LGE3M30065Q

Silicon CarbidePower MOSFET

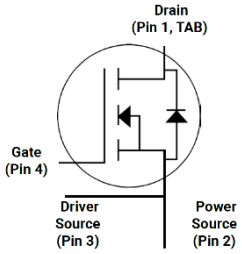
V_{DS} = 650 V
I_D@25ºC = 92A
$R_{DS(ON)}$ = 28mΩ

Features

- High Blocking Voltage
- High Frequency Operation
- Low on-resistance
- Fast intrinsic diode with low reverse recovery

Benefits

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



TO-247-4
Pin definition

Applications

- Motor Drives
- Solar / Wind Inverters
- Onboard EV Charger
- Energy Storage
- Server
- Telecom
- SMPS
- Uninterruptable power supplies

Part Number	Package	Marking
LGE3M30065Q	TO-247-4	LGE3M30065Q

Maximum Ratings (T_C=25°C unless otherwise specified)

Parameter	Symbol	Test conditions	Value	Unit
Drain - Source Voltage	V_{DSmax}	V_{GS}=0V, I_D=100μA	650	V
Gate - Source Voltage (dynamic)	V_{GSmax}	AC (f>1 Hz)	-8 / +23	V
Gate - Source Voltage (static)	V_{GSop}	static	-4 / +18	V
Continuous Drain Current	I_D	V_{GS} = 18V, T_C=25°C V_{GS} = 18V, T_C=100°C	92 65	A
Pulsed Drain Current	$I_{D(pulse)}$	T_C=25°C	210	A
Short Circuit Capability	t_{SC}	V_{DD}=400V, V_{GS}=18V	9	μS
Short Circuit Capability	I_{DS}	V_{DD}=400V, V_{GS}=18V	400	A
Total power dissipation	P_D	T_C=25°C	326	W
Operating Junction Temperature	T_J		-55 to 175	°C
Storage Temperature	T_{STG}		-55 to 175	°C

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device

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

Electrical Characteristics (T_C=25°C unless otherwise specified)

Parameter	Symbol	Test conditions	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D = 100μA	650			V
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 10mA	2.0	2.7	4.0	V
		V_{DS} = V_{GS}, I_D = 10mA, T_J = 150°C		2.0		V
		V_{DS} = V_{GS}, I_D = 10mA, T_J = 175°C		1.9		V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 650V, V_{GS} = 0V	0	1	100	μA
Gate-Source Leakage Current	I_{GSS}	V_{GS} = 18V, V_{DS} = 0V	0	10	200	nA
Gate-Source Leakage Current	I_{GSS}	V_{GS} = -4V, V_{DS} = 0V	-200	-10	0	nA
Drain-Source On-State Resistance	$R_{DS(on)}$	V_{GS} = 15V, I_D = 40 A		39		mΩ
		V_{GS} = 15V, I_D = 40 A, T_J = 150°C		36		
		V_{GS} = 15V, I_D = 40 A, T_J = 175°C		39		
		V_{GS} = 18V, I_D = 40 A		28	36	
		V_{GS} = 18V, I_D = 40 A, T_J = 150°C		32		
		V_{GS} = 18V, I_D = 40 A, T_J = 175°C		34		
Transconductance	g_{fs}	V_{DS} = 20V, I_D = 40 A,		20		S
		V_{DS} = 20V, I_D = 40 A, T_J = 150°C		20		
		V_{DS} = 20V, I_D = 40 A, T_J = 175°C		20		
Input capacitance	C_{iss}	V_{DS} = 400V, V_{GS} = 0V f = 1MHz		3480		pF
Output capacitance	C_{oss}			295		
Reverse transfer capacitance	C_{rss}			13		
C_{oss} Stored Energy	E_{oss}			28		μJ
Total gate charge	Q_g	V_{DS} = 400V, V_{GS} = -4V / 18V I_D = 40 A,		163		nC
Gate-source charge	Q_{gs}			47		
Gate-drain charge	Q_{gd}			65		
Internal gate input resistance	$R_{g(int)}$	f = 1MHz, I_D = 0A		2.0		Ω
Turn-On Switching Energy	E_{ON}	V_{DS} = 400 V, V_{GS} = -4V/18V, I_D = 40A, $R_{G(ext)}$ = 2Ω, L=200μH		44		μJ
Turn-Off Switching Energy	E_{OFF}			46		
Turn-On Delay Time	$t_{d(on)}$			12		ns
Rise Time	t_r			14		
Turn-Off Delay Time	$t_{d(off)}$			31		
Fall Time	t_f			7		
Avalanche Capability	E_{AS}	V_{DD} = 100V, V_{GS}=18V, L=1mH		312		mJ
Avalanche Capability	I_{AV}			25		A

