

SPECIFICATION SHEET NO.	S1111 – LGE3M20120QL0T	
ORIGINAL MFG/PART NO.	 LGE Diodes/LGE3M20120Q-L	
NEXTGEN PART CODE	LGE3M20120QL0T	Indicate This Code For RFQ /Order
DATE	Nov. 11, 2025	
REVISION	A4	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_{DS}): 1200V Max.</p> <p>Current Drain-source On-state Resistance R_{DS(ON)}: 20mΩ Typ.</p> <p>Continuous Drain Current (I_D) @ T_c=25°C: 100A</p> <p>Operating Temperature: -55°C ~ 175°C (T_J)</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. 11, 2025		

CUSTOMER APPROVE	
Date:	

MAIN FEATURE

- High Blocking Voltage with Low On-Resistance
- High Frequency Operation
- Fast Intrinsic Diode With Low Reverse Recovery
- Higher System Efficiency
- Parallel Device Convenience without Thermal Runaway
- High Temperature Application
- 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 LGE3M20120QL0T For RFQ and Order.

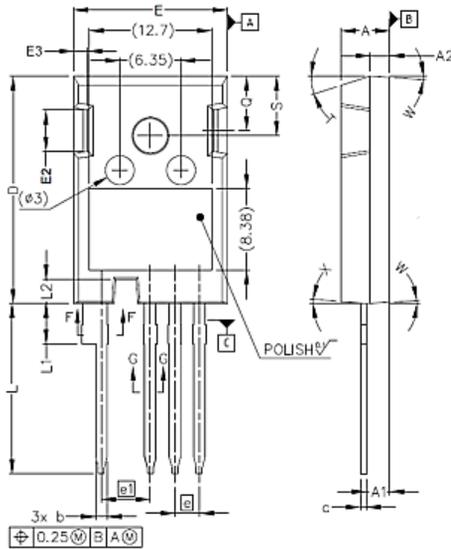
PART CODE GUIDE

RFQ
Request For Quotation

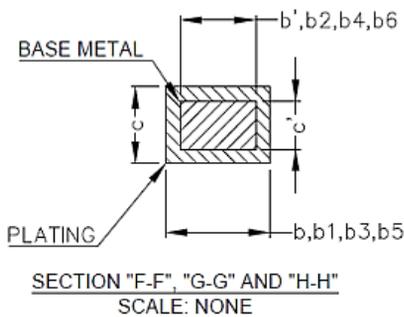
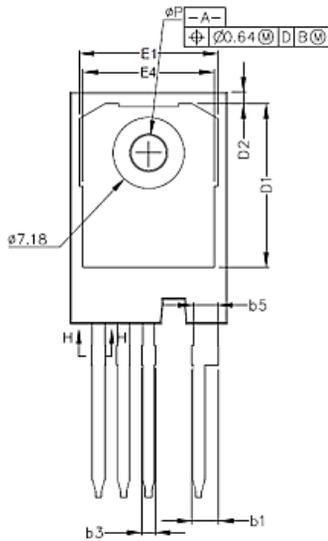
CODE	NAME	KEY SPECIFICATION OPTION
LGE3M	Product Series Code	Silicon Carbide (SiC) Power MOSFET, 4 Pins, Case TO-247-4, LGE3M L Series
20	Current Drain-source On-state Resistance R _{DS(ON)} Code	20: 20mΩ
120	Drain-Source Voltage (V _{DS}) Code	120: 1200V Max.
Q	Package Case Code	B: TO-247-3; E: TO-263-2; J: TO-263-7; Q: TO-247-4;
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

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

Top View

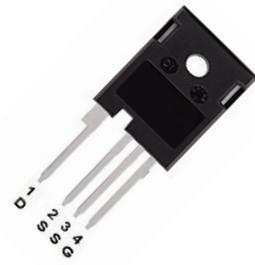
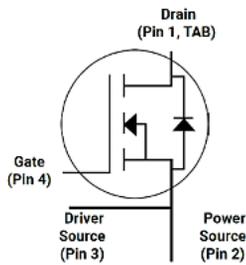


Side View



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.	

INTERNAL CIRCUIT DIAGRAM



1200V N-CHANNEL SiC MOSFET

VDS	ID @ Tc=25°C	R DS(on)	MARKING	PACKAGE/CASE
1200V	100A	20mΩ	LGE3M20120Q	TO-247-4

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

PARAMETER	SYMBOL	TEST CONDITIONS	VALUE	UNIT
Drain-Source Voltage	V DS, Max	VGS=0V, ID=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	VGS=20V, Tc=25°C	100	A
		VGS=20V, Tc=100°C	71	
Pulsed Drain Current	I D (pulse)	Tc=25°C	200	A
Short Circuit Capability	T sc	VDD=800V, VGS=20V	TBD	μS
Short Circuit Capability	I DS	VDD=800V, VGS=20V	TBD	A
Total Power Dissipation	P D	TC=25°C	428	W
Operating Junction Temperature	T J		-55~ +175	°C
Storage Temperature	T STG		-55~ +175	°C

