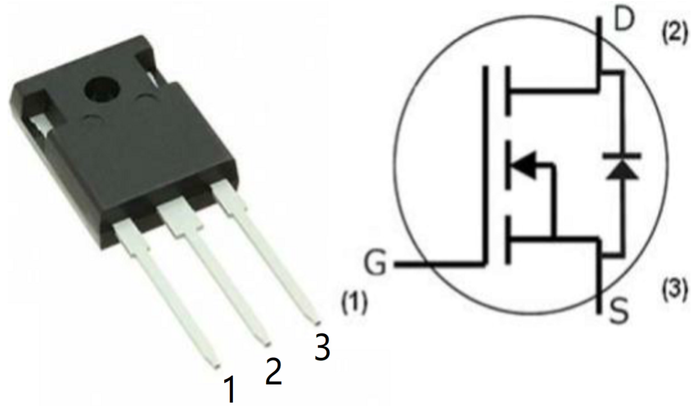
LGE3M50120B

Silicon Carbide Power MOSFET

V_{DS}	=	1200 V
$R_{DS(on)}$	=	50 mΩ
I_D@25°C	=	58A

Features

- High voltage, low on resistance
- High speed, low parasitic capacitance
- High junction temperature
- Fast recovery diode



TO-247-3
Pin definition

Benefits

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

Applications

- motor drive
- Photovoltaic inverter
- UPS power supply
- High voltage DC / DC converter
- Switching Mode Power Suppl

Part Number	Package	Marking
LGE3M50120B	TO-247-3	LGE3M50120B

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

Maximum Ratings

T_C=25°C, unless otherwise specified

Parameter			Symbol	Value	Unit
Drain-source voltage	V_{GS} = 0V，	I_D =100 μ A	V_{DS}	1200	V
Gate-source voltage	Recommended maximum		V_{GS}	-5 to 20	V

Maximum Ratings

T_C=25°C, unless otherwise specified

Parameter	Symbol	Value	Unit
Continuous drain current : V_{GS} = 20V T_C = 25° C T_C = 100° C	I_D	58 43	A
Pulsed drain current： Pulse width limited by SOA	I_{DM}	145	A
Power dissipation ： T_C = 25° C	P_{TOT}	327	W
Storage temperature range :	T_{stg}	-55 to +175	°C
Operating and junction temperature:	T_j	-55 to +175	°C
Soldre temperature: Wave soldering only allowed at leads, 1.6 mm from case for 10 s	T_L	260	°C

Thermal Resistance

Parameter	Symbol	Typ.	Unit
Thermal resistance to shell	R_{thJC}	0.459	°C/W

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

Electrical Characteristic

T_C =25°C, unless otherwise specified

Parameter	Symbol	Value			Unit	Test Condition
		Min.	Typ.	Max.		
Zero gate voltage drain current	I_{DSS}		5	100	µA	V_{DS} = 1200V V_{GS} = 0V
Gate leakage current	I_{GSS}		1	±100	nA	V_{DS} = 0V V_{GS} = -5~20V
Gate threshold voltage	V_{TH}		3.2 2.2		V	V_{GS} = V_{DS} I_D = 6mA T_C =175° C
Drain-source on-state resistance	R_{ON}		50 80	65	mΩ	V_{GS} = 20V I_D = 20A T_J = 25℃ T_J = 175℃
Input capacitance	C_{iss}		2770		pF	V_{DS} = 800V V_{GS} = 0V f = 1MHz V_{AC} = 25mV
Output capacitance	C_{oss}		110			
Reverse transfer capacitance	C_{rss}		10			
The output capacitor stores energy	E_{oss}		45		µJ	
Total gate charge	Q_g		120		nC	V_{DS} = 800V I_D = 20A V_{GS} = -5 to 20V
Gate to source charge	Q_{gs}		25			
Gate to drain charge	Q_{gd}		48			
Gate input resistance	R_g		2.8		Ω	f =1MHz
Tuen-on switching energy	E_{ON}		877		µJ	V_{DS} = 800V, I_D = 30A, V_{GS} = -2 to 20V, $R_{G(ext)}$ =3.3Ω, L = 450µH
Turn-off switching energy	E_{OFF}		211		µJ	
Turn-on delay time	$t_{d(on)}$		31		ns	
Rise time	t_r		22			

