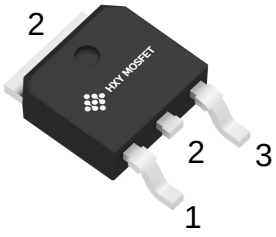
R6509END3TL1

SiC Power MOSFET N-Channel Enhancement Mode

Features

- Wide bandgap SiC MOSFET technology
- Built Sic SBD
- Low On-Resistance with High Blocking Voltage
- Low Capacitances with High-Speed switching
- Low reverse recovery(Qrr)
- Halogen free, RoHs compliant



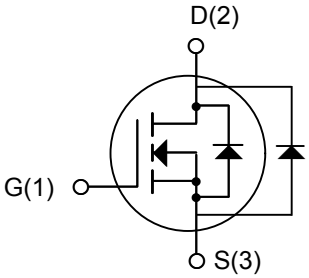
TO-252-2L

Benefits

- Reduce switching losses
- Increased system Switching Frequency
- Increased power density
- Reduction of heat sink requirements

Applications

- Switch mode power supplies
- Renewable energy
- On Board Charger
- High Voltage DC/DC Converters



Ordering Part Number	Package	Brand
R6509END3TL1	TO-252-2L	HXY MOSFET

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

Symbol	Parameter	Test conditions	Value	Unit	Note
V_{DSmax}	Drain-Source Voltage	V_{GS} = 0V, I_D = 100μA	800	V	
V_{GS}	Gate-Source voltage (transient)	$t_p \leqslant$500ns, duty cycle ⩽1%	-8/+20	V	
V_{GSop}	Recommend Gate-Source Voltage	Static	-4/+18	V	
EAS	Single pulse avalanche energy	V_{DS}=800V, V_{DD}=50V, V_{GS}=15V, L=1mH, T_C=25°C	32	mJ	
I_D	Continuous Drain current	V_{GS} = 18V, T_C = 25°C	10.2	A	Fig. 14
		V_{GS} = 18V, T_C = 100°C	7.2		
$I_{D,pulse}$	Pulsed Drain Current	Pulse with t_p limited by T_{jmax}	14	A	
P_D	Power Dissipation	T_C = 25°C, Tj = 175°C	44.4	W	Fig. 16
T_j	Operating junction temperature		-55~175	°C	
T_{stg}	Storage temperature		-55~175	°C	

Thermal Characteristics

Symbol	Parameter	Value			Unit	Note
		Min.	Typ.	Max.		
$R_{th(jc)}$	Thermal resistance from Junction to Case		3.38		K/W	Fig. 15
$R_{th(ja)}$	Thermal resistance from Junction to Ambient		40		K/W	

Electrical Characteristics (T_C = 25˚C unless other wise specified)

Static Characteristics

Symbol	Parameter	Test conditions	Value			Unit	Note
			Min.	Typ.	Max.		
$V_{(BR)DSS}$	Drain-Source Breakdown voltage	V_{GS} = 0V, I_D = 100μA	800			V	
$V_{GS(th)}$	Gate Threshold voltage	V_{GS} = V_{DS}, I_D =0.7mA		2.6		V	Fig. 9
		V_{GS} = V_{DS}, I_D =0.7mA, T_j=175°C		1.9			
I_{GSS}	Gate-Source Leakage current	V_{GS} = 18V, V_{DS} = 0V			250	nA	
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} =800V, V_{GS} = 0V, T_j = 25°C		5	50	μA	
$R_{DS(on)}$	Drain-Source On-state Resistance	V_{GS} = 15V, I_D =2A V_{GS} = 18V, I_D =2A		704 550	750	mΩ	Fig. 3, 4 , 5
		V_{GS} = 15V, I_D =2A, T_j = 175°C V_{GS} = 18V, I_D =2A, T_j = 175°C		744 670			
g_{fs}	Transconductance	V_{DS} = 15V, I_D =2A		1.4		S	Fig. 6
		V_{DS} = 15V, I_D =2A, T_j = 175°C		1.2			

Gate Charge Characteristics

Symbol	Parameter	Test conditions	Value			Unit	Note
			Min.	Typ.	Max.		
Q_{GS}	Gate to Source Charge	V_{DS} = 400V I_D =2A V_{GS} = -4V/18V		1.2		nC	Fig. 10
Q_{GD}	Gate to Drain Charge			3.9			
Q_G	Total Gate Charge			6.6			

