NextGen
Components,Inc.

# SPECIFICATION SHEET

## N-CHANNEL SIC POWER MOSFET TO-247-4 LGE3M L SERIES

| | | |
|---|---|---|
| SPECIFICATION SHEET NO. | S1107 – LGE3M18120QL0T | |
| ORIGINAL MFG/PART NO. | LGE LGE Diodes/LGE3M18120Q-L | |
| NEXTGEN PART CODE | LGE3M18120QL0T | Indicate This Code For RFQ /Order |
| DATE | Nov. 07, 2025 | |
| REVISION | A3 | Updated With Most Recent Data |
| DESCRIPTION AND<br>MAIN PARAMETRICS | Silicon Carbide (SiC) MOSFET, 4 Pins, Case TO-247-4, LGE3M L Series,<br>N-Channel, Drain-Source Voltage ($V_{DS}$): 1200V Max.<br>Current Drain-source On-state Resistance $R_{DS(ON)}$: 18mΩ Typ.<br>Continuous Drain Current ($I_D$) @ Tc=25℃: 105A<br>Operating Temperature: -55°C ~ 175°C ($T_J$)<br>Package in Tube, 30pcs/Tube<br>RoHS/RoHS III compliant, RoHS Annex III lead Exemption (Exempt per RoHS EU 2015/863) and Halogen Free (HF) | |
| CUSTOMER | | |
| CUSTOMER PART NUMBER | | |
| CROSS REF. PART NUMBER | | |
| MEMO | | |

| VENDOR APPROVE | | | |
|---|---|---|---|
| Issued/Checked/Approved | Mandy Xu | Ruby Zhang | Jack Zhang |
| Effective Date: Nov. 07, 20257 | | | |

| CUSTOMER APPROVE |
|---|
| |
| Date: |

## MAIN FEATURE

- High Blocking Voltage with Low On-Resistance
- High Speed Switching with Low Capacitance
- Fast Intrinsic Diode With Low Reverse Recovery
- Higher System Efficiency
- Parallel Device Convenience without Thermal Runaway
- Hard Switching & Higher Reliability
- Easy To Drive
- Meet MSL 1 Requirement
- Cross Competitors Parts and More.
- RoHS/RoHS III compliant, RoHS Annex III lead Exemption (Exempt per RoHS EU 2015/863) and Halogen Free (HF)

*Image shown is a representation only. Exact specifications should be obtained from the product dimension.*

## APPLICATION

- Motor Drives
- Solar / Wind Inverters
- EV Charging Station
- AC/DC Converters
- DC/DC Converters
- Uninterruptable Power Supplies

## ELECTRICAL CHARACTERISTICS

- See Page 5 ~ Page 8.
- All Products Parameters are Subject To NextGen Components’ Final Confirmation.

## HOW TO ORDER

- Please Follow Up Part Code Guide And Indicate NextGen Part Code LGE3M18120QL0T For RFQ and Order.

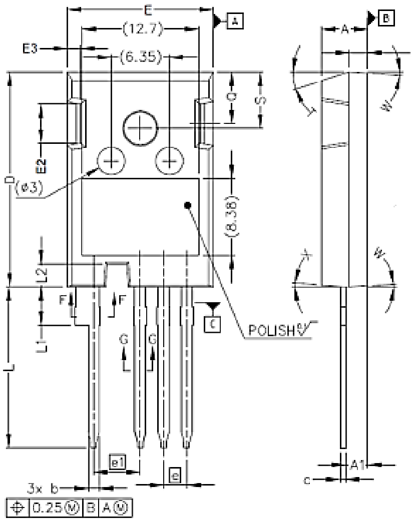
## PART CODE GUIDE

**RFQ**
**Request For Quotation**

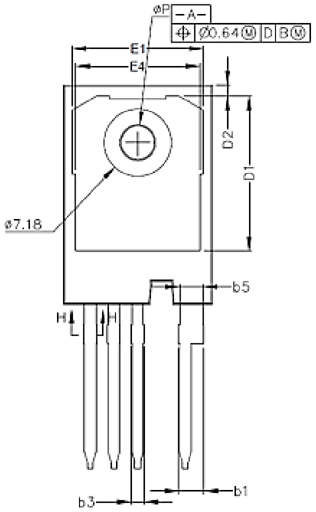
| CODE | NAME | KEY SPECIFICATION OPTION |
|---|---|---|
| LGE3M | Product Series Code | Silicon Carbide (SiC) MOSFET, 4 Pins, Case TO-247-4, LGE3M L Series |
| 18 | Current Drain-source On-state Resistance RDS(ON) Code | 18: 18mΩ |
| 120 | Drain-Source Voltage ($V_{DS}$ ) Code | 120: 1200V Max. |
| Q | Package Case Code | B: TO-247-3; E: TO-263-2; J: TO-263-7; Q: TO-247-4; |
| L0T | Internal Control Code | Letter A~Z, a-z or Digits (0-9) |
| XX | Special/Custom Parameters | Blank: N/A;<br>XX: Letter A~Z, a~z or digits (0~9) for Special/Custom Parameters |

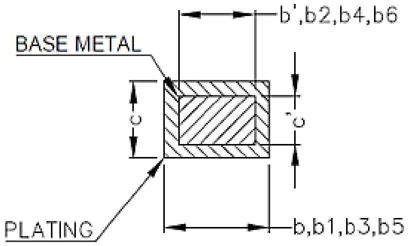
## DIMENSION - - Unit: (mm), Case TO-247-4 Outline

