1700V N-Channel MOSFET

Description

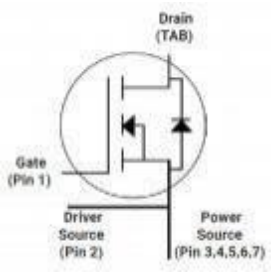
Silicon Carbide (SiC) MOSFET use a completely new technology that provide superior switching performance and higher reliability compared to Silicon. In addition, the low ON resistance and compact chip size ensure low capacitance and gate charge. Consequently, system benefits include highest efficiency, faster operating frequency, increased power density, reduced EMI, and reduced system size.

Features

- High Speed Switching with Low Capacitances
- High Blocking Voltage with Low RDS(on)
- Low parasitic inductance and Low impedance package
- Separate driver source pin
- Normally-off and simple to drive
- ROHS Compliant, Halogen free

Application

- High-frequency applications
- High-voltage capacitive loads
- Switch Mode Power Supplies
- Auxilialy power supplies



Ordering Information

Part Number	Marking	Package	Packaging
JX7S0750R170T3	JX7S0750R170T3	TO-263-7	Tube

Absolute Maximum Ratings(Tc=25°C)

Symbol	Parameter	Value	Unit
V_{DS}	Drain-Source Voltage	1700	V
I_D	Drain Current(continuous)at Tc=25°C	5	A
I_D	Drain Current(continuous)at Tc= 100°C	3	A
I_{DM}	Drain Current (pulsed)	10	A
V_{GS}	Gate-Source Voltage	-5/+15	V
P_D	Power Dissipation T_C = 25°C	60	W
T_J, Tstg	Junction and Storage Temperature Range	-55 to +150	°C

Electrical Characteristics(T_J = 25°C unless otherwise specifie d)

cTypical Performance-Static

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
BV_{DS}	Drain-source Breakdown Voltage	I_D=250uA,V_{GS}=0V	1700			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 1700V, V_{GS} =0V, T_J=25°C			100	uA
I_{GSS}	Gate-body Leakage Current	V_{DS} =0V ; V_{GS} =-5 to 15V			250	nA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}= V_{GS}, I_D= 1mA	1.5	2	3	V
V_{GSon}	Recommended turn-on Voltage	Static		12		V
V_{GSoff}	Recommended turn-off Voltage			-3		V
$R_{DS(on)}$	Static Drain-source On Resistance	V_{GS}= 12V, I_D=2A		750	1000	mΩ
		V_{GS}= 12V, I_D=2A T_J= 150°C		1220		mΩ

Typical Performance-Dynamic

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
C_{iss}	Input Capacitance	V_{DS}=1000V,f=1MHz，V_{AC}=25mV		200		pF
C_{oss}	Output Capacitance			12		pF
C_{rss}	Reverse Transfer Capacitance			2		pF
g_{fs}	Transconductance	V_{DS}=10V，I_D=1A		0.48		S
E_{OSS}	C_{OSS} Stored Energy	V_{DS}=1000V,f=1MHz		5.8		μJ
E_{ON}	Turn-On Energy （Body Diode）	V_{DS}=1200V,V_{GS}=-5/12V，I_D=2A，L=1.5mH T_J=150°C		53		μJ
E_{OFF}	Turn-Off Energy （Body Diode）			62		μJ
Q_g	Total Gate Charge	V_{DS}=1200V, V_{GS}=-5V/12V, I_D = 2A		11		nC
Q_{gs}	Gate-source Charge			2		nC
Q_{gd}	Gate-Drain Charge			6		nC
$R_{G(int)}$	Internal Gate Resistance	f=1MHz,V_{AC}=25mV		28		Ω
$t_{d(on)}$	Turn-on Delay Time	V_{DS}=1200V,V_{GS}=-5V/12V, I_D=2A, L=1.5mH Rext=2.5Ω		6		ns
t_r	Rise Time			10		ns
$t_{d(off)}$	Turn-off Delay Time			19		ns
t_f	Fall Time			56		ns

Typical Performance-Reverse Diode(T_J = 25°Cunless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V_{FSD}	Forward Voltage	V_{GS}=0V,I_F=1A,T_J=25°C		4.2	6.5	V
		V_{GS}=0V,I_F=1A,T_J=150°C		3.9	6	V
Is	Continuous Diode Forward Current	V_{GS}=0V，T_C=25°C			5	A

Thermal Characteristics

Symbol	Parameter	Value.	Unit
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	2.5	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	40	°C/W