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

Reverse Diode Characteristics (T_C=25°C unless otherwise specified)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Diode Forward Voltage	V_{SD}	V_{GS} = -4V, I_{SD} = 20A,		3.9		V
		V_{GS} = -4V, I_{SD} = 20A, T_J = 150°C		3.5		
		V_{GS} = -4V, I_{SD} = 20A, T_J = 175°C		3.4		
Continuous Diode Forward Current	I_S	V_{GS} = -5V		62		A
Reverse Recovery time	t_{rr}	V_{GS} = -4V, I_{SD} = 40A, V_R= 400V, dif/dt = 3300 A/μs		23		ns
Reverse Recovery Charge	Q_{rr}			430		nC
Peak Reverse Recovery Current	I_{rrm}			32		A

Thermal Characteristics

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Thermal Resistance (per device)	$R_{th(j-c)}$	junction-case		0.37	0.46	^{0}C/W

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

Typical Performance

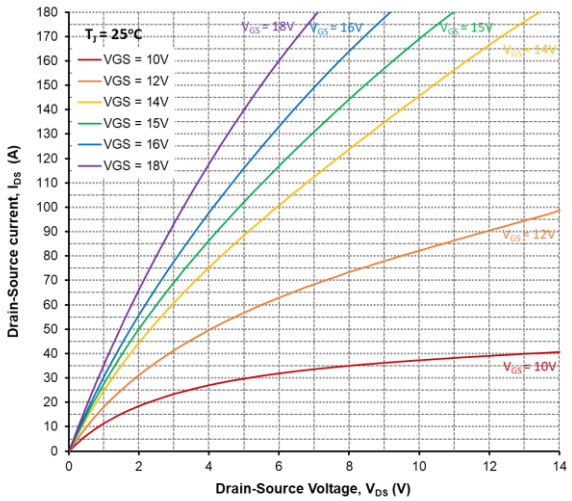