Top View



Side View



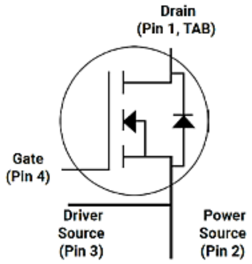


SECTION "F-F", "G-G" AND "H-H"
SCALE: NONE

| SYMBOL | TO-247-4 | |
|---|---|---|
| | Min. | Max. |
| A | 4.83 | 5.21 |
| A1 | 2.29 | 2.54 |
| A2 | 1.91 | 2.16 |
| b' | 1.07 | 1.28 |
| b | 1.07 | 1.33 |
| b1 | 2.39 | 2.94 |
| b2 | 2.39 | 2.84 |
| b3 | 1.07 | 1.60 |
| b4 | 1.07 | 1.50 |
| b5 | 2.39 | 2.69 |
| b6 | 2.39 | 2.64 |
| c' | 0.55 | 0.65 |
| c | 0.55 | 0.68 |
| D | 23.30 | 23.60 |
| D1 | 16.25 | 17.65 |
| D2 | 0.95 | 1.25 |
| E | 15.75 | 16.13 |
| E1 | 13.10 | 14.15 |
| E2 | 3.68 | 5.10 |
| E3 | 1.00 | 1.90 |
| E4 | 12.38 | 13.43 |
| e | 2.54 BSC | |
| e1 | 5.08 BSC | |
| N | 4 | |
| L | 17.31 | 17.82 |
| L1 | 3.97 | 4.37 |
| L2 | 2.35 | 2.65 |
| ØP | 3.51 | 3.65 |
| Q | 5.49 | 6.00 |
| S | 6.04 | 6.30 |
| T | 17.5° REF. | |
| W | 3.5° REF. | |
| X | 4° REF. | |

Note:
1. All Metal Surfaces: TIN Plated Except Area Of Cut
2. Dimensioning & Tolerancing Confirm To ASME Y14.5m-1994

## INTERNAL CIRCUIT DIAGRAM



## 1200V N-CHANNEL SiC MOSFET

| $V_{DS}$ | $I_D$ @ Tc=25°C | $R_{DS(on)}$ | MARKING | PACKAGE/CASE |
|---|---|---|---|---|
| 1200V | 105A | 18mΩ | LGE3M18120Q | TO-247-4 |

## MAX. RATINGS @Tc=25 °C (Unless Otherwise Specified)

- 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.

| PARAMETER | SYMBOL | TEST CONDITIONS | VALUE | UNIT |
|---|---|---|---|---|
| Drain-Source Voltage | $V_{DS, Max}$ | $V_{GS}$=0V, $I_D$=100µA | 1200 | V |
| Gate-Source Voltage (Dynamic) | $V_{GS, MAX}$ | AC (f>1 Hz) | -10/+25 | V |
| Gate-Source Voltage (Static) | $V_{Gsop}$ | Static | -5/+20 | V |
| Continuous Drain Current | $I_D$ | $V_{GS}$=20V, Tc=25°C | 105 | A |
| | | $V_{GS}$=20V, Tc=100°C | 74 | |
| Pulsed Drain Current | $I_{D\,(pulse)}$ | Tc=25°C | 220 | A |
| Total Power Dissipation | $P_D$ | TC=25°C | 428 | W |
| Avalanche Capability | $E_{AS}$ | $V_{DD}$ = 100V, $V_{GS}$=20V, L=2mH | 784 | mJ |
| Avalanche Capability | $I_{AV}$ | $V_{DD}$ = 100V, $V_{GS}$=20V, L=2mH | 28 | A |
| Operating Junction and Storage Temperature Range | $T_J$,$T_{STG}$ | | -55~ +175 | °C |

ELECTRICAL CHARACTERISTICS PART I - Tc = 25°C (Unless Otherwise Specified)

| PARAMETER | SYMBOL | CONDITIONS | VALUE | | | UNIT |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| Drain-Source Breakdown Voltage | V (BR) DSS | VGS=0V, ID=100µA | 1200 | - | - | V |
| Gates Threshold Voltage | V GS(th) | VDS=VGS, ID=20mA | 1.9 | 2.45 | 3.8 | V |
| | | VDS=VGS,ID=20mA, Tj=150°C | - | 1.7 | - | |
| | | VDS=VGS,ID=20mA, Tj=175°C | - | 1.6 | - | |
| Zero Gates Voltage Drain Current | I DSS | VDS=1200V, VGS=0V | 0 | 1 | 50 | µA |
| Gates-Source Leakage Crurent | I GSS | VGS=20V, VDS=0V | 0 | 1 | 200 | nA |
| Gates-Source Leakage Crurent | I GSS | VGS=-5V, VDS=0V | -200 | -1 | 0 | nA |
| Drain-source On-state Resistance | R DS (ON) | VGS=20V, ID=50A | - | 18 | 26 | mΩ |
| | | VGS=20V, ID=50A Tj=150°C | - | 30 | - | |
| | | VGS=20V, ID=50A Tj=175°C | - | 34 | - | |
| | | VGS=18V, ID=50A | - | 20 | - | |
| Transconductance | g fs | VDS=20V, IDS=50A | - | 39 | - | S |
| | | VDS=20V, IDS=50A, Tj=150°C | - | 34 | | |
| | | VDS=20V, IDS=50A, Tj=175°C | - | 33 | - | |
| Input Capacitance | C ISS | VDS=1000V, VGS=0V f = 1MHz | - | 4800 | - | pF |
| Output Capacitance | C OSS | | - | 225 | - | pF |
| Reverse Transfer Capacitance | C RSS | | - | 10 | - | pF |
| Coss Stored Energy | E OSS | | - | 150 | - | µJ |

