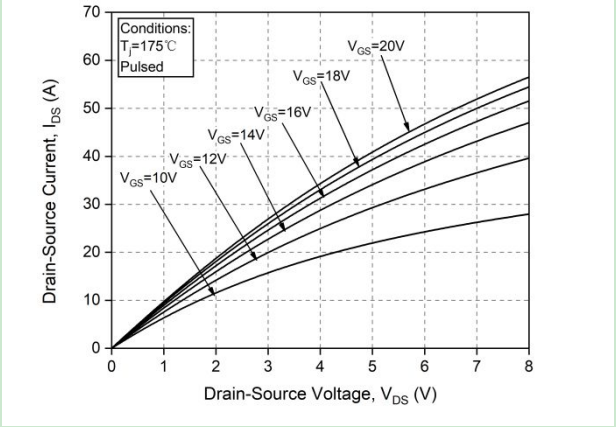



**Figure 3. Output characteristics, $T_J$= 175ºC**

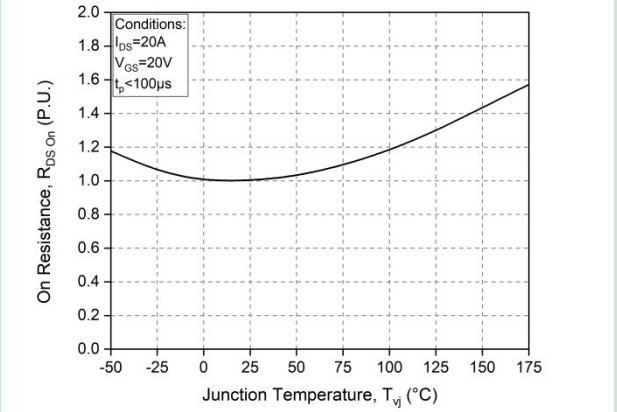



**Figure 4. Normalized on-resistance vs. temperature**

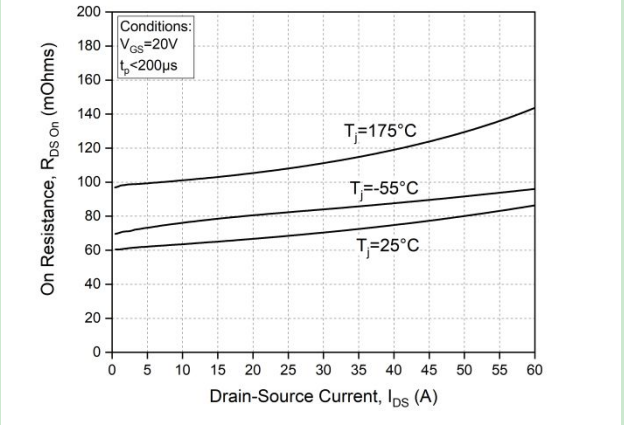



**Figure 5. On-resistance vs. drain current**

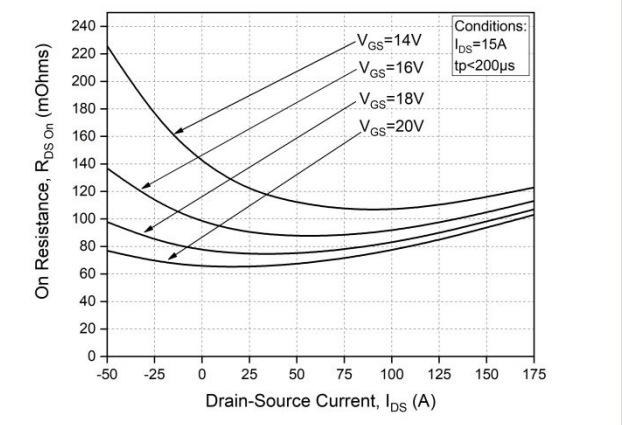



