

SPECIFICATION SHEET NO.	S1112 – LGE3M50120QL0T	
ORIGINAL MFG/PART NO.	 LGE Diodes/LGE3M50120Q-L	
NEXTGEN PART CODE	LGE3M50120QL0T	Indicate This Code For <a href="#">RFQ</a> /Order
DATE	Nov. 12, 2025	
REVISION	A5	Updated With Most Recent Data
DESCRIPTION AND MAIN PARAMETRICS	<p>Silicon Carbide (SiC) Power MOSFET, 4 Pins, Case TO-247-4, LGE3M L Series, N-Channel, Drain-Source Voltage (V<sub>DS</sub>): 1200V Max.</p> <p>Current Drain-source On-state Resistance R<sub>DS(ON)</sub>: 50mΩ Typ.</p> <p>Continuous Drain Current (I<sub>D</sub>) @ T<sub>c</sub>=25°C: 58A</p> <p>Operating Temperature: -55°C ~ 175°C (T<sub>J</sub>)</p> <p>Package in Tube, 30pcs/Tube</p> <p>RoHS/RoHS III compliant, RoHS Annex III lead Exemption (Exempt per RoHS EU 2015/863) and Halogen Free (HF)</p>	
CUSTOMER		
CUSTOMER PART NUMBER		
CROSS REF. PART NUMBER		
MEMO		

VENDOR APPROVE		
Issued/Checked/Approved		
		
Effective Date: Nov. 12, 2025		

CUSTOMER APPROVE	
Date:	

## MAIN FEATURE

- High Blocking Voltage with Low On-Resistance
- High Speed Switching with Low Parasitic Capacitance
- High Junction Temperature
- Fast Recovery Diode
- Kelvin Connection Driver
- 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 Drive
- Photovoltaic Inverter
- UPS Power Supply
- High voltage DC / DC converter
- Switching Mode Power Supply

## ELECTRICAL CHARACTERISTICS

- See Page 5 ~ Page 7.
- All Products Parameters are Subject To NextGen Components' Final Confirmation.

HOW TO ORDER

- Please Follow Up Part Code Guide And Indicate NextGen Part Code LGE3M50120QL0T For RFQ and Order.

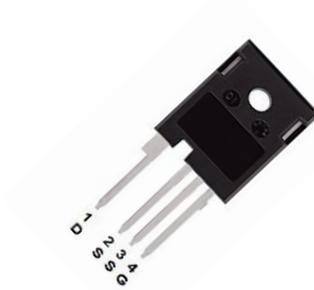
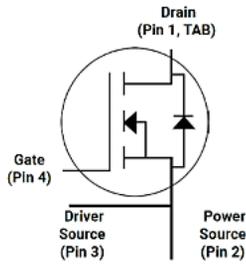
PART CODE GUIDE

**RFQ**  
Request For Quotation

CODE	NAME	KEY SPECIFICATION OPTION
LGE3M	Product Series Code	Silicon Carbide (SiC) Power MOSFET, 4 Pins, Case TO-247-4, LGE3M L Series
50	Current Drain-source On-state Resistance R <sub>DS(ON)</sub> Code	50: 50mΩ Typical
120	Drain-Source Voltage (V <sub>DS</sub> ) Code	120: 1200V Max.
Q	Package Case Code	B: TO-247-3; E: TO-263-2; J: TO-263-7; Q: TO-247-4;
LOT	Internal Control Code	Letter A~Z, a-z or Digits (0-9)
XX	Special/Custom Parameters	Blank: N/A; XX: Letter A~Z, a~z or digits (0~9) for Special/Custom Parameters



**INTERNAL CIRCUIT DIAGRAM**



**1200V N-CHANNEL SiC MOSFET**

VDS	ID @ Tc=25°C	R DS(on)	MARKING	PACKAGE/CASE
1200V	58A	50mΩ	LGE3M50120Q	TO-247-4

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

PARAMETER	SYMBOL	TEST CONDITIONS	VALUE	UNIT
Drain-Source Voltage	V DS	V GS=0V, I D=100μA	1200	V
Gate-Source Voltage	V GS	Recommended maximum	-5/+20	V
Continuous Drain Current	I D	V GS=20V, Tc=25°C	58	A
		V GS=20V, Tc=100°C	43	
Pulsed Drain Current	I DM	Pulse width limited by SOA	145	A
Power Dissipation	P TOT	Tc=25°C	344	W
Operating and Junction Temperature Range	T J		-55 ~ +175	°C
Storage Temperature Range	T STG		-55 ~ +175	°C
Soldering Temperature	TL	Wave soldering only allowed at leads, 1.6 mm from case for 10 s	260	°C

**THERMAL CHARACTERISTICS**

PARAMETER	SYMBOL	CONDITIONS	VALUE			UNIT
			MIN.	TYP.	MAX.	
Thermal Resistance To Shell	$R_{th(j-c)}$	Junction-case	-	0.436	-	°C/W

