LGE3M40120Q

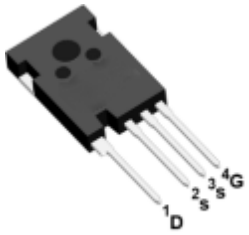
1200V 40mohm Silicon Carbide Power MOSFET

V_{DS} = 1200 V
I_D@25ºC = 59A
$R_{DS(ON)}$ = 40mΩ

Features:

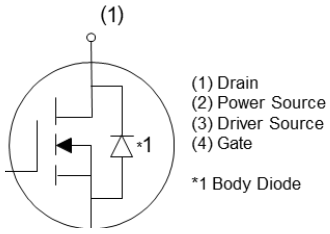
- Low on-resistance
- Fast switching speed with low capacitances
- Fast intrinsic diode with low reverse recovery (Q_{RR})

TO-247-4



Benefits

- Higher System Efficiency
- Parallel Device Convenience without thermal runaway
- High Temperature Application
- Hard Switching & Higher Reliability
- Easy to drive



Applications:

- Motor drives
- DC/DC converters
- Switched mode power supplies
- Solar inverters

Part Number	Package	Marking
LGE3M40120Q	TO-247-4	LGE3M40120Q

Caution: This device is sensitive to electrostatic discharge .Users should follow ESD handing procedures.

LGE3M40120Q

1200V 40mohm Silicon Carbide Power MOSFET

Maximum Ratings (T_A = 25°C unless otherwise noted)

Symbol	Parameter	Value	Units
V_{DS}	Drain-Source Voltage	1200	V
I_D	Drain Current - Continuous (T_C = 25°C) (Note 1)	59	A
	Drain Current - Continuous (T_C = 100°C) (Note 1)	45	A
I_{DM}	Drain Current - Pulsed (Note 2)	100	A
V_{GS}	Gate-Source Voltage (dynamic)	-10/+22	V
V_{GS}	Gate-Source Voltage (static)	-6/+18	V
P_D	Power Dissipation (T_C = 25°C)	300	W
$T_{J,}$ T_{STG}	Operating and Storage Temperature Range	-55 to +175	℃

Thermal Characteristics

Symbol	Parameter	Value	Units
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case, Steady-State	0.5	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient, Steady-State	40	°C/W

Notes:

1. The max drain current limited by maximum junction temperature
2. Repetitive Rating: Pulse width limited by maximum junction temperature

Caution: This device is sensitive to electrostatic discharge .Users should follow ESD handing procedures.

LGE3M40120Q

1200V 40mohm Silicon Carbide Power MOSFET

Electrical Characteristics (T_J = 25°C unless otherwise noted)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
Static Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS} = 0 V, I_D = 100 μA	1200			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 1200 V, V_{GS} = 0 V		5	50	μA
I_{GSS}	Gate Leakage Current	V_{GS} = + 18 V, V_{DS} = 0 V			100	nA
		V_{GS} = - 6 V, V_{DS} = 0 V			100	nA
$V_{GS(TH)}$	Gate Threshold voltage	V_{DS} = V_{GS}, I_D = 9.5 mA	2.2	3.2	4.5	V
		V_{DS} = V_{GS}, I_D = 9.5 mA, T_J = 175 °C		2.2		V
$R_{DS(ON)}$	Drain-Source on-state resistance	V_{GS} = 18 V, I_D = 33.3 A		40	54	mΩ
		V_{GS} = 18 V, I_D = 33.3 A, T_J = 175 °C		64		mΩ
G_{FS}	Forward Transconductance	V_{DS} = 20 V, I_D = 33.3 A		16		S
		V_{DS} = 20 V, I_D = 33.3 A, T_J = 175 °C		17		S
Dynamic Characteristics						
C_{ISS}	Input Capacitance	V_{DS} = 800 V, V_{GS} = 0 V, F = 100 kHz, V_{AC} = 25 mV		2360		pF
C_{OSS}	Output Capacitance			108		pF
C_{RSS}	Reverse Transfer Capacitance			13		pF
E_{OSS}	C_{OSS} Stored Energy			43		μJ
R_G	Gate Resistance	F = 1 MHz, V_{AC} = 25 mV		3.3		Ω
Q_{GS}	Gate-Source Charge	V_{DS} = 800 V , I_D = 33.3 A, V_{GS} = -5/+18 V		38		nC
Q_{GD}	Gate-Drain Charge			58		nC
Q_G	Total Gate Charge			128		nC

Caution: This device is sensitive to electrostatic discharge .Users should follow ESD handing procedures.

Switching Characteristics (Note3)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
$T_{D(ON)}$	Turn On Delay Time	V_{DD} = 800 V , I_D = 33.3 A, V_{GS} = -5/+18 V, $R_{G,EXT}$ = 5 Ω L = 99 μH Diode： Body Diode at V_{GS} = -5V		19		nS
T_R	Rise Time			22		nS
$T_{D(OFF)}$	Turn Off Delay Time			33		nS
T_F	Fall Time			22		nS
E_{ON}	Turn On Energy			1227		μJ
E_{OFF}	Turn Off Energy			160		μJ
$T_{D(ON)}$	Turn On Delay Time	V_{DD} = 800 V , I_D = 33.3 A, V_{GS} = -5/+18 V, $R_{G,EXT}$ = 20 Ω L = 99 μH Diode： Body Diode at V_{GS} = -5V		30		nS
T_R	Rise Time			45		nS
$T_{D(OFF)}$	Turn Off Delay Time			88		nS
T_F	Fall Time			53		nS
E_{ON}	Turn On Energy			1970		μJ
E_{OFF}	Turn Off Energy			580		μJ

Note3: All switching charateristics reference TO247-3L.