Figure 1. Output Characteristics, T_J = 25ºC

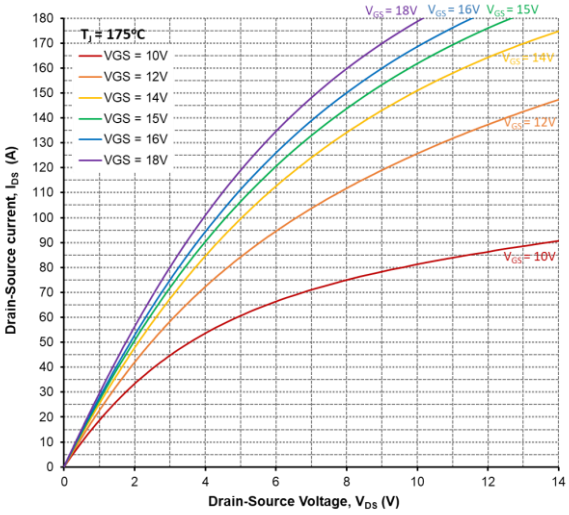


Figure 2. Output Characteristics, T_J = 175ºC

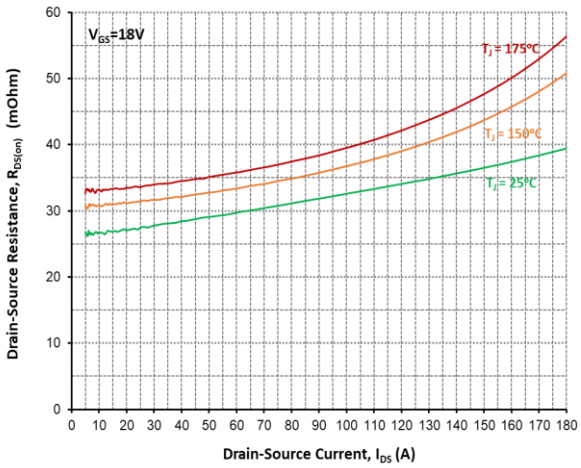


Figure 3. On-Resistance vs. Drain Current For Various Temperatures

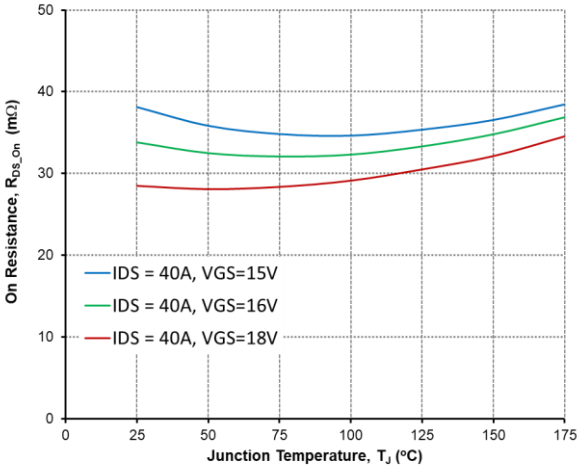


Figure 4. On-Resistance vs. Temperature

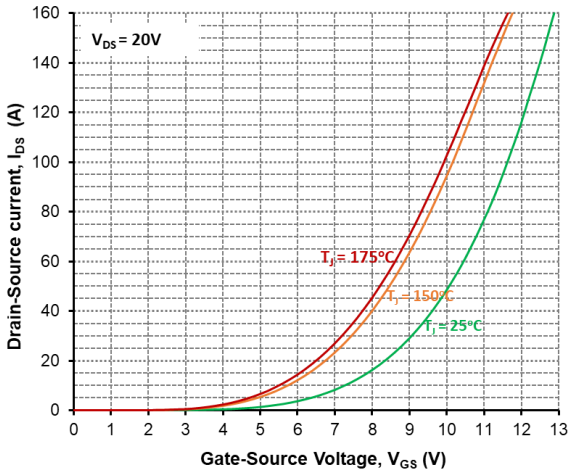


Figure 5. Transfer Characteristic For Various Junction Temperatures

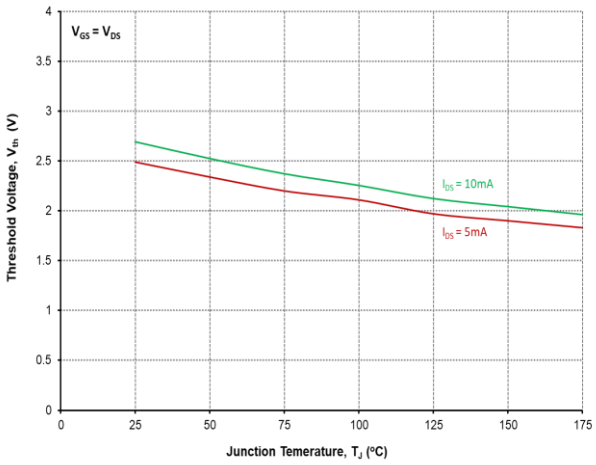


Figure 6. Threshold Voltage vs. Temperature

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

Typical Performance

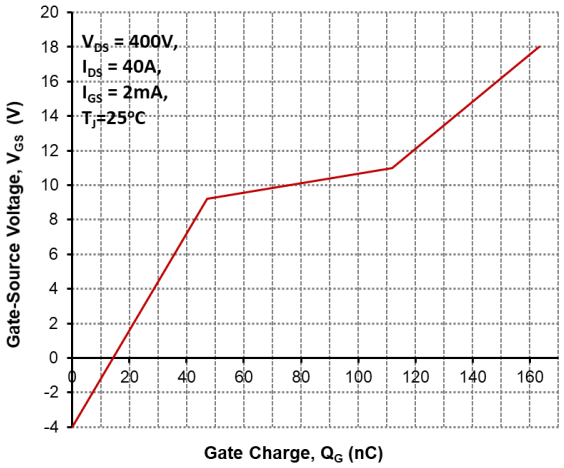


Figure 7. Gate Charge Characteristics

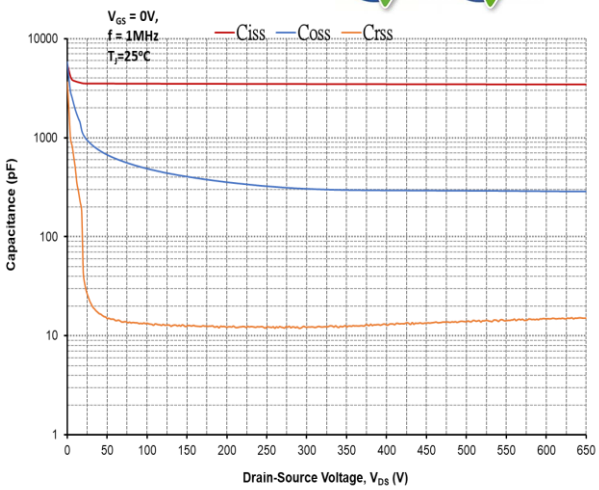


Figure 8. Capacitances vs. Drain-Source Voltage (0-650V)

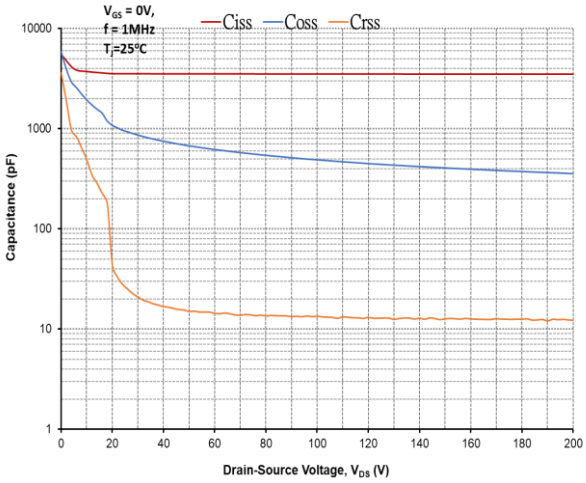


Figure 9. Capacitances vs. Drain-Source Voltage (0-200V)