**Figure 6. On-resistance vs. temperature for various gate voltage**

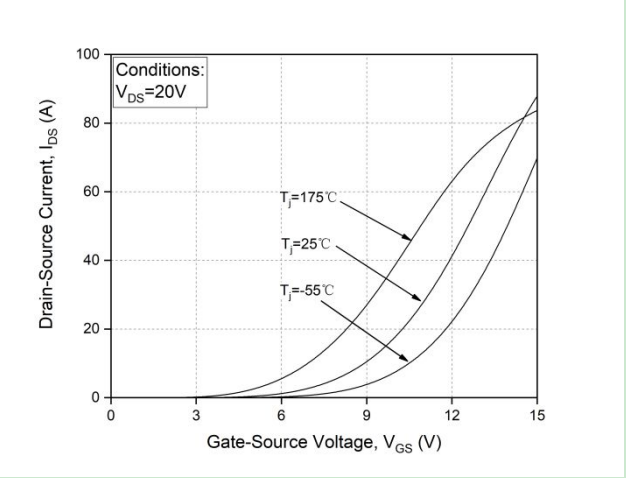



**Figure 7. Transfer characteristic for various junction temperatures**

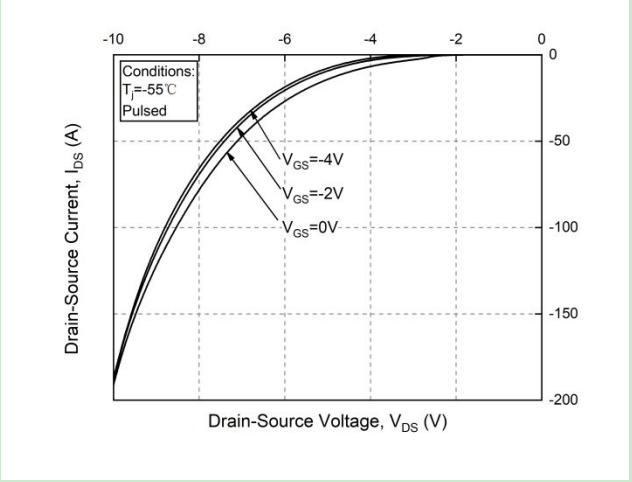



**Figure 8. Body diode characteristic at $T_J$= -55ºC**

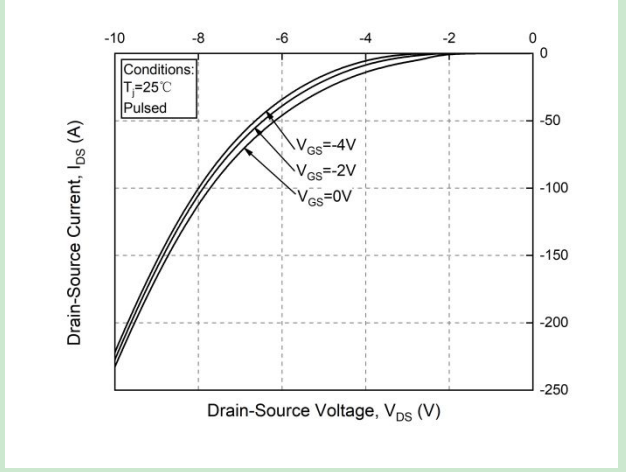



**Figure 9. Body diode characteristic at $T_J$= 25ºC**

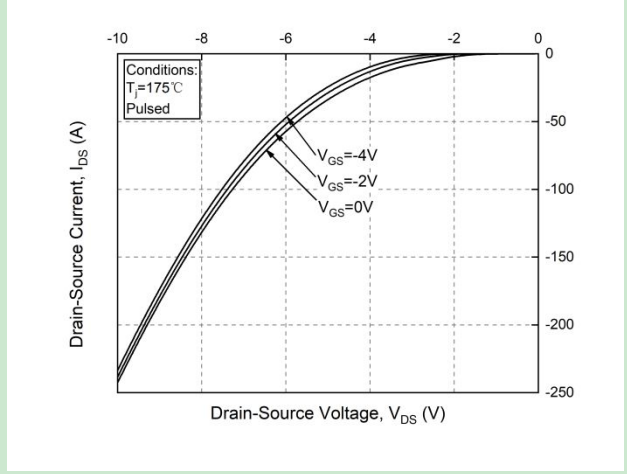