**ELECTRICAL CHARACTERISTICS – Part I Characteristics (Tc = 25°C Unless Otherwise Specified)**

PARAMETER	SYMBOL	CONDITIONS	VALUE			UNIT
			Min.	Typ.	Max.	
Zero Gates Voltage Drain Current	$I_{DSS}$	$V_{DS}=1200V, V_{GS}=0V$	-	5	100	μA
Gate Leakage Current	$I_{GSS}$	$V_{DS}=0V, V_{GS}=-5/+20V,$	-	1	±100	nA
Gate Threshold Voltage	$V_{TH}$	$V_{GS}=V_{DS}, I_D=6mA$	-	3.2	-	V
		$V_{GS}=V_{DS}, I_D=6mA$ TC=175°C	-	2.2	-	
Drain-source On-state Resistance	$R_{ON}$	$V_{GS}=20V, I_D=20A$ Tj=25°C	-	50	65	mΩ
		$V_{GS}=20V, I_D=20A$ Tj=175°C	-	80	-	
Input Capacitance	$C_{ISS}$	$V_{DS} = 800V,$ $V_{GS} = 0V$ F=1MHz, $V_{AC} = 25mV$	-	2750	-	pF
Output Capacitance	$C_{OSS}$		-	106	-	pF
Reverse Transfer Capacitance	$C_{RSS}$		-	5.2	-	pF
The Output Capacitor Stores Energy	$E_{OSS}$		-	43	-	μJ
Total Gate Charge	$Q_g$	$V_{DS} = 800V,$ $V_{GS} = -5/+20V$ $I_D = 20A$	-	120	-	nC
Gate To Source Charge	$Q_{gs}$		-	25	-	nC
Gate To Drain Charge	$Q_{gd}$		-	48	-	nC

**ELECTRICAL CHARACTERISTICS – Part II Characteristics (Tc = 25°C Unless Otherwise Specified)**

PARAMETER	SYMBOL	CONDITIONS	VALUE			UNIT	
			Min.	Typ.	Max.		
Gate Input Resistance	R <sub>g</sub>	f=1MHZ		2.8		Ω	
Turn On Switching Energy	E <sub>on</sub>	V <sub>DS</sub> =800V, V <sub>GS</sub> =-2/20V I <sub>D</sub> =30A, R <sub>G(ext)</sub> = 3.3Ω, L= 450μH	-	455.4	-	μJ	
Turn Off Switching Energy	E <sub>off</sub>		-	213.6	-	μJ	
Turn On Delay Time	t <sub>d (on)</sub>		-	8.9	-	ns	
Rise Time	t <sub>r</sub>		-	28.9	-	ns	
Turn Off Delay Time	t <sub>d (off)</sub>		-	25.6	-	ns	
Fall time	T <sub>f</sub>				17.2		ns

**REVERSE DIODE CHARACTERISTICS @Tc=25 °C (Unless Otherwise Specified)**

PARAMETER	SYMBOL	CONDITIONS	VALUE			UNIT
			Min.	Typ.	Max.	
Diode Forward Voltage	V <sub>SD</sub>	V <sub>GS</sub> =0V, I <sub>SD</sub> =20A T <sub>J</sub> =175°C	-	4.9	-	V
			-	4.4	-	V
Reverse Recovery Time	T <sub>rr</sub>	V <sub>R</sub> =800V, V <sub>GS</sub> =-2/20V I <sub>SD</sub> =30A di/dt = 1000A/μS R <sub>G(ext)</sub> = 10Ω, L= 450μH	-	44.4	-	nS
Reverse Recovery Charge	Q <sub>rr</sub>		-	212.6	-	nC
Reverse Recovery Peak Current	I <sub>rrm</sub>		-	10.8	-	A

ELECTRICAL CHARACTERISTIC CURVES (For Reference Only)

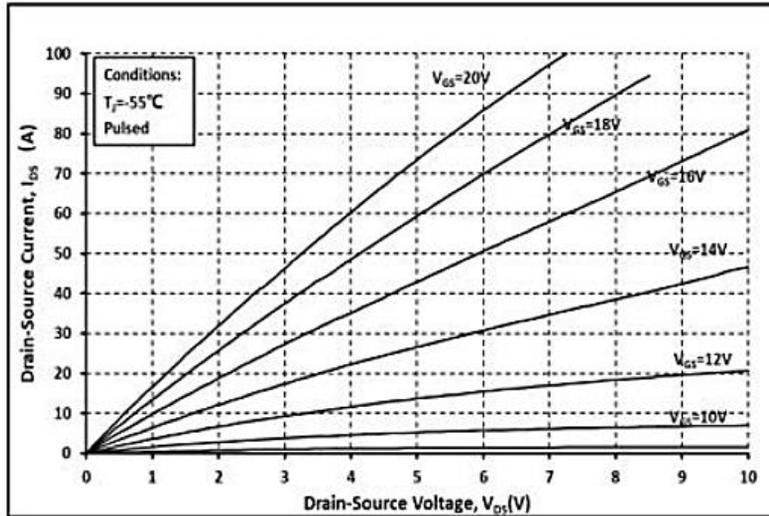


Figure 1. Output Characteristics  $T_J=55^\circ\text{C}$

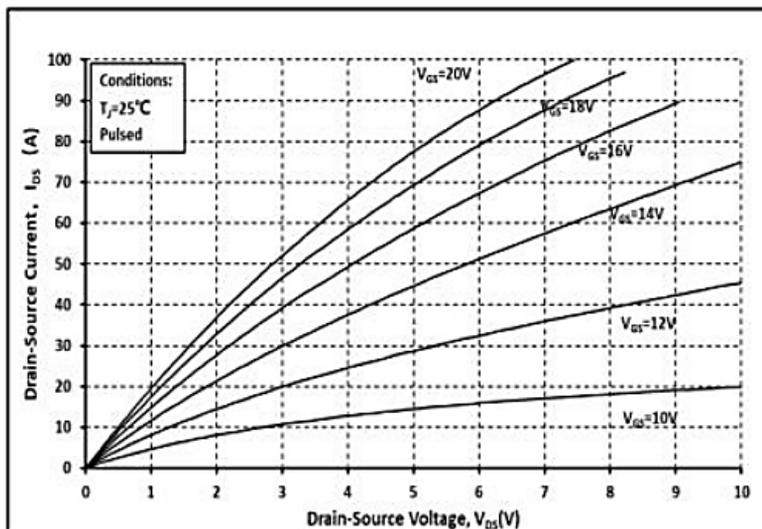


Figure 2. Output Characteristics  $T_J=25^\circ\text{C}$

ELECTRICAL CHARACTERISTIC CURVES (For Reference Only)