ELECTRICAL CHARACTERISTICS PART II - $T_C$ = 25° C (Unless Otherwise Specified)

| PARAMETER | SYMBOL | CONDITIONS | VALUE | | | UNIT |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| Total Gate Charge | $Q_g$ | $V_{DS}$ =800V,<br>$V_{GS}$ =-5/20V<br>$I_D$ =50A | - | 235 | - | nC |
| Gate-Source Charge | $Q_{gs}$ | | - | 62 | - | |
| Gate-Drain Charge | $Q_{gd}$ | | - | 75 | - | |
| Internal Gate Input Resistance | $R_{g(int)}$ | f = 1MH, $I_D$=0A | | 3.6 | | Ω |
| Turn - On Switching Energy | $E_{on}$ | $V_{DS}$ = 800 V,<br>$V_{GS}$ =-5V/20V,<br>$I_D$ = 50A,<br>$R_{G(ext)}$ =2Ω,<br>L=200μH | | 400 | | μJ |
| Turn - Off Switching Energy | $E_{off}$ | | | 135 | | μJ |
| Turn - On Delay Time | $t_{d(on)}$ | | | 15 | | ns |
| Rise Time | $t_r$ | | | 22 | | ns |
| Turn - Off Delay Time | $t_{d(off)}$ | | | 44 | | ns |
| Fall Time | $t_f$ | | | 11 | | ns |

## REVERSE DIODE CHARACTERISTICS - $T_c$ = 25° C (Unless Otherwise Specified)

| PARAMETER | SYMBOL | CONDITIONS | VALUE | | | UNIT |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| Diode Forward Voltage | $V_{SD}$ | $V_{GS}$ =-5V, $I_{SD}$ =25A | - | 4.3 | - | V |
| | | $V_{GS}$ = -5V, $I_{SD}$ = 25A, $T_J$ = 150℃ | - | 3.9 | - | |
| | | $V_{GS}$ = -5V, $I_{SD}$ = 25A, $T_J$ = 175℃ | - | 3.8 | - | |
| Continuous Diode Forward Current | $I_S$ | $V_{GS}$ =-5V | - | - | 91 | A |
| Reverse Recovery Time | $T_{rr}$ | $V_{GS}$ = -5V,<br>$I_{SD}$ = 50A,<br>$V_R$= 800V,<br>dif/dt =3700 A/µs | - | 30 | - | nS |
| Reverse Recovery Charge | $Q_{rr}$ | | - | 970 | - | nC |
| Peak Reverse Recovery Current | $I_{rrm}$ | | - | 53 | - | A |

## THERMAL CHARACTERISTICS

| PARAMETER | SYMBOL | CONDITIONS | VALUE | | | UNIT |
|---|---|---|---|---|---|---|
| | | | MIN. | TYP. | MAX. | |
| Thermal Resistance (Per Device) | $R_{th(j-c)}$ | Junction-case | - | 0.27 | 0.35 | °C/W |

TYPICAL PERFORMANCE (For Reference Only)

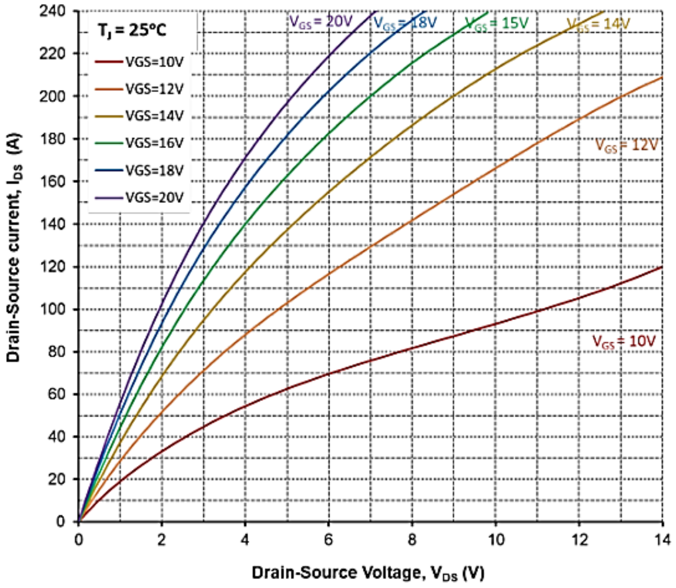


Figure 1. Output Characteristics, $T_J$ = 25°C

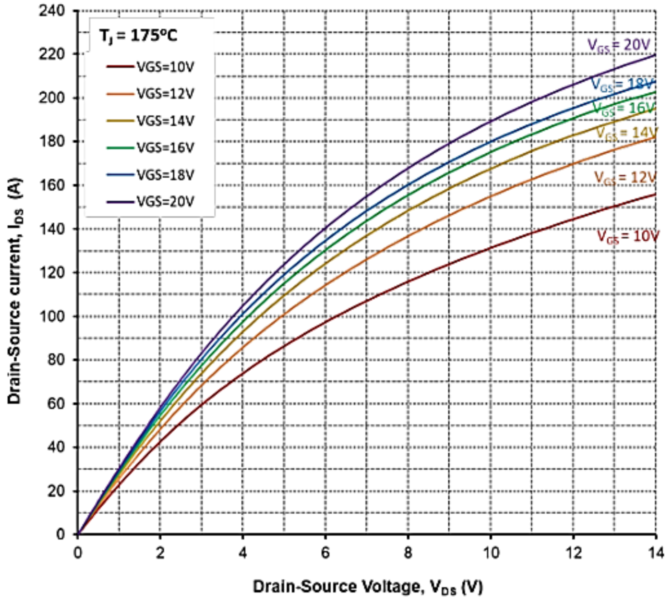


Figure 2. Output Characteristics, $T_J$ = 175°C

TYPICAL PERFORMANCE (For Reference Only)