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

PARAMETER	SYMBOL	CONDITIONS	VALUE			UNIT
			Min.	Typ.	Max.	
Drain-Source Breakdown Voltage	V _{(BR) DSS}	V _{GS} =0V, I _D =100μA	1200	-	-	V
Gates Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =20mA	1.9	2.8	3.8	V
		V _{DS} =V _{GS} , I _D =20mA, T _J =150°C	-	2.05	-	
		V _{DS} =V _{GS} , I _D =20mA, T _J =175°C	-	1.95	-	
Zero Gates Voltage Drain Current	I _{DSS}	V _{DS} =1200V, V _{GS} =0V	0	5	100	μA
Gates-Source Leakage Current	I _{GSS}	V _{GS} =20V, V _{DS} =0V	0	10	200	nA
		V _{GS} =-5V, V _{DS} =0V	-200	-10	0	nA
Drain-source On-state Resistance	R _{DS(ON)}	V _{GS} =20V, I _D =50A	-	20	29	mΩ
		V _{GS} =20V, I _D =50A T _J =150°C	-	35	-	
		V _{GS} =20V, I _D =50A T _J =175°C	-	39	-	
Transconductance	g _{fs}	V _{GS} =20V, I _D =50A	-	36	-	S
		V _{GS} =20V, I _D =50A, T _J =150°C	-	30	-	
		V _{GS} =20V, I _D =50A, T _J =175°C	-	29.5	-	
Input Capacitance	C _{ISS}	V _{DS} =1000V, V _{GS} =0V f = 1MHz	-	4900	-	pF
Output Capacitance	C _{OSS}		-	248	-	pF
Reverse Transfer Capacitance	C _{RSS}		-	14	-	pF
C _{OSS} Stored Energy	E _{OSS}		-	146	-	μJ

ELECTRICAL CHARACTERISTICS PART II - $T_c = 25^\circ \text{C}$ (Unless Otherwise Specified)

PARAMETER	SYMBOL	CONDITIONS	VALUE			UNIT	
			Min.	Typ.	Max.		
Total Gate Charge	Q_g	$V_{DS} = 800V,$ $V_{GS} = -5/20V$ $I_D = 50A$	-	254	-	nC	
Gate-Source Charge	Q_{gs}		-	71	-		
Gate-Drain Charge	Q_{gd}		-	109	-		
Internal Gate Input Resistance	$R_{g(int)}$	$f = 1MH, I_D = 0A$	-	2.0	-	Ω	
Turn - On Switching Energy	E_{on}	$V_{DS} = 800 V,$ $V_{GS} = -5V/20V,$ $I_D = 50A,$ $R_{G(ext)} = 1\Omega,$ $L = 450\mu H$	-	1250	-	μJ	
Turn - Off Switching Energy	E_{off}		-	126	-	μJ	
Turn - On Delay Time	$t_{d(on)}$		-	28	-	ns	
Rise Time	t_r		-	46	-	ns	
Turn - Off Delay Time	$t_{d(off)}$		-	56	-	ns	
Fall Time	t_f		-	12	-	ns	
Avalanche Capability	E_{AS}		$V_{DD} = 100 V,$ $V_{GS} = 20V,$ $L = 2mH$	-	1.36	-	mJ
	I_{Av}			-	37	-	A

REVERSE DIODE CHARACTERISTICS - $T_c = 25^\circ \text{C}$ (Unless Otherwise Specified)

PARAMETER	SYMBOL	CONDITIONS	VALUE			UNIT
			Min.	Typ.	Max.	
Diode Forward Voltage	V_{SD}	$V_{GS} = -5V, I_{SD} = 25A$	-	3.8	-	V
		$V_{GS} = -5V, I_{SD} = 25A,$ $T_J = 150^\circ\text{C}$	-	3.5	-	
		$V_{GS} = -5V, I_{SD} = 25A,$ $T_J = 175^\circ\text{C}$	-	3.4	-	
Continuous Diode Forward Current	I_S	$V_{GS} = -5V$	-	85	-	A
Reverse Recovery Time	T_{rr}	$V_{GS} = -5V,$ $I_{SD} = 50A,$ $V_R = 800V,$ $dif/dt = 2100 \text{ A}/\mu\text{s}$	-	34	-	nS
Reverse Recovery Charge	Q_{rr}		-	450	-	nC
Peak Reverse Recovery Current	I_{rrm}		-	24	-	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	$^\circ\text{C}/\text{W}$

TYPICAL PERFORMANCE (For Reference Only)