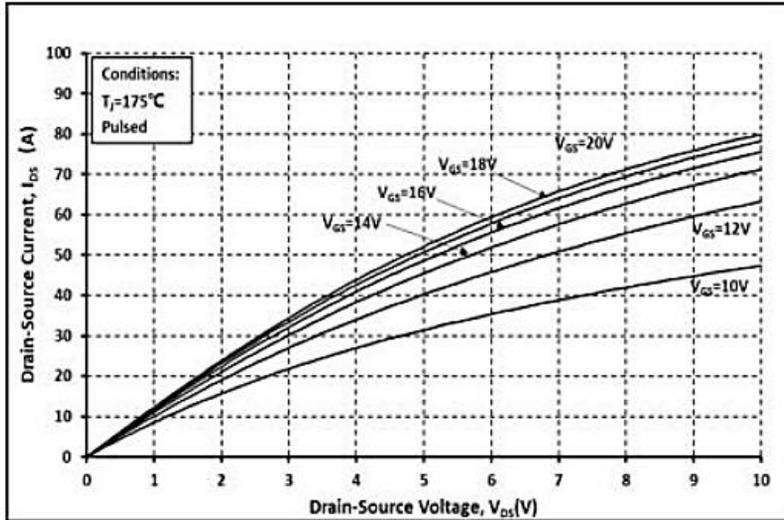


Figure 3. Output Characteristics  $T_J = 175^\circ\text{C}$

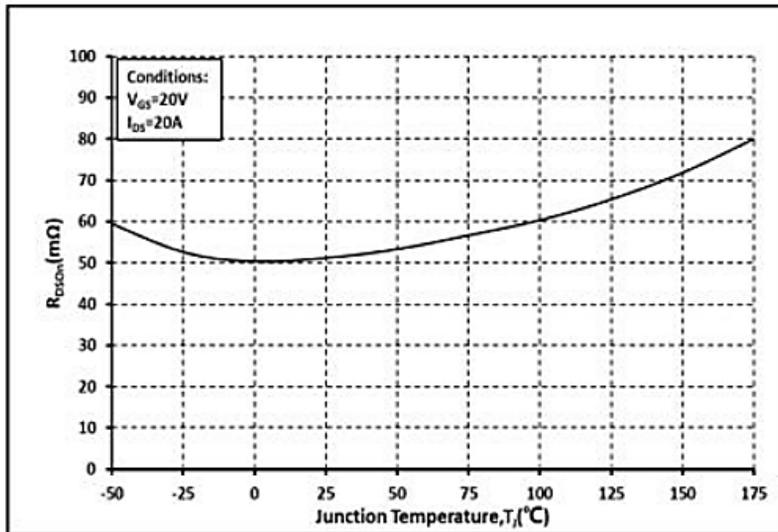


Figure 4. On-Resistance vs. Temperature

ELECTRICAL CHARACTERISTIC CURVES (For Reference Only)

