LGE3M50330Q

Silicon Carbide Power MOSFET

V_{DS}	=	3300	V
$R_{DS(on)}$	=	50	mΩ
I_D@25℃	=	68	A

Features

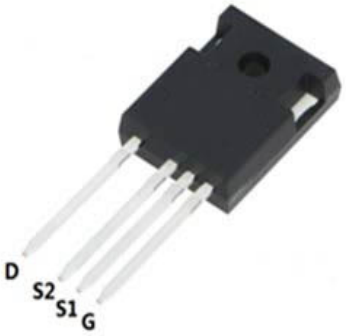
- High Blocking Voltage with Low On-Resistance
- High Speed Switching with Low Capacitance
- Temperature-Independent Switching
- Easy to Parallel and Simple to Drive

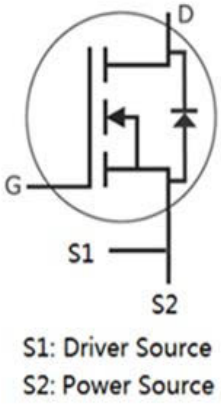
Benefits

- Higher System Efficiency
- High Temperature Operation
- Reduced Cooling Requirements
- Increased Power Density
- Increased System Switching Frequency

Applications

- Solar Inverters
- Rail Traction
- Motor Drives
- Ultra-Fast EV Chargers
- Pulsed Power applications





TO-247-4
Pin definition

Part Number	Package	Marking
LGE3M50330Q	TO-247-4	LGE3M50330Q

Maximum Ratings (T_C=25℃ unless otherwise specified)

Symbol	Parameter	Value	Unit	Test Conditions	Note
V_{DSmax}	Drain-Source Voltage	3300	V	V_{GS}=0V, I_D=100μA	
V_{GSmax}	Gate-Source Voltage	-10/+22	V	Absolute maximum values	
V_{GSop}	Gate-Source Voltage	-5/+18	V	Recommended operational values	
I_D	Continuous Drain Current	68	A	V_{GS}=18V, T_c=25℃	
		42		V_{GS}=18V, T_c=100℃	
$I_{D(pulse)}$	Pulsed Drain Current	150	A	Pulse width t_p limited by T_{Jmax}	
P_D	Power Dissipation	560	W	T_C=25℃, T_J=150℃	
T_J, T_{STG}	Operating Junction and Storage Temperature	-55 to +175	℃		

Assumes a $R_{\theta JC}$<0.22℃/W

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

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Silicon Carbide Power MOSFET

Electrical Characteristics (T_C=25℃ unless otherwise specified)

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions	Note
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	3300	/	/	V	V_{GS}=0V, I_D=100μA	
$V_{GS(th)}$	Gate Threshold Voltage	2.0	2.6	4.0	V	V_{DS}=V_{GS}, I_D=18mA	
		/	1.8	/		V_{DS}=V_{GS}, I_D=18mA, T_J=150℃	
I_{DSS}	Zero Gate Voltage Drain Current	/	1	100	μA	V_{DS}=3300V, V_{GS}=0V	
I_{GSS+}	Gate-Source Leakage Current	/	10	250	nA	V_{DS}=0V, V_{GS}=22V	
I_{GSS-}	Gate-Source Leakage Current	/	10	250	nA	V_{DS}=0V, V_{GS}=-8V	
$R_{DS(on)}$	Drain-Source On-State Resistance	/	50	70	mΩ	V_{GS}=18V, I_D=50A	
		/	120	160		V_{GS}=18V, I_D=50A, T_J=150℃	
g_{fs}	Transconductance	/	21.4	/	S	V_{DS}=20V, I_D=50A	
		/	20.2	/		V_{DS}=20V, I_D=50A, T_J=150℃	
C_{iss}	Input Capacitance	/	5050	/	pF	V_{GS}=0V V_{DS}=1700V f=1MHz	
C_{oss}	Output Capacitance	/	360	/			
C_{rss}	Reverse Transfer Capacitance	/	18	/			
E_{oss}	C_{oss} Stored Energy		514		μJ	V_{AC}=25mV	
E_{ON}	Turn-On Switching Energy		6.18		mJ	V_{DS}=1700V, V_{GS}=-5V/20V I_D=35A, $R_{G(ext)}$=2.5Ω, L=200μH	
E_{OFF}	Turn-Off Switching Energy		3.77				
$t_{d(on)}$	Turn-On Delay Time		34		ns	V_{DS}=1700V, V_{GS}=-5V/20V, I_D=35A $R_{G(ext)}$=2.5Ω, R_L=40Ω	
t_r	Rise Time		47.2				
$t_{d(off)}$	Turn-Off Delay Time		88				
t_f	Fall Time		39.2				
$R_{G(int)}$	Internal Gate Resistance	/	1.2	/	Ω	f=1MHz, V_{AC}=25mV	
Q_{GS}	Gate to Source Charge	/	72	/	nC	V_{DS}=1700V V_{GS}=-4V/18V I_D=40A	
Q_{GD}	Gate to Drain Charge	/	54	/			
Q_G	Total Gate Charge	/	262	/			