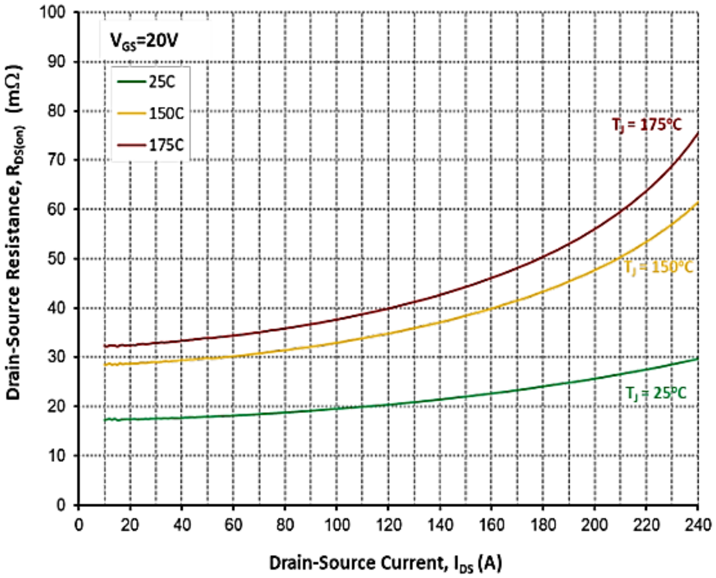


Figure 3. On-Resistance vs. Drain Current
For Various Temperatures

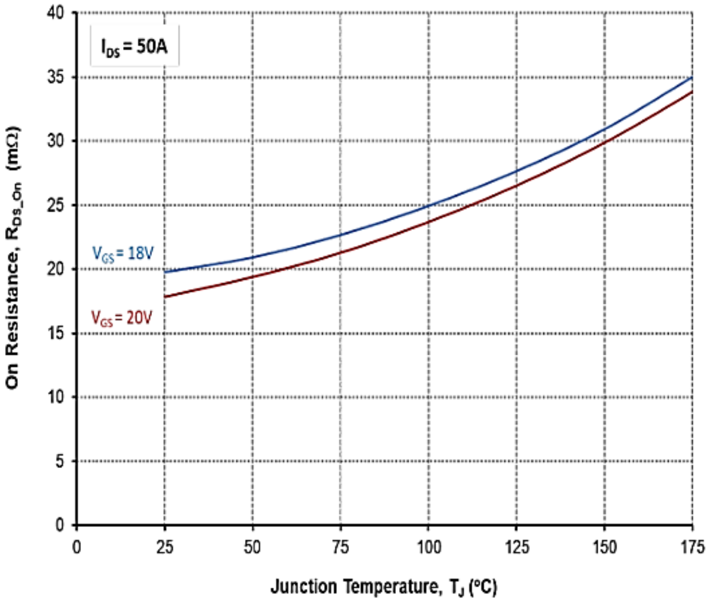


Figure 4. On-Resistance vs. Temperature

TYPICAL PERFORMANCE (For Reference Only)

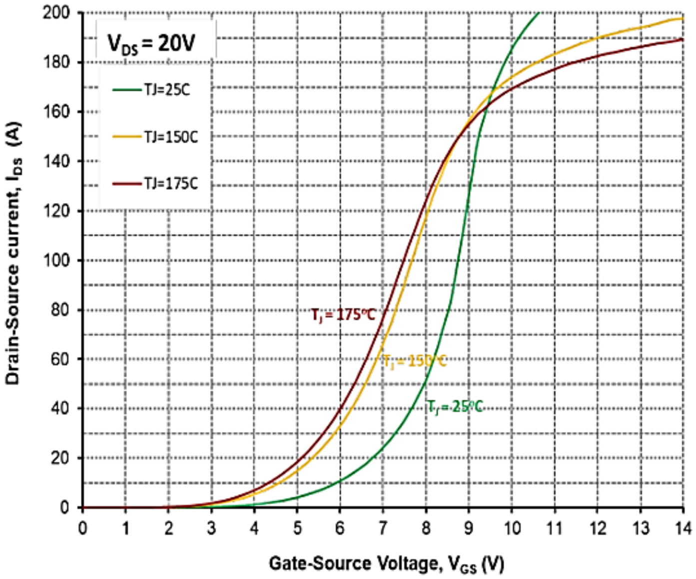


Figure 5. Transfer Characteristic For Various Junction Temperatures

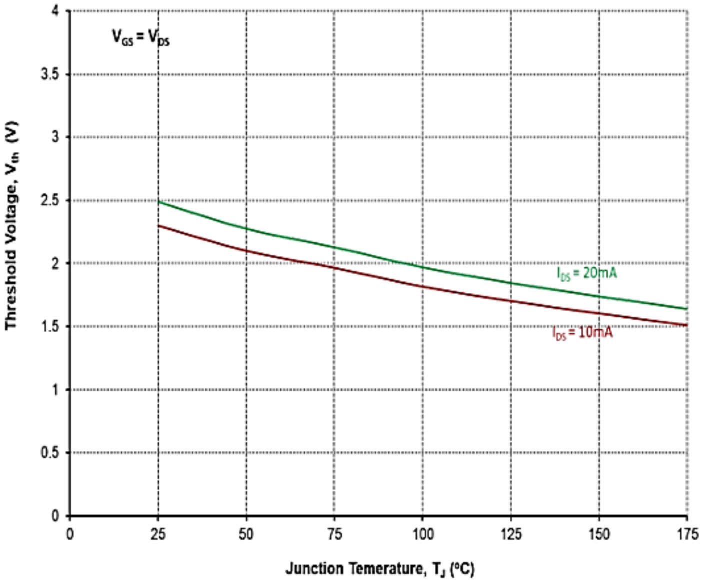


Figure 6. Threshold Voltage vs. Temperature

TYPICAL PERFORMANCE (For Reference Only)