AC Characteristics

Symbol	Parameter	Test conditions	Value			Unit	Note
			Min.	Typ.	Max.		
C_{iss}	Input Capacitance	V_{GS} = 0V, V_{DS} = 600V f =1 MHz V_{AC} = 25mV		89		pF	Fig. 13
C_{oss}	Output Capacitance			19		pF	
C_{rss}	Reverse Transfer Capacitance			2.3		pF	
$R_{G(int)}$	Internal Gate Resistance	f=1 MHz, V_{AC} = 25mV		8		Ω	

Reverse Diode Characteristics

Symbol	Parameter	Test conditions	Value			Unit	Note
			Min.	Typ.	Max.		
V_{SD}	Diode Forward Voltage	V_{GS} = -4V, I_{SD} = 1A		1.35		V	Fig. 7,8
		V_{GS} = -4V, I_{SD} = 1A , T_j = 175°C		1.65			
I_S	Continuous Diode Forward Current	V_{GS} = -4V, T_C = 25°C		8.3		A	
$I_{S,\ pulse}$	Diode pulse Current	V_{GS} = -4V, pulse width t_p limited by T_{jmax}		14		A	

Typical Performance

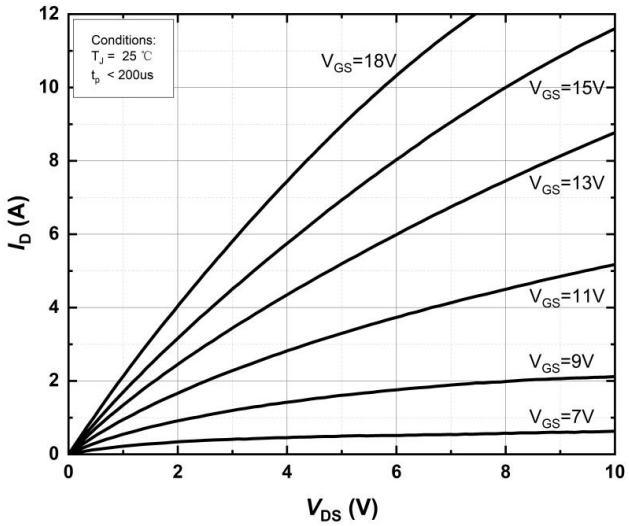


Figure 1. Output characteristics at Tj=25°C

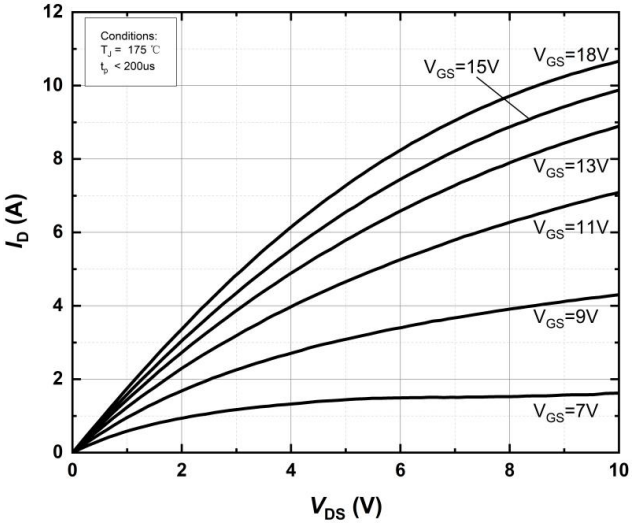


Figure 2. Output characteristics at Tj=175°C

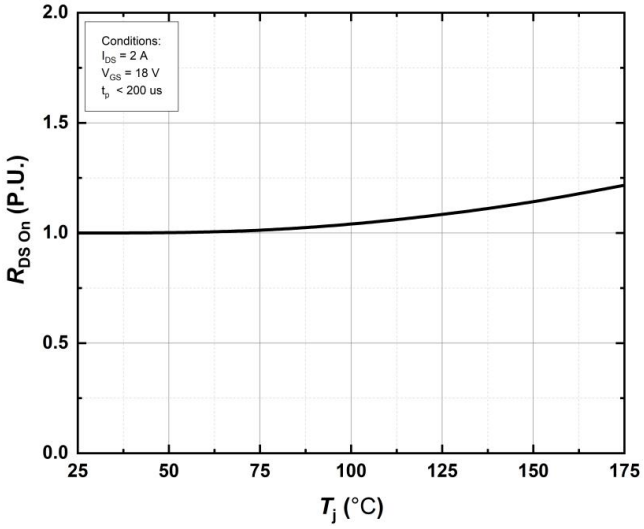


Figure 3. Normalized On-Resistance vs. Temperature