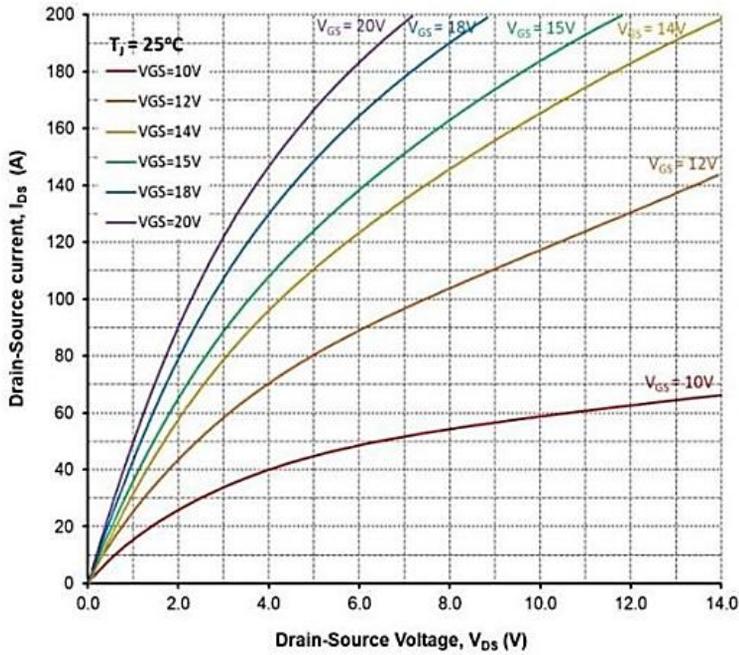


Figure 1. Output Characteristics, $T_j = 25^\circ\text{C}$

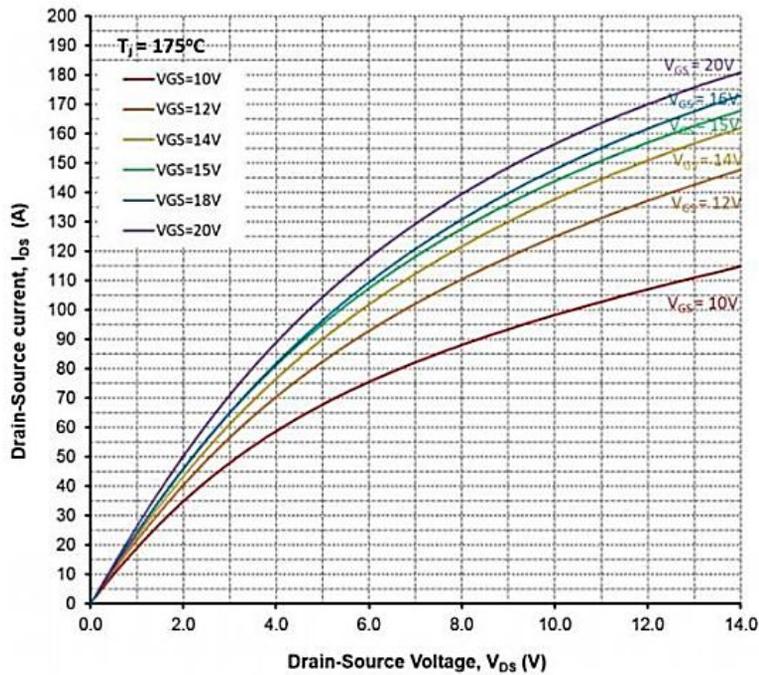


Figure 2. Output Characteristics, $T_j = 175^\circ\text{C}$

TYPICAL PERFORMANCE (For Reference Only)

