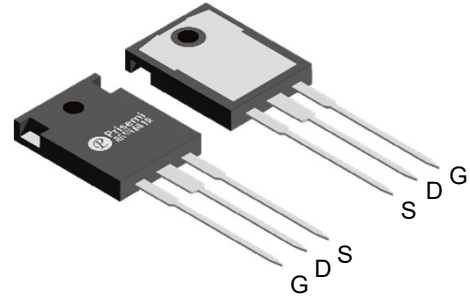


Description

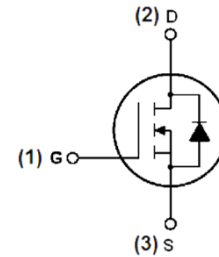
MOSFET Product Summary		
$V_{DS}(V)$	$R_{DS(on)}(m\Omega)$	$I_D(A)$
650	12@ $V_{GS} = 18V$	150


TO-247-3L (Top View)
Feature

- High Speed Switching with Low Capacitances
- High Blocking Voltage with Low $R_{DS(on)}$
- Easy to parallel and simple to drive
- ROHS Compliant, Halogen free

Applications

- EV motor drive
- High Voltage DC/DC Converters
- Switch Mode Power Supplies
- Solar inverters
- EV charging


Schematic diagram
Absolute maximum rating@25°C

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V_{DS}	650	V
Gate-Source Voltage	V_{GS}	-10/+22	V
Continuous Drain Current	I_D	$T_C=25^\circ C$	150
		$T_C=100^\circ C$	100
Pulsed Drain Current	I_{DM}	300	A
Power Dissipation	P_D	550	W
Operating Junction Temperature	T_J	-55 to +175	°C
Storage Temperature	T_{STG}	-55 to +175	°C

Thermal Resistance

Parameter	Symbol	Rating	Unit
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	0.28	°C/W
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	40	°C/W

Electrical characteristics per line@25°C (unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units
Statistic Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS} = 0V, I_D = 250\mu A$	650	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 650V, V_{GS} = 0V$	-	-	100	μA
Gate-Body Leakage Current	I_{GSS}	$V_{GS} = -10 \text{ to } 20V,$ $V_{DS} = 0V$	-	-	250	nA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 22mA$	2.0	3.0	4.0	V
Recommended turn-on Voltage	V_{GSon}	Static	-	18	-	V
Recommended turn-off Voltage	V_{GSoff}		-	-5.0	-	
Drain-Source On-State Resistance	$R_{DS(on)}$	$V_{GS} = 18V, I_D = 75A$	-	12	20	m Ω
		$V_{GS} = 18V, I_D = 75A$ $T_J = 175^\circ C$	-	16	-	
Dynamic Characteristics						
Input Capacitance	C_{iss}	$V_{DS} = 400V,$ $f = 1MHz, V_{AC} = 25mV$	-	7169	-	pF
Output Capacitance	C_{oss}		-	325	-	
Reverse Transfer Capacitance	C_{rss}		-	31	-	
Transconductance	g_{fs}	$V_{DS} = 20V, I_D = 50A$	-	42	-	S
C_{OSS} Stored Energy	E_{OSS}	$V_{DS} = 400V, f = 1MHz$	-	32	-	μJ
Turn-On Energy (Body Diode)	E_{on}	$V_{DS} = 400V, I_D = 50A$ $V_{GS} = -5/+20V,$ $L = 60\mu H, T_J = 175^\circ C$	-	1565	-	μJ
Turn-Off Energy (Body Diode)	E_{off}		-	800	-	
Turn-on Delay Time	$t_{d(on)}$	$V_{DS} = 400V, I_D = 50A$ $V_{GS} = -5/+20V,$ $R_{ext} = 5\Omega, L = 60\mu H$	-	25	-	ns
Turn-on Rise Time	t_r		-	136	-	
Turn-Off Delay Time	$t_{d(off)}$		-	63	-	
Turn-Off Fall Time	t_f		-	27	-	
Total Gate Charge	Q_g	$V_{DS} = 400V, I_D = 50A,$ $V_{GS} = -5/+20V$	-	236	-	nC
Gate-Source Charge	Q_{gs}		-	56	-	
Gate-Drain Charge	Q_{gd}		-	64	-	
Internal Gate Resistance	$R_{G(int)}$	$f = 1MHz, V_{AC} = 25mV$	-	3.5	-	Ω
Reverse Diode Characteristics						
Forward Voltage	V_{FSD}	$V_{GS} = 0V, I_F = 50A$	-	3.5	6.0	V
		$V_{GS} = 0V, I_F = 50A$ $T_J = 175^\circ C$	-	3.0	6.0	
Reverse Recovery Time	t_{rr}	$V_R = 400V, V_{GS} = -5V,$ $I_F = 50A, T_J = 175^\circ C$ $di/dt = 2400A/\mu s$	-	88	-	ns
Reverse Recovery Charge	Q_{rr}		-	680	-	nC
Peak Reverse Recovery Current	I_{mm}		-	17	-	A
Continuous Diode Forward Current	I_S	$V_{GS} = 0V$	-	80	-	A