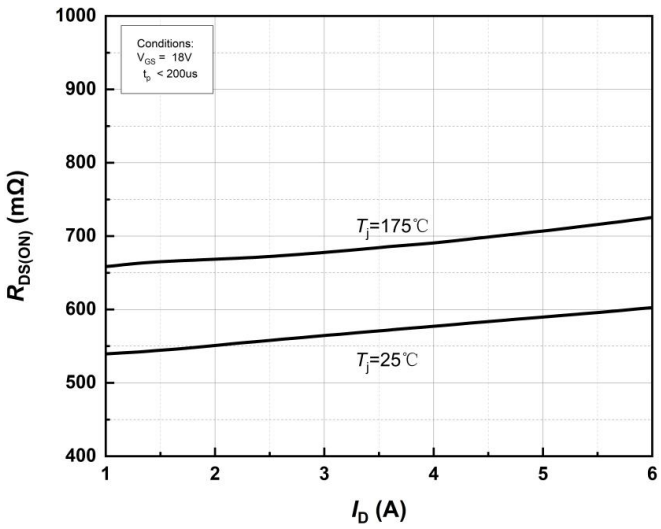


Figure 4. On-Resistance vs. Drain current for Various Temperature

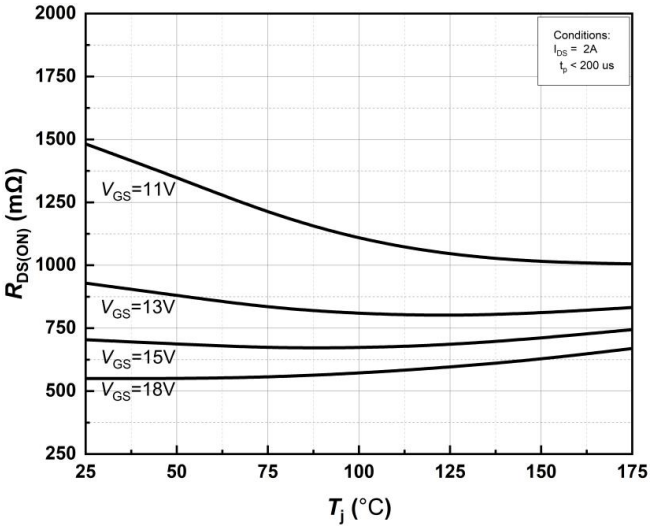


Figure 5. On-Resistance vs. Temperature for Various Gate Voltage

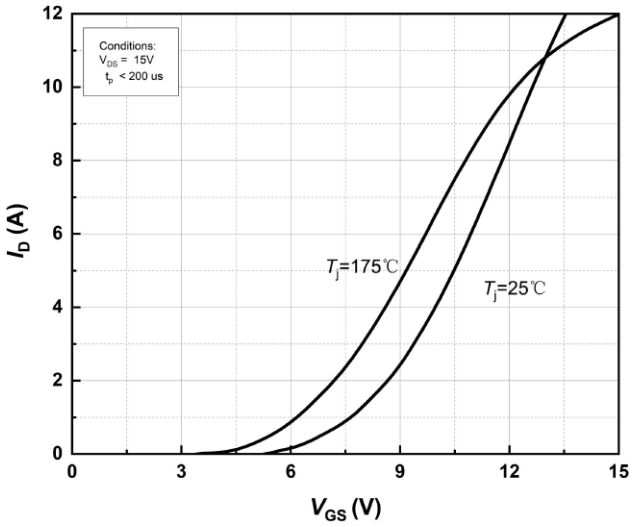


Figure 6. Transfer Characteristics for Various Junction Temperatures

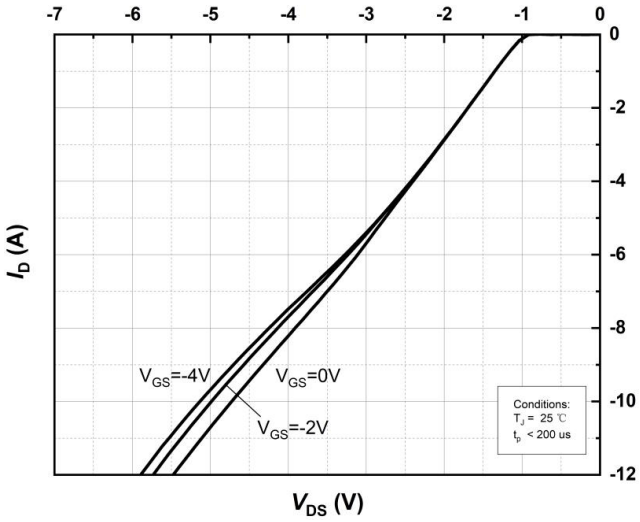


Figure 7. Body Diode Characteristics at Tj=25°C

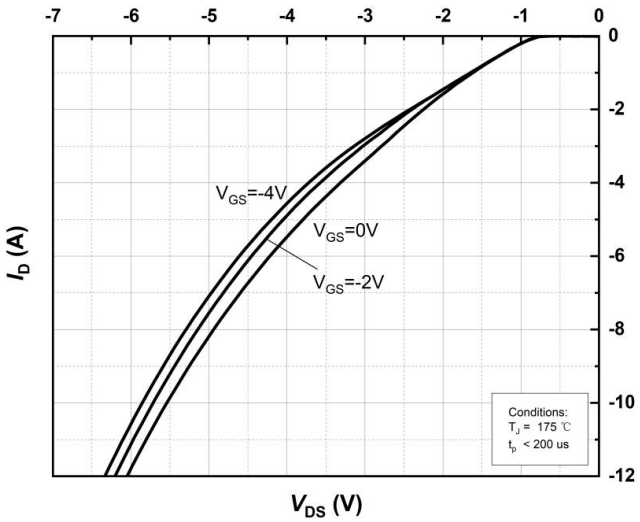


