LGE3M28065Q

Silicon Carbide Power MOSFET

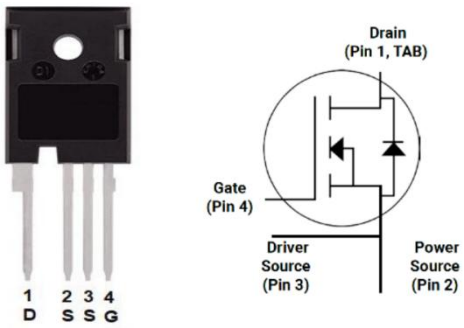
Features

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

V_{DS} = 650 V
I_D@25°C = 95A
$R_{DS(ON)}$ = 28mΩ

Benefits

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



TO-247-4

Applications

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

Part Number	Package	Marking
LGE3M28065Q	TO-247-4	LGE3M28065Q

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

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Maximum Ratings

T_C=25°C, unless otherwise specified

Parameter	Symbol	Test con	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

Maximum Ratings

T_C=25°C, unless otherwise specified

Parameter	Symbol	Value	Unit
Continuous Drain Current: V_{GS} = 18V, T_C = 25°C V_{GS} = 20V, T_C = 100°C	I_D	95 67	A
Pulsed Drain Current: T_C =25°C	$I_{D(pulse)}$	211	A
Short Circuit Capability : V_{DD} = 400V V_{GS} = 18V	t_{sc}	9	μS
Short Circuit Capability : V_{DD} =400V V_{GS} = 18V	I_{DS}	400	A
Total power dissipation : T_C = 25°C	P_D	326	W
Operating Junction Temperature :	T_J	-55 to 175	°C
Storage Temperature :	T_{STG}	-55 to 150	°C

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Thermal Characteristics

Parameter	Symbol	Condition	Typ	Max	Unit
Thermal Resistance (per device)	Rth(j-c)	junction-case	0.37	0.46	°C/W

Electrical Characteristic

T_C =25°C, unless otherwise specified

Parameter	Symbol	Value			Unit	Test Condition
		Min.	Typ.	Max.		
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	650			V	V_{GS} = 0V, I_D = 100μA
Gate Threshold Voltage	$V_{GS(th)}$	2.0	2.7 2.0 1.9	4.0	V	V_{DS} = V_{GS}, I_D = 10mA T_J = 150°C T_J = 175°C
Zero Gate Voltage Drain Current	I_{DSS}	0	1	100	μA	V_{DS} = 650V, V_{GS} = 0V
Gate-Source Leakage Current	I_{GSS}	0 -200	10 -10	200 0	nA	V_{GS} = 18V, V_{DS} = 0V V_{GS} = -4V, V_{DS} = 0V
Drain-Source On-State Resistance	$R_{DS(on)}$		39 35 37		mΩ	V_{GS} = 15V, I_D = 40 A T_J = 150°C T_J = 175°C
			28 31 32	36		V_{GS} = 18V, I_D = 40 A T_J = 150°C T_J = 175°C
Transconductance	g_{fs}		20 20 20		S	V_{DS} =20V, I_D = 40 A T_J = 150°C T_J = 175°C
Input capacitance	C_{iss}		3480		pF	V_{DS} = 400V V_{GS} = 0V f = 1MHz
Output capacitance	C_{oss}		295			
Reverse transfer capacitance	C_{rss}		13			
C_{oss} Stored Energy	E_{oss}		28		μJ	

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Total gate charge	Q_g		163		nC	V_{DS} = 400V V_{GS} = -4V / 18V I_D = 40 A
Gate-source charge	Q_{gs}		47			
Gate-drain charge	Q_{gd}		65			
Internal gate input resistance	$R_{g(int)}$		2.0		Ω	f = 1MHz, I_D = 0A
Turn-On Switching Energy	E_{ON}		44		µJ	V_{DS} = 400V V_{GS} = -4V/18V I_D = 40A, $R_{G(ext)}$ =2 Ω L= 200µH
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}		312		mJ	V_{DD} = 100V, V_{GS}=18V L=1mH
	I_{Av}		25		A	