Typical Characteristics

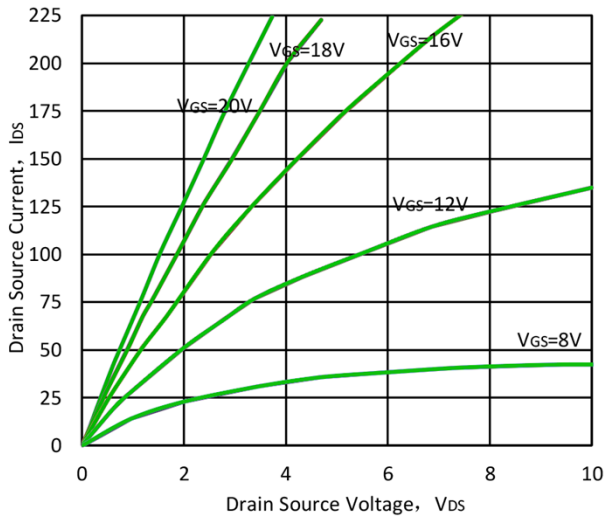


Fig1. Output characteristics ($T_J = 25\text{ }^\circ\text{C}$)

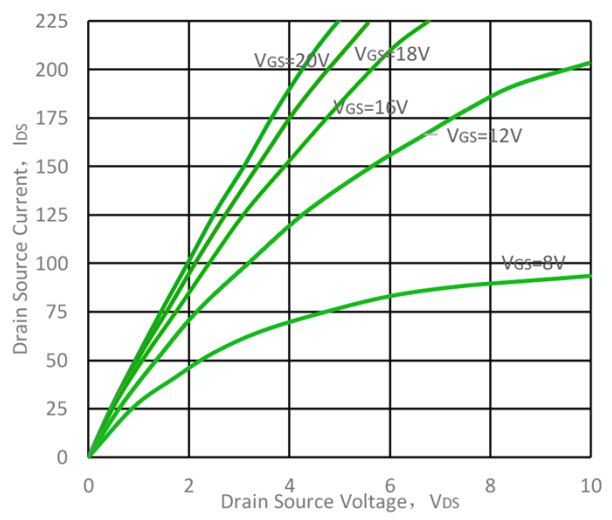


Fig2. Output characteristics ($T_J = 175\text{ }^\circ\text{C}$)