Figure 8. Body Diode Characteristics at Tj=175°C

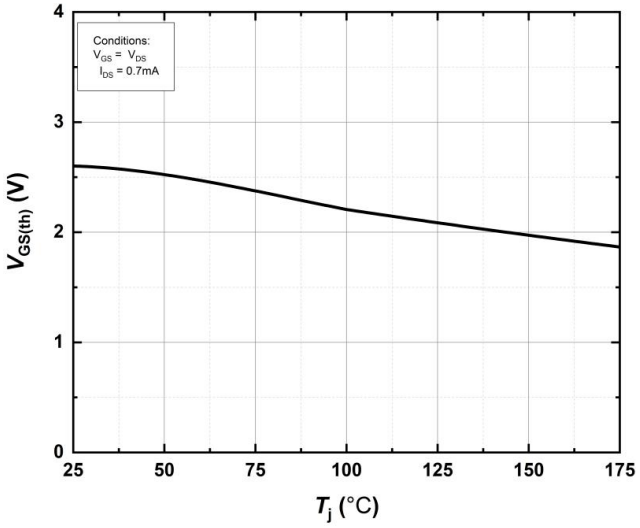


Figure 9. Threshold Voltage vs. Temperature

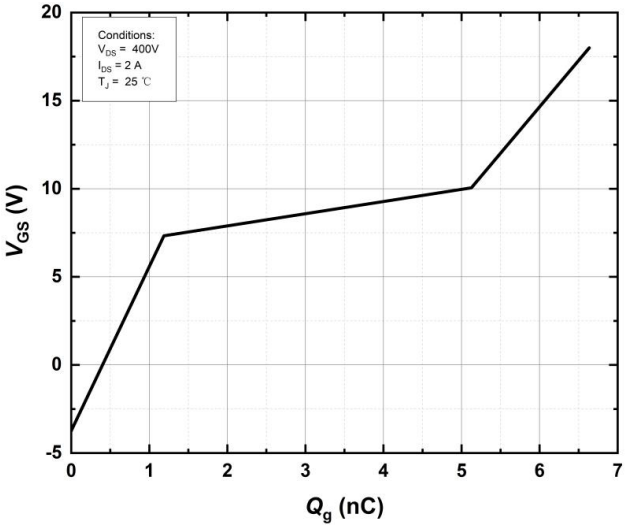


Figure 10 Gate Charge Characteristics

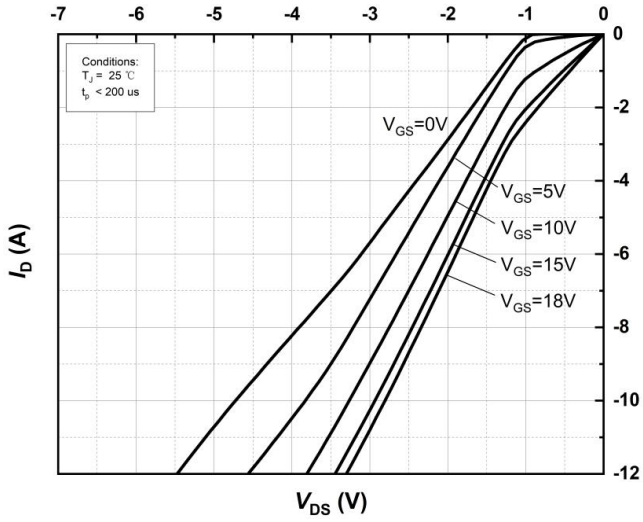


Figure 11. 3rd Quadrant Characteristic at Tj=25°C

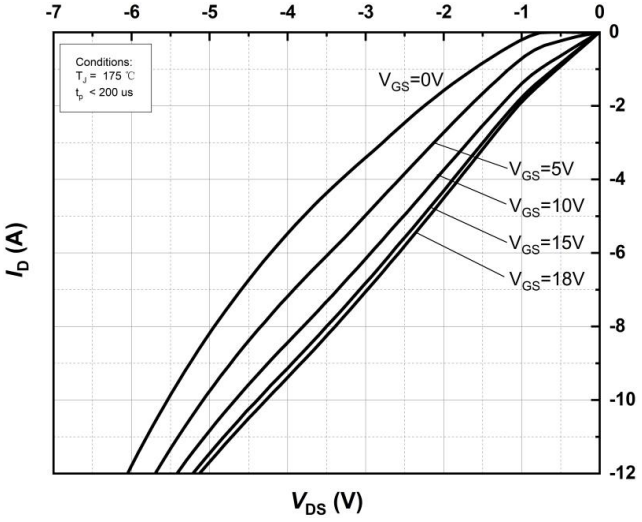


Figure 12. 3rd Quadrant Characteristic at Tj=175°C

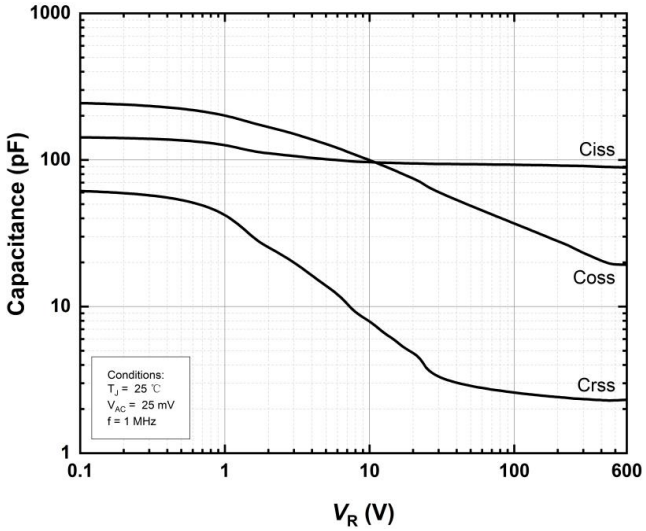


Figure 13. Capacitances vs. Drain-Source Voltage (0 – 600V)