**Figure 10. Body diode characteristic at $T_J$= 175ºC**

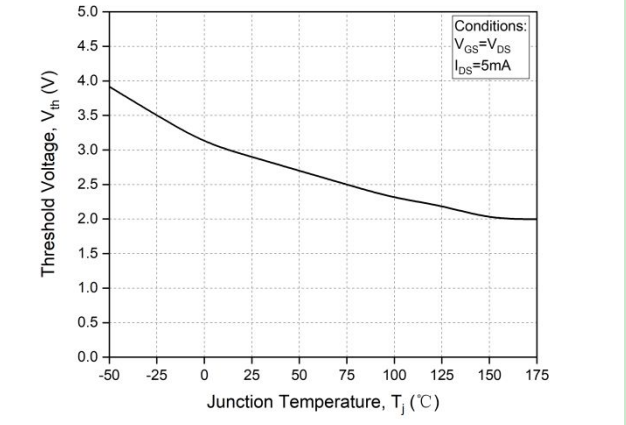



**Figure 11. Threshold voltage vs. temperature**

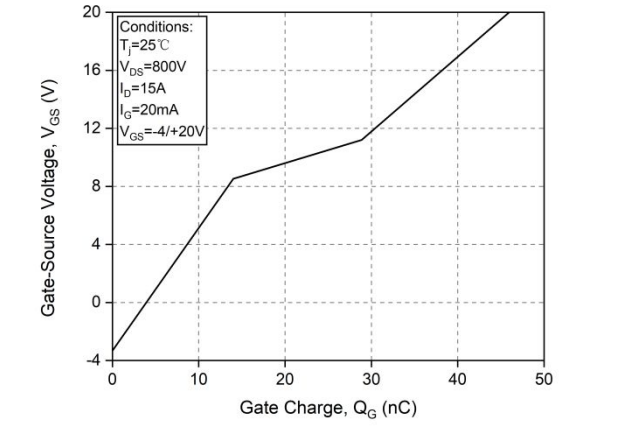



**Figure 12. Gate charge characteristic**

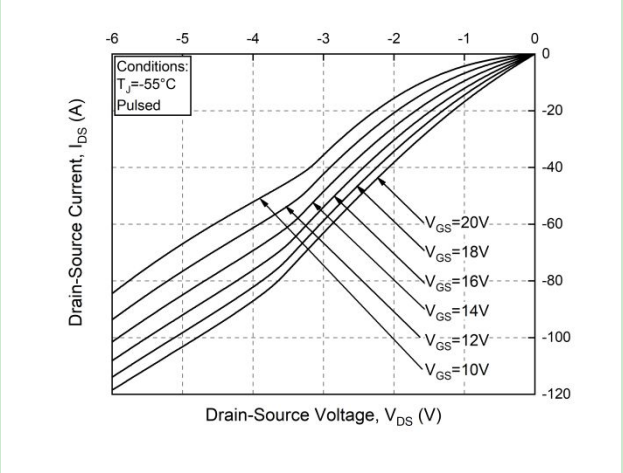



**Figure 13. 3rd quadrant characteristic at $T_J$= -55ºC**

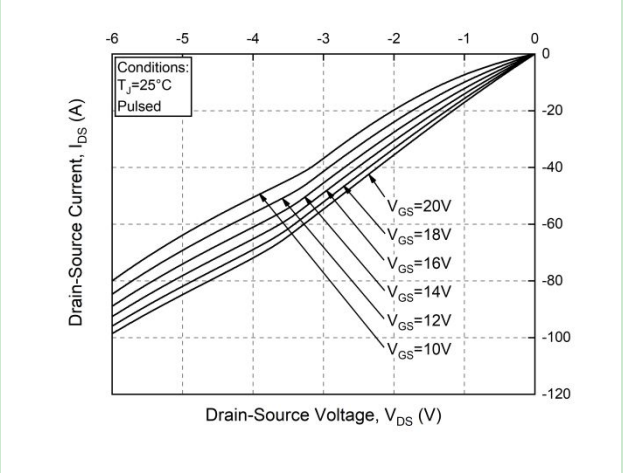