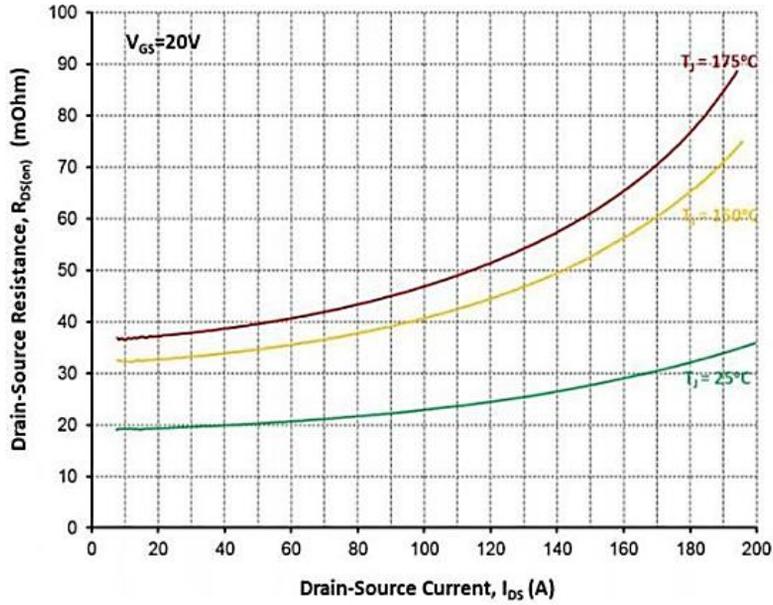


Figure 3. On-Resistance vs. Drain Current For Various Temperatures

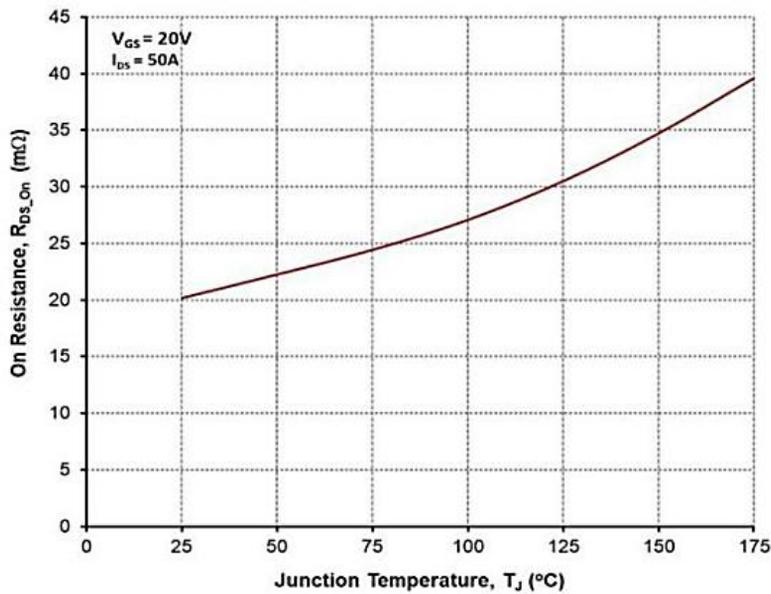


Figure 4. On-Resistance vs. Temperature

TYPICAL PERFORMANCE (For Reference Only)

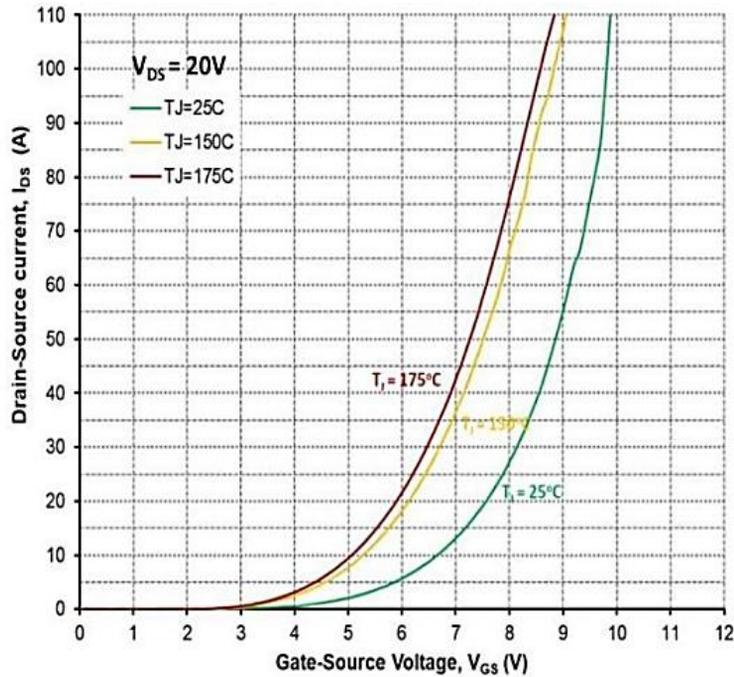


Figure 5. Transfer Characteristic For Various Junction Temperatures

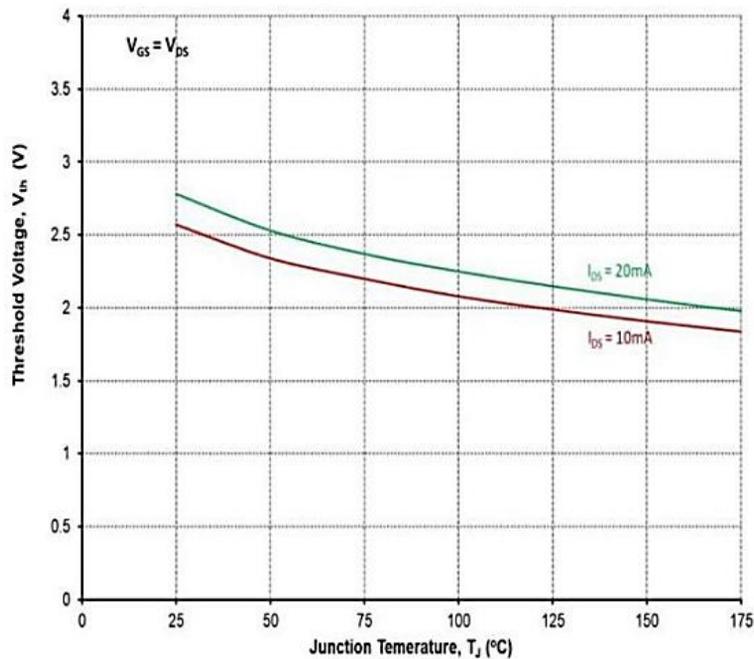


Figure 6. Threshold Voltage vs. Temperature

TYPICAL PERFORMANCE (For Reference Only)