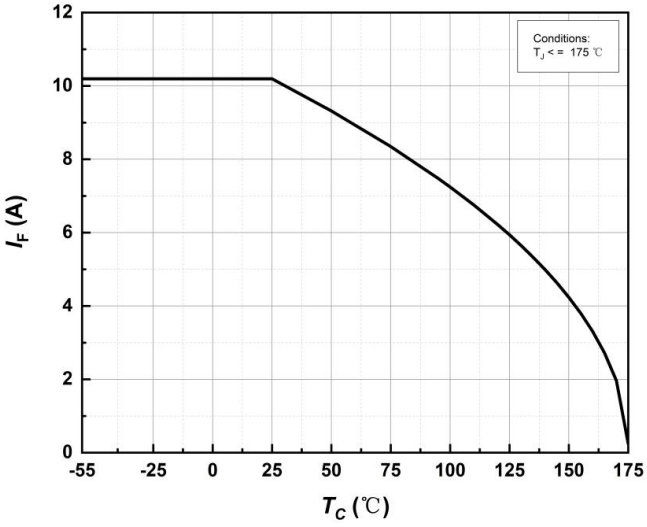


Figure 14. Continuous Drain Current Derating vs Case Temperature

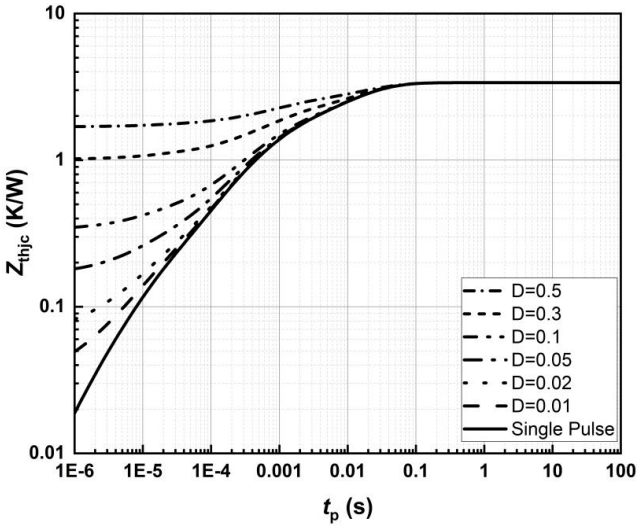


Figure 15.Transient Thermal Impedance (Junction – Case)