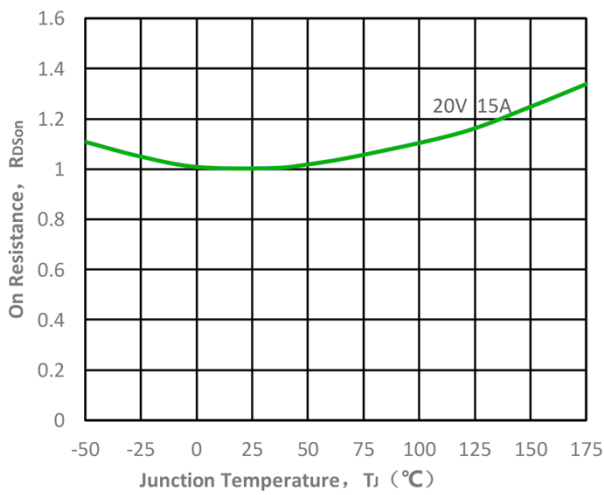


Fig3. Normalized On-Resistance vs. Temperature

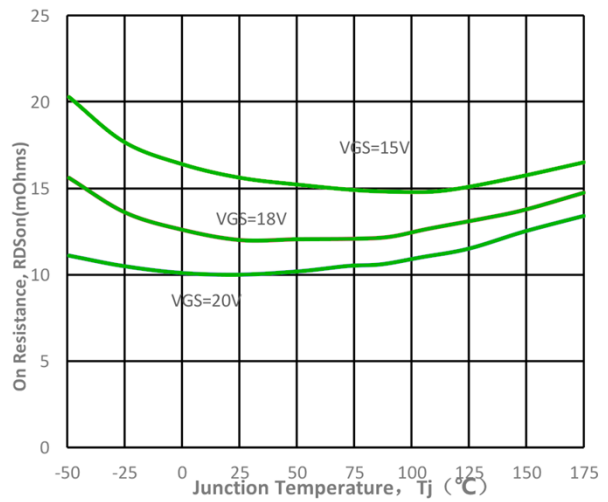


Fig4. On-Resistance vs. Temperature

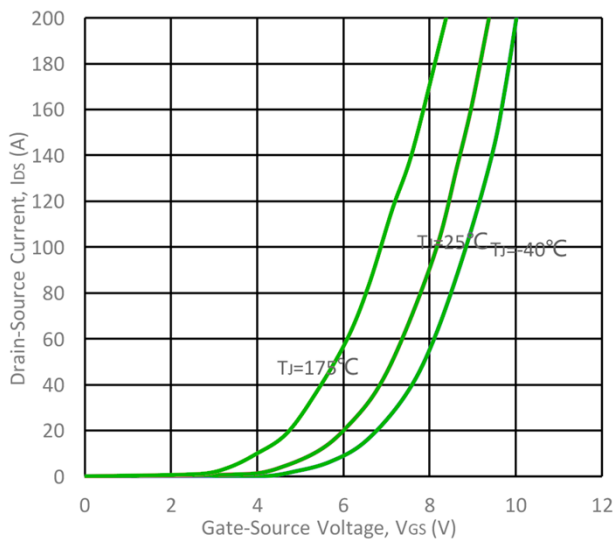


Fig5. Transfer Characteristic

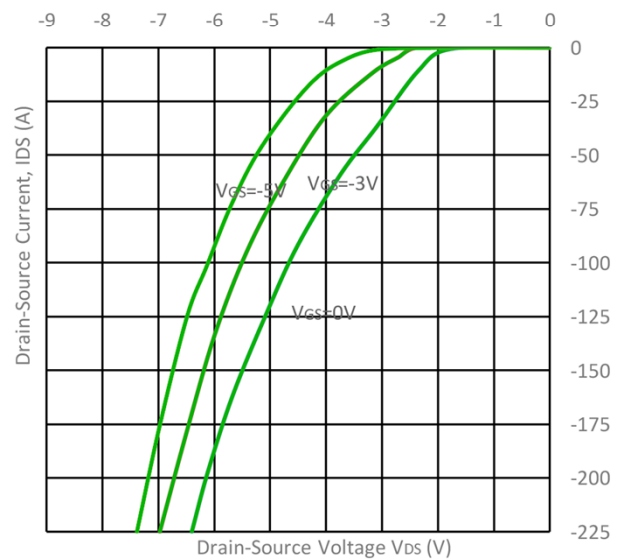


Fig6. Body Diode Characteristic at $25\text{ }^\circ\text{C}$

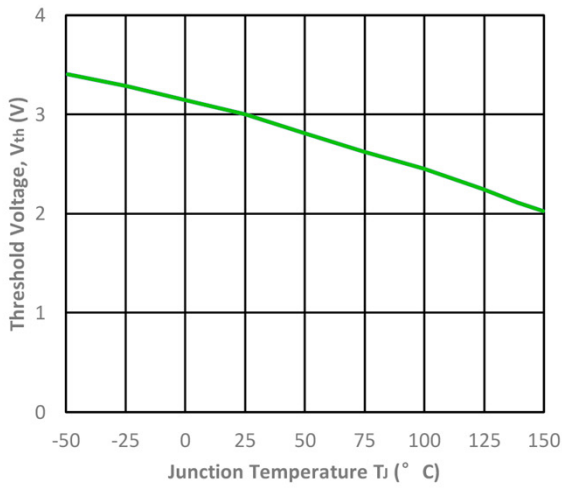


