X600N65JMHE2

MOSFET

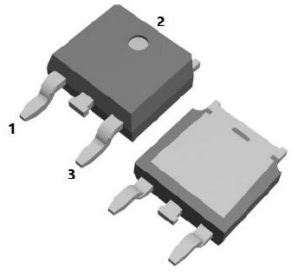
7A ,650V ,0.6Ω N-CHANNEL MOSFET

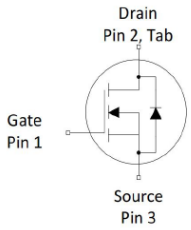
FEATURE

- Low gate charge
- Low Ciss
- Fast switching
- 100% avalanche tested
- Improved dv/dt capability
- RoHS 2.0 Compliant

View and Internal Schematic Diagram

TO-252-2L





Parameter	Values	Unit
BV_{dss}	650	V
I_D	7	A
R_{Dson}(max)	0.6	Ω
$V_{GS(th)}$(typ)	3	V

Ordering Code	Marking	Package	Packaging
X600N65JMHE2	X600N65JMHE2	TO-252-2L	Tape and Reel

Absolute Maximum Ratings(T_C=25℃,unless otherwise noted)

Parameter	Symbol	Values			Unit	Note/Test Conditions
		Min	Typ	Max		
Drain-Source Voltage	V_{DSS}	-	-	650	V	-
Gate-Source Voltage	V_{GS}	-20	-	20	V	-
Continuous Drain Current	I_D	-	-	7	A	T_C=25℃
		-	-	4.2	A	T_C=100℃
Pulsed Drain Current (Note 1)	I_{DM}	-	-	28	A	T_C=25℃, tp=100μs
Single Pulse Avalanche Energy	E_{AS}	-	-	52	mJ	L=10mH,V_D=50V, T_C=25℃
Maximum Power Dissipation	P_D	-	-	63	W	T_C=25℃
Reverse Diode dV/dt (Note 2)	dv/dt	-	-	15	V/ns	
Operating Junction and Storage Temperature Range	T_J,T_{STG}	-55	-	150	℃	-
Maximum lead temperature for soldering purposes, 1/8"from case for 5	T_L	-	-	260		

Thermal Characteristics

Parameter	Symbol	Values			Unit	Note/Test Conditions
		Min	Typ	Max		
Thermal resistance , Channel to Case	$R_{th(ch-c)}$	-	1.98	-	℃/W	-
Thermal resistance , Channel to Ambient	$R_{th(ch-A)}$	-	62.5	-	℃/W	-

Electrical Characteristics (T_J=25℃,unless otherwise noted)

Static characteristics

Parameter	Symbol	Values			Unit	Note/Test Conditions
		Min	Typ	Max		
Drain-Source Breakdown Voltage	BV_{DSS}	650	-	-	V	V_{GS}=0V,I_D=250μA
Zero Gate Voltage Drain Current	I_{DSS}	-	-	1	μA	V_{DS}=650V,V_{GS}=0V
Gate-Body Leakage Current,Forward	I_{GSSF}	-	-	100	nA	V_{GS}=20V,V_{DS}=0V
Gate-Body Leakage Current,Reverse	I_{GSSR}	-	-	-100	nA	V_{GS}=-20V,V_{DS}=0V
Gate-Source Threshold Voltage	$V_{GS(th)}$	2	-	4	V	V_{DS}=V_{GS},I_D=250μA
Drain-Source On-State Resistance	$R_{DS(on)}$	-	0.5	0.6	Ω	V_{GS}=10V,I_D=3.5A
Gate Resistance	R_g	-	13	-	Ω	V_{GS}=0V, V_{DS} Open, f=1MHz
Forward Transconductance	g_{fs}	-	3.3	-	S	V_{DS}=5V,I_D=3.5A

Dynamic characteristics

Parameter	Symbol	Values			Unit	Note/Test Conditions
		Min	Typ	Max		
Input Capacitance	C_{iss}	-	466	-	pF	V_{DS}=25V,V_{GS}=0V,f=1.0MHZ
Output Capacitance	C_{oss}	-	395	-		
Reverse Transfer Capacitance	C_{rss}	-	50	-		
Turn-On Delay Time	$t_{d(on)}$	-	12.4	-	ns	V_{DD}=325V,R_G=10Ω, V_{GS}=10V,R_L=150Ω
Turn-On Rise Time	t_r	-	2	-		
Turn-Off Delay Time	$t_{d(off)}$	-	56.4	-		
Turn-Off Fall Time	t_f	-	11.2	-		