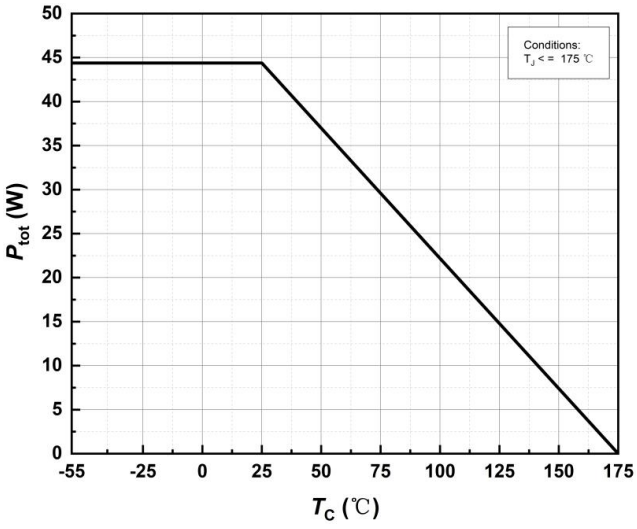


Figure 16. Maximum Power Dissipation Derating vs. Case Temperature

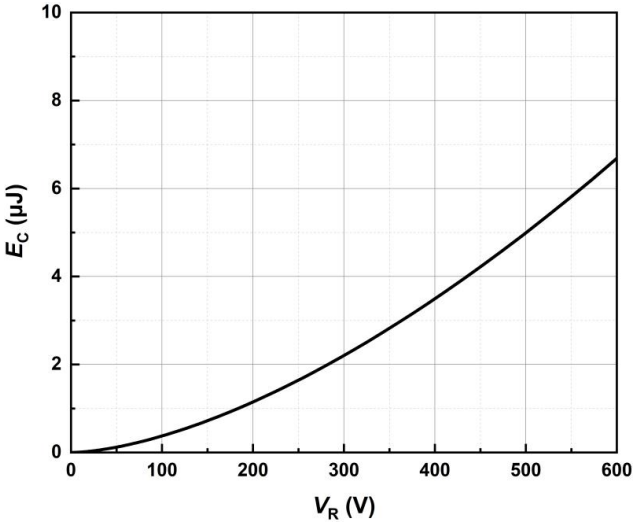


Figure 17. Output Capacitor Stored Energy

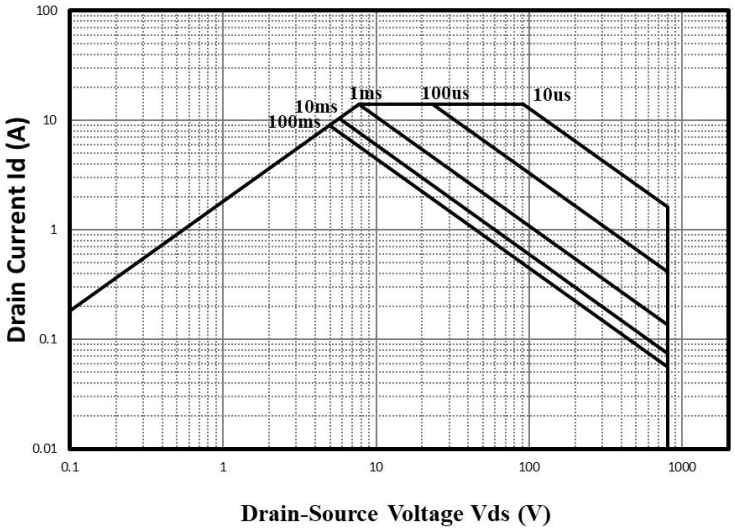
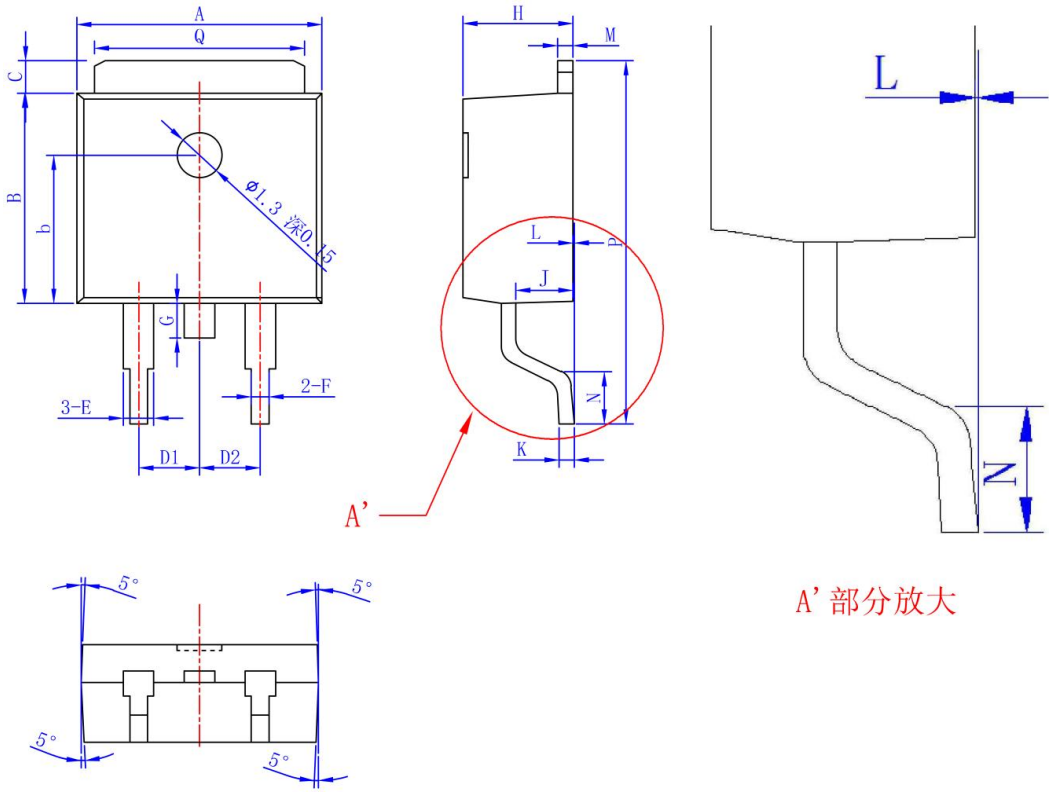


Figure 18. Safe Operating Area

Package Dimensions

Package TO-252-2L



SYMBOL	MM		
	MIN	NOM	MAX
*A	6.30	6.55	6.90
*B	5.90	6.10	6.30
b	4.10	4.30	4.50
C	0.90	1.00	1.10
*D1		2.29BSC	
*D2		2.29BSC	
*E	0.61	0.76	0.91
*F	0.50	0.60	0.70
G	0.60	0.80	1.00
*H	2.10	2.30	2.50
*J	0.90	1.00	1.10
*K	0.40	0.50	0.60
*L	0.00	0.05	0.127
*M	0.45	0.50	0.55
*N	1.39		1.77
*P	9.60	9.90	10.30
Q	5.10	5.30	5.50
带*为必须检验尺寸			

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