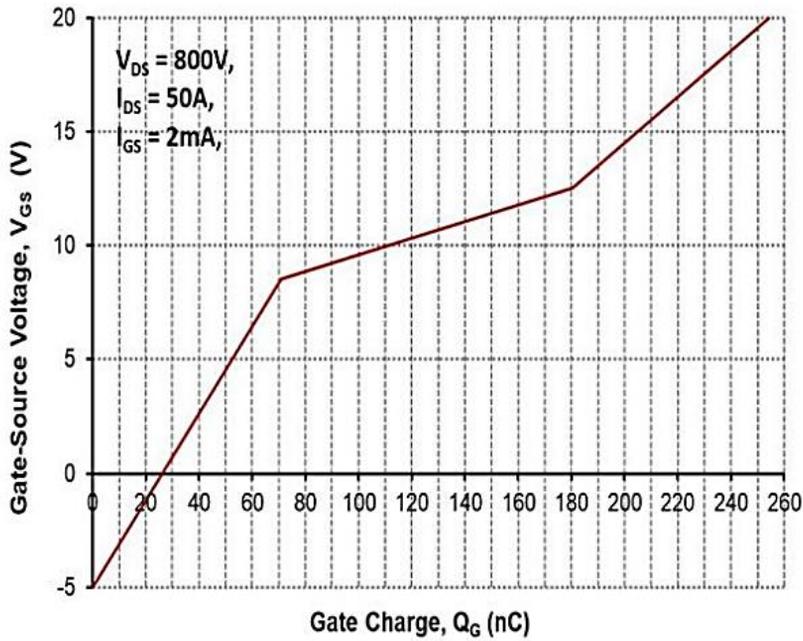


Figure 7. Gate Charge Characteristics

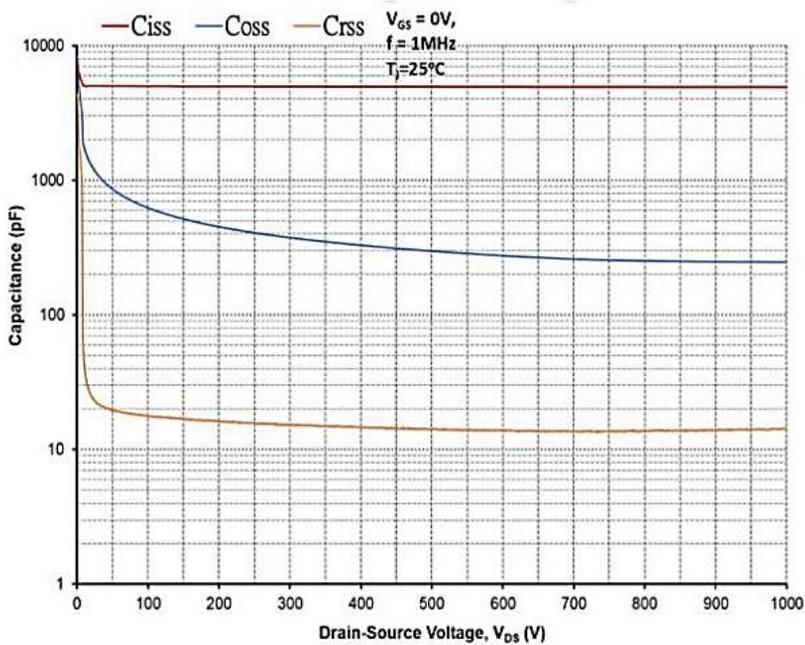


Figure 8. Capacitances vs. Drain-Source Voltage (0-1000V)

TYPICAL PERFORMANCE (For Reference Only)

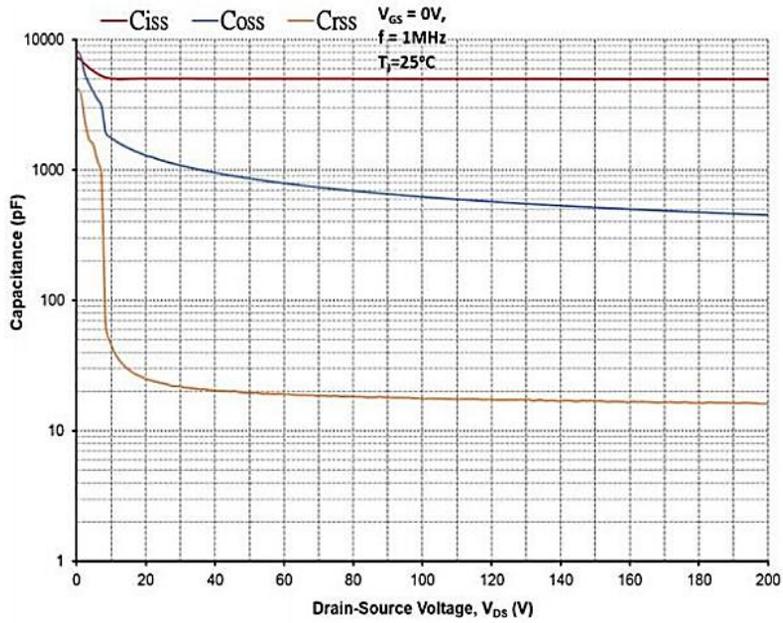


Figure 9. Capacitances vs. Drain-Source Voltage (0-200V)