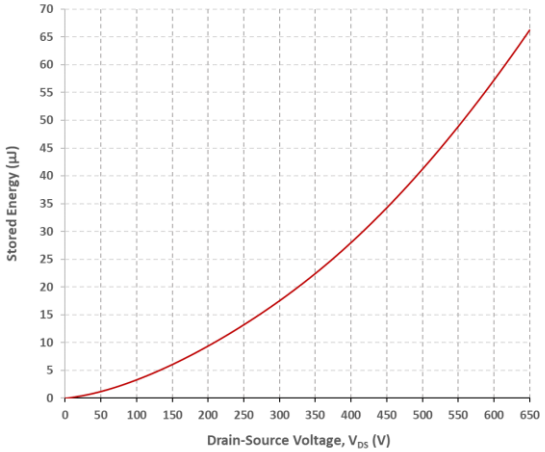


Figure 10. Output Capacitor Stored Energy

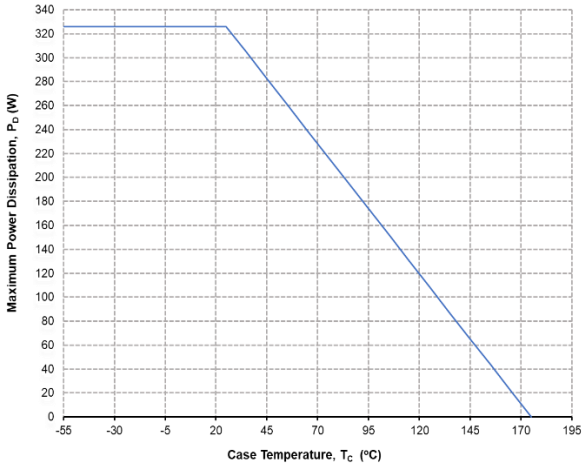


Figure 11. Maximum Power Dissipation Derating vs. Case Temperature

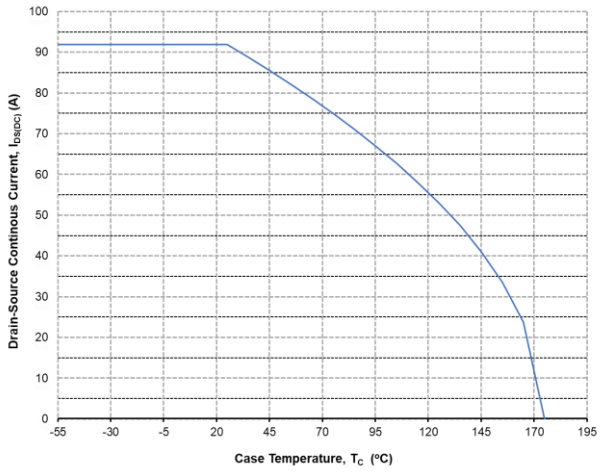