Drain-Source Diode Characteristics (T_J = 25 °C unless otherwise noted)

I_S	Maximum Continuous Drain-Source Diode Forward Current			59		A
I_{SM}	Maximum Pulsed Drain-Source Diode Forward Current			100		A
V_{SD}	Diode Forward Voltage	V_{GS} = -4 V , I_{SD} = 20 A		4.5		V
		V_{GS} = -4 V , I_{SD} = 20 A, T_J = 175 °C		4		V
I_{RM}	Peak Reverse Recovery Current	V_{GS} = -4 V , I_{SD} = 33.3 A, V_R = 800 V, di/dt = 650 A/μS		7.5		A
T_{RR}	Reverse Recovery Time			22		nS
Q_{RR}	Reverse Recovery Charge			92		nC

Caution: This device is sensitive to electrostatic discharge .Users should follow ESD handing procedures.

Electrical Characteristics Diagrams(Note4)

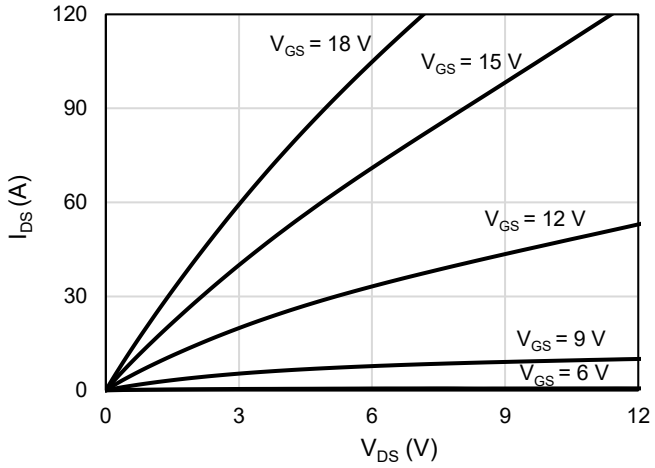


Figure 1: Output Characteristics T_J = -40℃

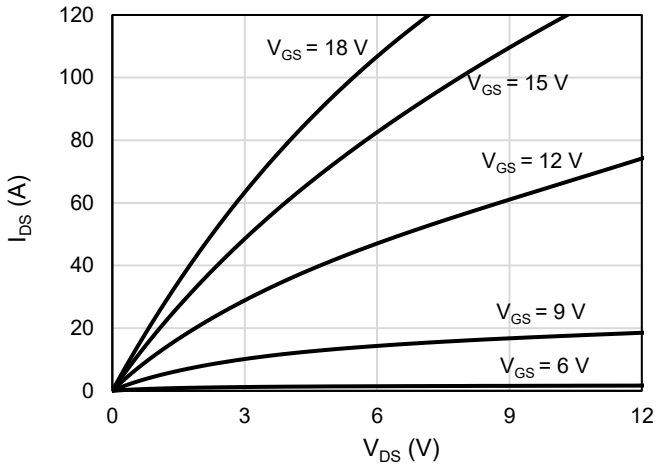


Figure 2: Output Characteristics T_J = 25℃

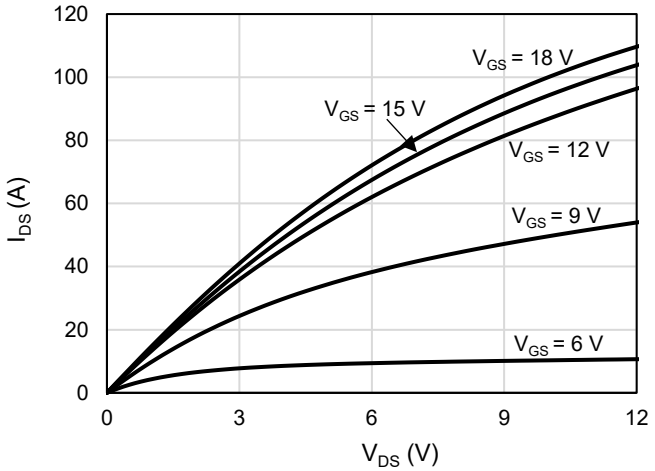


Figure 3: Output Characteristics T_J = 175℃

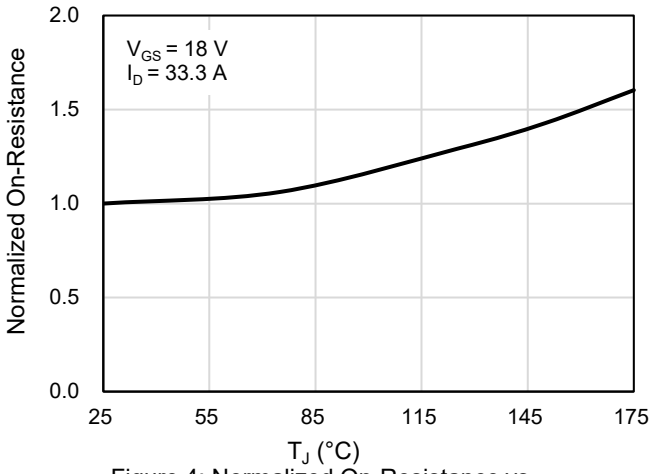


Figure 4: Normalized On-Resistance vs. Temperature

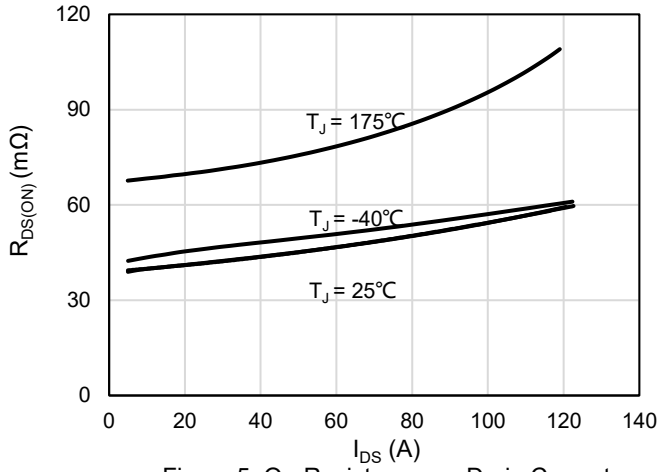


Figure 5: On-Resistance vs. Drain Current For Various Temperatures

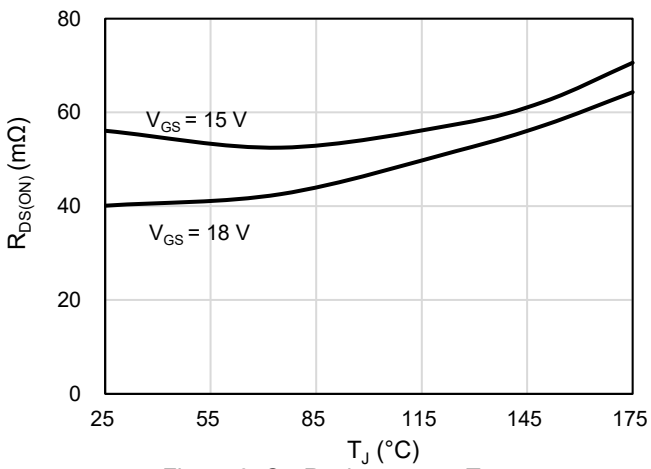


Figure 6: On-Resistance vs. Temperature For Various Gate Voltage

Caution: This device is sensitive to electrostatic discharge .Users should follow ESD handing procedures.