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

Turn-off delay time	$t_{d(off)}$		22			
Fall time	t_f		19			

Reverse Diode Characteristics

T_C =25°C, unless otherwise specified

Parameter	Symbol	Value			Unit	Test Condition
		Min.	Typ.	Max.		
Diode forward voltage	V_{SD}		4.9 4.4		V	I_{SD} = 20A V_{GS} = 0V T_J = 175° C
Reverse recovery time	t_{rr}		44.4		ns	V_{GS}= -2V/+20V, I_{SD} = 30A, V_R = 800V, di/dt = 1000A/us, $R_{G(ext)}$ =10 Ω L = 450 μH
Reverse recovery charge	Q_{rr}		212.6		nC	
Reverse recovery peak current	I_{RRM}		10.8		A	

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

Characteristics Curves

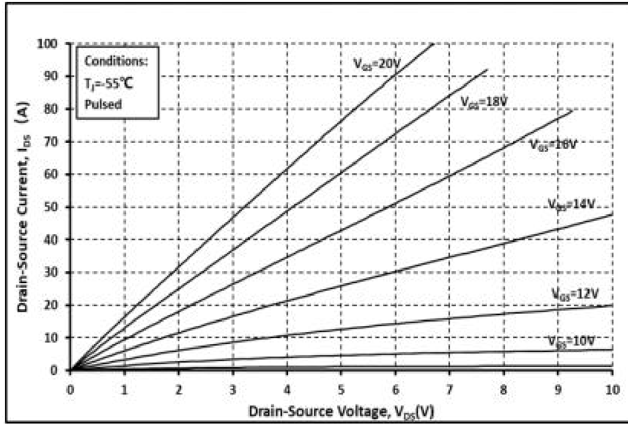


图. 1 输出曲线 @ T_J=-55°C

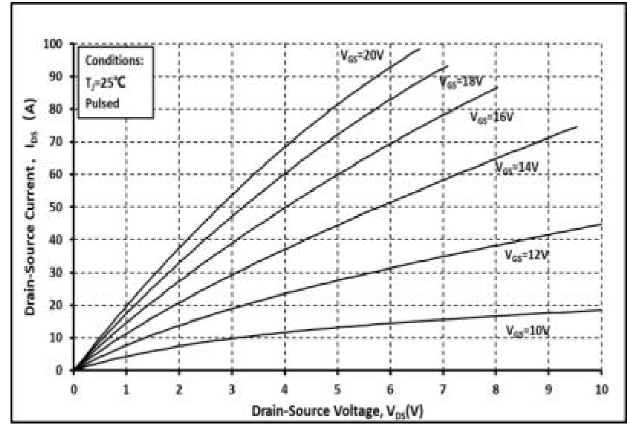


图. 2 输出曲线 @ T_J=25°C

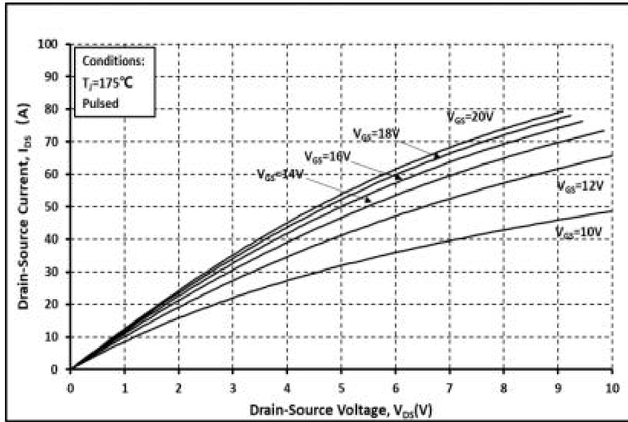


图. 3 输出曲线 @ T_J=175°C

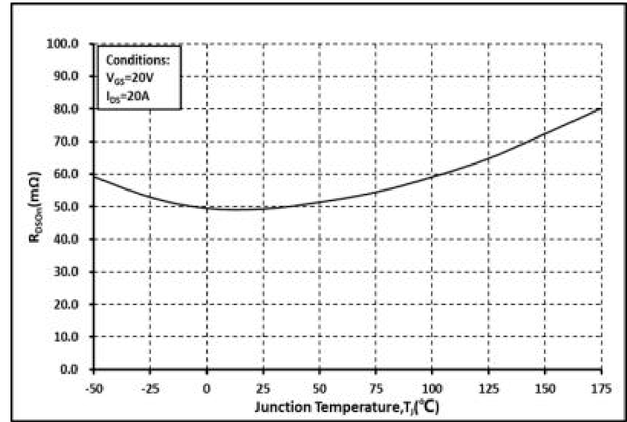


图. 4 Ron 和温度关系曲线

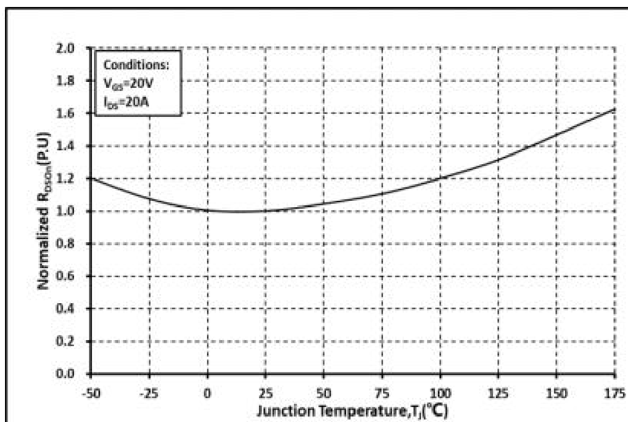


图. 5 归一化的 Ron 和温度关系曲线