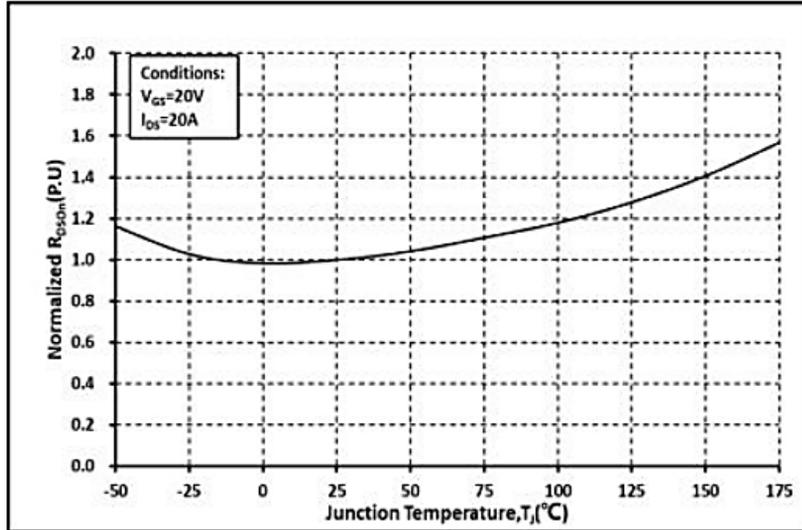


Figure 5. Normalized On-Resistance vs. Temperature

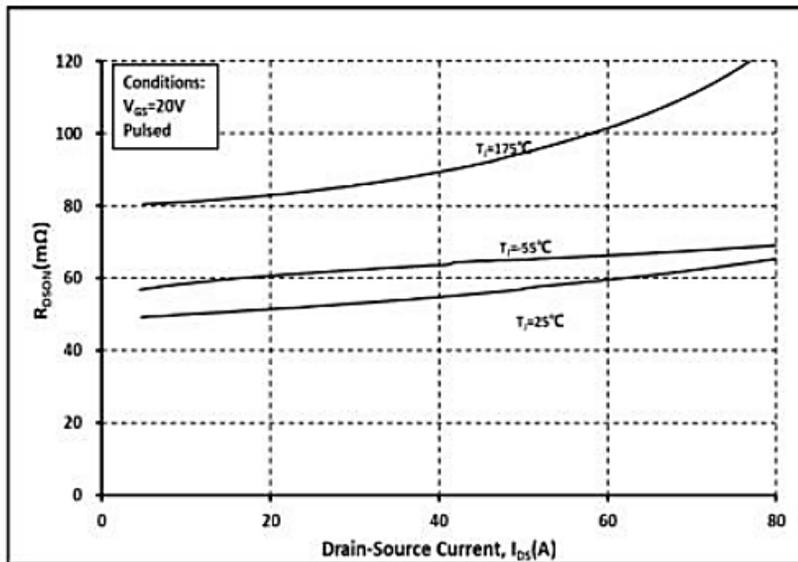


Figure 6. On-Resistance Vs. Drain-Source Current @ Various Temperature

ELECTRICAL CHARACTERISTIC CURVES (For Reference Only)

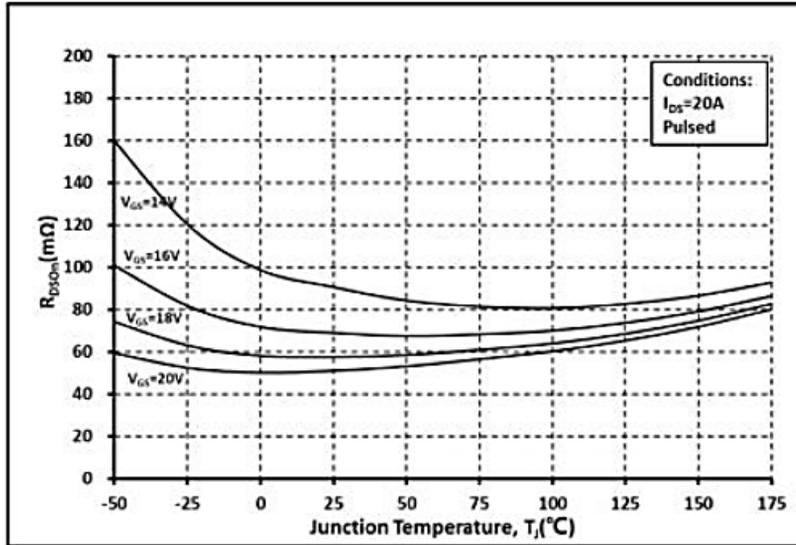


Figure 7. On-Resistance @ $V_{GS}$  vs. Temperature

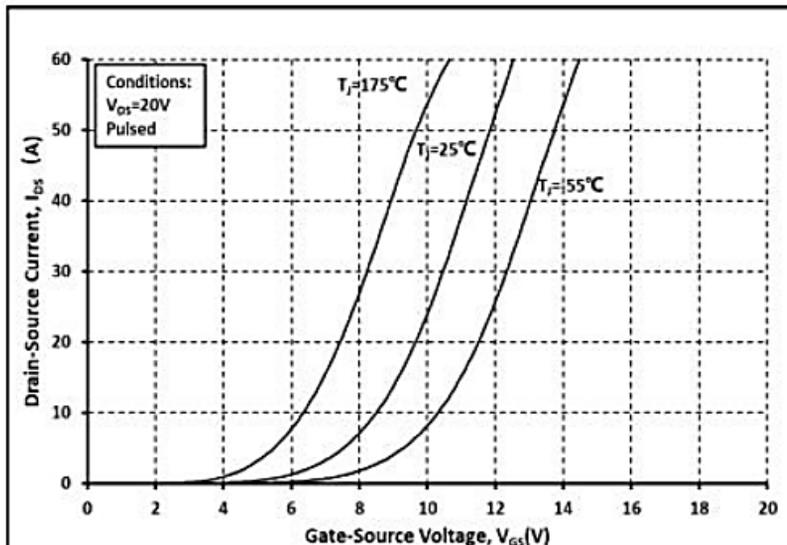


Figure 8. Transfer Characteristic For Various Junction Temperatures

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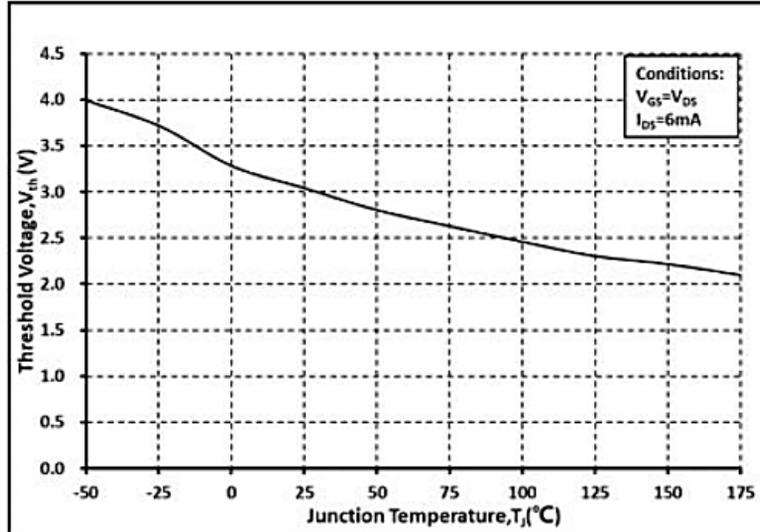