Gate charge characteristics

Parameter	Symbol	Values			Unit	Note/Test Conditions
		Min	Typ	Max		
Total Gate Charge	Q_g	-	19.7	-	nC	V_{DS}=520V,I_D=7A,V_{GS}=10V
Gate-Source Charge	Q_{gs}	-	4.1	-		
Gate-Drain Charge	Q_{gd}	-	7	-		

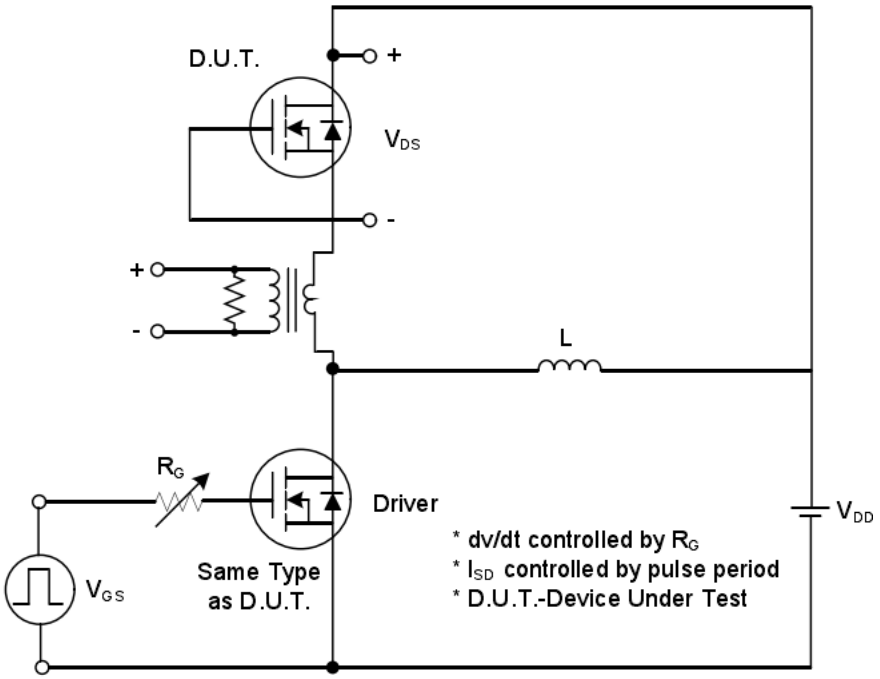
Reverse diode

Parameter	Symbol	Values			Unit	Note/Test Conditions
		Min	Typ	Max		
Continuous Diode Forward Current	I_S	-	-	7	A	-
Pulsed Diode Forward Current	I_{SM}	-	-	28	A	-
Diode Forward Voltage	V_{SD}	-	-	1.5	V	I_S=3.5A,V_{GS}=0V
Reverse Recovery Time	t_{rr}	-	151	-	ns	V_D=30V,I_F=1A,di/dt=100A/μs
Reverse Recovery Charge	Q_{rr}	-	565.7	-	nC	(Note 2)