The values are based on the junction-to case thermal impedance which is measured with the device mounted to a large heat sink assuming maximum junction temperature of Tj(max)=150°C

Electrical Characteristics

Fig1. Output characteristics (T_J = 25 °C)

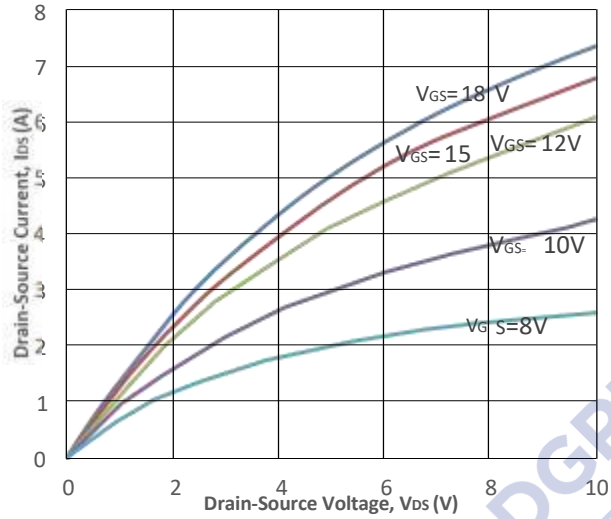


Fig2. Output characteristics (T_J = 150 °C)