**Figure 14. 3rd quadrant characteristic at $T_J$= 25ºC**

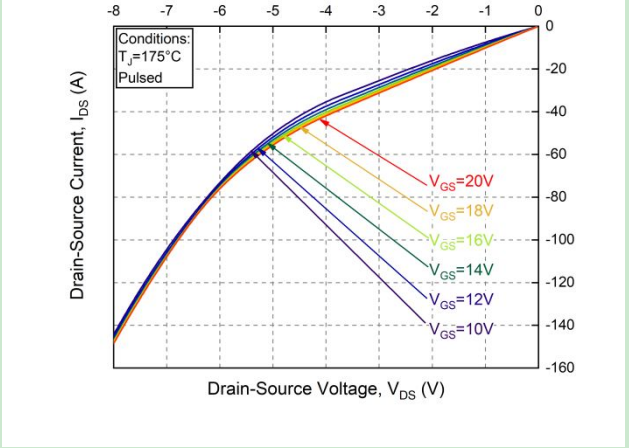



**Figure 15. 3rd quadrant characteristic at $T_J$= 175ºC**

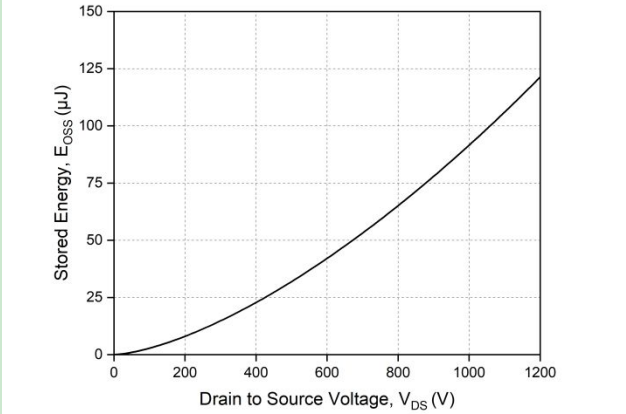



**Figure 16. Output capacitor stored energy**

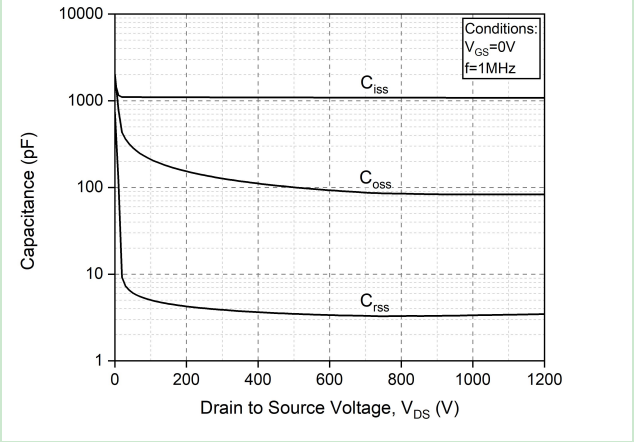



**Figure 17. Capacitances vs. drain-source voltage**

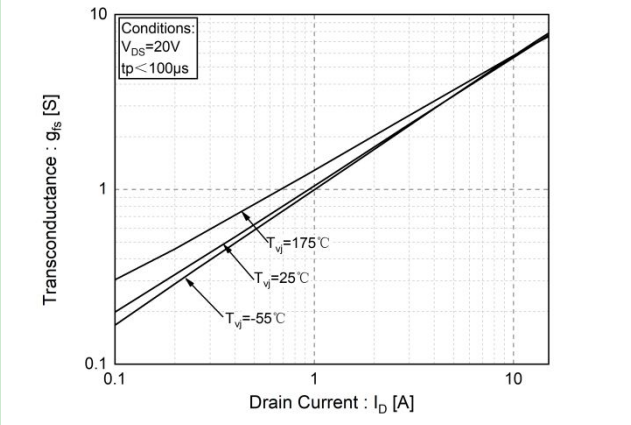