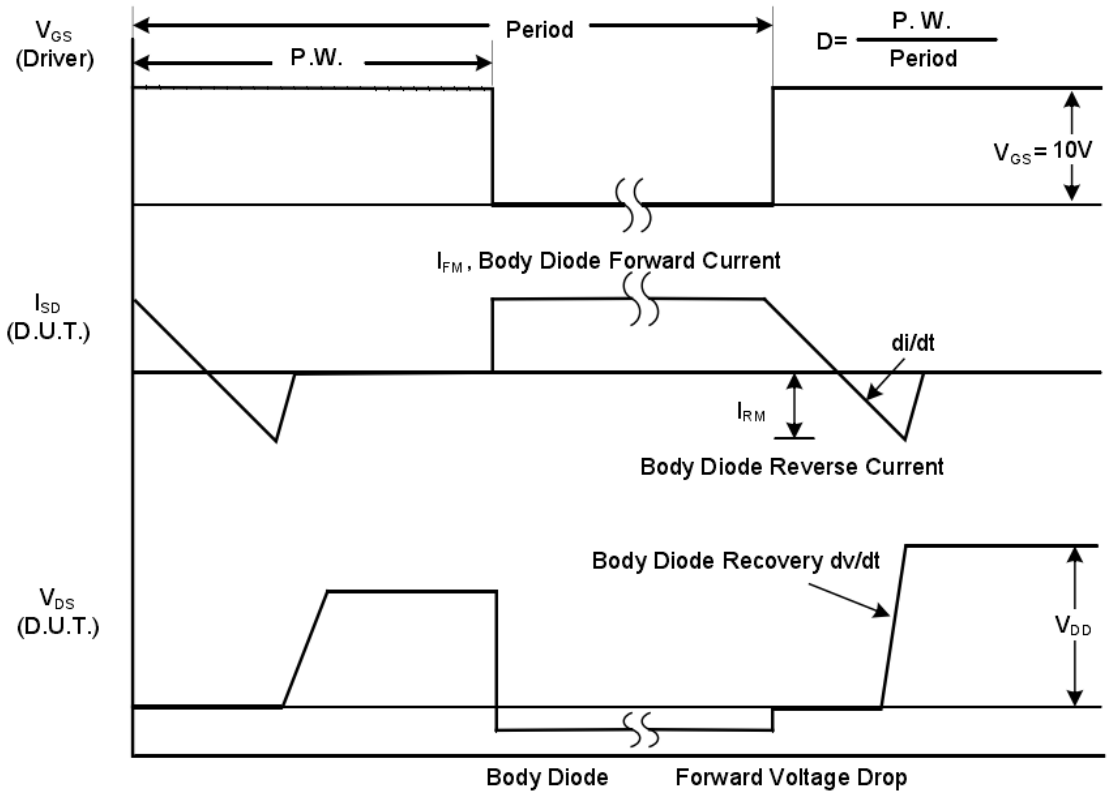
Notes

1. Repetitive Rating:pulse width limited by maximum junction temperature.
2. Pulse width≤300us,duty cycle≤2%.

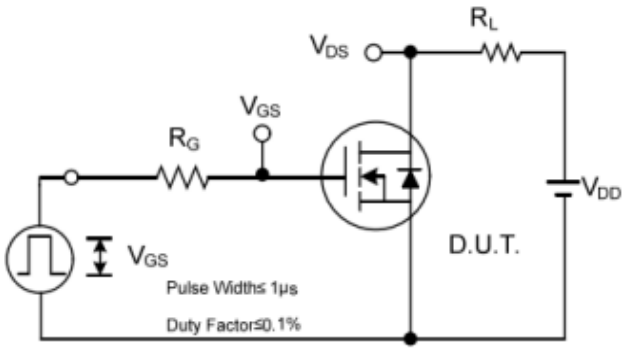
RATING AND CHARACTERISTIC CURVES



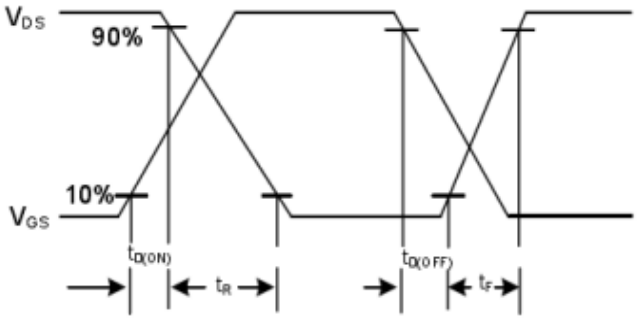
Peak Diode Recovery dv/dt Test Circuit



