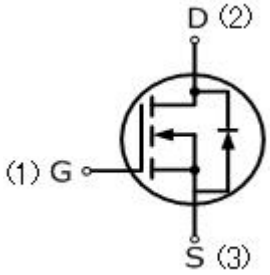
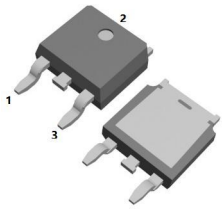
4N65(G,D)

4 Amps,650 Volts N-CHANNEL Power MOSFET

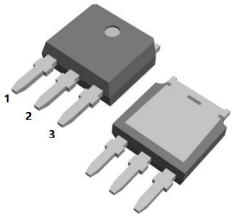
FEATURE

- 4A,650V,$R_{DS(ON)MAX}$=2.92 Ω @V_{GS}=10V/2A
- Low gate charge
- Low C_{iss}
- Fast switching
- 100% avalanche tested
- Improved dv/dt capability





TO-252-2L
4N65G



TO-251-3L
4N65D

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

Parameter	Symbol	4N65(G,D)	UNIT
Drain-Source Voltage	V_{DSS}	650	V
Gate-Source Voltage	V_{GS}	±30	
Continuous Drain Current	I_D	4	A
Pulsed Drain Current(Note1)	I_{DM}	16	
Single Pulse Avalanche Energy (Note 2)	E_{AS}	138	mJ
Reverse Diode dV/dt (Note 3)	dv/dt	5	V/ns
Operating Junction and Storage Temperature Range	T_J,T_{STG}	-55to+150	℃
Maximum lead temperature for soldering purposes, 1/8″from case for 5 seconds	T_L	260	℃

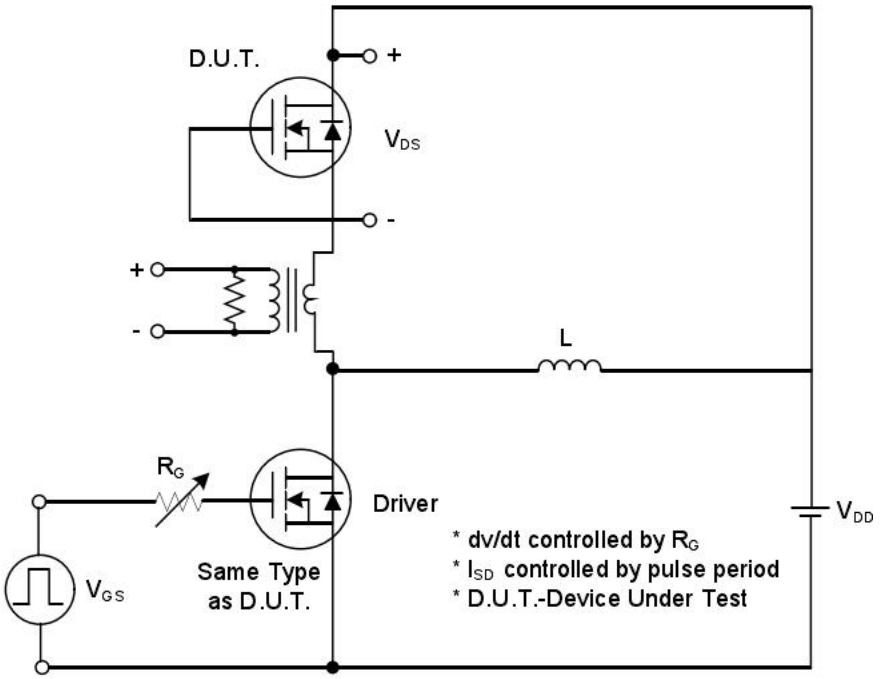
Parameter		Symbol	4N65(G,D)	Units
Thermal resistance , Channel to Case		$R_{th(ch-c)}$	1.67	℃/W
Maximum Power Dissipation	T_C=25℃	P_D	75	W