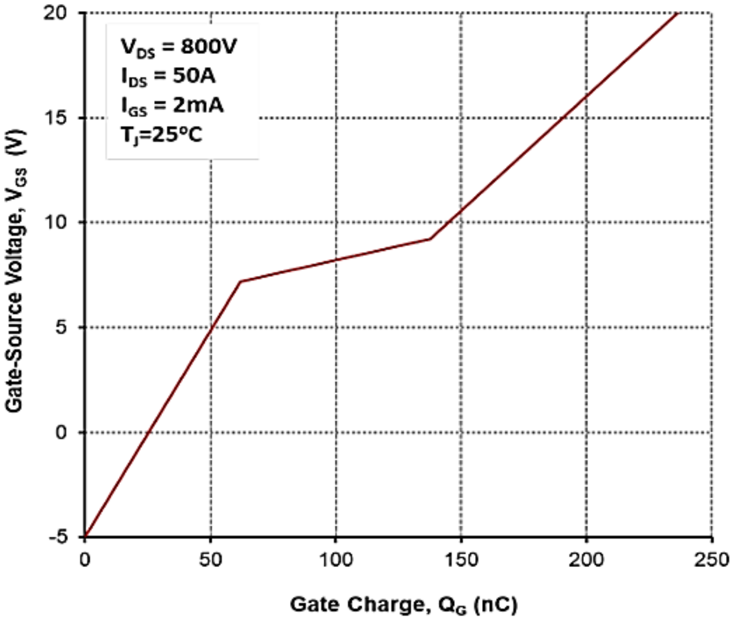


Figure 7. Gate Charge Characteristics

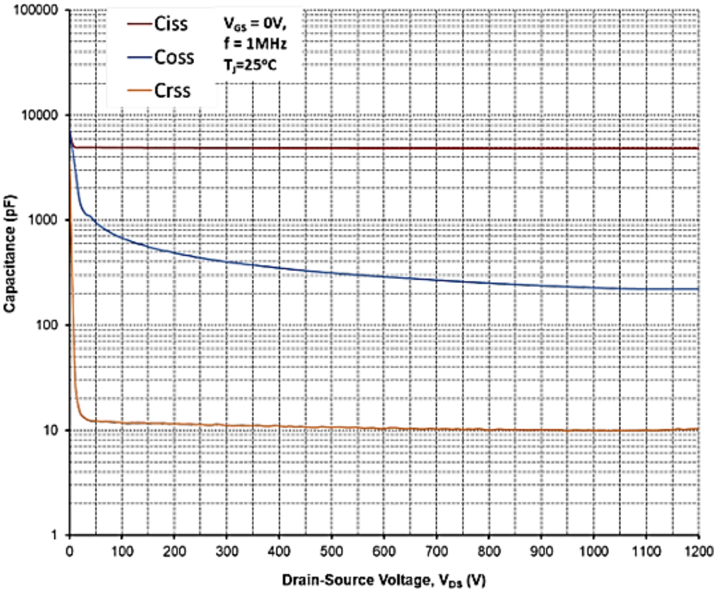


Figure 8. Capacitances vs. Drain-Source Voltage (0-1200V)

TYPICAL PERFORMANCE (For Reference Only)

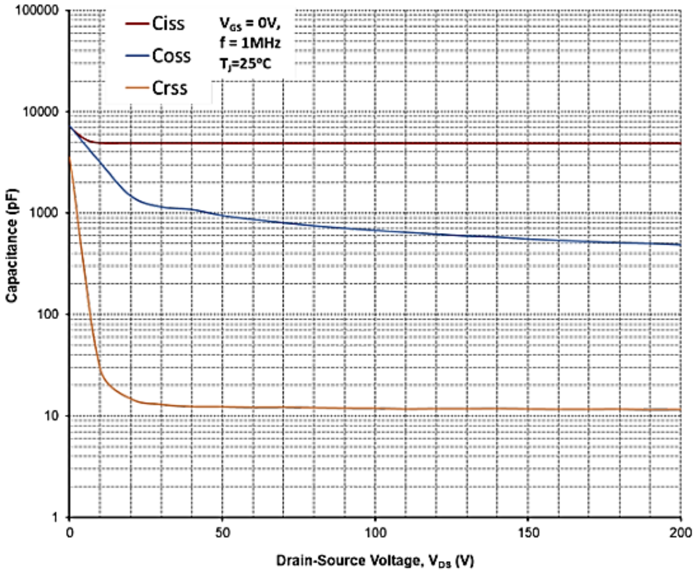


Figure 9. Capacitances vs. Drain-Source Voltage (0-200V)