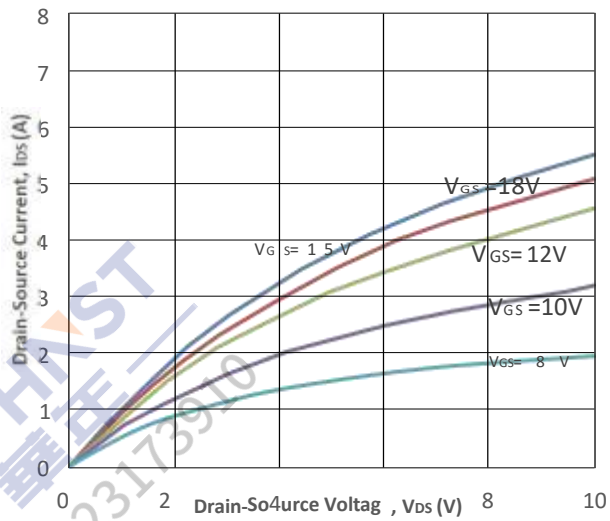


Fig3.Normalized On-Resistance vs. Temperature

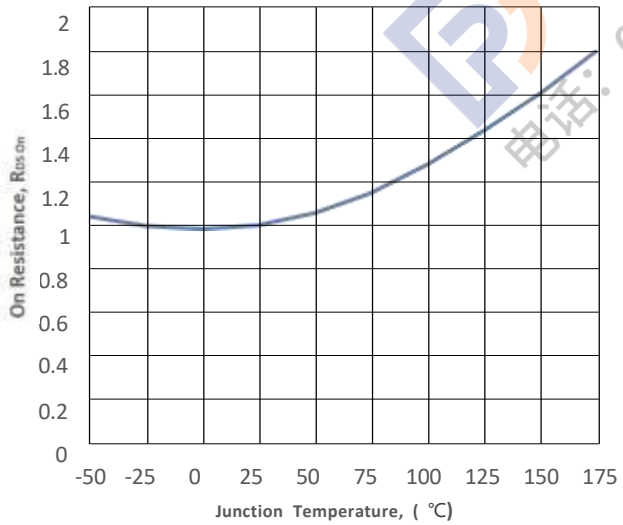


Fig4. On-Resistance vs. Temperature

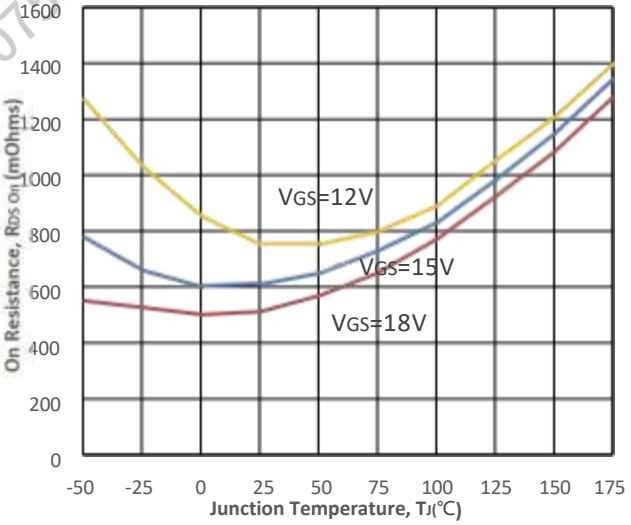


Fig5. Transfer Characteristic

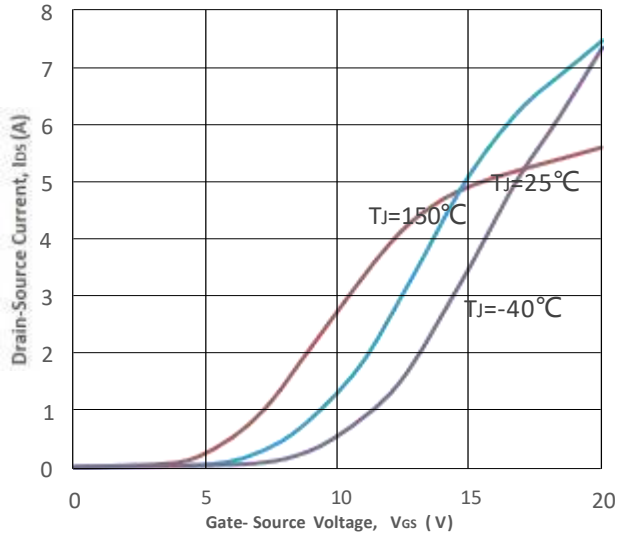


Fig6. Body Diode Characteristic at 25℃