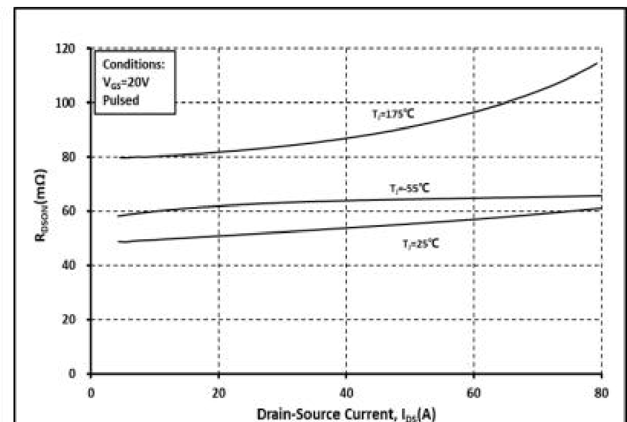


图 6 各温度下的 Ron 和 I_{DS} 关系曲线

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

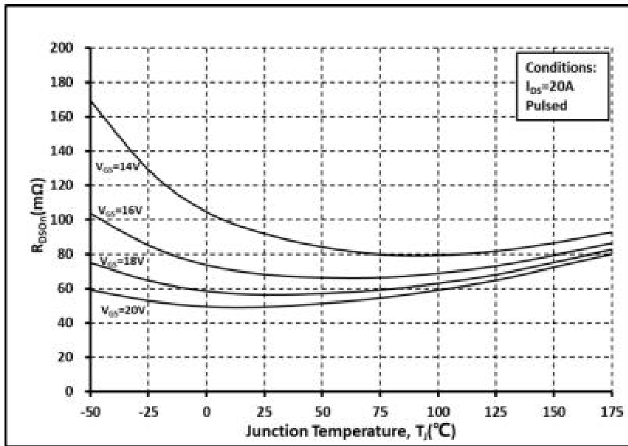


图. 7 各 V_{GS} 下的 Ron 和温度关系曲线

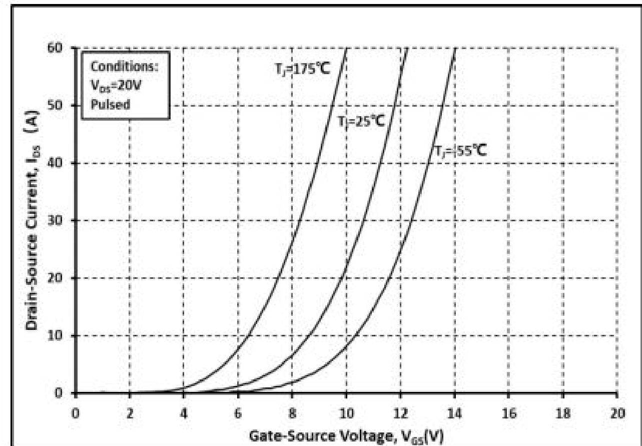


图. 8 各温度下的传输特性曲线

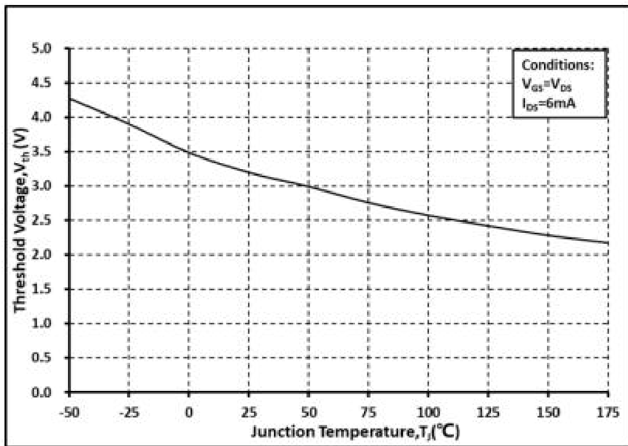


图. 9 阈值电压随温度变化曲线

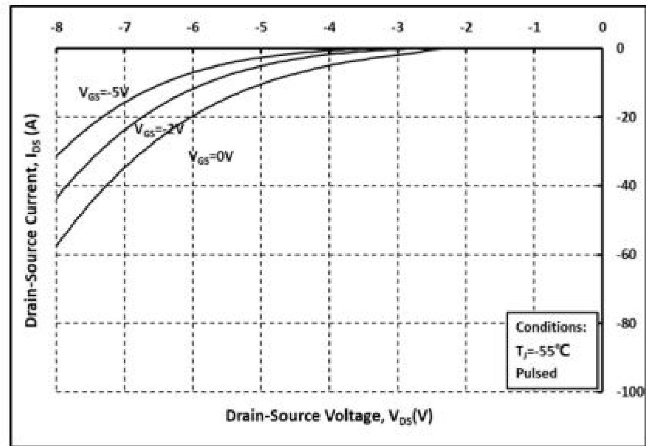


图. 10 体二极管导通曲线 @ T_J=-55℃

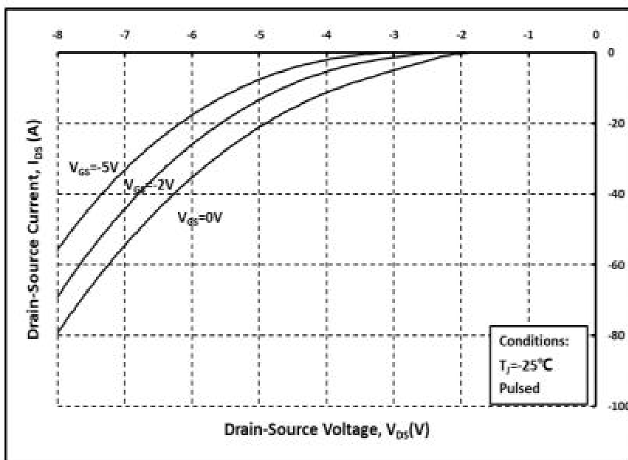


图. 11 体二极管导通曲线 @ T_J=25℃