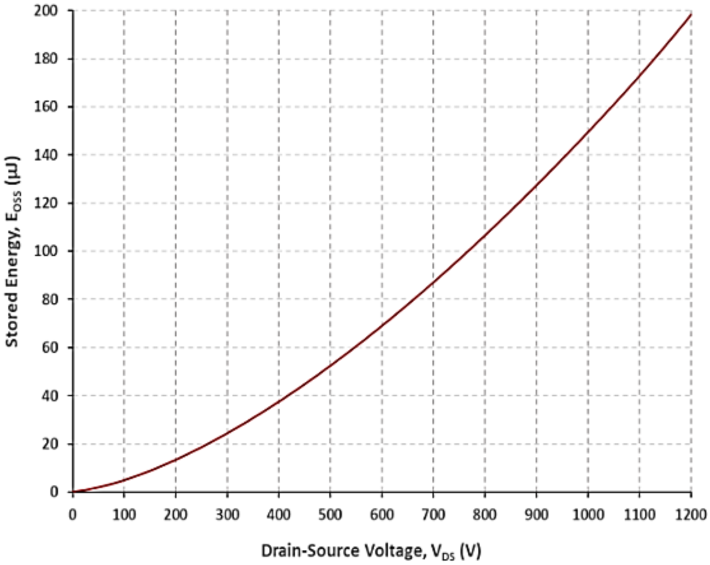


Figure 10. Output Capacitor Stored Energy

## TYPICAL PERFORMANCE (For Reference Only)

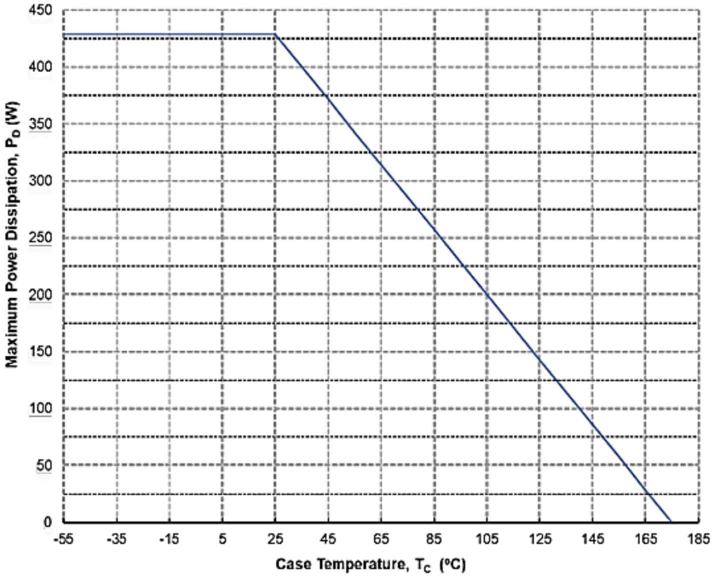


Figure 11. Maximum Power Dissipation Derating vs. Case Temperature

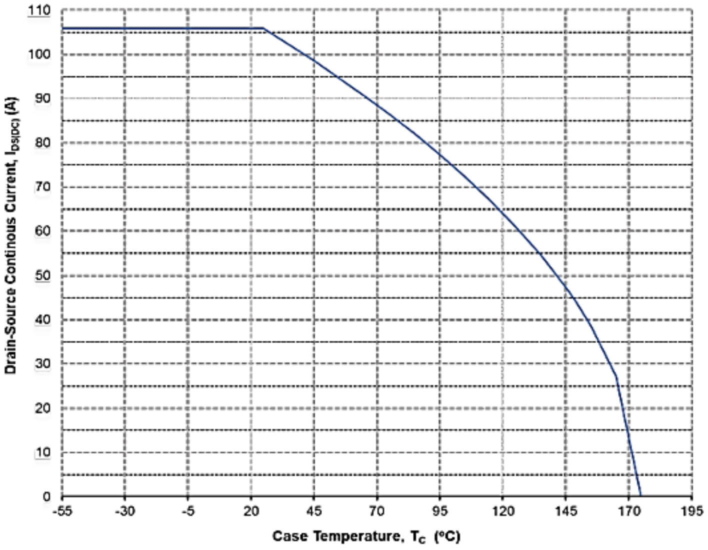


Figure 12. Continuous Drain Current Derating vs. Case Temperature

TYPICAL PERFORMANCE (For Reference Only)

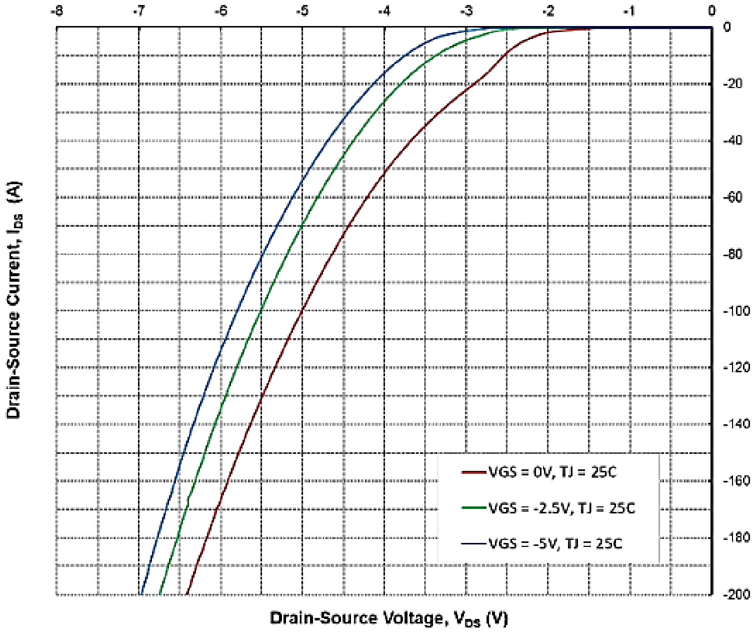


Figure 13. Body Diode Characteristics @ 25°C

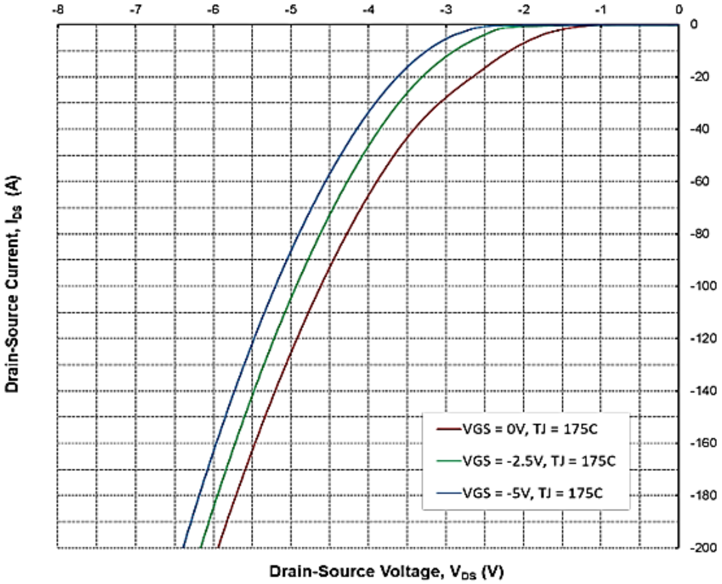


Figure 14. Body Diode Characteristics @ 175°C

TYPICAL PERFORMANCE (For Reference Only)