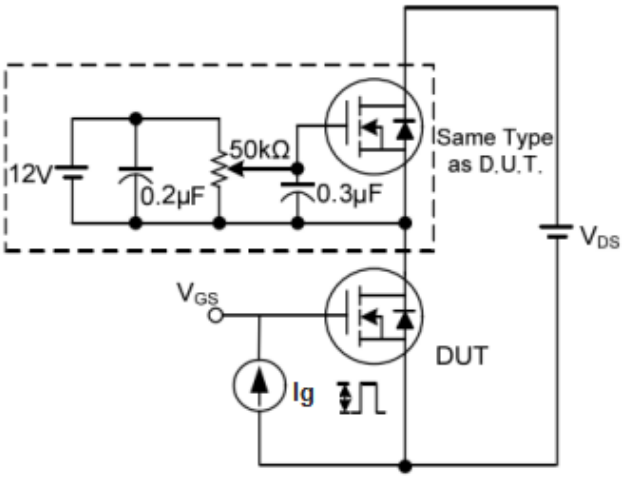
Peak Diode Recovery dv/dt Waveforms



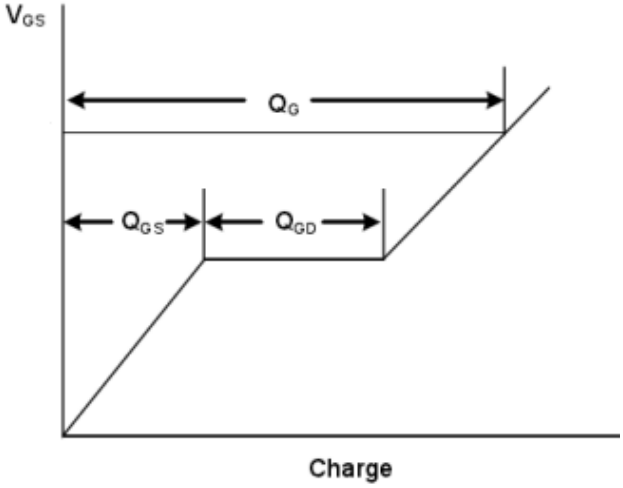
Switching Test Circuit



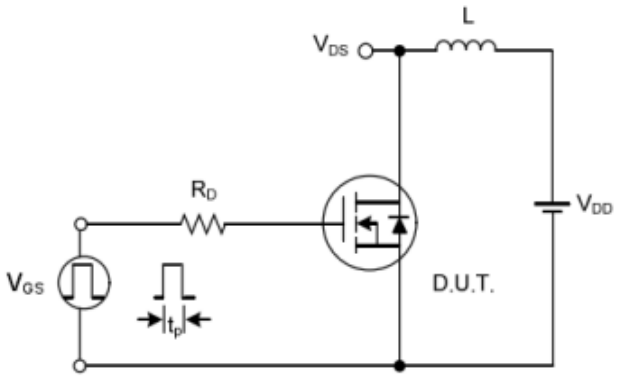
Switching Waveforms



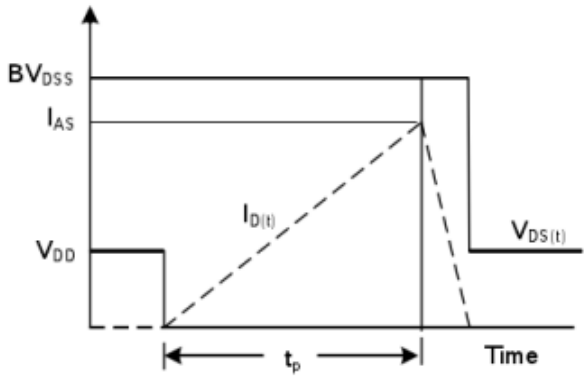
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