Reverse Diode Characteristics

Symbol	Parameter	Typ.	Max.	Unit	Test Conditions	Note
V_{SD}	Diode Forward Voltage	4.2	/	V	V_{GS}=-4V, I_{SD}=25A	
		3.8	/		V_{GS}=-4V, I_{SD}=25A, T_J=150℃	
I_S	Continuous Diode Forward Current	/	68	A	T_C=25℃	
t_{rr}	Reverse Recover Time	61	/	ns	V_R=1700V, I_{SD}=20A	
Q_{rr}	Reverse Recovery Charge	298	/	nC		
I_{rrm}	Peak Reverse Recovery Current	8.9	/	A		

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

Typical Performance

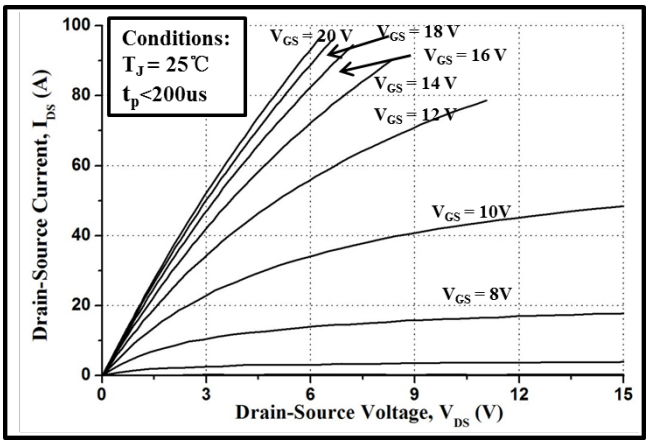

Figure 1. Output Characteristics T_J = 25 °C

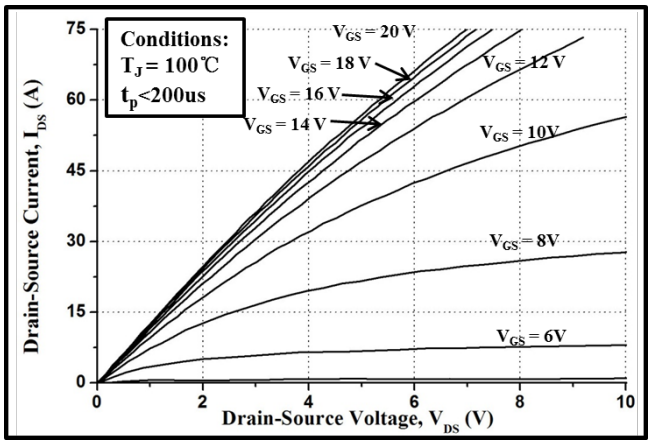