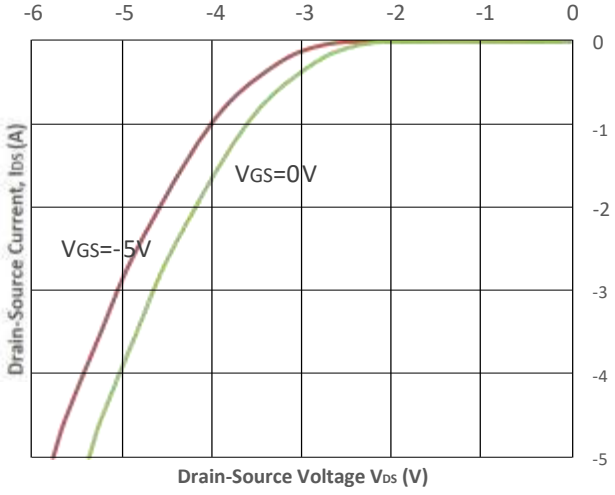


Fig7.Threshold Voltage vs. Temperature

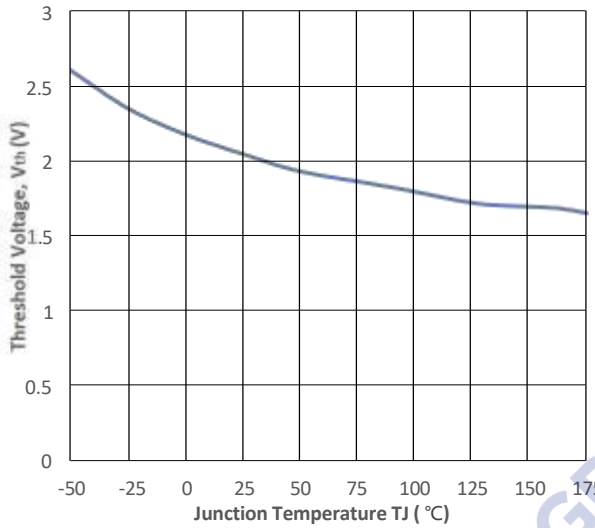


Fig8. Gate Charge Characteristics

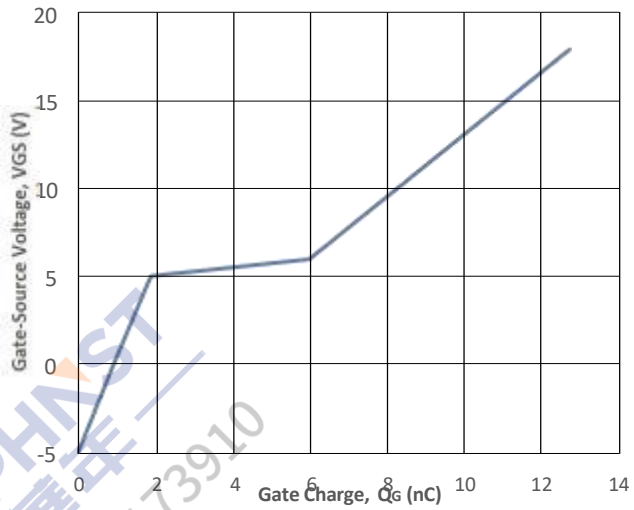


Fig9. 3rd Quadrant Characteristic at 25℃

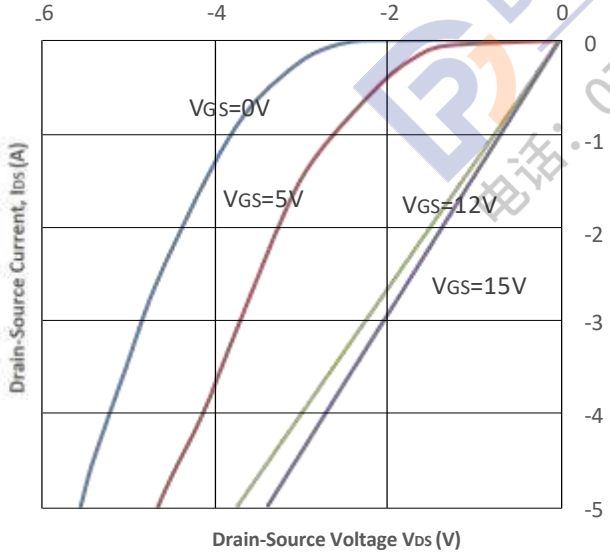


Fig10. Output Capacitor Stored Energy