**Figure 18. Transconductance vs drain current**

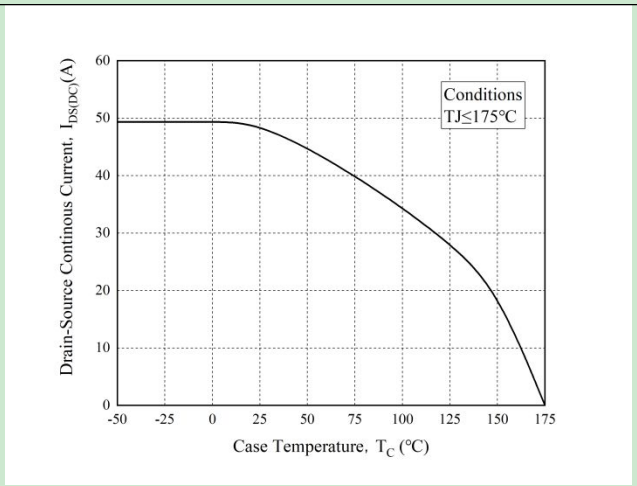



**Figure 19. Continuous drain current derating vs. case temperature**

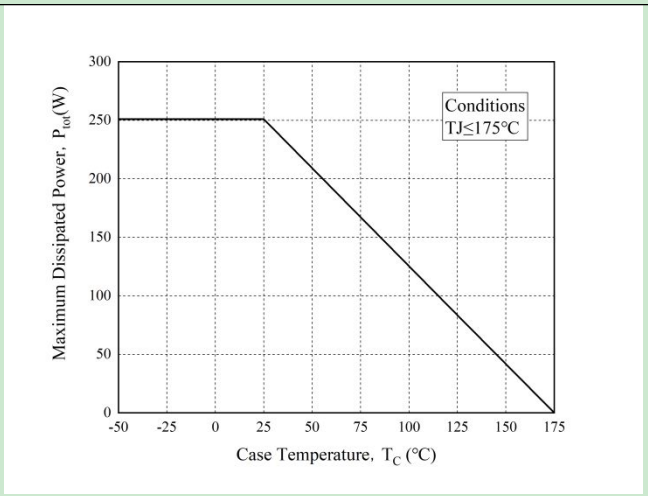



**Figure 20. Maximum power dissipation derating vs. case temperature**

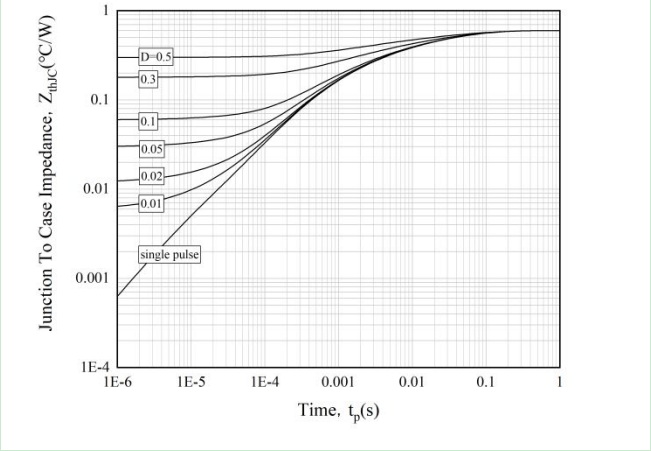



**Figure 21. Transient thermal impedance (junction - case)**

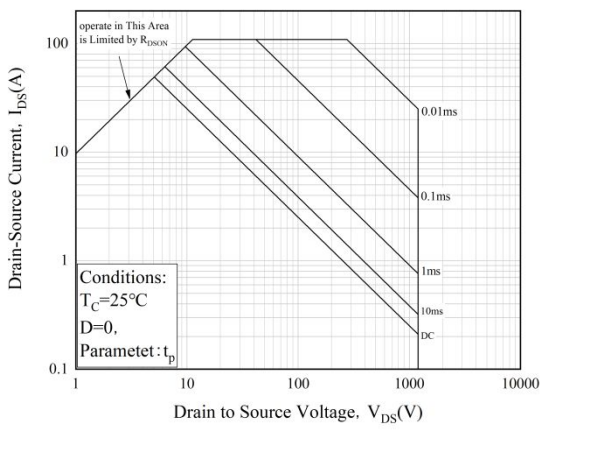