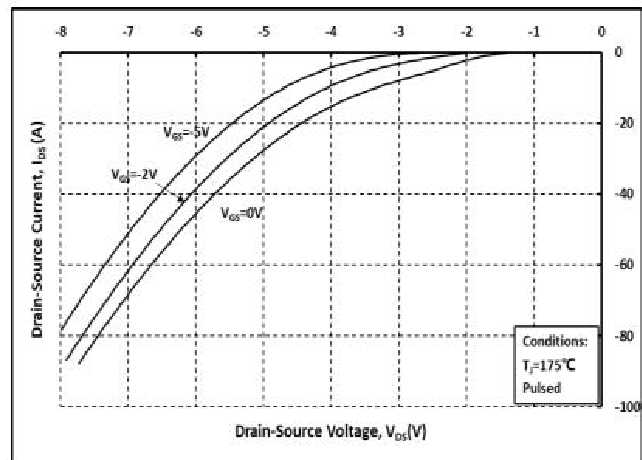


图. 12 体二极管导通曲线 @ T_J=175℃

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

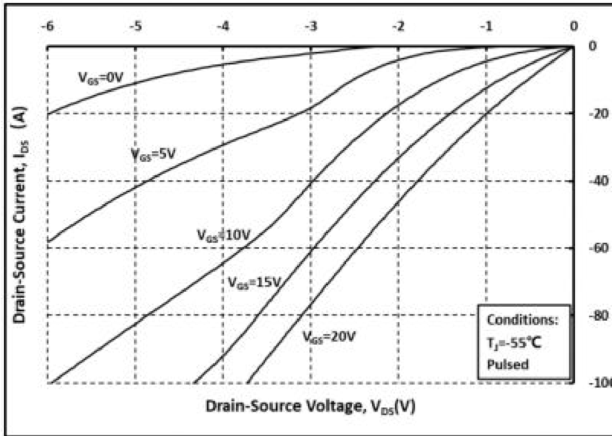


图. 13 第三象限曲线 @ T_J=-55°C

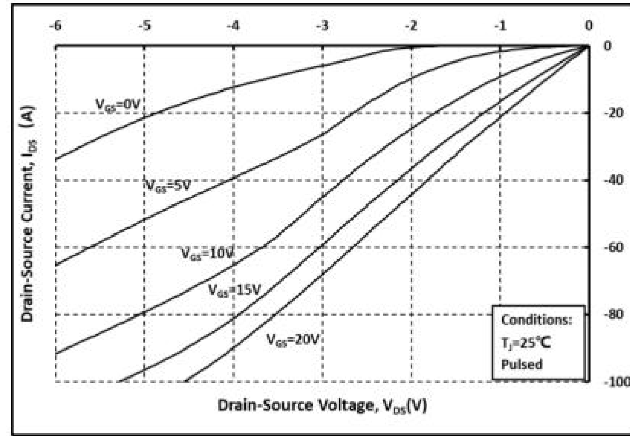


图. 14 第三象限曲线 @ T_J=25°C

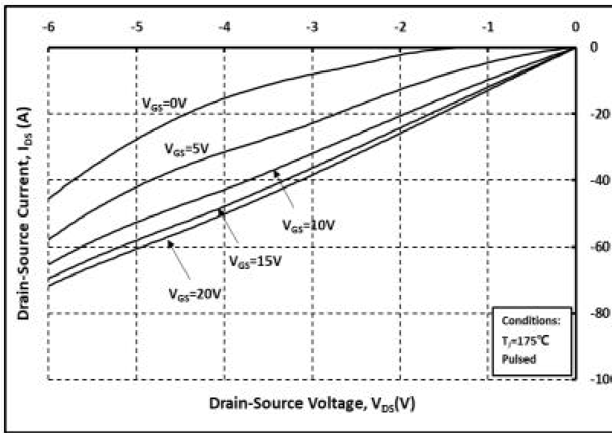


图. 15 第三象限曲线 @ T_J=175°C

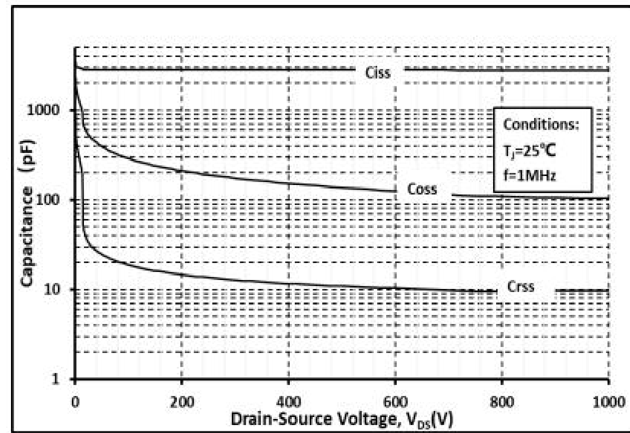


图. 16 各电容和 V_{DS}关系曲线

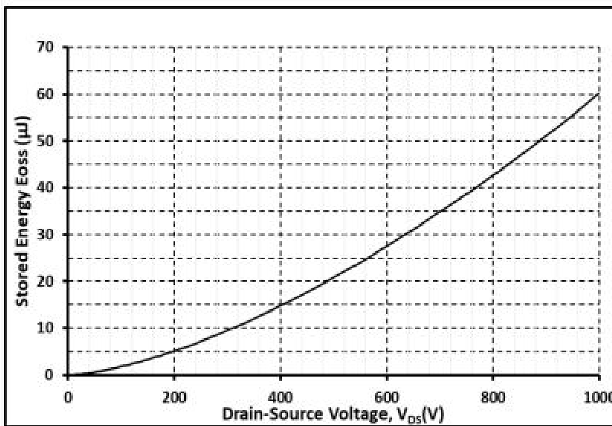


图. 17 输出电容存储能量曲线 c