Reverse Diode Characteristics

T_C =25°C, unless otherwise specified

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

Typical Performance

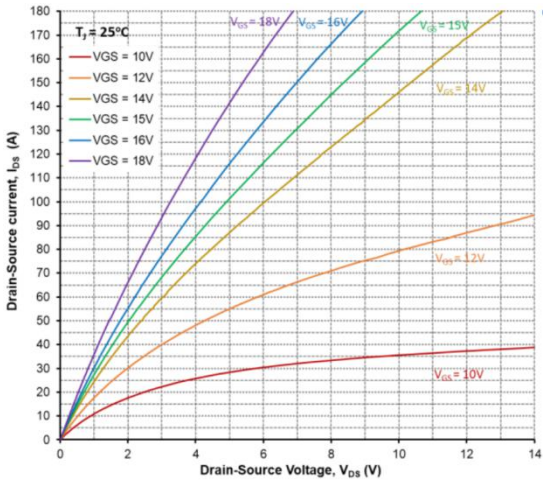

Figure 1. Output Characteristics, T_J = 25°C

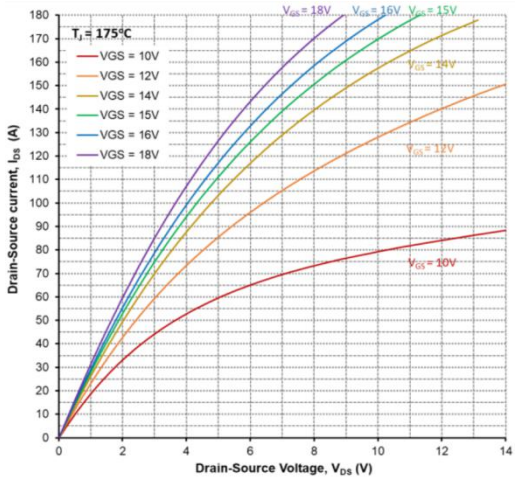

Figure 2. Output Characteristics, T_J = 175°C

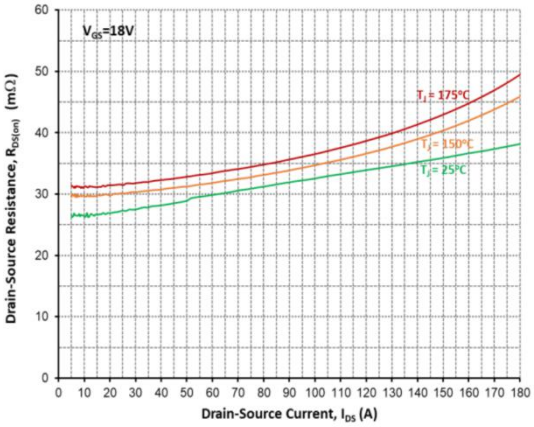

Figure 3. On-Resistance vs. Drain Current
For Various Temperatures

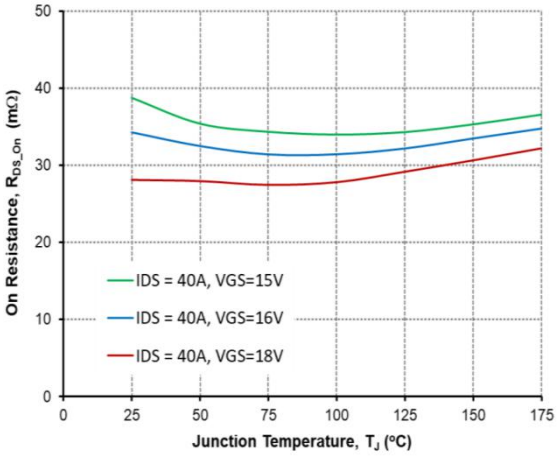

Figure 4. On-Resistance vs. Temperature