Figure 2. Output Characteristics T_J = 100 °C

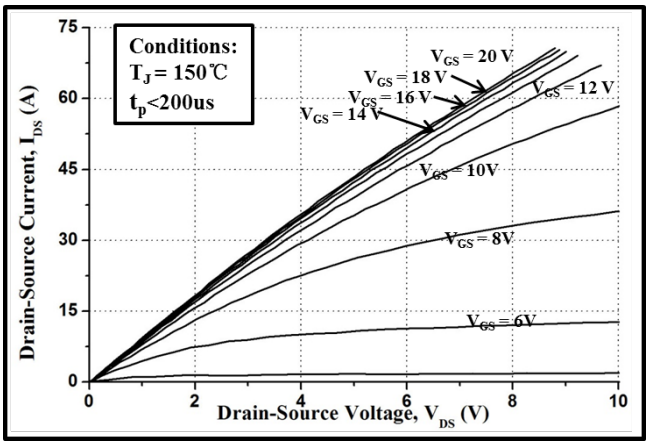

Figure 3. Output Characteristics T_J = 150°C

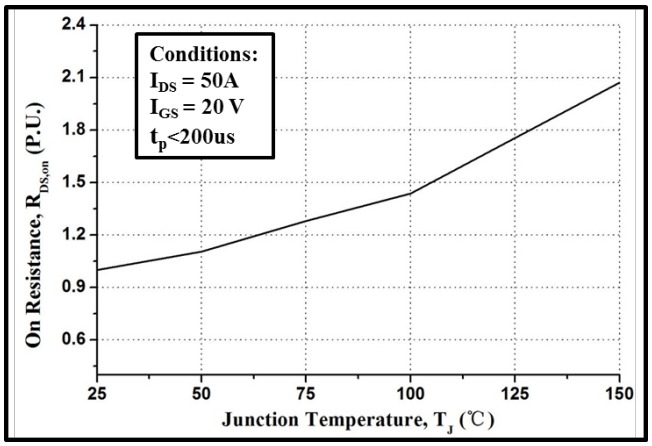

Figure 4. Normalized On-Resistance vs. Temperature

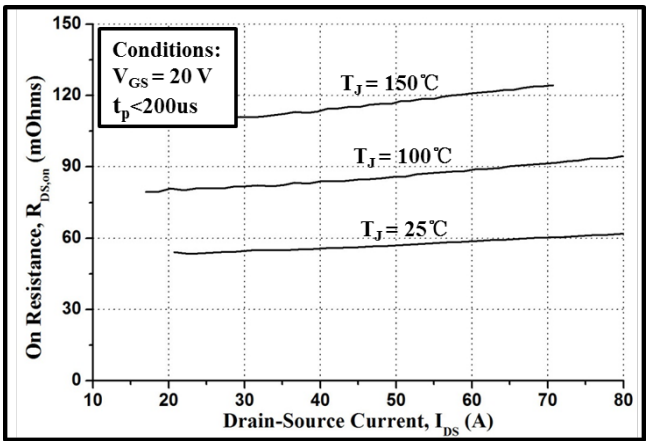

Figure 5. On-Resistance vs. Drain Current For Various Temperatures

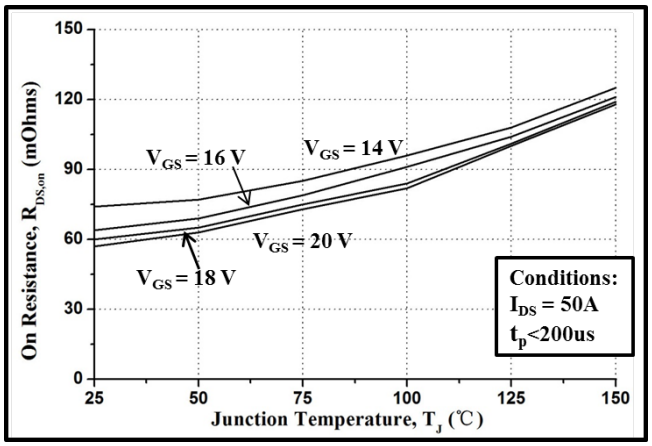

Figure 6. On-Resistance vs. Temperature For Various Gate Voltage

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

Typical Performance

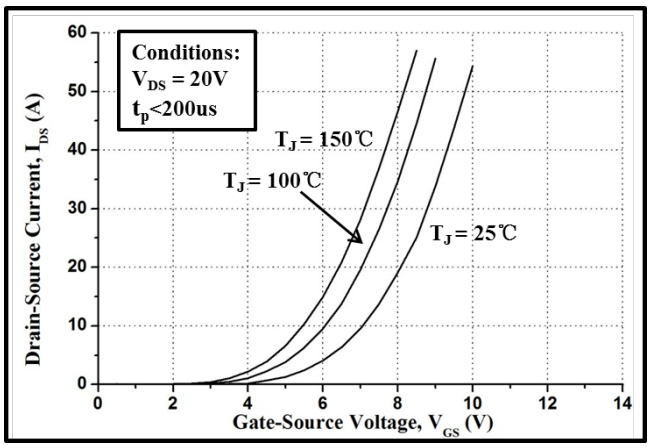

Figure 7. Transfer Characteristic for Various Junction Temperatures