Fig7. Threshold Voltage vs. Temperature

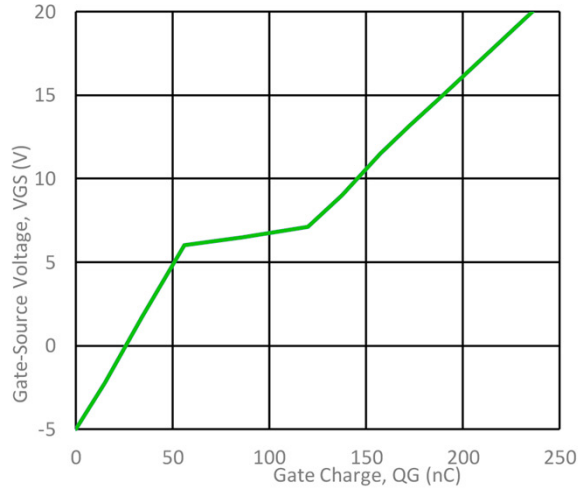


Fig8. Gate Charge Characteristics

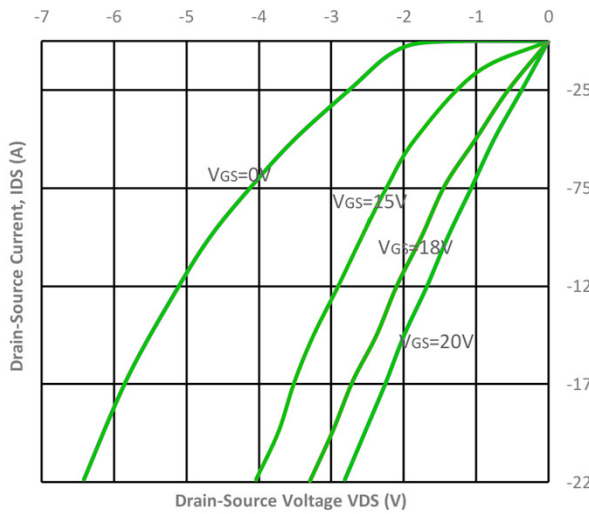


Fig9. 3rd Quadrant Characteristic at 25 °C

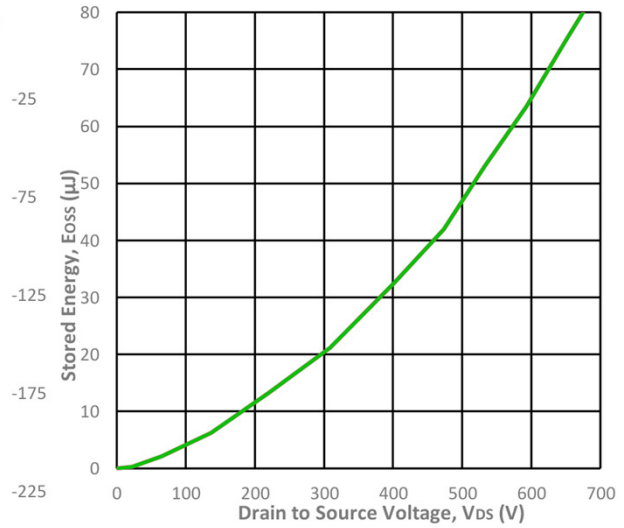


Fig10. Output Capacitor Stored Energy

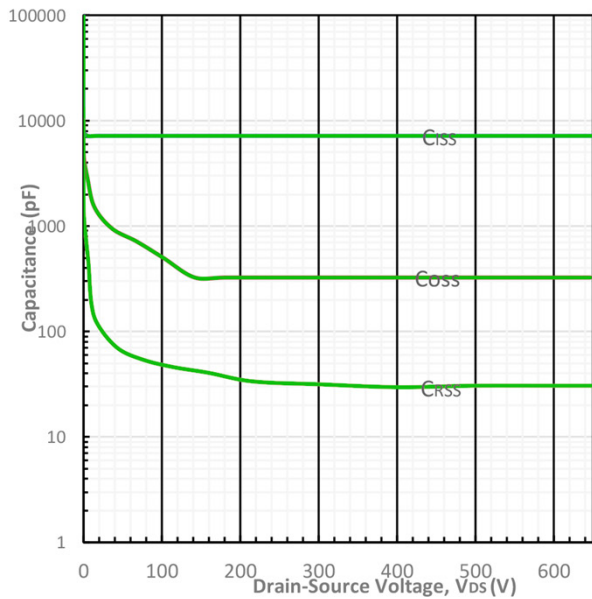


Fig11. Capacitances vs. Drain-Source

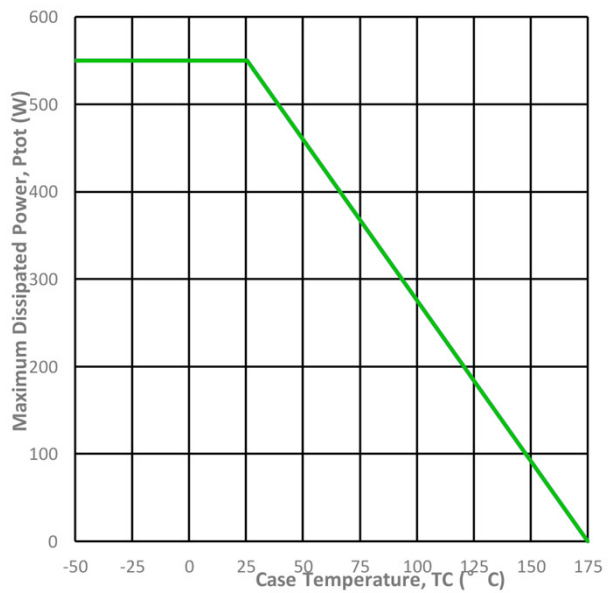