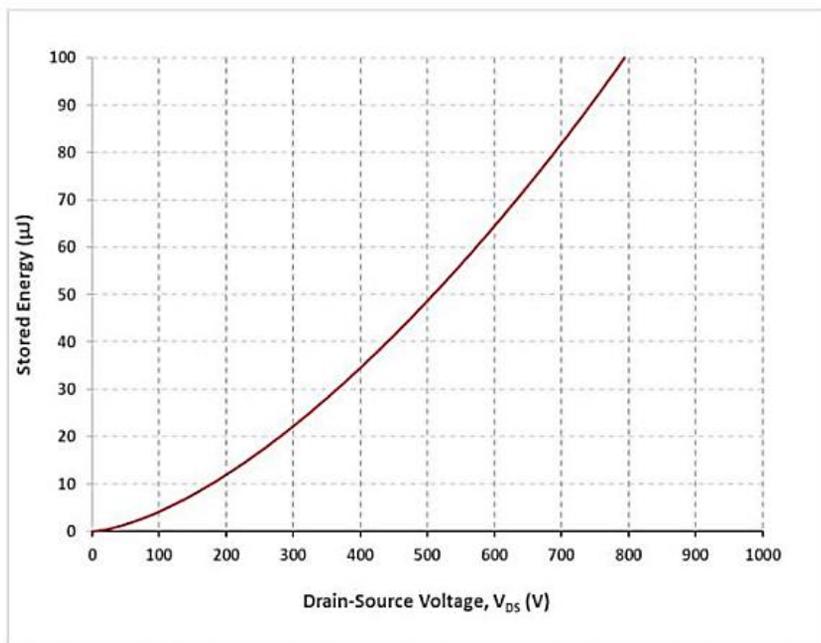


Figure 10. Output Capacitor Stored Energy

TYPICAL PERFORMANCE (For Reference Only)

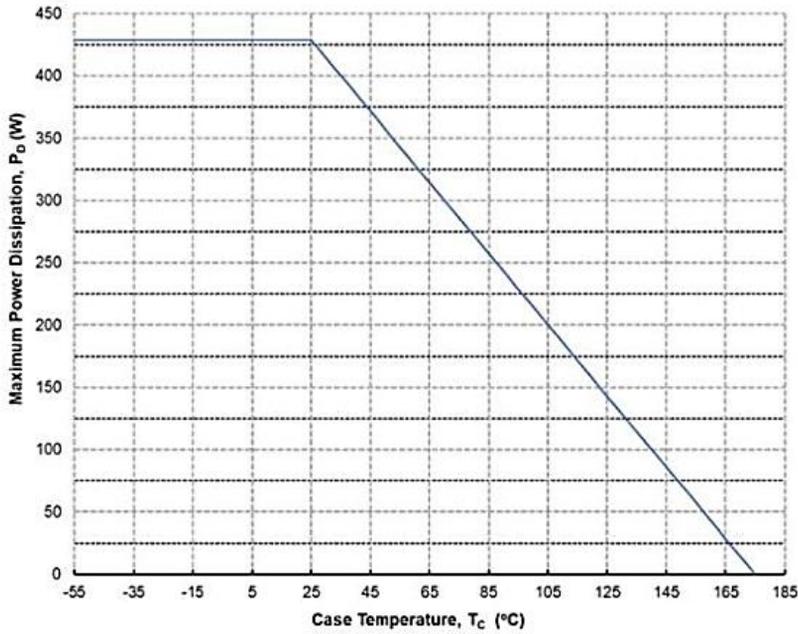


Figure 11. Maximum Power Dissipation Derating vs. Case Temperature

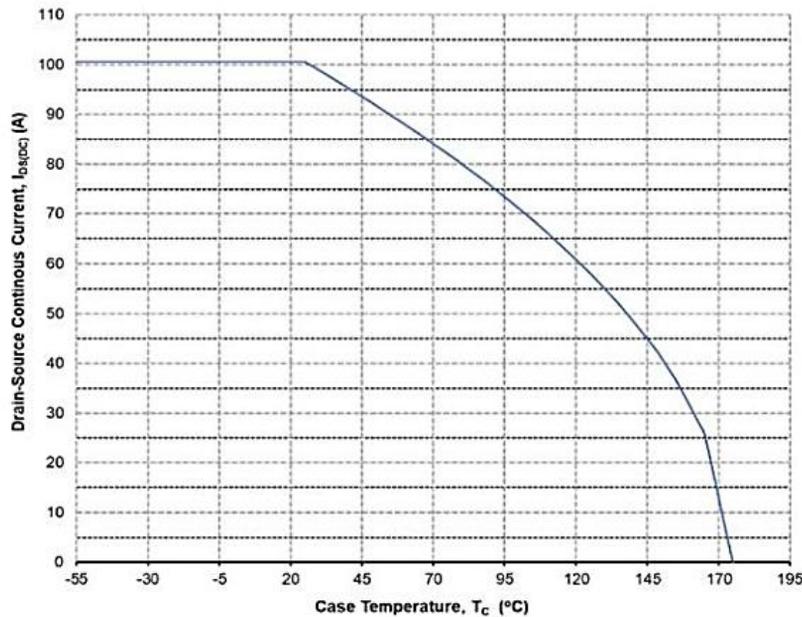


Figure 12. Continuous Drain Current Derating vs. Case Temperature

TYPICAL PERFORMANCE (For Reference Only)