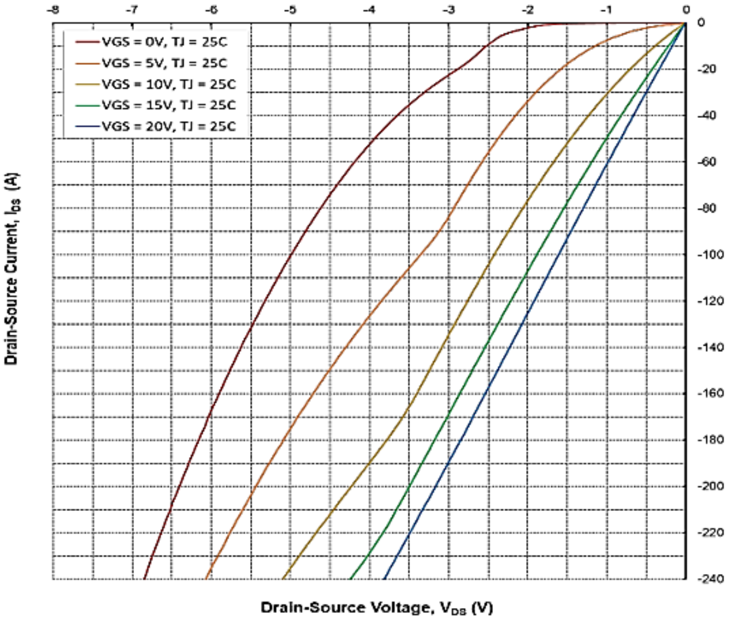


Figure 15. 3rd Quadrant Characteristics @ 25°C

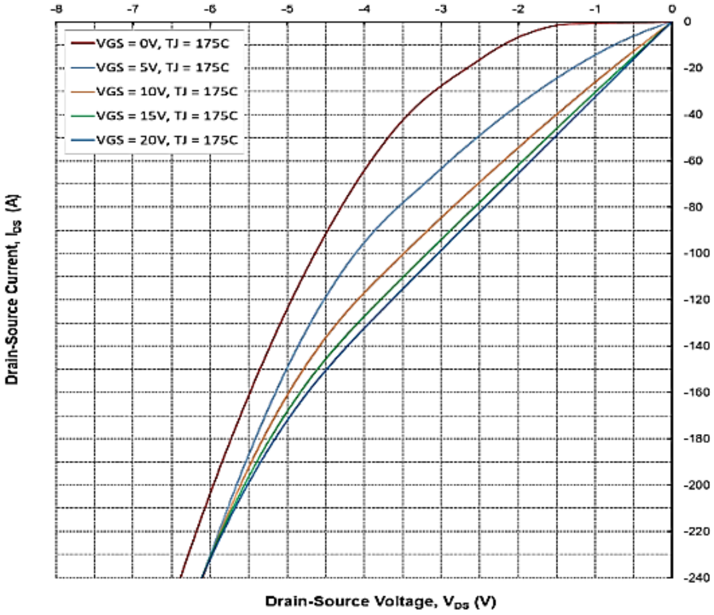


Figure 16. 3rd Quadrant Characteristics @ 175°C

TYPICAL PERFORMANCE (For Reference Only)

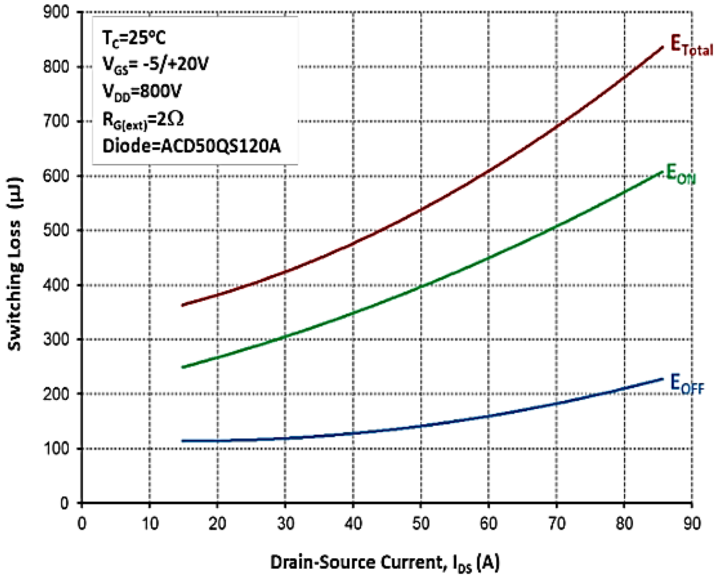


Figure 17. Clamped Inductive Switching Energy vs. Drain Current

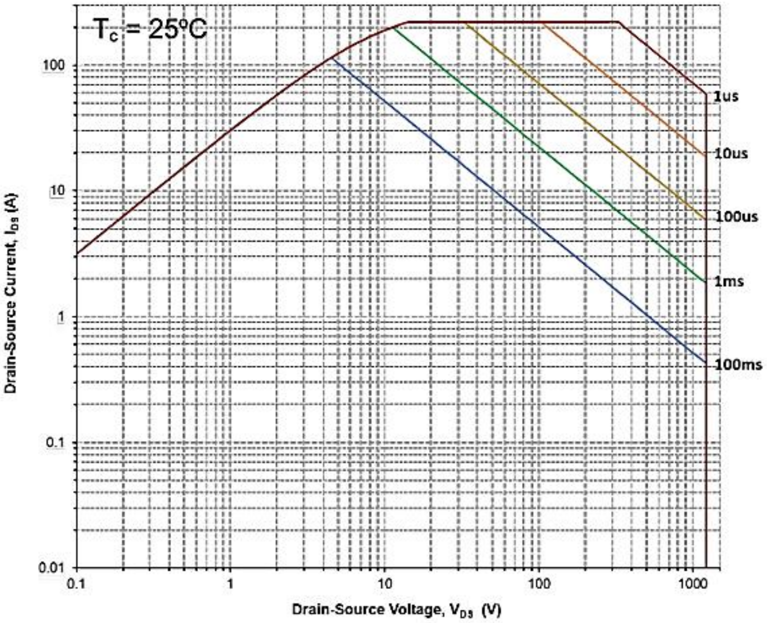


Figure 18. Safe Operating Area

TYPICAL PERFORMANCE (For Reference Only)