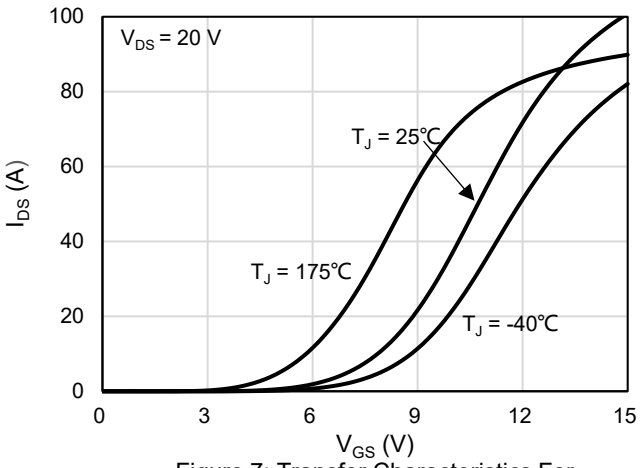


Figure 7: Transfer Characteristics For Various Junction Temparature

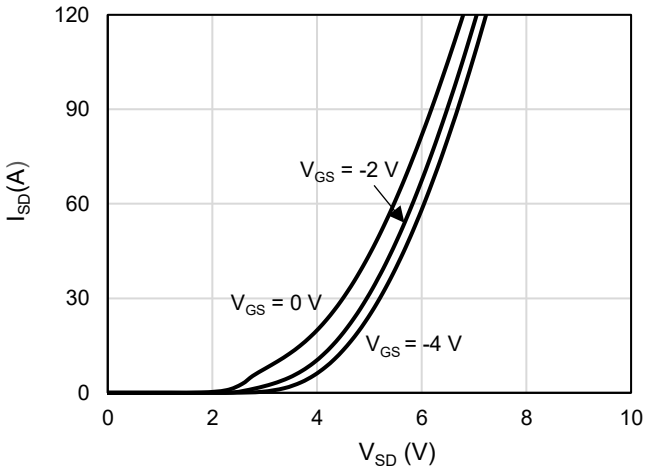


Figure 8: Body Diode Characteristics at -40℃

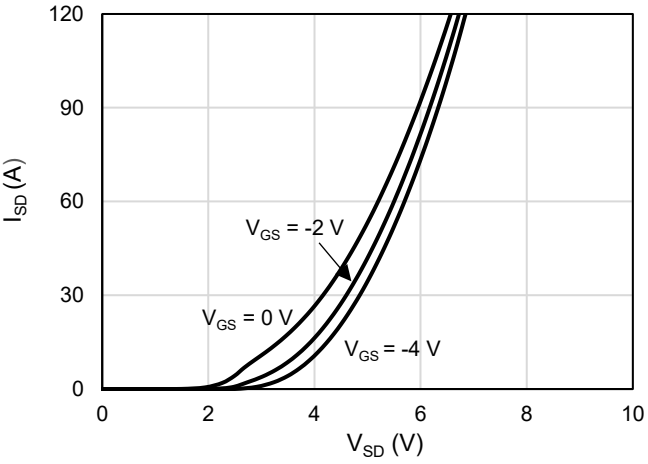


Figure 9: Body Diode Characteristics at 25℃

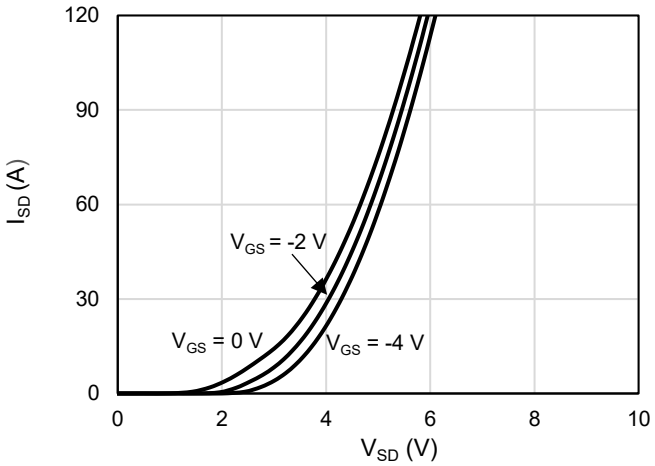


Figure 10: Body Diode Characteristics at 175℃

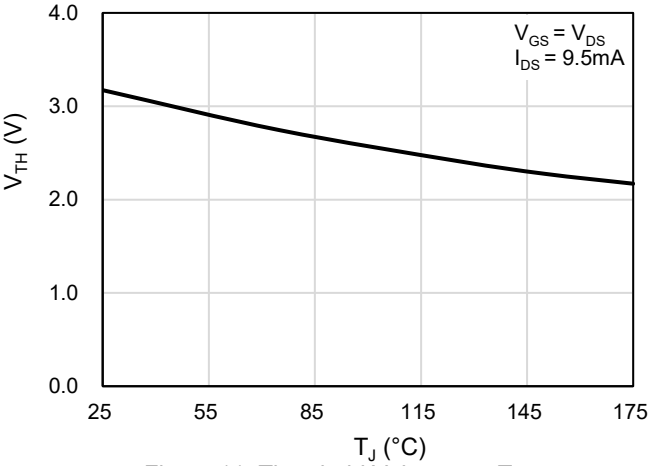


Figure 11: Threshold Voltage vs. Temperature

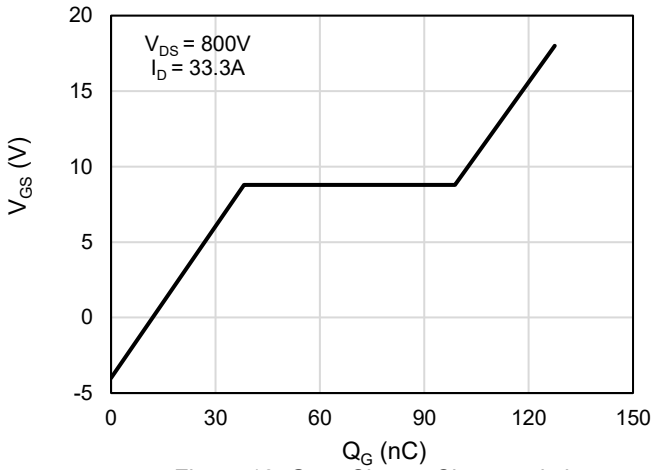


Figure 12: Gate-Charge Characteristics

Caution: This device is sensitive to electrostatic discharge .Users should follow ESD handing procedures.