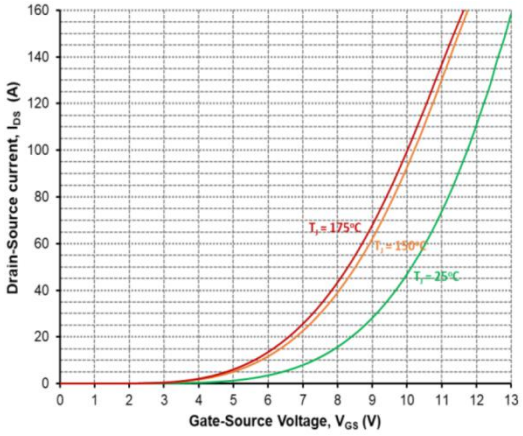

Figure 5. Transfer Characteristic For Various Junction Temperatures

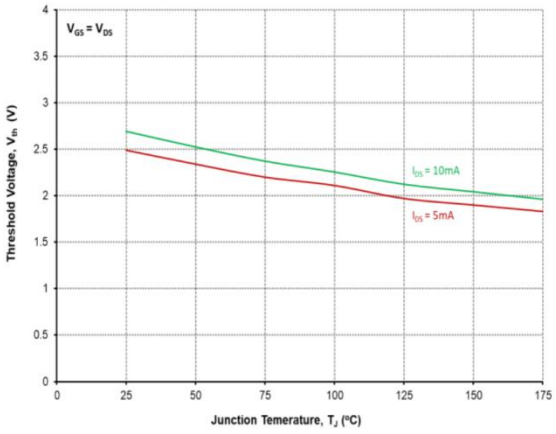

Figure 6. Threshold Voltage vs. Temperature

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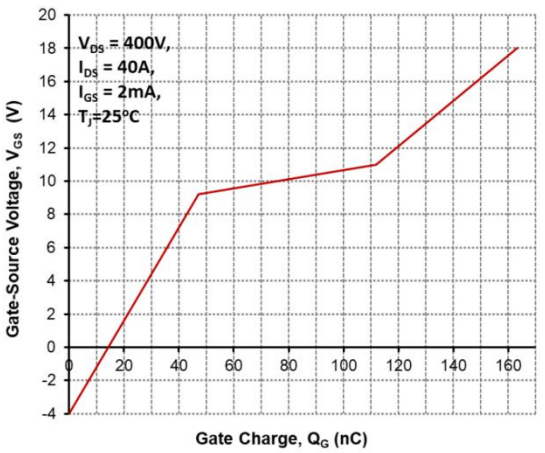

Figure 7. Gate Charge Characteristics

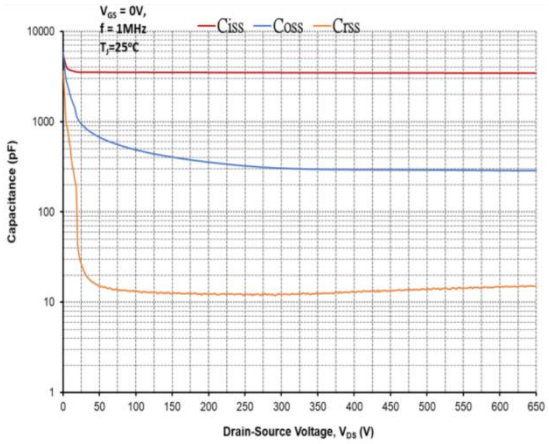

Figure 8. Capacitances vs. Drain-Source Voltage (0-650V)

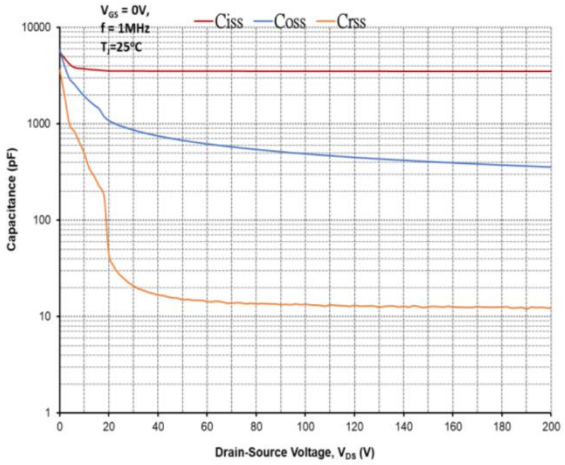

Figure 9. Capacitances vs. Drain-Source Voltage (0-200V)