Fig12. Max Power Dissipation Derating Vs Tc

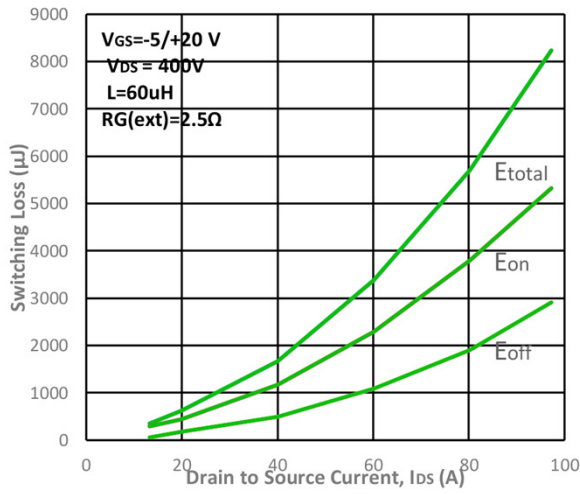


Fig13. Switching Energy vs. Drain Current

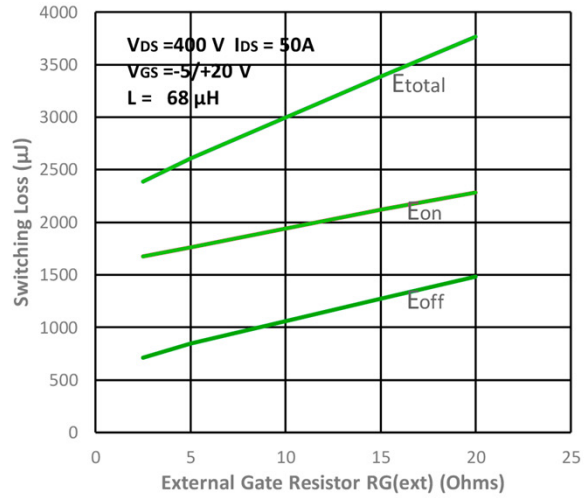


Fig14. Switching Energy vs. $R_{G(ext)}$

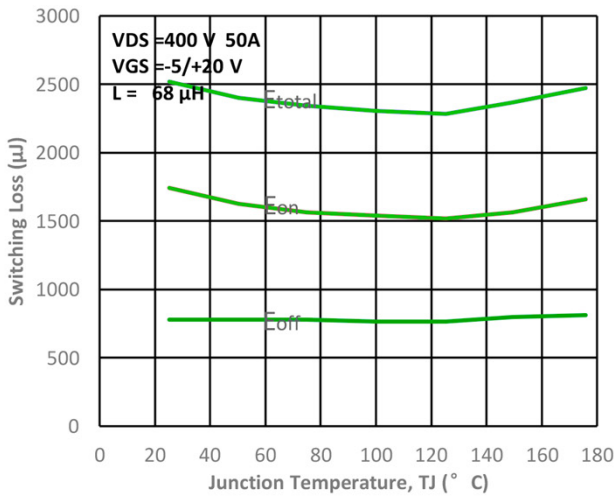


Fig15. Switching Energy vs. Temperature

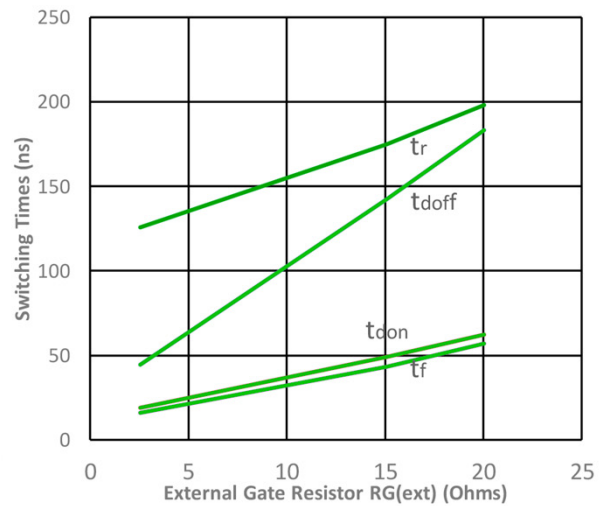


Fig16. Switching Times vs. $R_{G(ext)}$