Figure 9. Threshold Voltage vs. Temperature

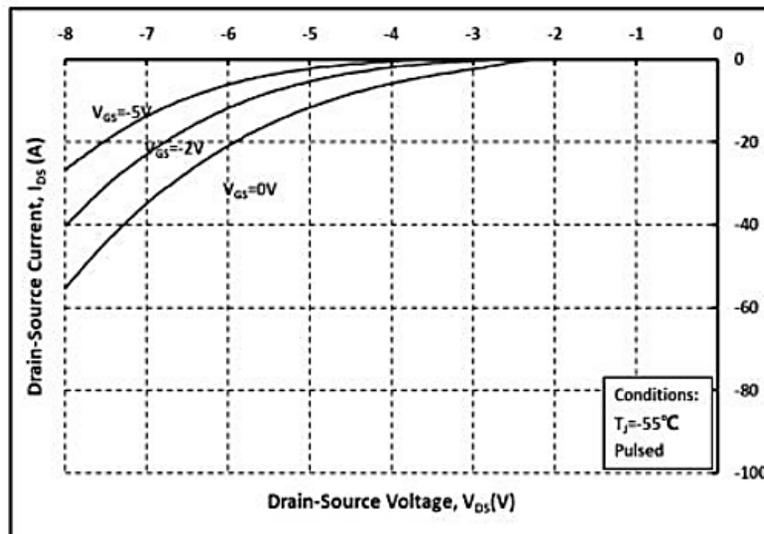


Figure 10. Body Diode Characteristics @  $T_j = -55^\circ\text{C}$

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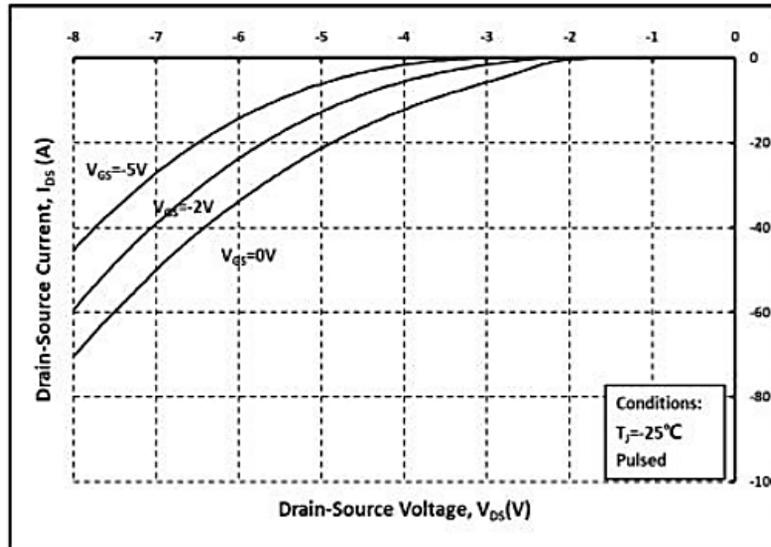


Figure 11. Body Diode Characteristics @  $T_J = 25^\circ\text{C}$

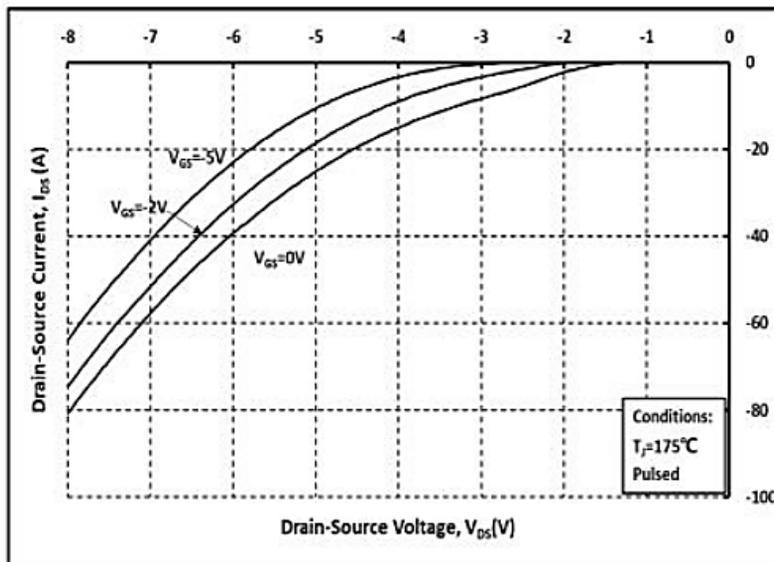


Figure 12. Body Diode Characteristics @  $T_J = 175^\circ\text{C}$

ELECTRICAL CHARACTERISTIC CURVES (For Reference Only)