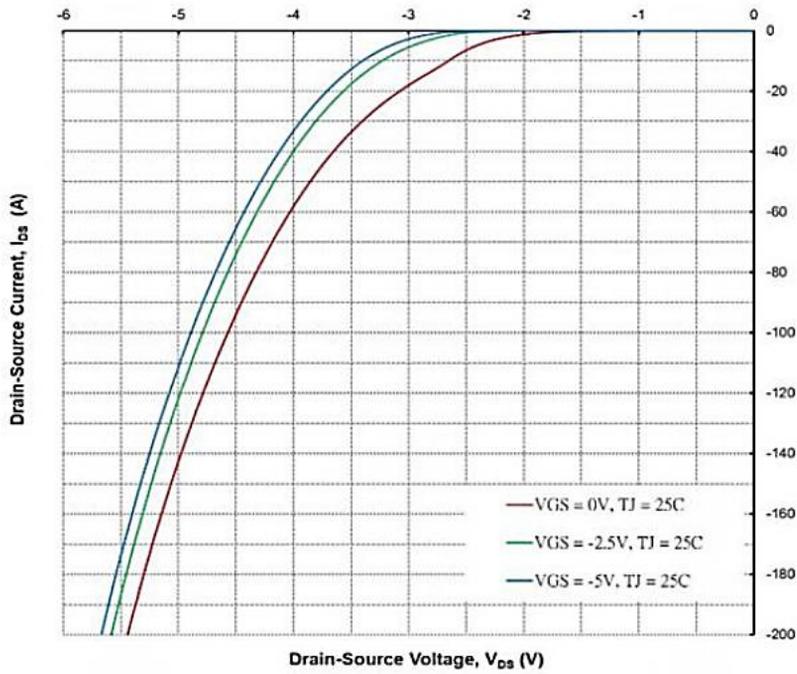


Figure 13. Body Diode Characteristics @ 25°C

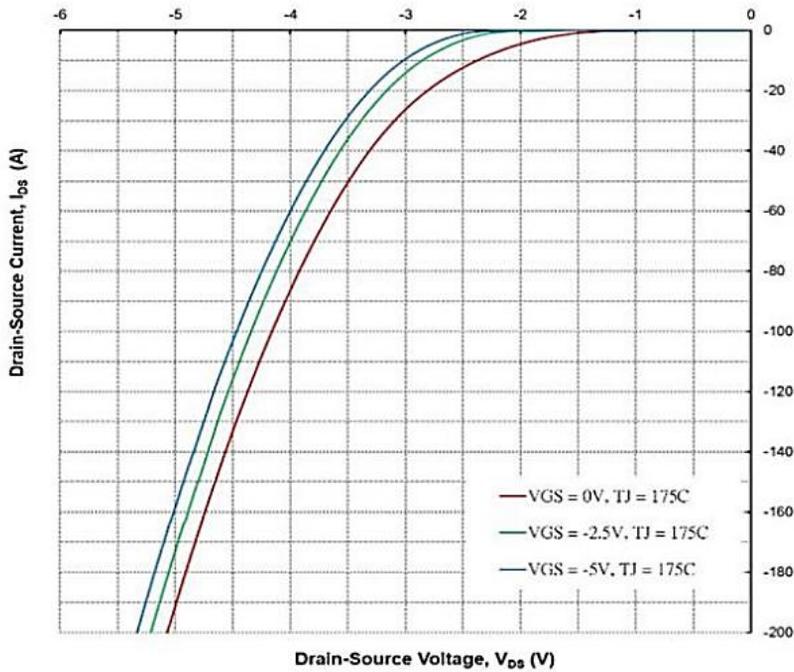


Figure 14. Body Diode Characteristics @ 175°C

TYPICAL PERFORMANCE (For Reference Only)