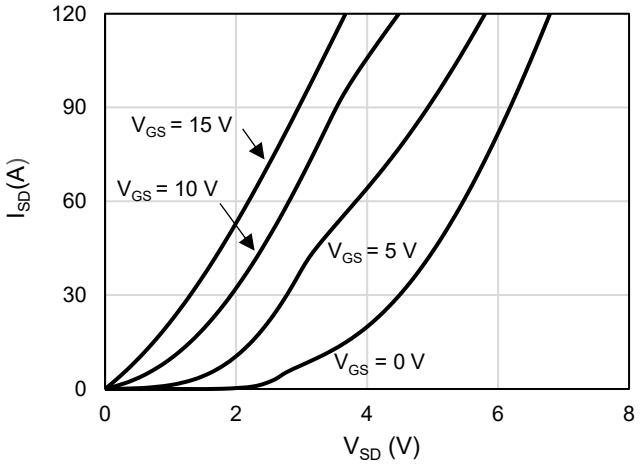


Figure 13: 3rd Quadrant Characteristics at -40℃

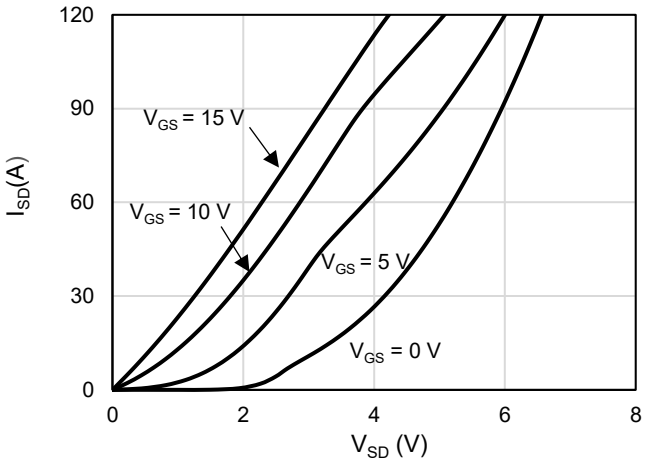


Figure 14: 3rd Quadrant Characteristics at 25℃

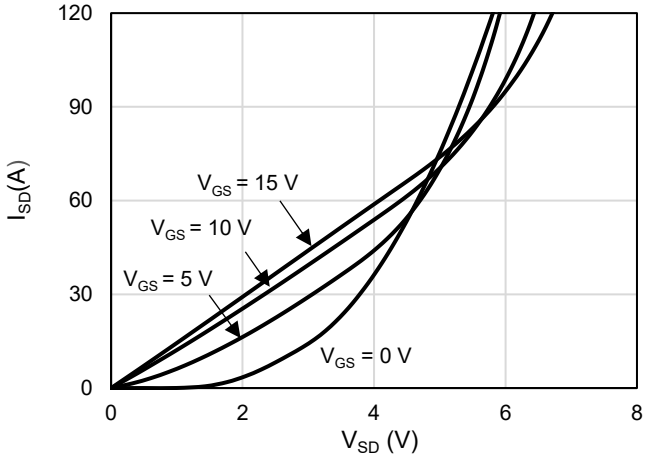


Figure 15: 3rd Quadrant Characteristics at 175℃

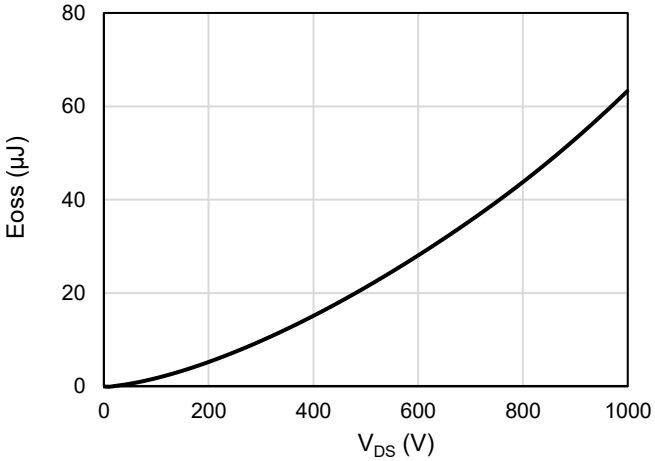


Figure 16: Output Capacitor Stord Energy

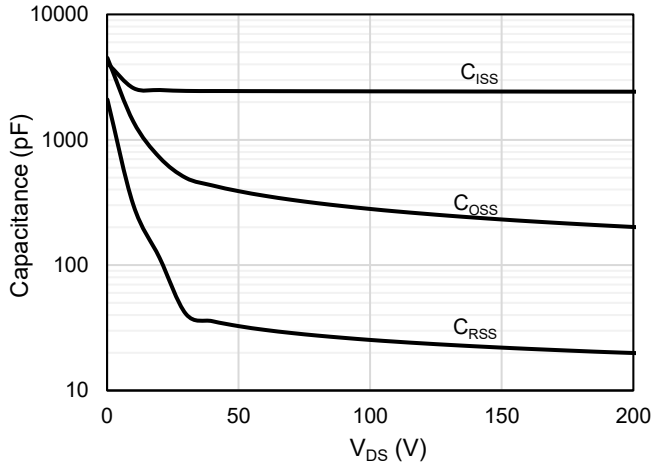


Figure 17: Capacitance Characteristics (0 - 200V)

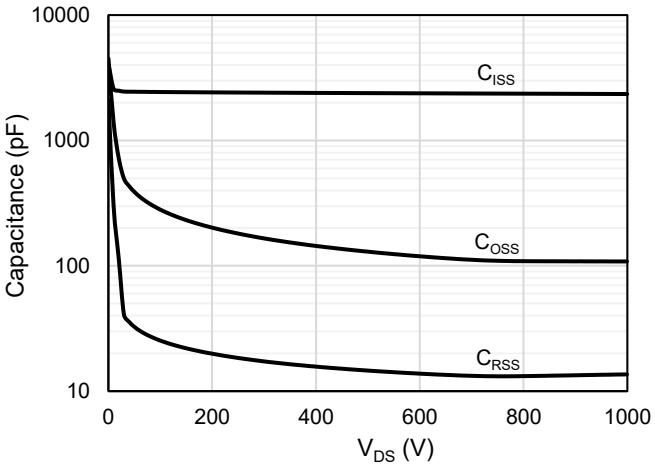


Figure 18: Capacitance Characteristics (0-1000V)

Caution: This device is sensitive to electrostatic discharge .Users should follow ESD handing procedures.