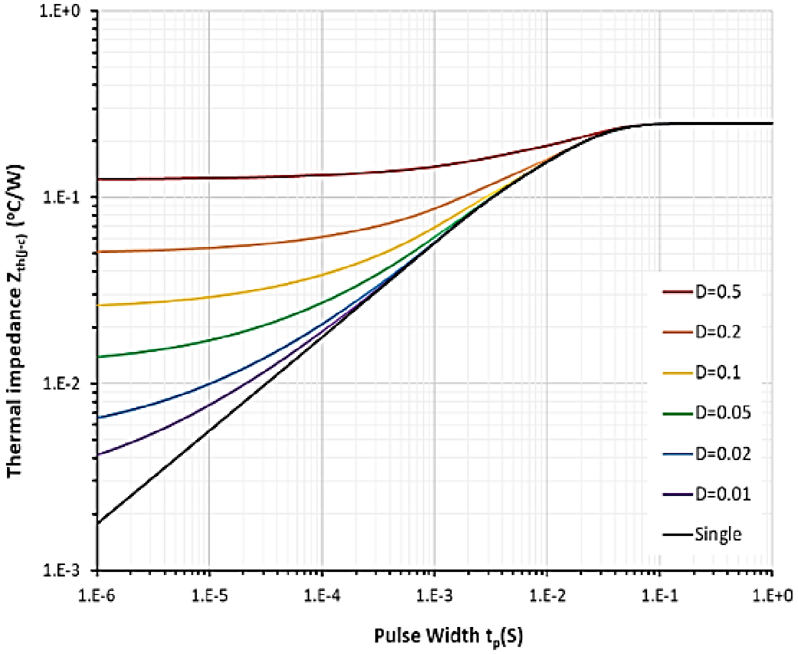
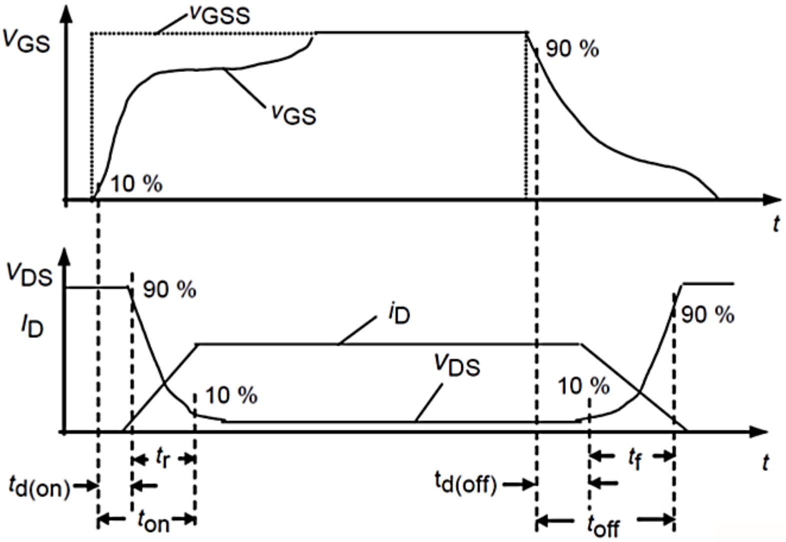
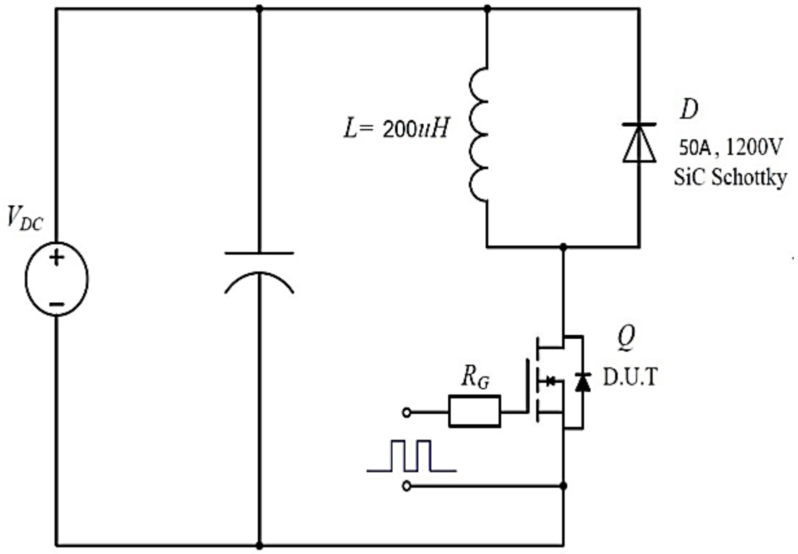


Figure 19. Transient Thermal Impedance
(Junction – Case)

## SWITCHING TIMES DEFINITION AND TEST CIRCUIT





## IMPORTANT NOTES AND DISCLAIMER

1. ROHS COMPLIANCE: The levels of RoHS restricted materials in this product are below the maximum concentration values (also referred to as the threshold limits) permitted for such substances, or are used in an exempted application, in accordance with EU RoHS Directive (EU) 2015/863 EC (RoHS3). RoHS Test Report for this product can be obtained can be obtained at Download Center.
2. REACH COMPLIANCE: REACH substances of high concern (SVHCs) information is available for this product. Since the European Chemical Agency (ECHA) has published notice of their intent to frequently revise the SVHC listing for the foreseeable future, REACH Test Report for this product can be obtained can be obtained at Download Center.
3. All Product parametric performance is indicated in the Electrical Characteristics for the listed herein test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.
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