**Figure 22. Safe operating area**

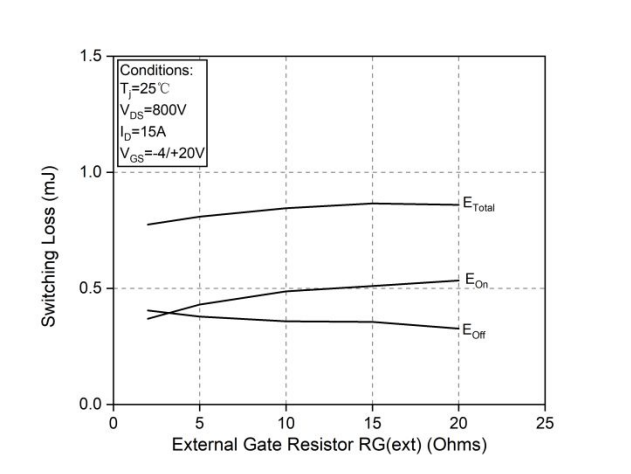



**Figure 23. Clamped inductive switching energy vs. $R_G$(ext)**

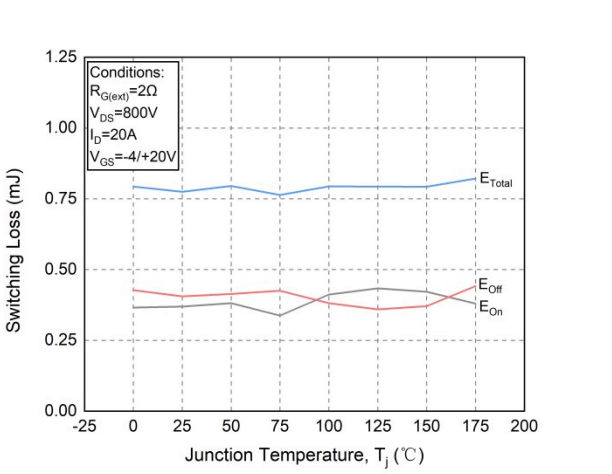



**Figure 24. Clamped inductive switching energy vs. temperature**

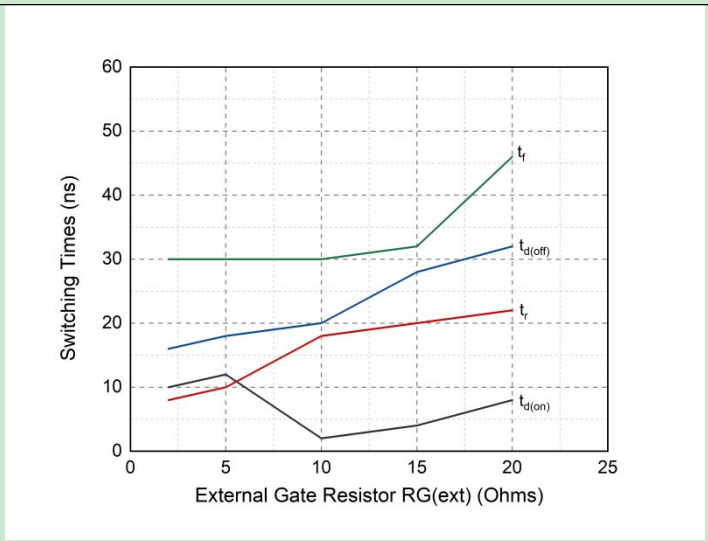
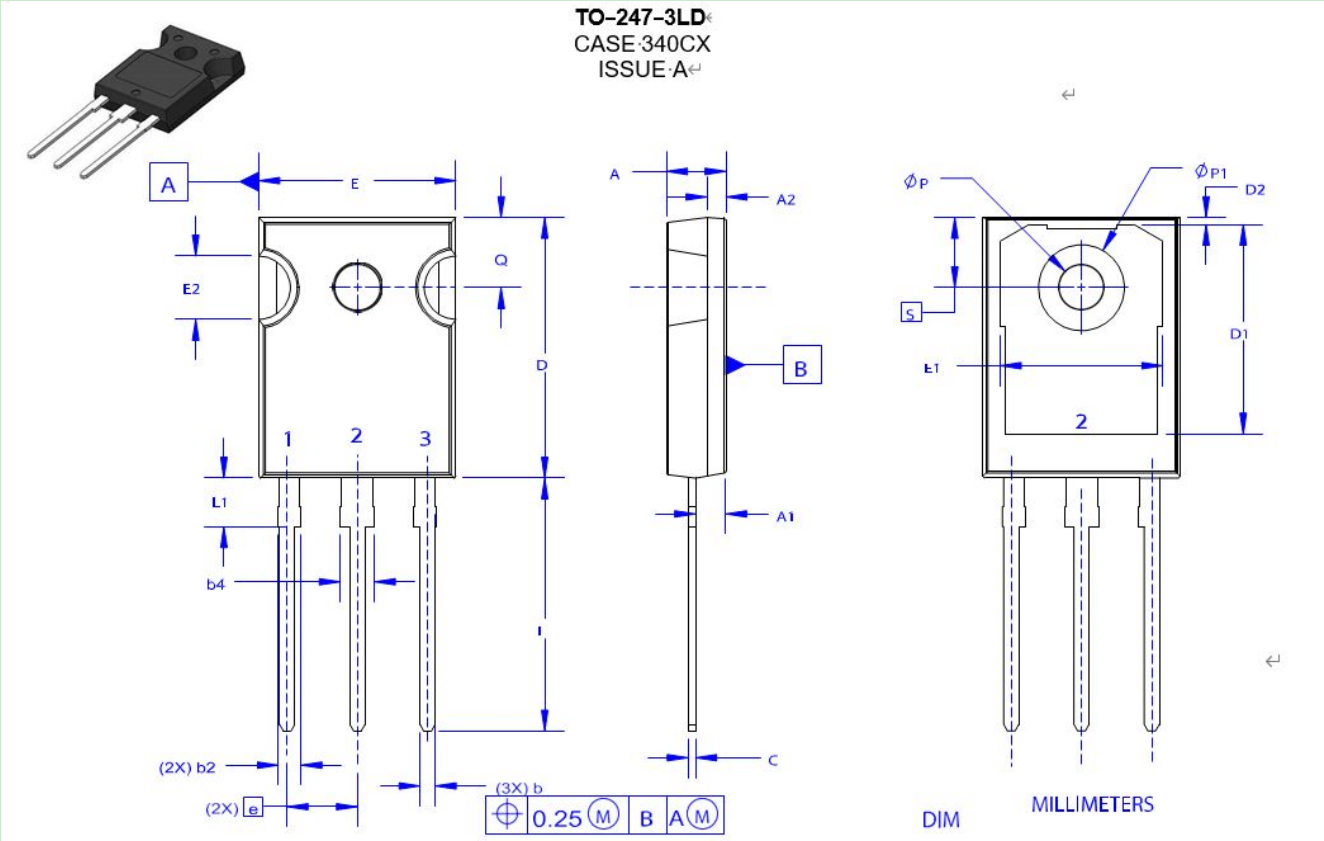