RATING AND CHARACTERISTIC CURVES

Figure.1 Typical Output Characteristics

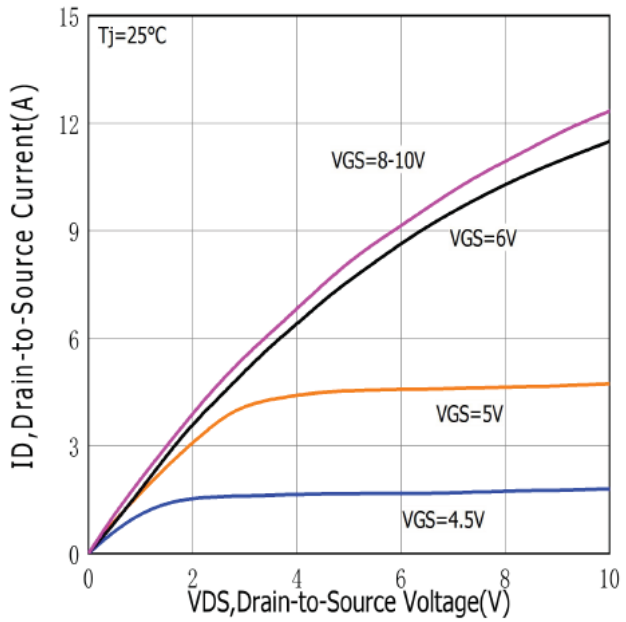


Figure.2 Typical Gate Charge vs Gate to Source Voltage

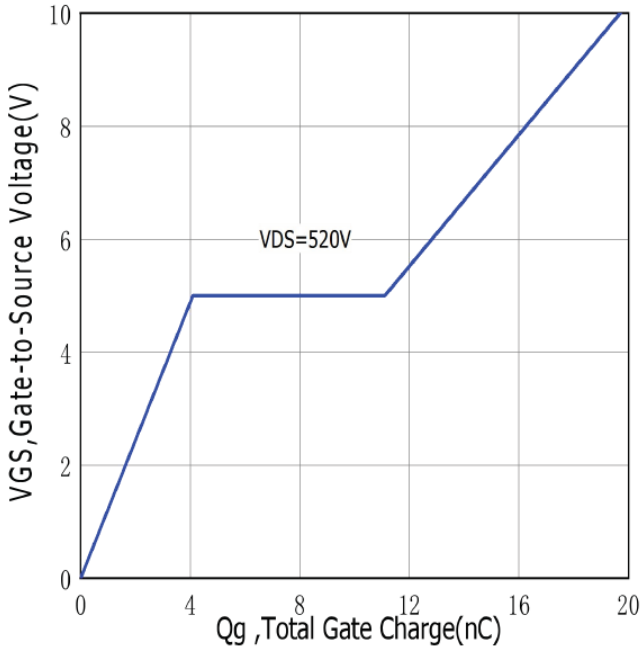


Figure.3 Typical Body Diode Transfer Characteristics

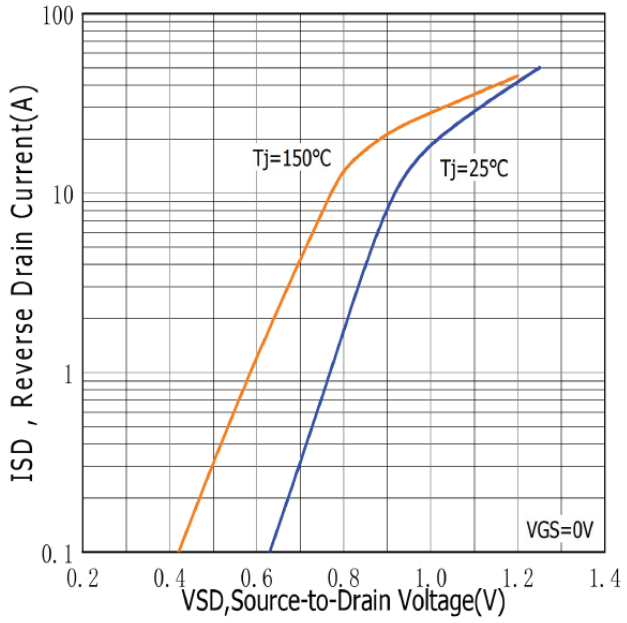


Figure.4 Typical Capacitance vs Drain to Source Voltage

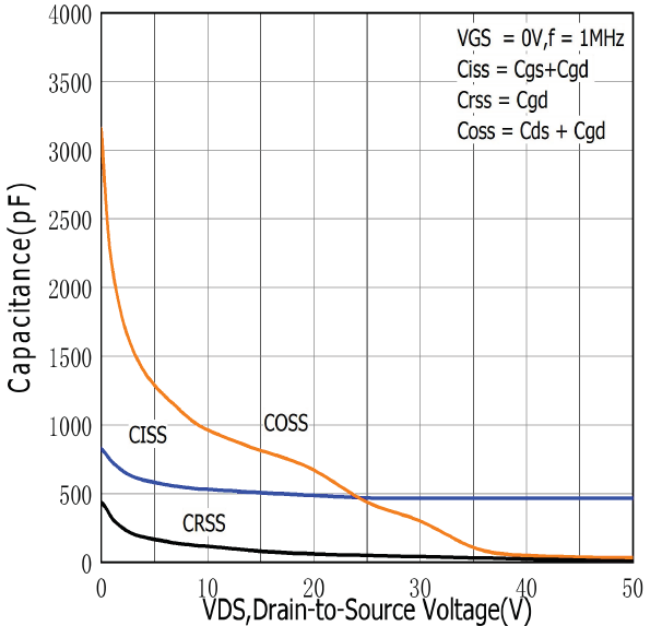


Figure.5 Typical Breakdown Voltage vs Junction Temperature