Electrical Characteristics (T_c=25℃,unless otherwise noted)						
Parameter	**Symbol**	**Test Conditions**	**Min**	**Typ**	**Max**	**Units**
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V,I_D=250uA	650	—	—	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=650V,V_{GS}=0V	—	—	1	uA
Gate-Body Leakage Current,Forward	I_{GSSF}	V_{GS}=30V,V_{DS}=0V	—	—	100	nA
Gate-Body Leakage Current,Reverse	I_{GSSR}	V_{GS}=-30V,V_{DS}=0V	—	—	-100	nA
On Characteristics						
Gate-Source Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS},I_D=250uA	2.0	—	4.0	V
Drain-Source On-State Resistance	$R_{DS(on)}$	V_{GS}=10V,I_D=2A	—	2.431	2.92	Ω
Dynamic Characteristics						
Input Capacitance	C_{iss}	V_{DS}=25V,V_{GS}=0V,	—	584	—	pF
Output Capacitance	C_{oss}	f=1.0MHZ	—	37	—	pF
Reverse Transfer Capacitance	C_{rss}		—	27	—	pF
Switching Characteristics						
Turn-On Delay Time	$t_{d(on)}$	V_{DD}=325V,I_D=4A,	—	10.4	—	ns
Turn-On Rise Time	t_r	R_G=10Ω	—	1.2	—	ns
Turn-Off Delay Time	$t_{d(off)}$		—	21.6	—	ns
Turn-Off Fall Time	t_f		—	4	—	ns
Total Gate Charge	Qg	V_{DS}=520V,I_D=4A,	—	12.8	—	nC
Gate-Source Charge	Qgs	V_{GS}=10V	—	5.6	—	nC
Gate-Drain Charge	Qgd		—	2.6	—	nC
Drain-Source Body Diode Charcteristics and Maximum Ratings						
Continuous Diode Forward Current	I_S		—	—	4	A
Pulsed Diode Forward Current	I_{SM}		—	—	16	A
Diode Forward Voltage	V_{SD}	I_S=2A,V_{GS}=0V	—	—	1.2	V
Reverse Recovery Time	t_{rr}	V_{DS}=30V,I_F=1A,	—	125	—	ns
Reverse Recovery Charge	Q_{rr}	dI_F/dt=100A/us,(Note3)	—	262	—	nC