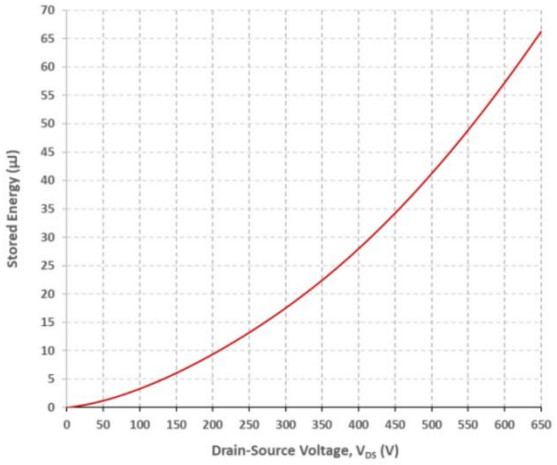

Figure 10. Output Capacitor Stored Energy

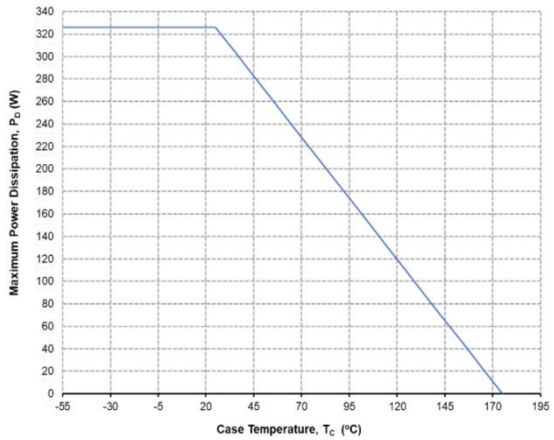

Figure 11. Maximum Power Dissipation Derating vs. Case Temperature

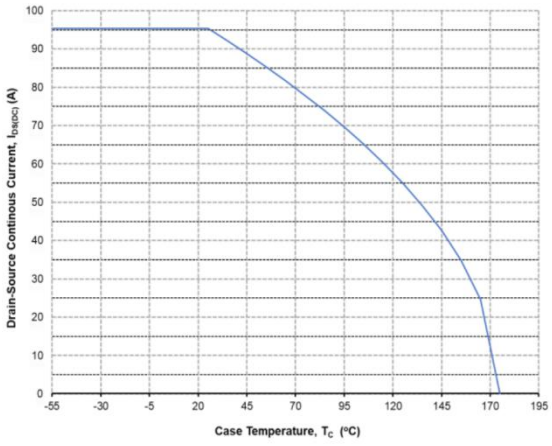

Figure 12. Continuous Drain Current Derating vs. Case Temperature

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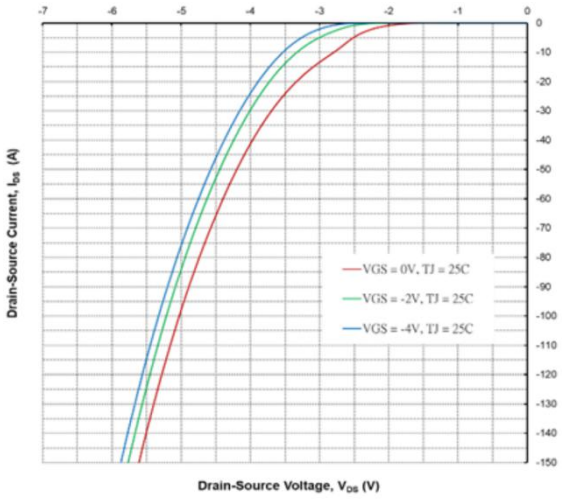