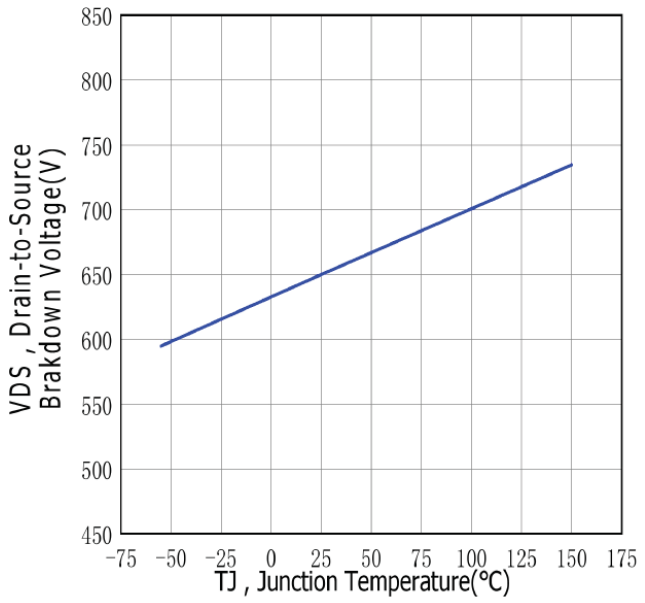


Figure.6 Typical Drain to Source on Resistance vs Junction Temperature

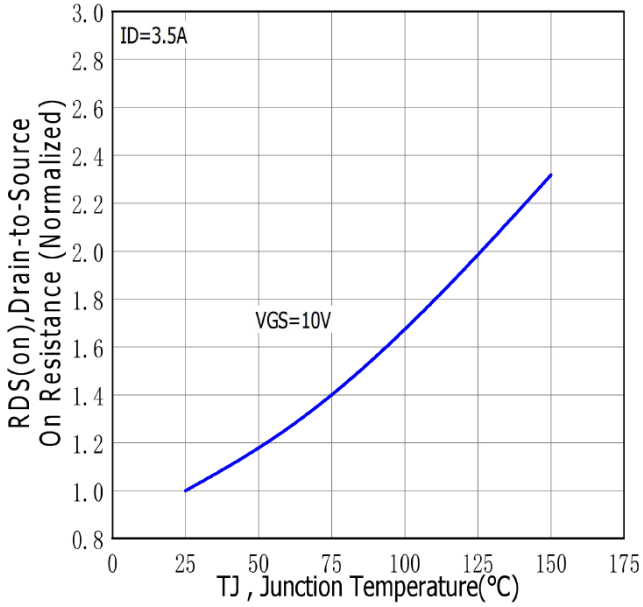


Figure.7 Maximum Forward Bias Safe Operating Area

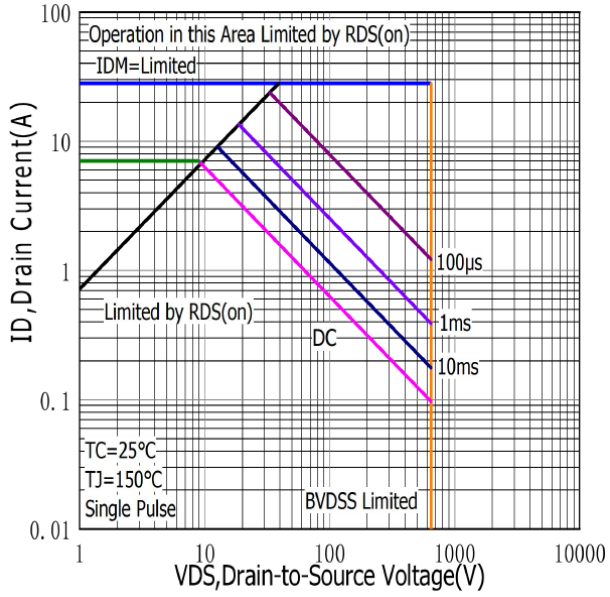


Figure.8 Typical Drain to Source ON Resistance vs Drain Current

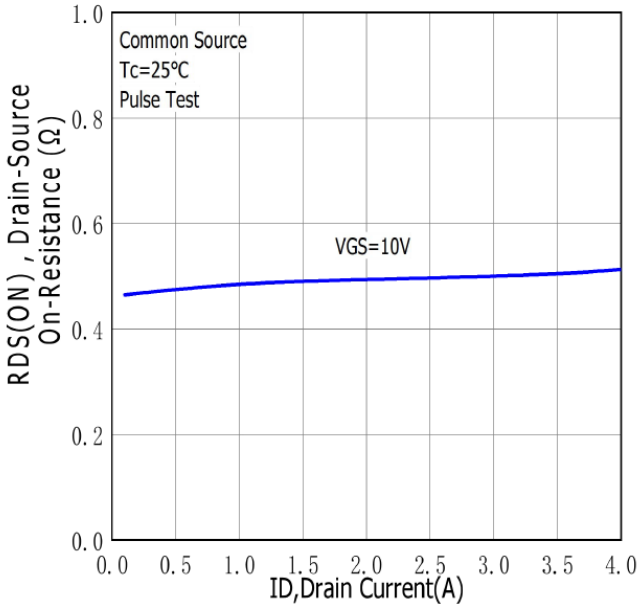


Figure.9 Maximum EAS vs Channel Temperature

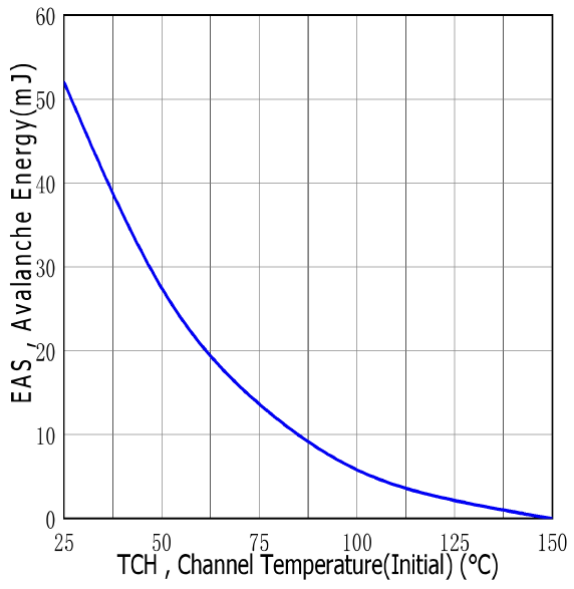


Figure.10 Typical Threshold Voltage vs Case Temperature