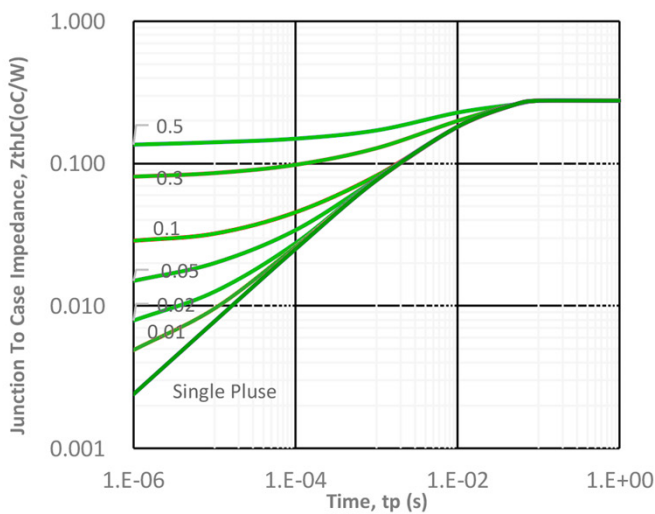


Fig17. Transient Thermal Impedance

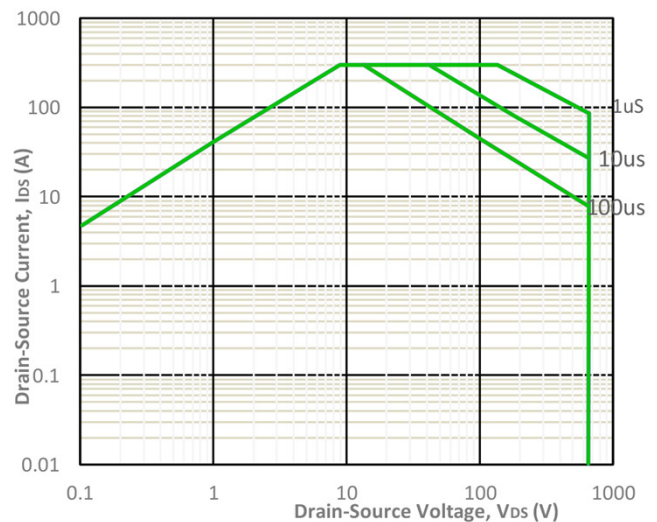
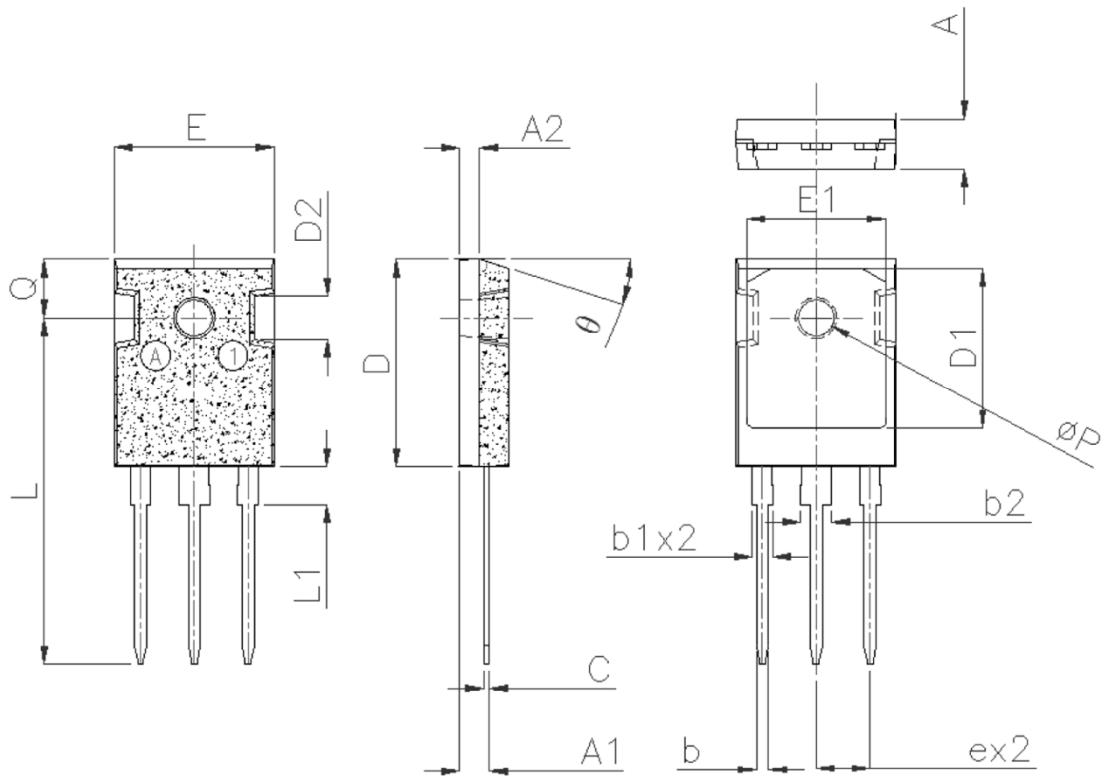



Fig18. Safe Operating Area

Product dimension (TO-247-3L)



Dim	Millimeters		Inches		Dim	Millimeters		Inches	
	Min	Max	Min	Max		Min	Max	Min	Max
A	4.80	5.20	0.189	0.205	e	5.44 BSC		0.214 BSC	
A1	2.85	3.15	0.112	0.124	E	15.95	16.35	0.628	0.644
b	1.16	1.27	0.046	0.050	E1	13.82	14.26	0.544	0.561
b1	2.03	2.10	0.080	0.083	L	34.65	35.45	1.364	1.396
b2	3.03	3.10	0.119	0.122	L1	-	3.86	-	0.152
C	0.55	0.65	0.022	0.026	Q	5.85	6.05	0.230	0.238
D	20.80	21.20	0.819	0.835	φP	3.45	3.75	0.136	0.148
D1	15.94	16.54	0.628	0.651	θ	17.5°		17.5°	
D2	4.30 BSC		0.169 BSC						


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