Figure 13. Body Diode Characteristics @ 25°C

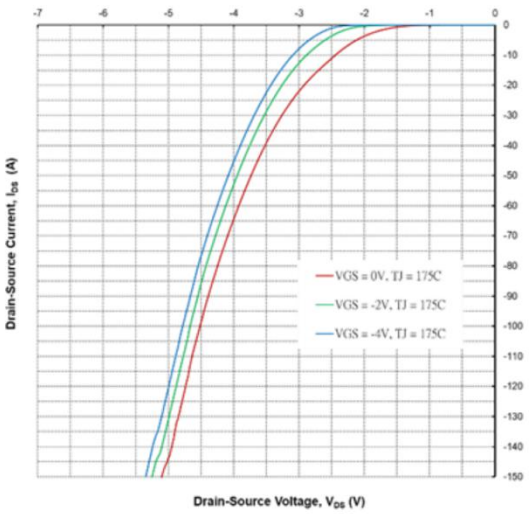

Figure 14. Body Diode Characteristics @ 175°C

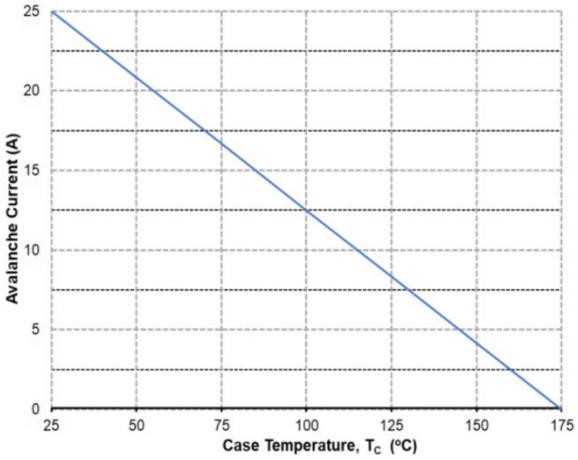

Figure 15. Single Avalanche vs. Temperature

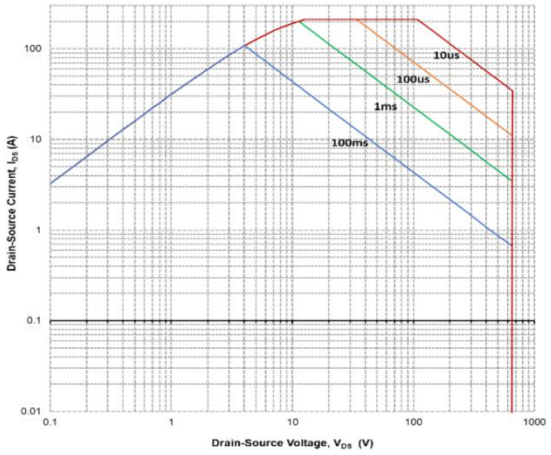

Figure 16. Safe Operating Area

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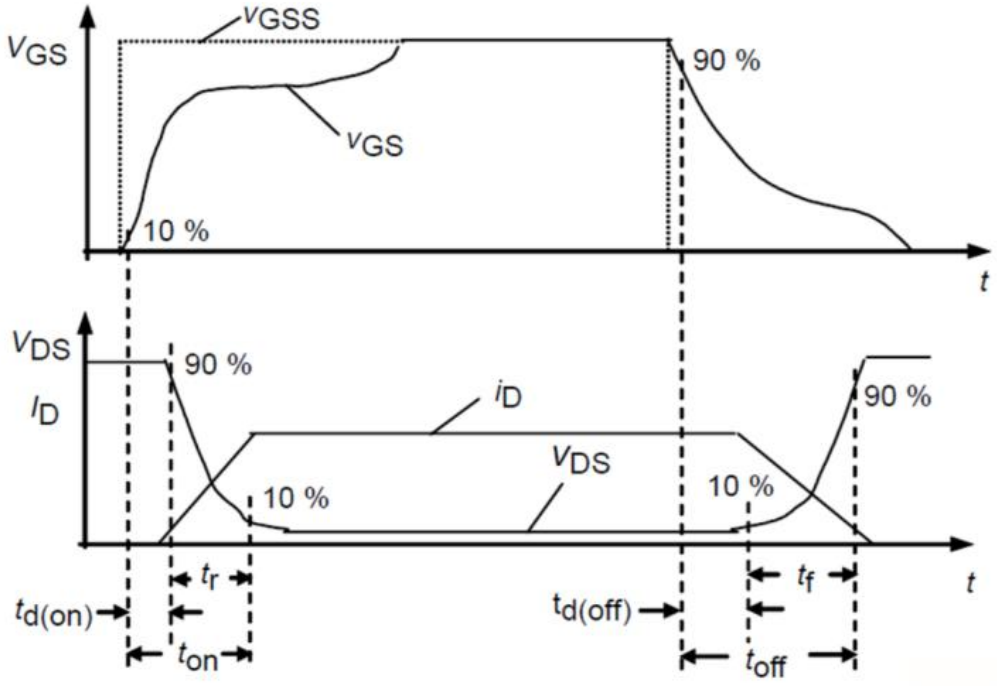
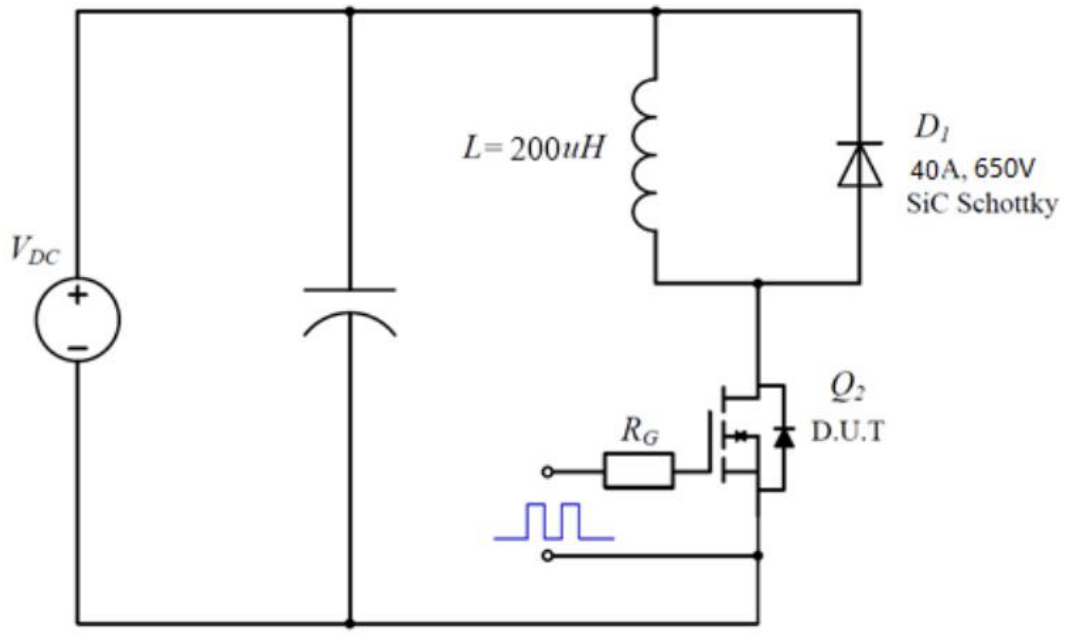
Switching Times Definition and Test Circuit