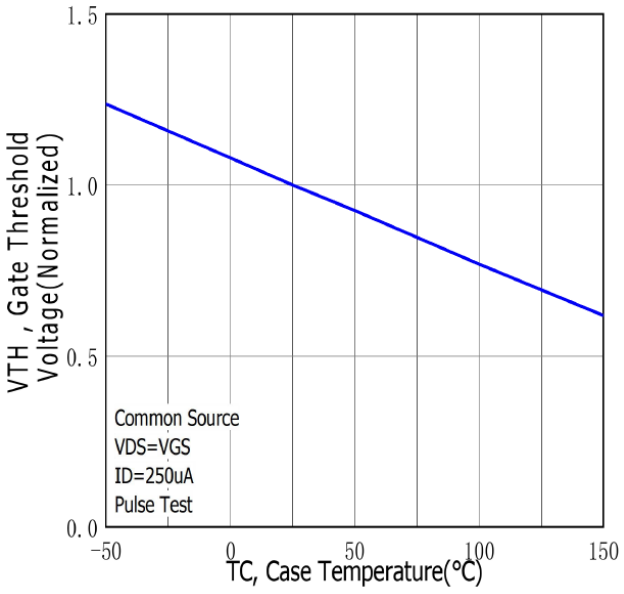


Figure.11 Typical Transfer Characteristics

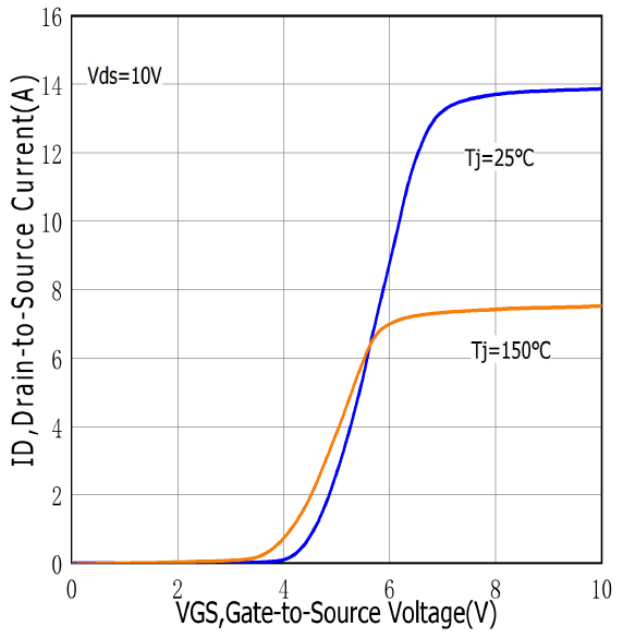


Figure.12 Maximum Power Dissipation vs Case Temperature

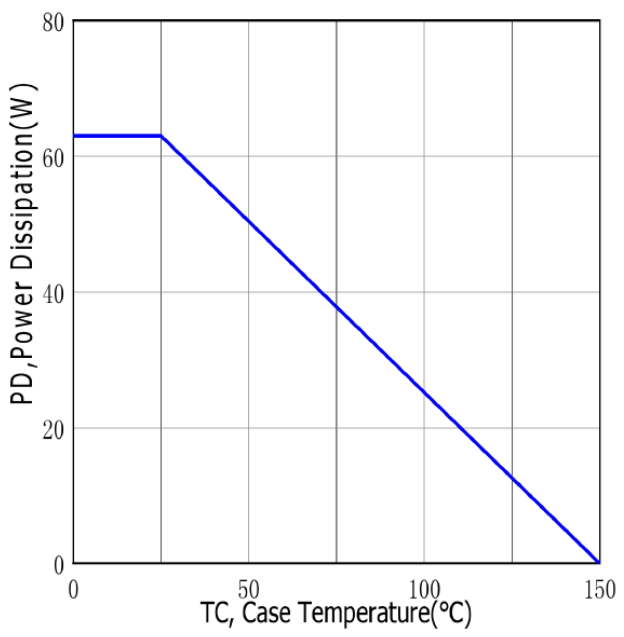
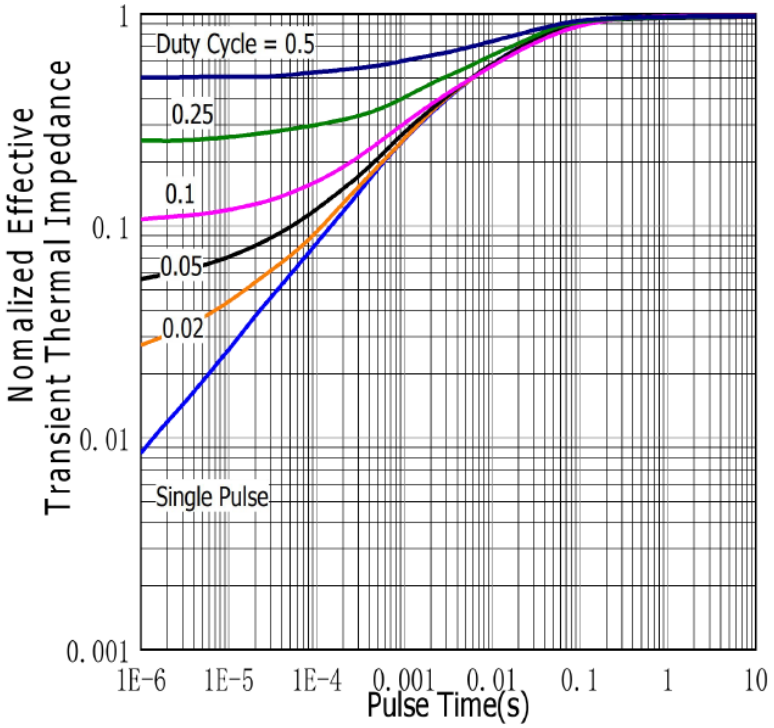
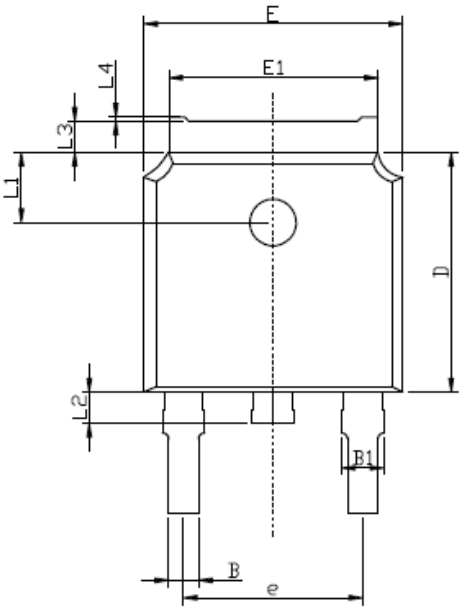
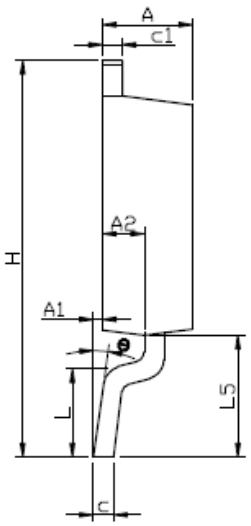


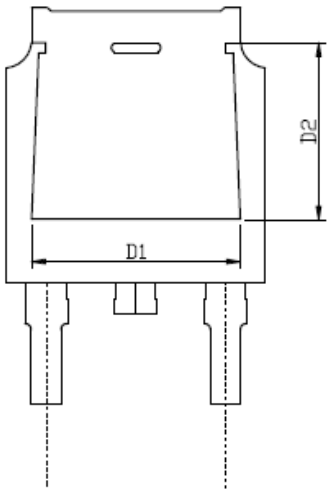
Figure.13 Maximum Drain Current vs. Case Temperature

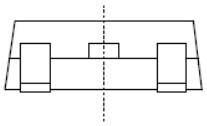