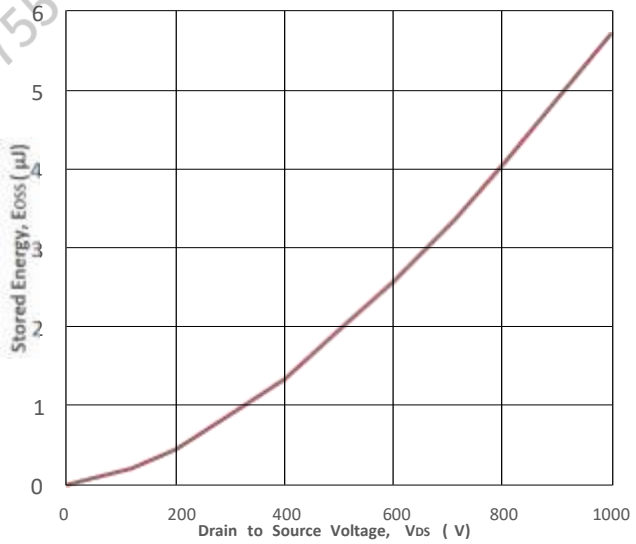


Fig11. Capacitances vs. Drain-Source

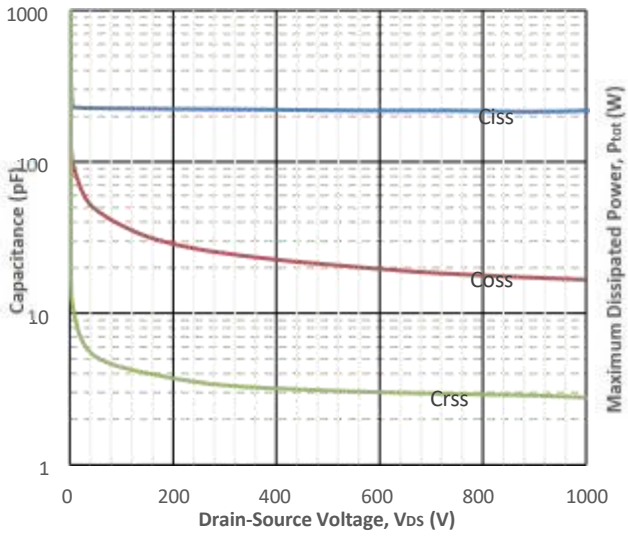


Fig12. Max Power Dissipation Derating Vs TC

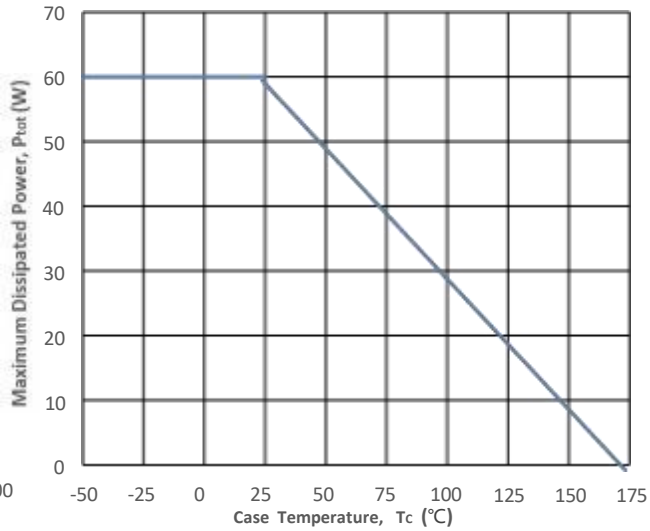


Fig13. Switching Energy vs. Drain Current

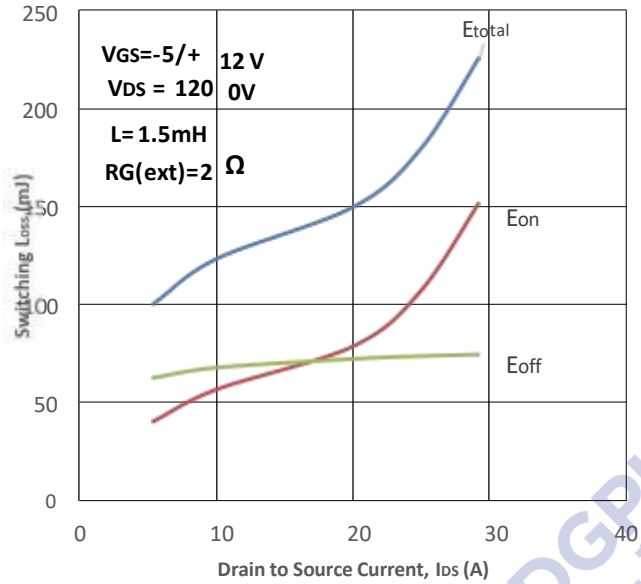


Fig14. Switching Energy vs. RG(ext)