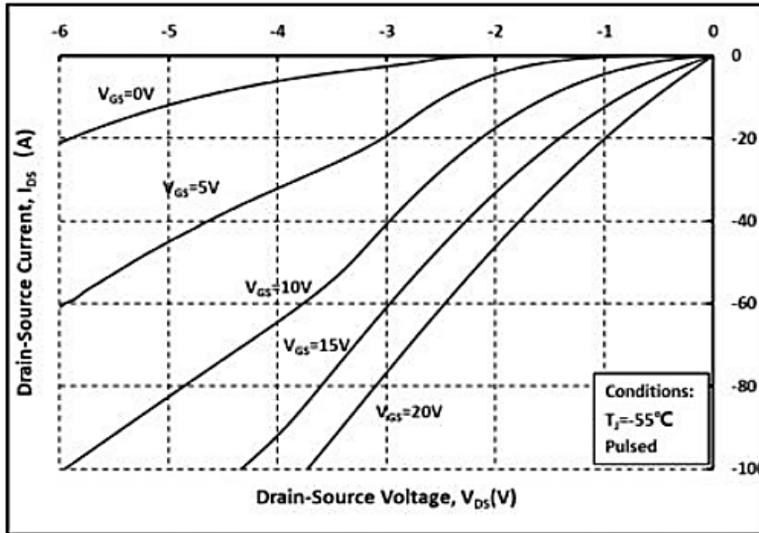


Figure 13. 3rd Quadrant Characteristics @  $T_j = -55^\circ\text{C}$

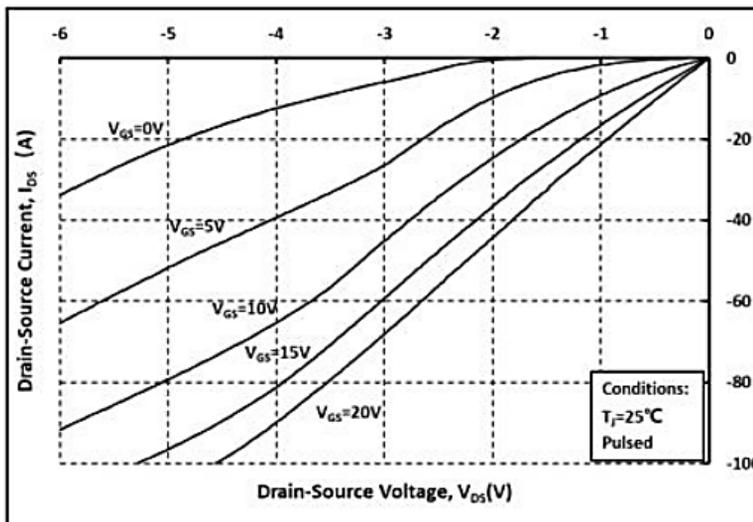


Figure 14. 3rd Quadrant Characteristics @  $T_j = 25^\circ\text{C}$

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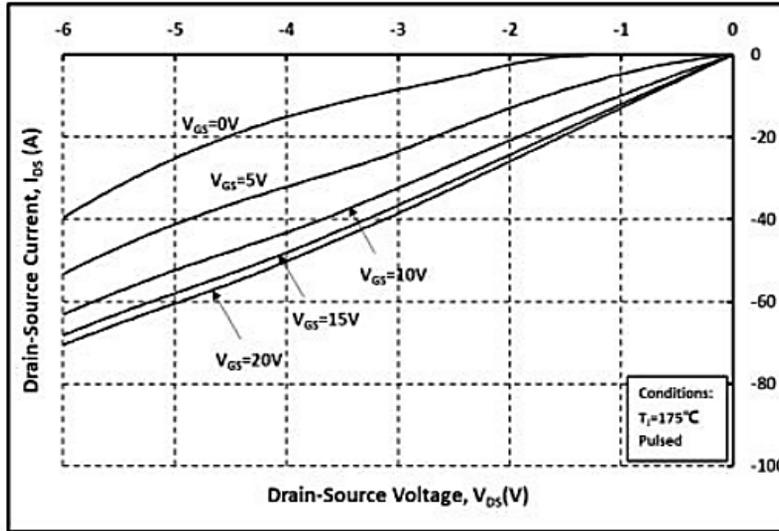


Figure 15. 3rd Quadrant Characteristics @  $T_J=175^\circ\text{C}$

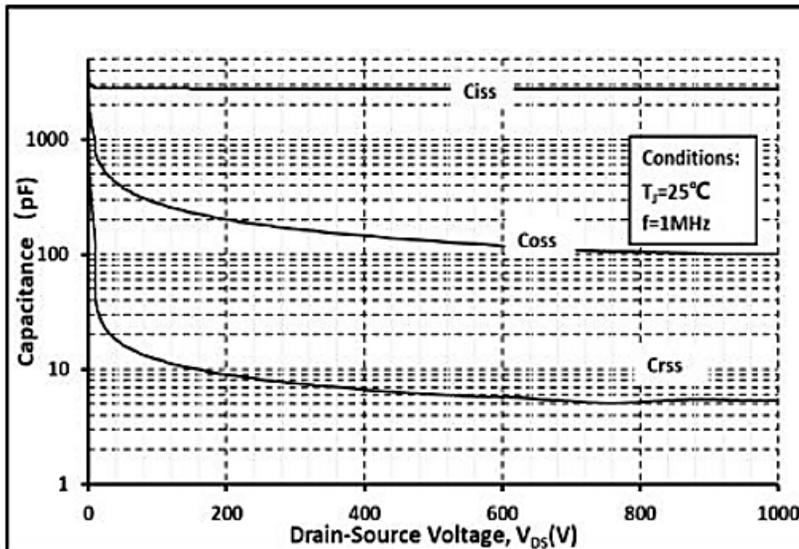


Figure 16. Capacitances vs. Drain-Source Voltage

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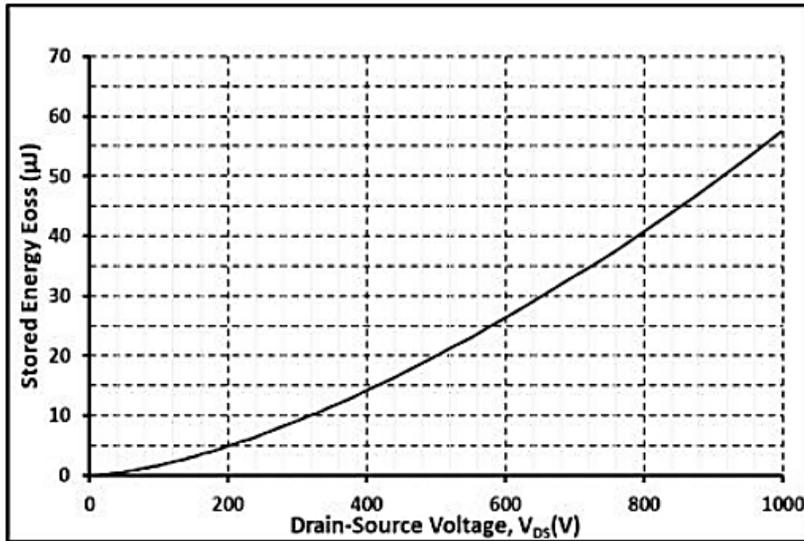