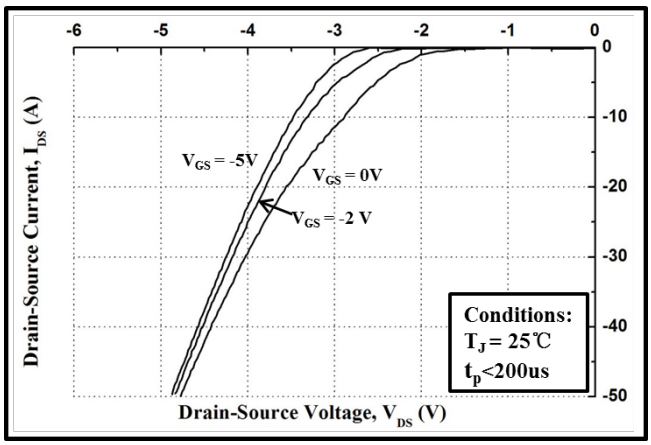

Figure 8. Body Diode Characteristic at 25 ºC

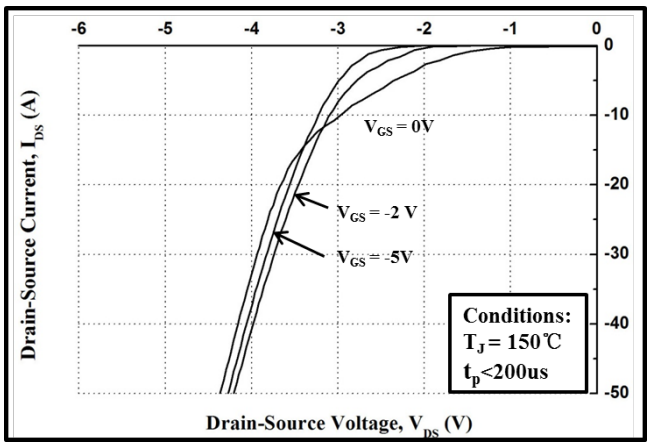

Figure 9. Body Diode Characteristic at 150 ºC

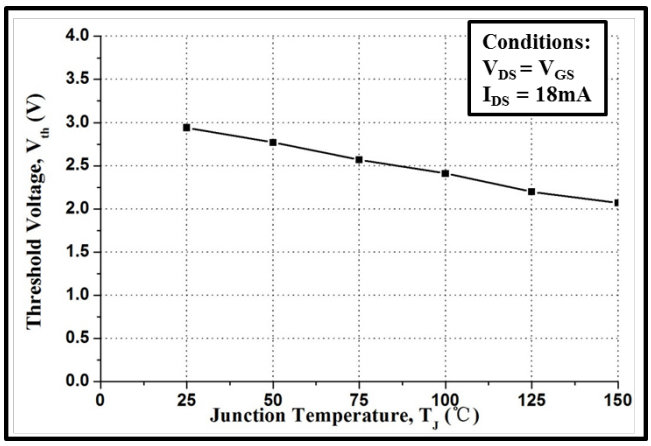

Figure 10. Threshold Voltage vs. Temperature

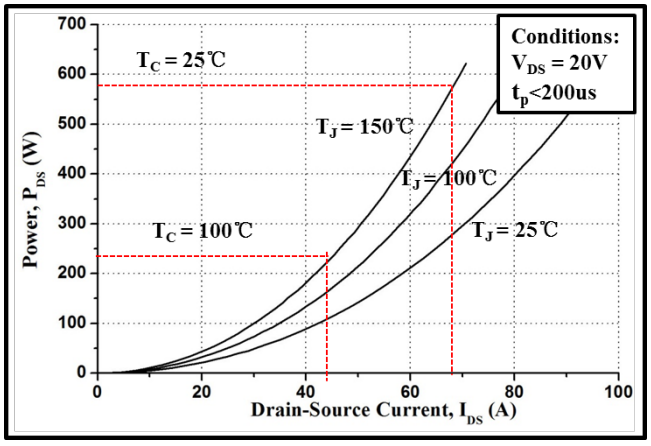

Figure 11. Power Dissipation vs. Drain Current Various Junction Temperatures

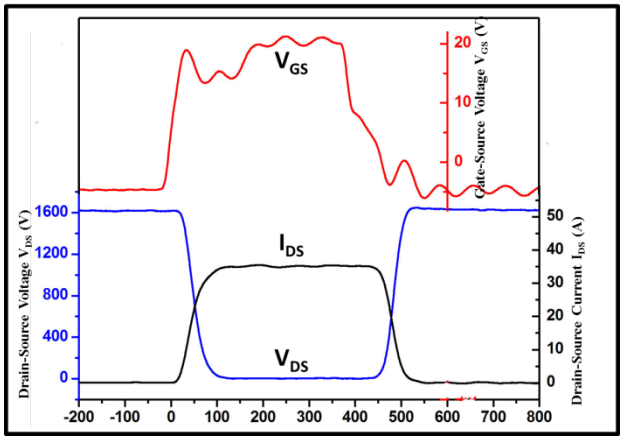

Figure 12. Switching waveforms

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

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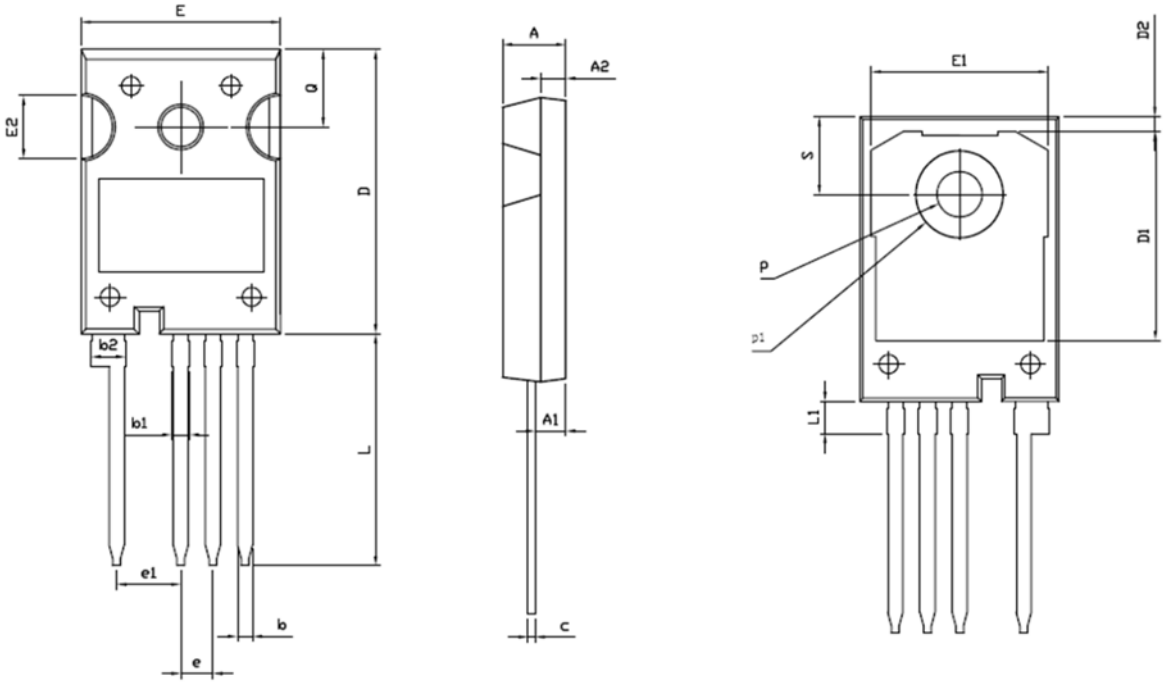
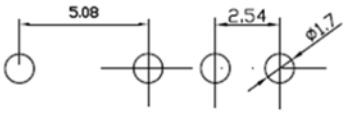
Package Dimensions



RECOMMENDED LAND PATTERN



UNIT: mm

	MIN	NOM	MAX
A2	1.85	2.00	2.15
b	1.05	1.20	1.35
b1	1.00	1.30	1.60
b2	2.35	2.65	2.95
c	0.50	0.60	0.70
D	22.34	22.54	22.74
D1	16.00	16.50	17.00
D2	0.97	1.17	1.37
e	2.34	2.54	2.74
e1	4.88	5.08	5.28
E	15.60	15.80	16.00
E1	13.50	14.00	14.50
E2	4.80	5.00	5.20
L	18.08	18.38	18.68
L1	2.38	2.58	2.78
p	3.50	3.60	3.70
p1	6.60	6.80	7.00
Q	6.00	6.15	6.30
S	6.00	6.15	6.30

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

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