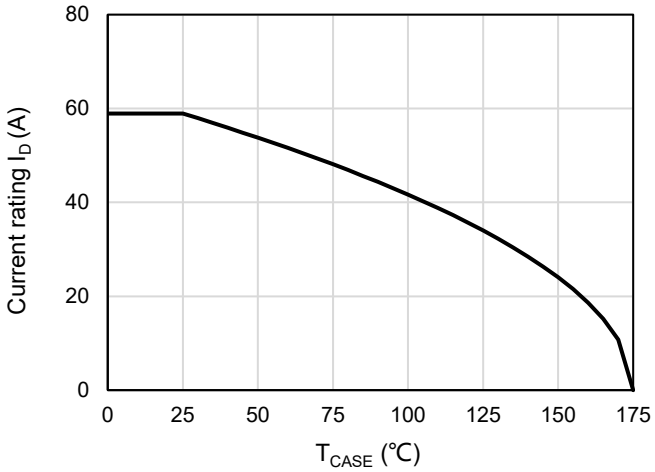


Figure 19: Current De-rating

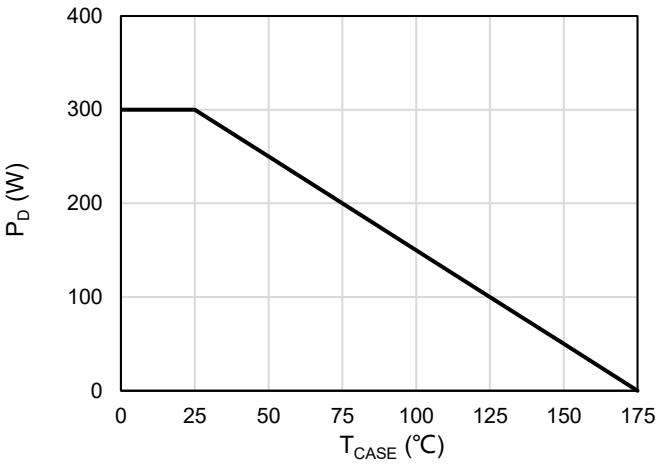


Figure 20: Maximum Power Disspation Derating vs CaseTemperature

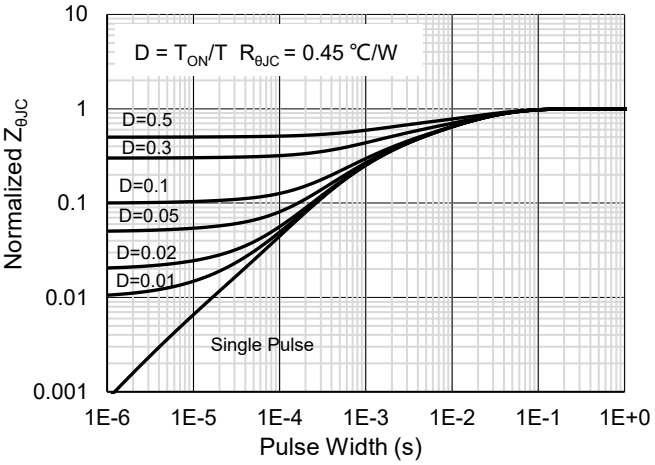


Figure 21: Normalized Maximum Transient Thermal Impedance

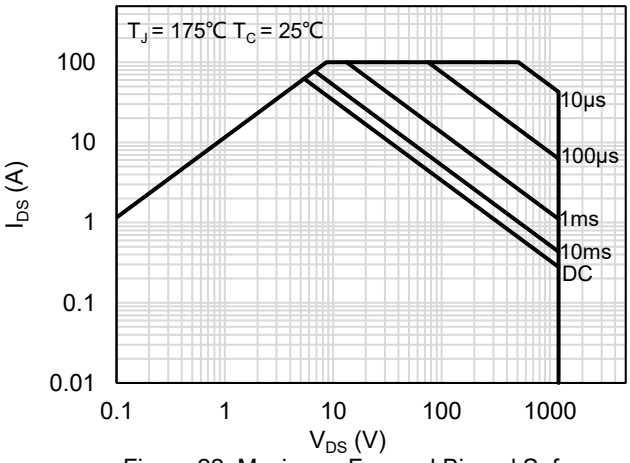


Figure 22: Maximum Forward Biased Safe Operating Area

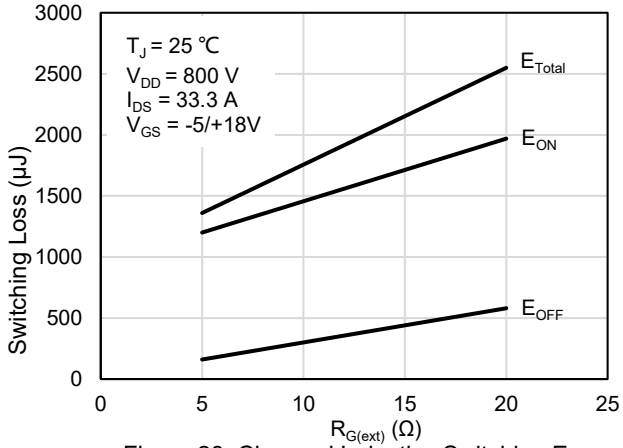


Figure 23: Clamped Inductive Switching Energy vs. $R_{G(ext)}$

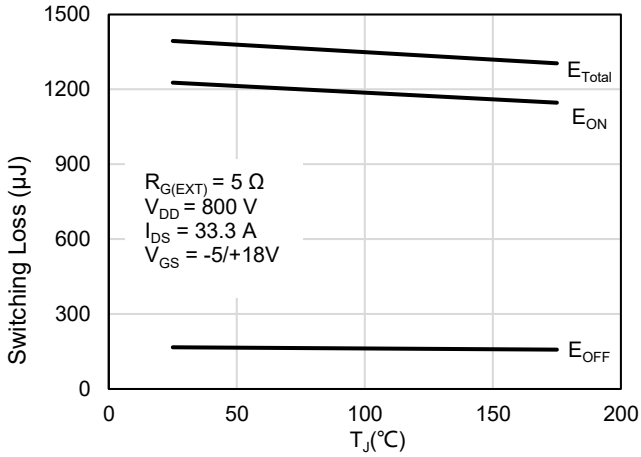