Package Outline: TO-252-2L

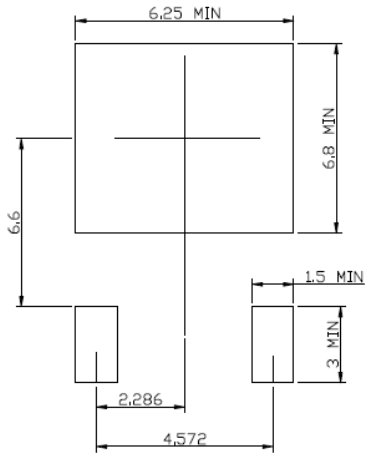








RECOMMENDED LAND PATTERN



UNIT: mm

	MIN	NOM	MAX
A	2.15	2.30	2.45
A1	0.05	0.10	0.20
A2	0.91	1.07	1.22
B	0.66	0.76	0.86
B1	0.93	1.08	1.23
C	0.40	0.50	0.60
C1	0.40	0.50	0.60
D	5.95	6.10	6.25
D1		4.8REF	
D2		3.8REF	
E	6.45	6.60	6.75
E1	5.12	5.32	5.52
L		1.65	
L1	1.58	1.78	1.98
L2	0.60	0.80	1.00
L3	0.70	0.85	1.00
L4	0.00	0.05	0.20
L5	2.80	3.10	3.40
H	9.80	10.10	10.40
θ	0°		8°
e		4.572REF	