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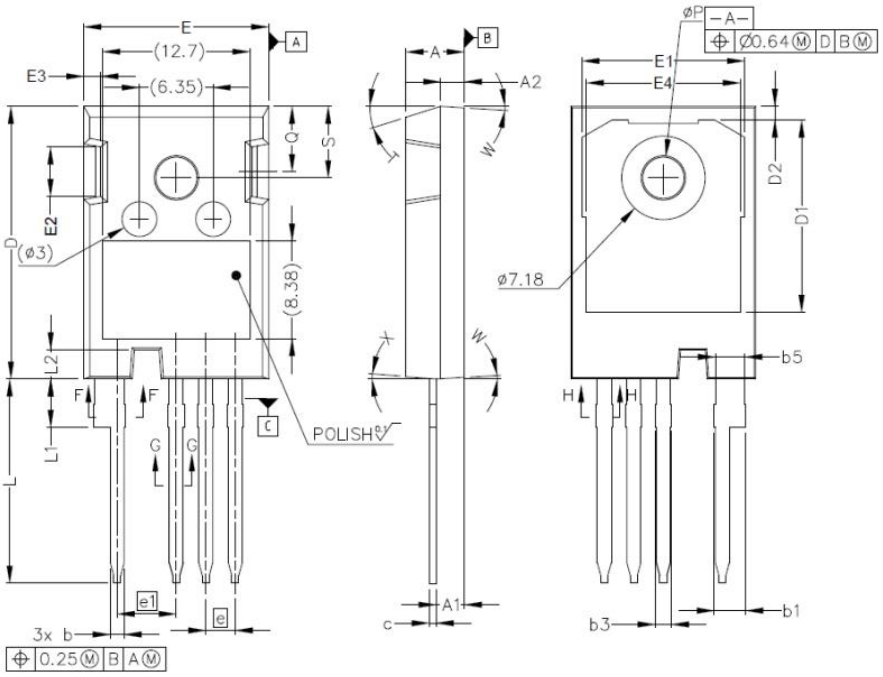
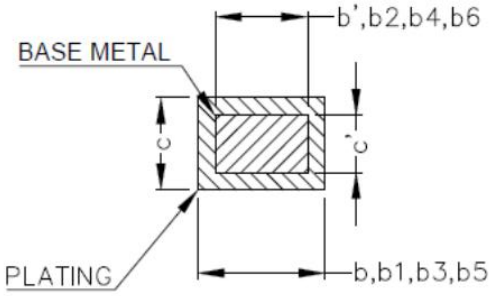
Package Outline:TO-247-4





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

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