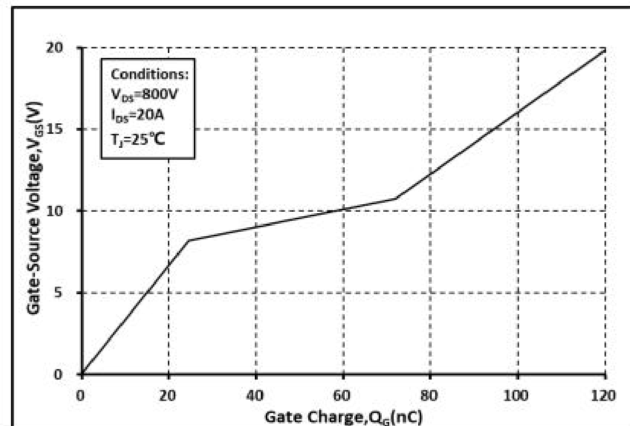


图. 18 栅电荷特征曲线 c

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

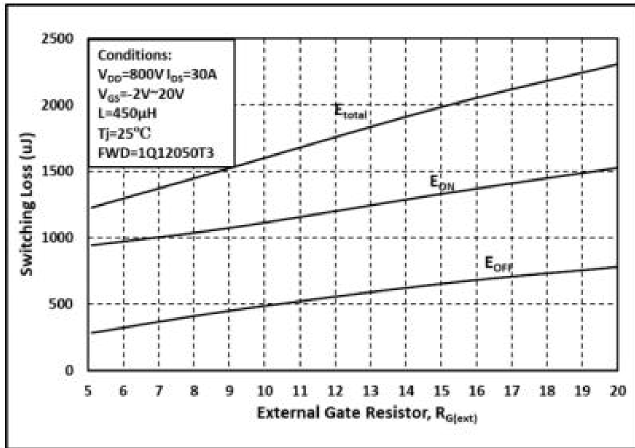


图. 19 开关能量和栅极电阻 $R_{G(ext)}$ 关系曲线

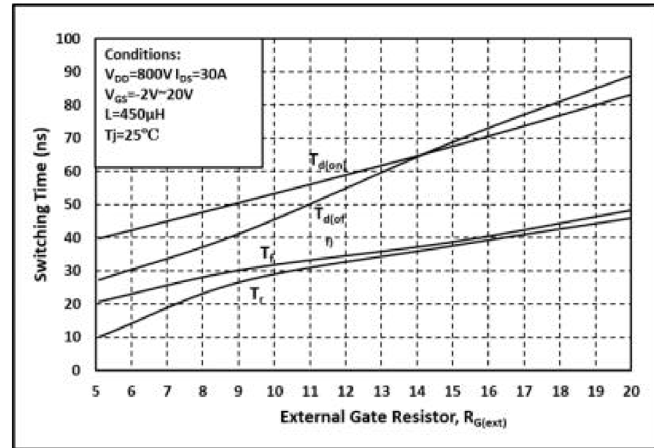


图. 20 开关时间和栅极电阻 $R_{G(ext)}$ 关系曲线

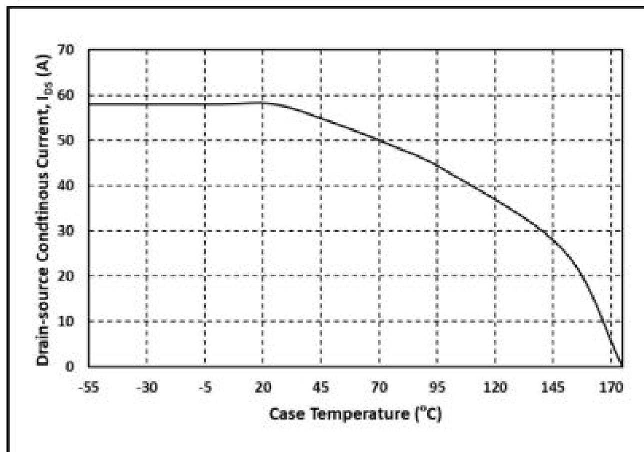


图. 21 漏端电流和温度关系曲线

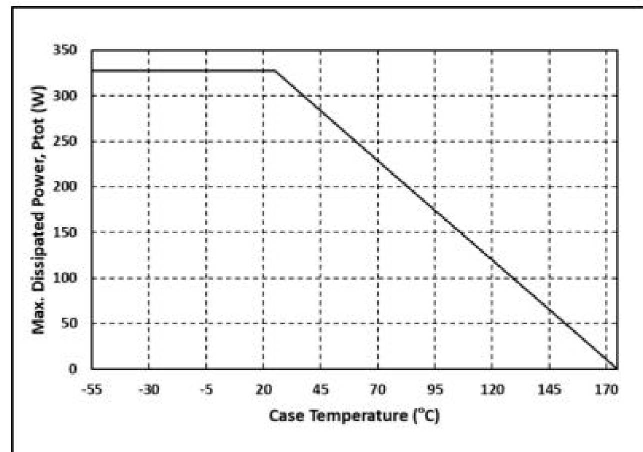


图. 22 最大功耗降额和温度关系曲线

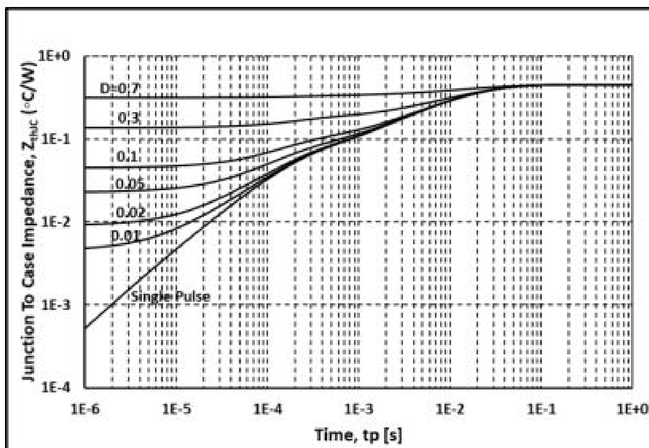


图. 23 热阻曲线

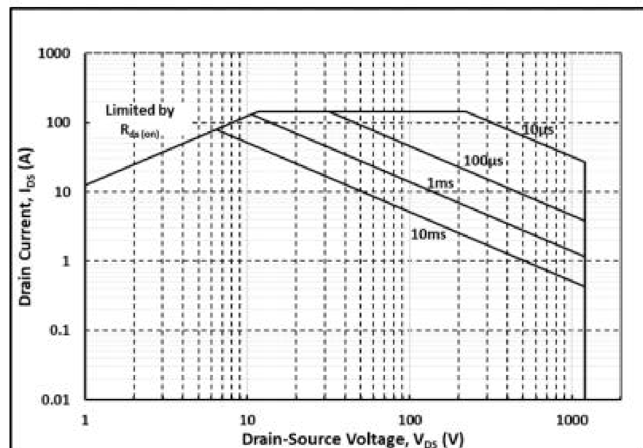