Figure 12. Continuous Drain Current Derating vs. Case Temperature

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

Typical Performance

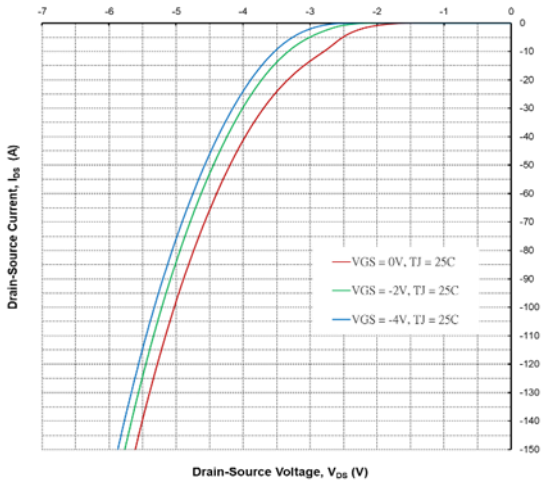


Figure 13. Body Diode Characteristics @ 25ºC

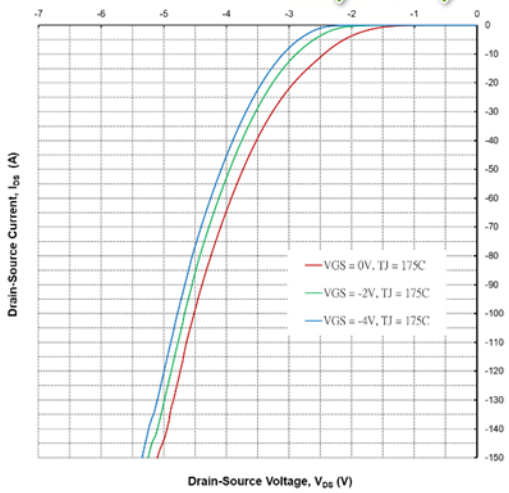