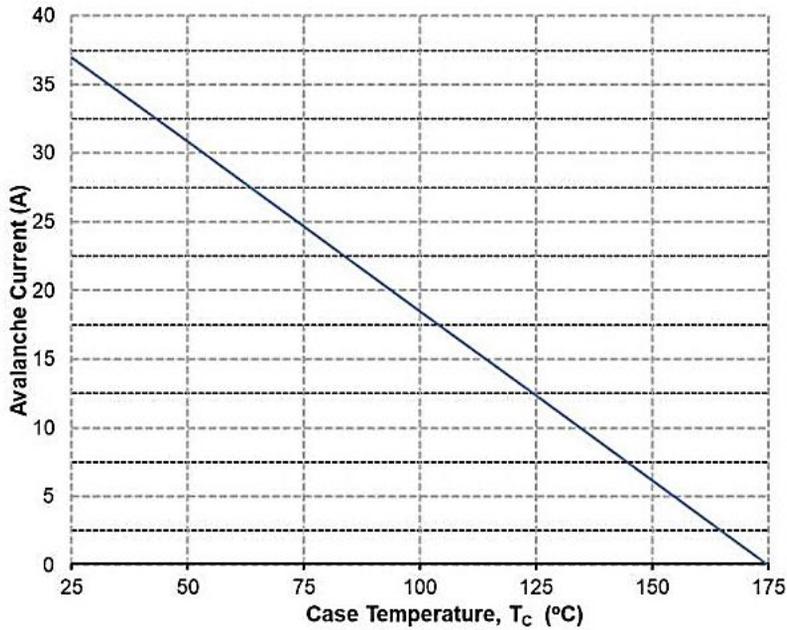


Figure 15. Single Avalanche vs. Temperature

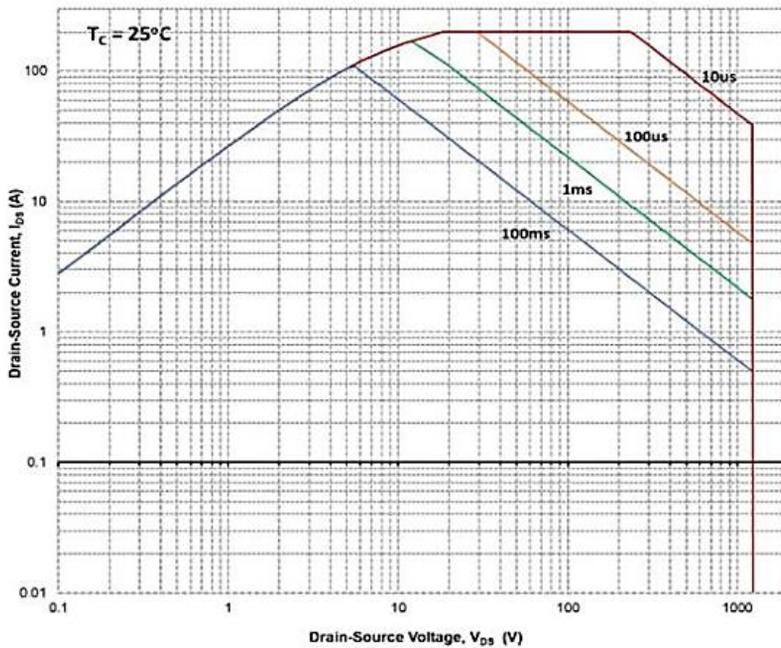
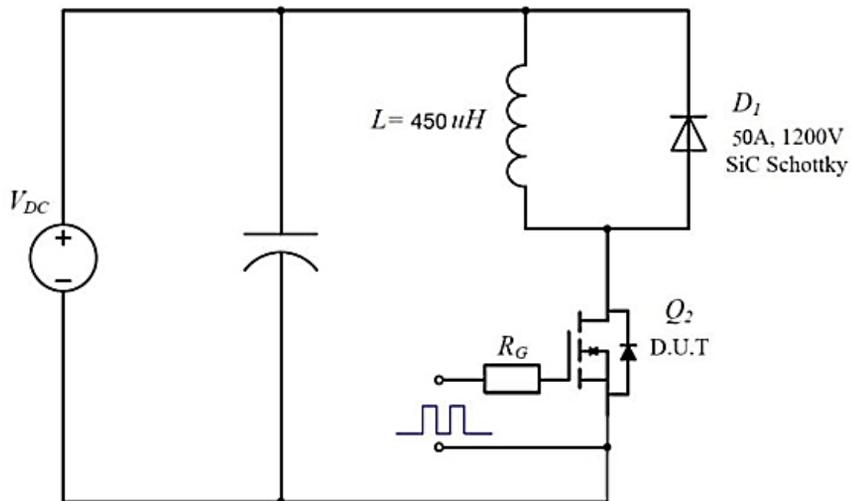
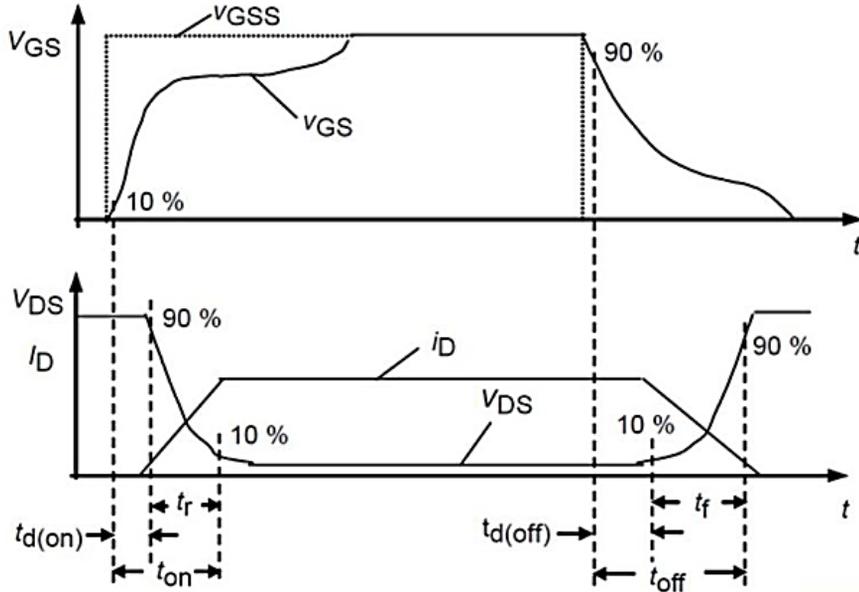


Figure 16. Safe Operating Area

SWITCHING TIMES DEFINITION AND TEST CIRCUIT



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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.
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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