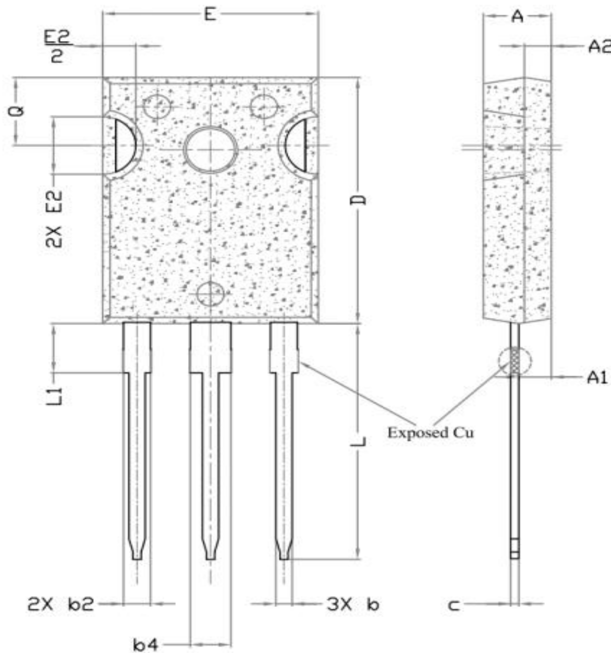


图. 24 安全工作区示意图

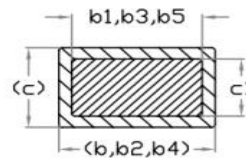
Caution: This device is sensitive to electrostatic discharge .Users should follow ESD handing procedures.

Package Outline:TO-247-3



SYMBOL	DIMENSIONS			NOTES
	MIN.	NOM.	MAX.	
A	4.83	5.02	5.21	
A1	2.29	2.41	2.55	
A2	1.50	2.00	2.49	
b	1.12	1.20	1.33	
b1	1.12	1.20	1.28	
b2	1.91	2.00	2.39	6
b3	1.91	2.00	2.34	
b4	2.87	3.00	3.22	6, 8
b5	2.87	3.00	3.18	
c	0.55	0.60	0.69	6
c1	0.55	0.60	0.65	
D	20.80	20.95	21.10	4
D1	16.25	16.55	17.65	5
D2	0.51	1.19	1.35	
E	15.75	15.94	16.13	4
E1	13.46	14.02	14.16	5
E2	4.32	4.91	5.49	3
e	5.44BSC			
L	19.81	20.07	20.32	
L1	4.10	4.19	4.40	6
⌀P	3.56	3.61	3.65	7
⌀P1	7.19REF.			
Q	5.39	5.79	6.20	
S	6.04	6.17	6.30	

E1 øP1 S D2 D1 øP D D E C C 2X e



Section C--C,D--D,E–E

说明：

1. 封装标准参考：：JEDEC TO247, Variation AD
2. 以上单位为：毫米
3. 需要开槽，槽口可为圆形
4. 尺寸 D 和 E 不包括模具溢料

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.