Figure 14. Body Diode Characteristics @ 175ºC

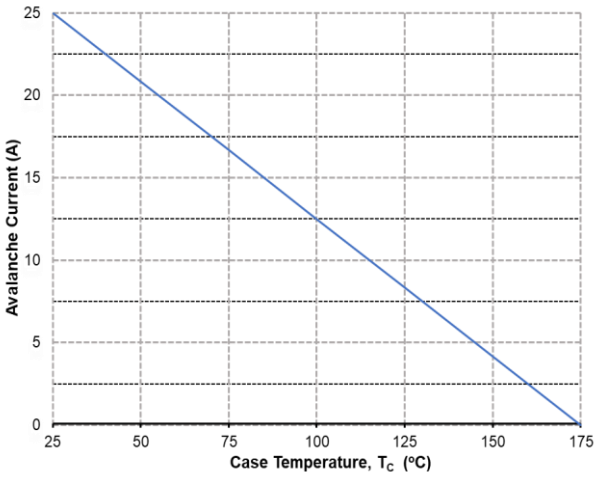


Figure 15. Single Avalanche vs. Temperature

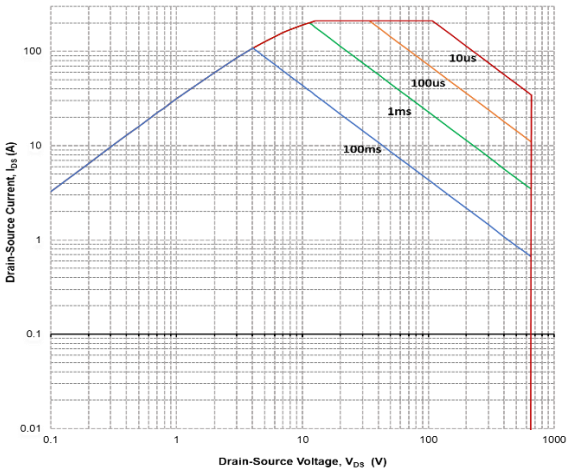
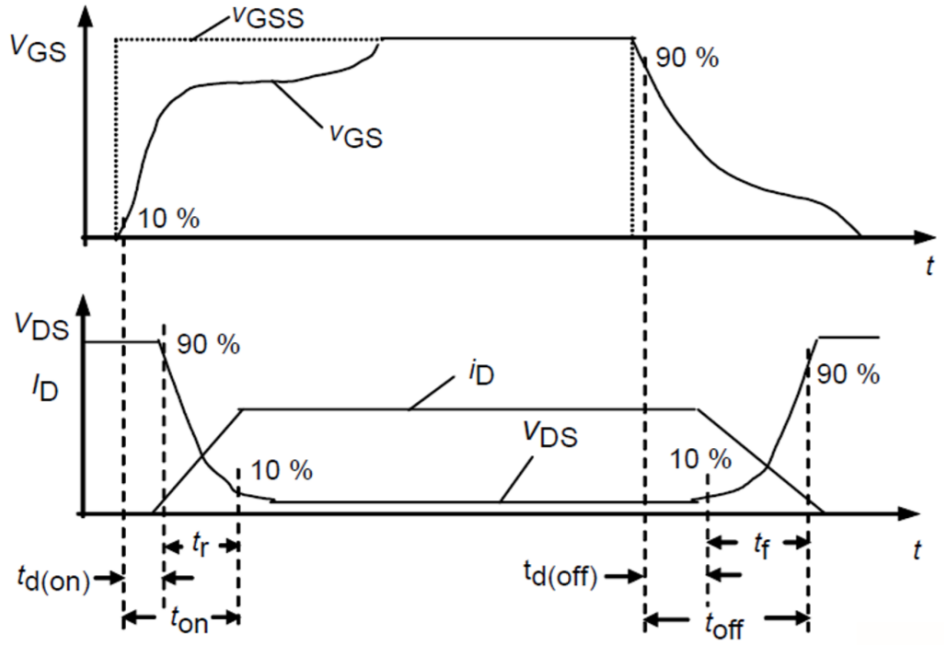
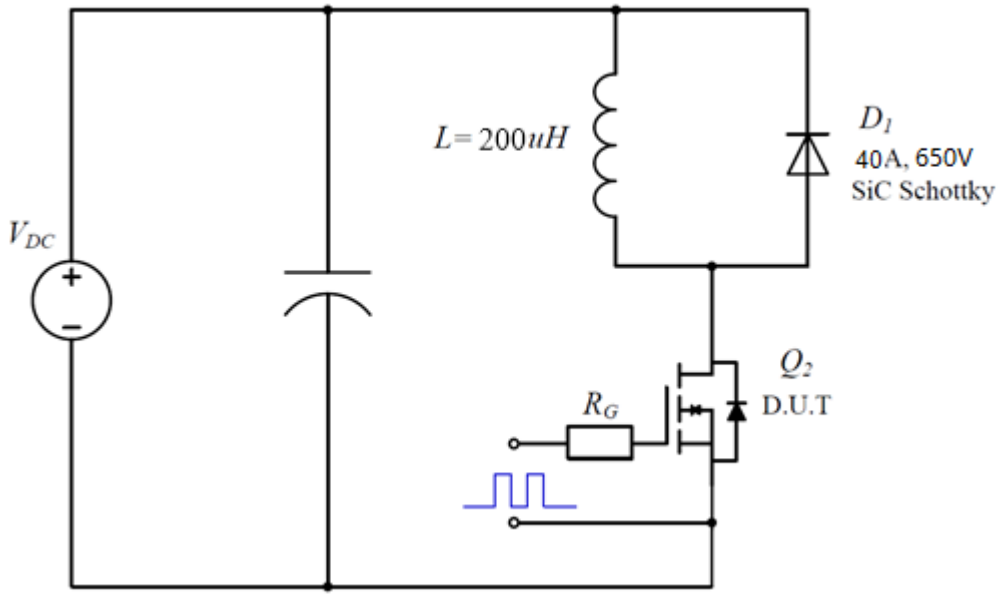