Figure 24: Clamped Inductive Switching Energy vs. T_J

Caution: This device is sensitive to electrostatic discharge .Users should follow ESD handing procedures.

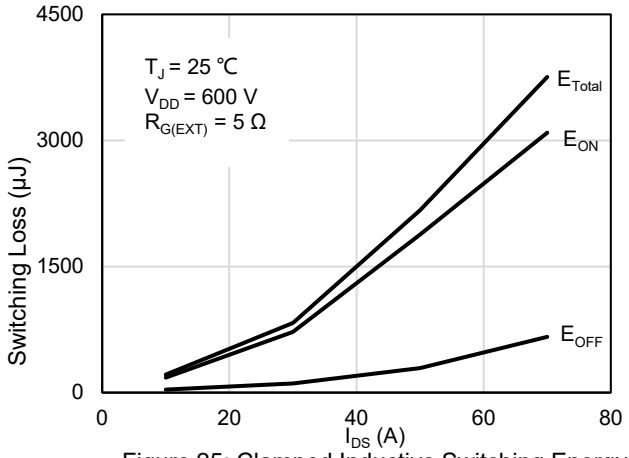


Figure 25: Clamped Inductive Switching Energy vs. Drain Current (V_{DD} = 600 V)

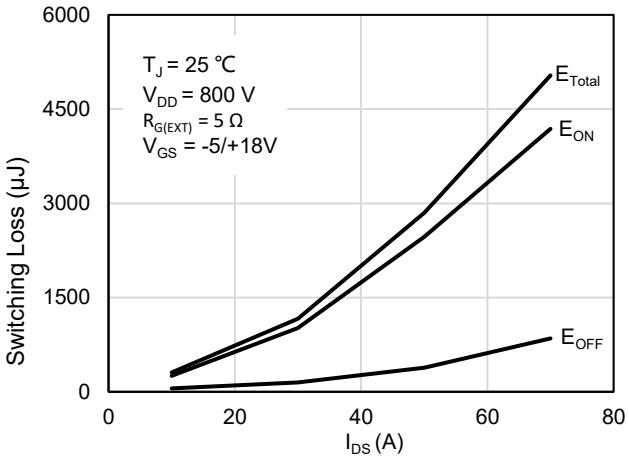
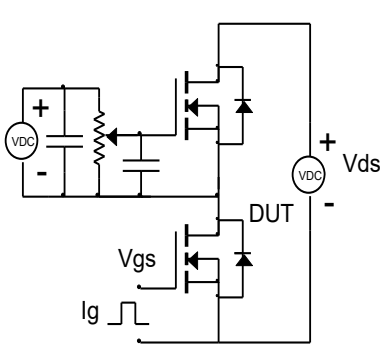


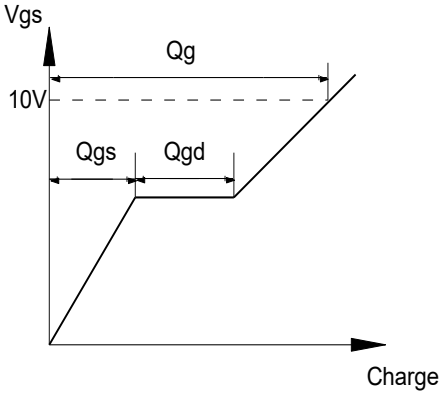
Figure 26: Clamped Inductive Switching Energy vs. Drain Current (V_{DD} = 800 V)

Note4: All figures reference TO247-3L.