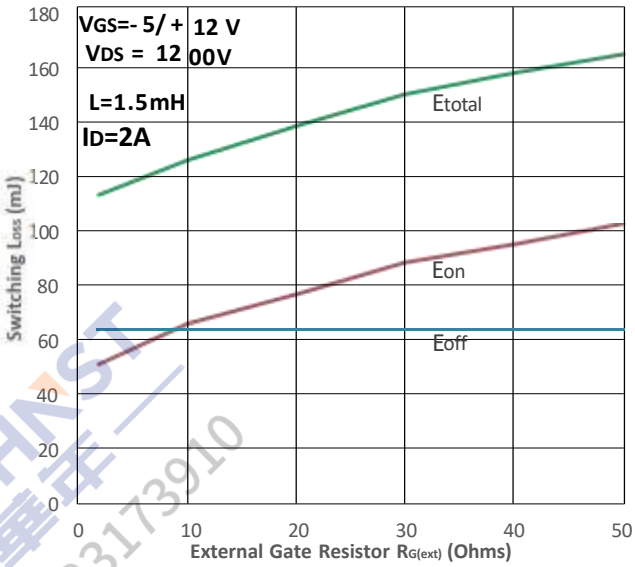


Fig15.Transient Thermal Impedance

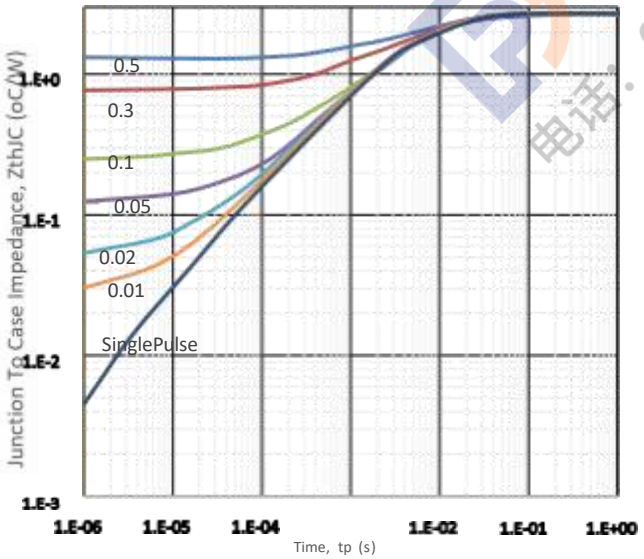
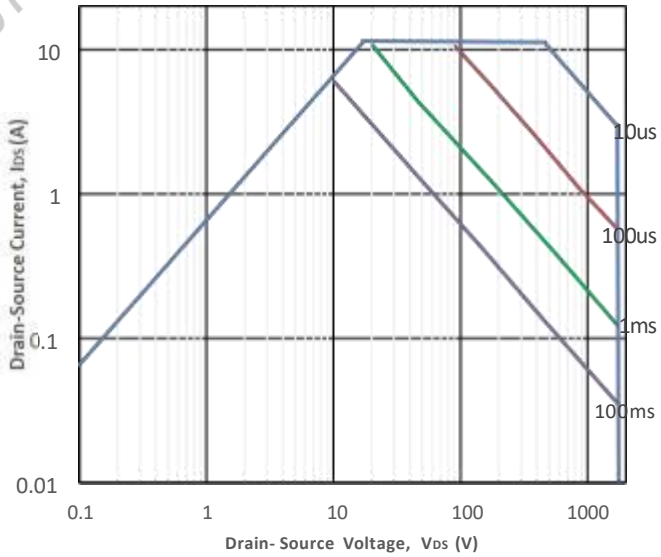
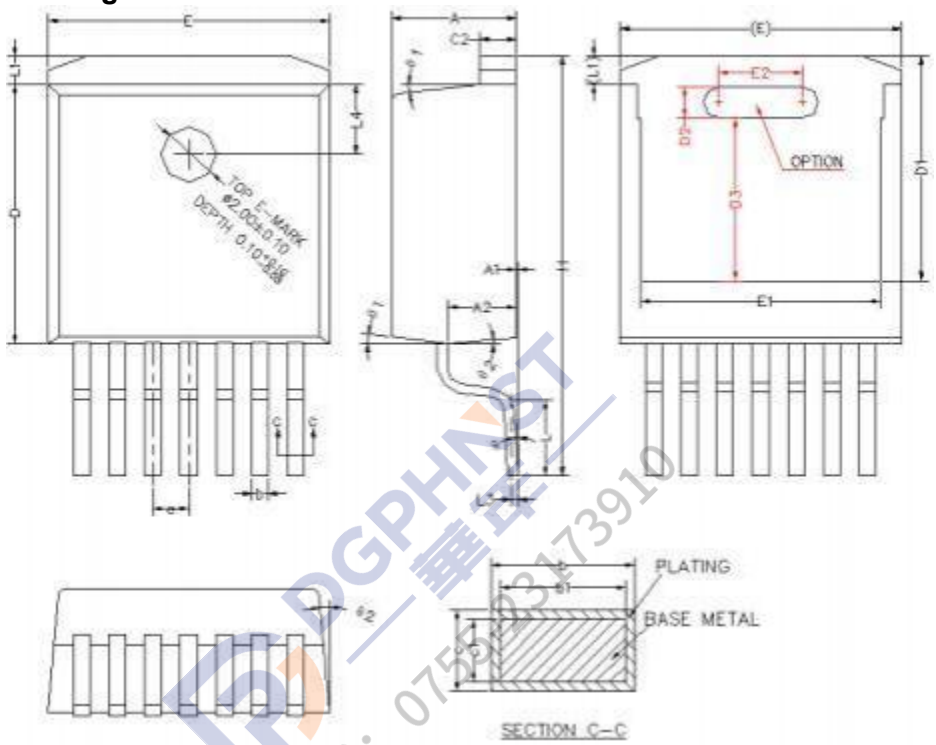


Fig16. Safe Operating Area



Package Drawing:



Dimensions （ UNIT：mm）

SYMBO	MIN	NOM	MAX
A	4.30	4.40	4.50
A1	0.00	0.10	0.25
A2	2.30	2.40	2.50
b	0.56	_	0.69
b1	0.55	0.60	0.65
c	0.37	_	0.44
c1	0.36	0.38	0.40
c2	1.22	1.27	1.32
D	9.15	9.25	9.35
D1	7.90	8.00	8.10
D2	1.00	1.11	1.20
D3	5.70	5.80	5.90
E	9.90	10.00	10.10
E1	8.40	8.50	8.60
E2	2.90	3.00	3.10
e	1.17	1.27	1.37
H	14.60	14.95	15.35
L	2.40	2.70	2.90
L1	0.90	1.00	1.10
L3	0.25BSC		
L4	2.50REF		
θ	0°		8°
θ1	5°	7°	9°
θ2	3°	5°	7°