Figure 16. Safe Operating Area

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

Switching Times Definition and Test Circuit





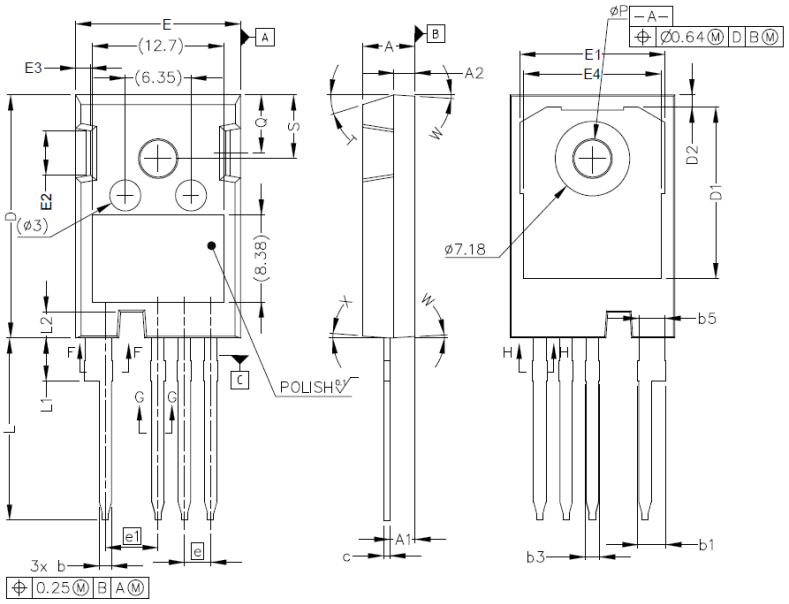
Caution: This device is sensitive to electrostatic discharge .Users should follow ESD handing procedures.

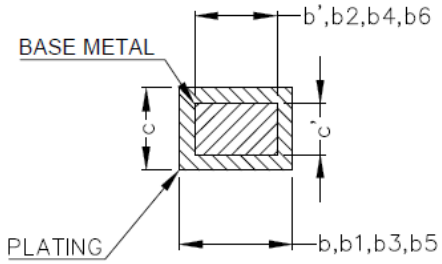
LGE3M30065Q

Silicon CarbidePower MOSFET

Package Dimensions

(TO-247-4 Package)





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.	

NOTE ;
1. ALL METAL SURFACES: TIN PLATED,EXCEPT AREA OF CUT
2. DIMENSIONING & TOLERANCEING CONFIRM TO ASME Y14.5M-1994.
3. ALL DIMENSIONS ARE IN MILLIMETERS. ANGLES ARE IN DEGREES.

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.