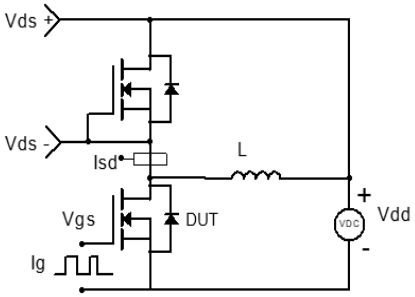
Test Circuit and Waveform

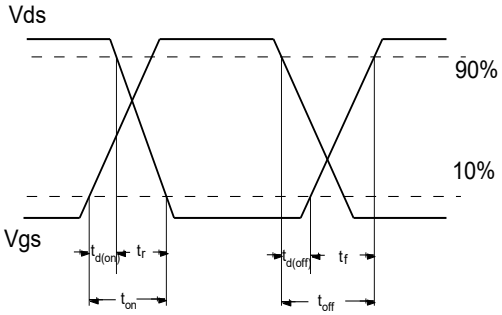
Gate Charge Test Circuit & Waveform



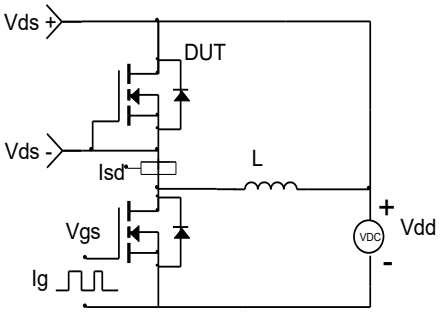


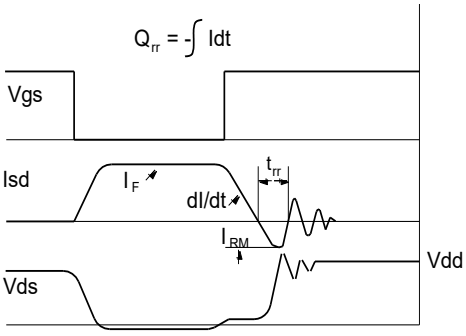
Clamped Inductive Switching Test Circuit & Waveforms





Diode Recovery Test Circuit & Waveforms





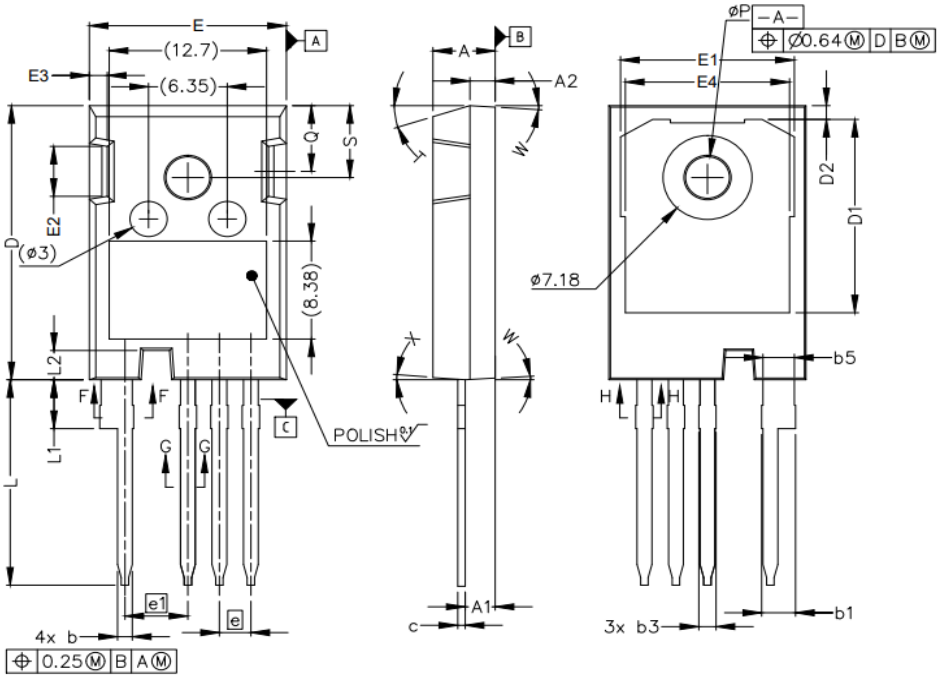
Caution: This device is sensitive to electrostatic discharge .Users should follow ESD handing procedures.

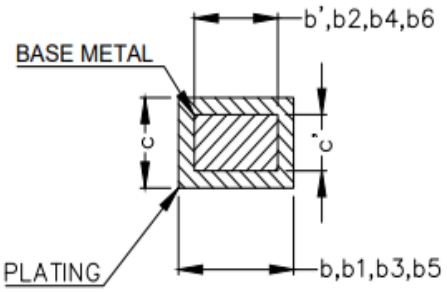
LGE3M40120Q

1200V 40mohm Silicon Carbide Power MOSFET

Package Outlines

TO-247-4 PKG Outlines





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

SYMBOL	MILLIMETERS	
	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.	

Packge	Packing	Box Size L×W×H(mm)	Quatity(pcs/box)	Carton Size L×W×H(mm)	Quatity(pcs/carton)
TO-247	30pcs/Tube	570×155×50	450	580×340×125	1800

Caution: This device is sensitive to electrostatic discharge .Users should follow ESD handing procedures.

ENTEGRECİ

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Elektronik komponent tedarikinde Entegreci

Entegreci, Eskişehir merkezli, Türkiye geneline satış yapan bir elektronik komponent mağazasıdır. Entegreler (IC), mikrodenetleyiciler, transistörler, diyotlar, pasif elemanlar, konnektörler, modüller ve geliştirme kartları tek adetten seri üretim adetlerine kadar satılır. Ürün sayfalarında güncel stok durumunu, fiyatı ve datasheet bağlantısını bulabilirsiniz.

Parça koduyla arama

Üretici parça numarasını yazın; stok ve fiyatı hemen görün.

www.entegreci.com

Ürün kategorileri

Entegreden kapasitöre tüm elektronik komponent kategorileri.

Kategorilere göz atın

Üreticiler

Aradığınız üreticinin ürünlerini tek sayfada inceleyin.

Üreticileri görün

Toplu alım ve teklif

Listede olmayan ya da yüksek adetli parçalar için teklif isteyin.

Teklif isteyin

www.entegreci.com | **destek@entegreci.com** | **0850 305 90 34**

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