Figure 17. Output Capacitor Stored Energy

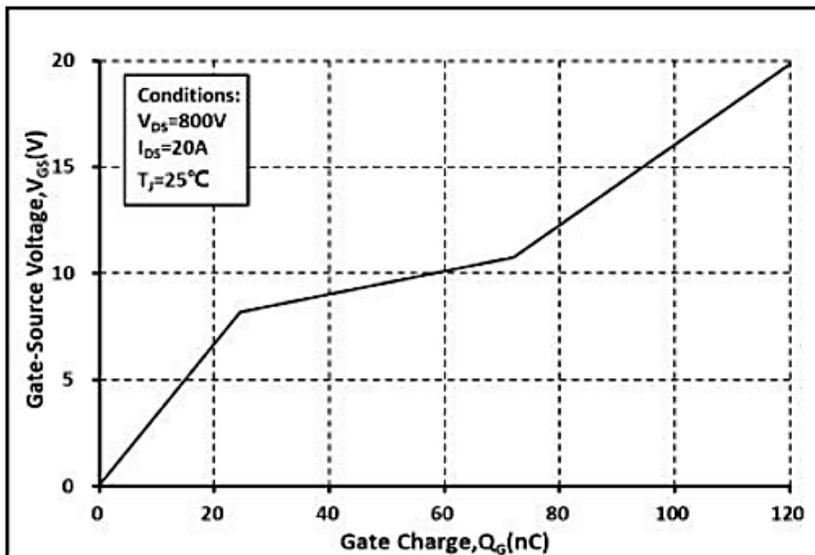


Figure 18. Gate Charge Characteristics

ELECTRICAL CHARACTERISTIC CURVES (For Reference Only)

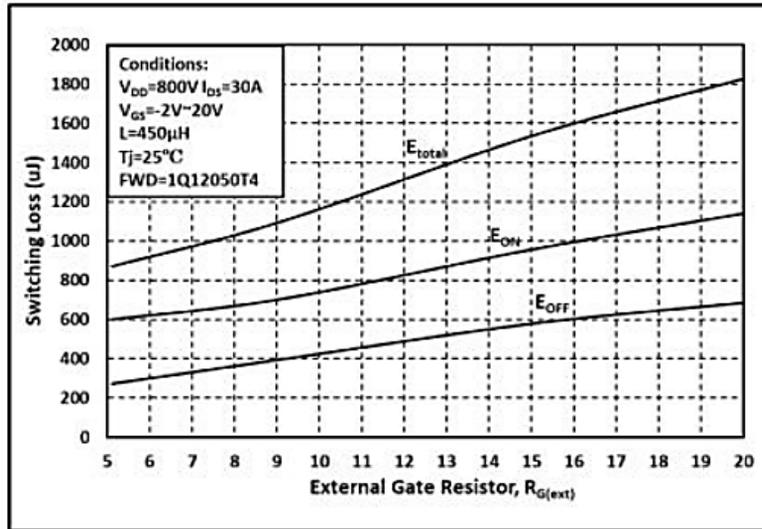


Figure 19. Switching Energy vs. External Gate Resistor

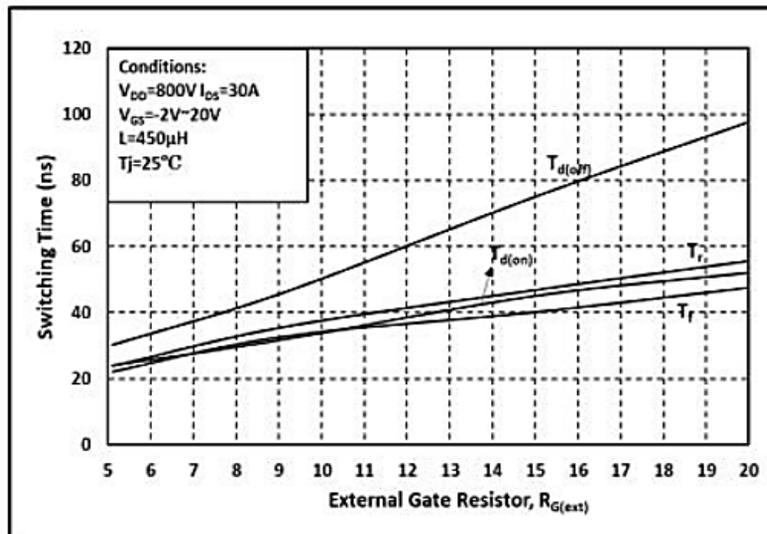


Figure 20. Switching Time vs. External Gate Resistor

ELECTRICAL CHARACTERISTIC CURVES (For Reference Only)