**Figure 25. Switching times vs. $R_G$(ext)**

## PACKAGE MARKING AND ORDERING INFORMATION

| Part Number | Top Marking | Package | Packing Method | Reel Size | Tape Width | Quantity |
|---|---|---|---|---|---|---|
| KXMW120R65T3 | KXMW120R65T3 | TO–247 Long Lead | Tube | N/A | N/A | 30 Units |




NOTES: UNLESS OTHERWISE SPECIFIED.

A. DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLD FLASH, AND TIE BAR EXTRUSIONS.
B. ALL DIMENSIONS ARE IN MILLIMETERS.
C. DRAWING CONFORMS TO ASME Y14.5 - 2009.
D. DIMENSION A1 TO BE MEASURED IN THE REGION DEFINED BY L1.
E. LEAD FINISH IS UNCONTROLLED IN THE REGION DEFINED BY L1.


| DIM | MILLIMETERS | | |
|---|---|---|---|
| | MIN | NOM | MAX |
| A | 4.58 | 4.70 | 4.82 |
| A1 | 2.20 | 2.40 | 2.60 |
| A2 | 1.40 | 1.50 | 1.60 |
| D | 20.32 | 20.57 | 20.82 |
| E | 15.37 | 15.62 | 15.87 |
| E2 | 4.96 | 5.08 | 5.20 |
| e | ~ | 5.56 | ~ |
| L | 19.75 | 20.00 | 20.25 |
| L1 | 3.69 | 3.81 | 3.93 |
| ØP | 3.51 | 3.58 | 3.65 |
| Q | 5.34 | 5.46 | 5.58 |
| S | 5.34 | 5.46 | 5.58 |
| b | 1.17 | 1.26 | 1.35 |
| b2 | 1.53 | 1.65 | 1.77 |
| b4 | 2.42 | 2.54 | 2.66 |
| c | 0.51 | 0.61 | 0.71 |
| D1 | 13.08 | ~ | ~ |
| D2 | 0.51 | 0.93 | 1.35 |
| E1 | 12.81 | ~ | ~ |
| ØP1 | 6.60 | 6.80 | 7.00 |

单击下面可查看定价，库存，交付和生命周期等信息

>>浙江芯科