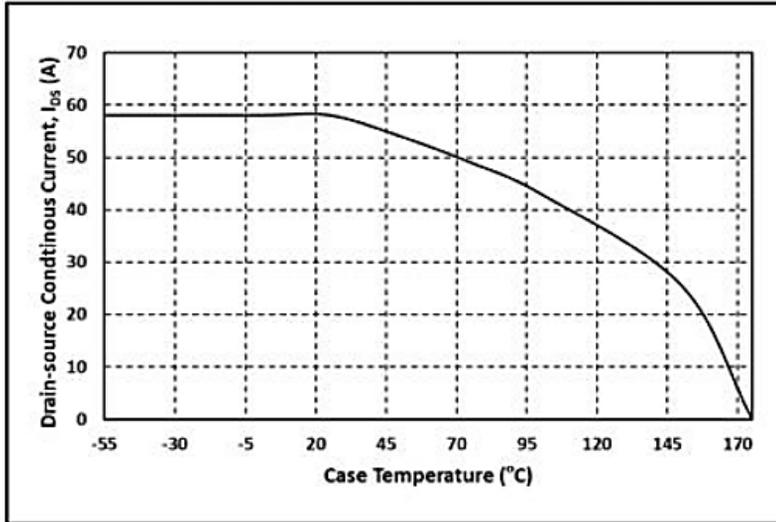


Figure 21. Continuous Drain Current Derating vs. Case Temperature

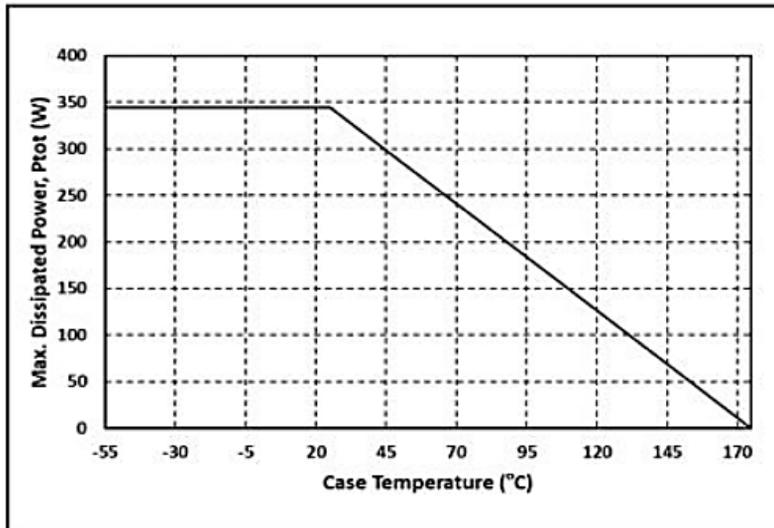


Figure 22. Maximum Power Dissipation Derating vs. Case Temperature

ELECTRICAL CHARACTERISTIC CURVES (For Reference Only)

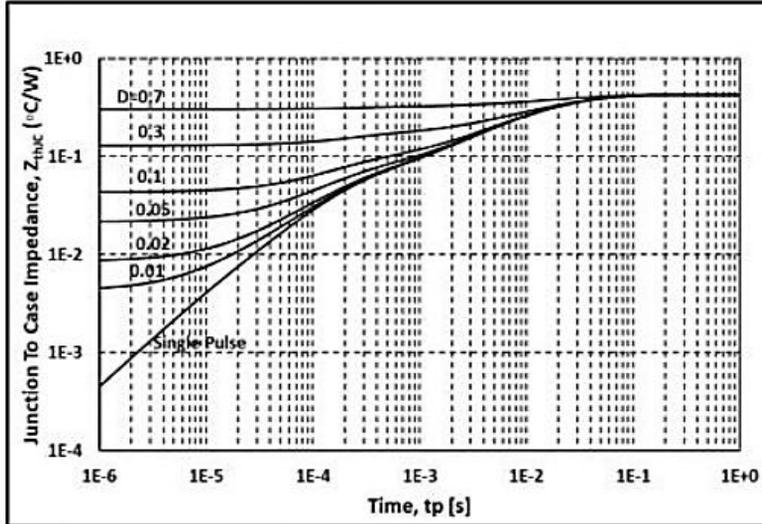


Figure 23. Transient Thermal Impedance (Junction to Case)

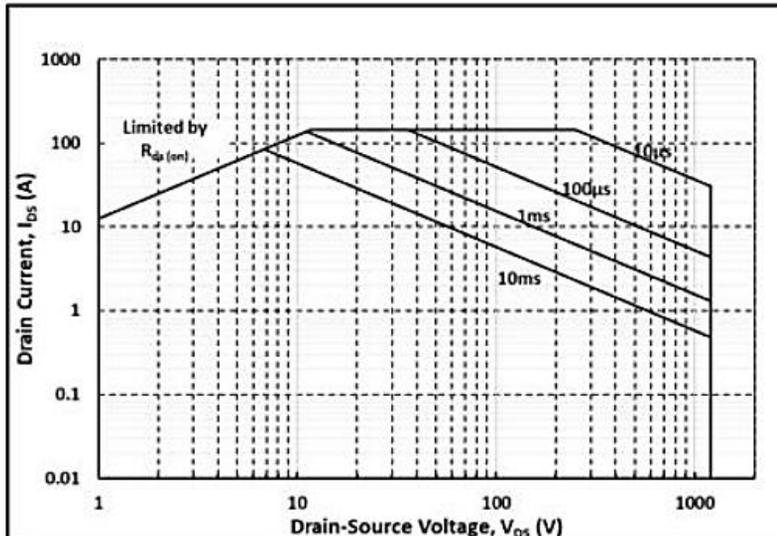


Figure 24. Safe Operating Area

## 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 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 at Download Center.
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