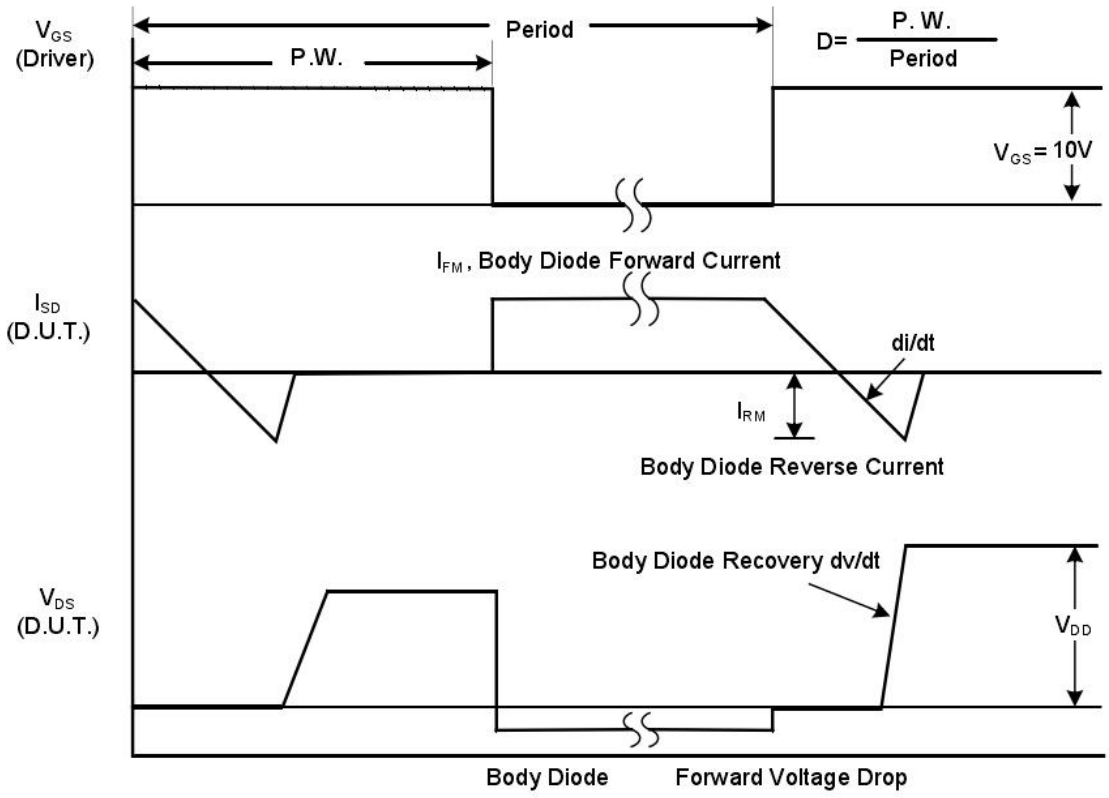
Notes

1. Repetitive Rating:pulse width limited by maximum junction temperature.
2. V_{DD}=50V,L=10mH,R_g=25Ω, starling T_J=25℃.
3. Pulse width≤300us;duty cycle≤2%.

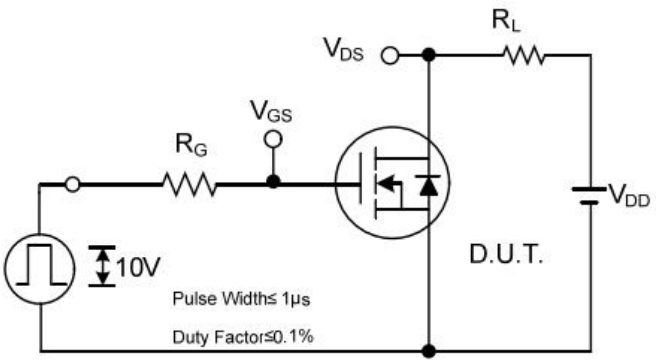
RATINGAND CHARACTERISTIC CURVES



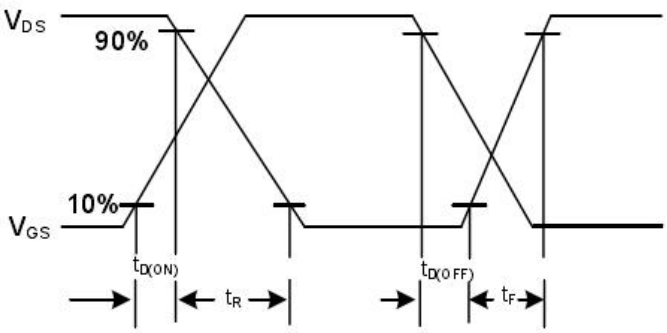
Peak Diode Recovery dv/dt Test Circuit



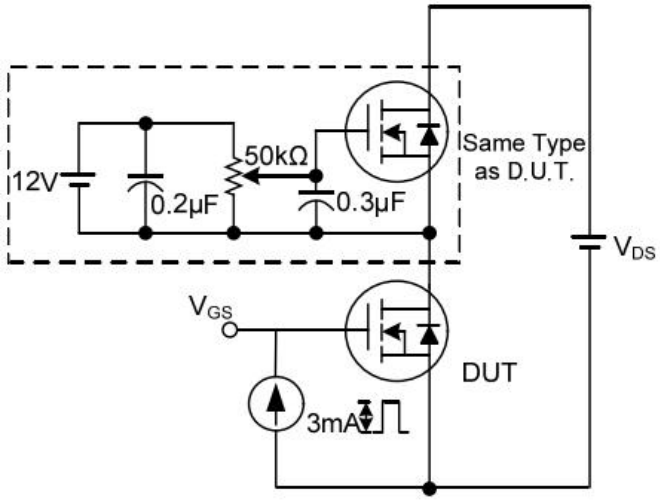
Peak Diode Recovery dv/dt Waveforms



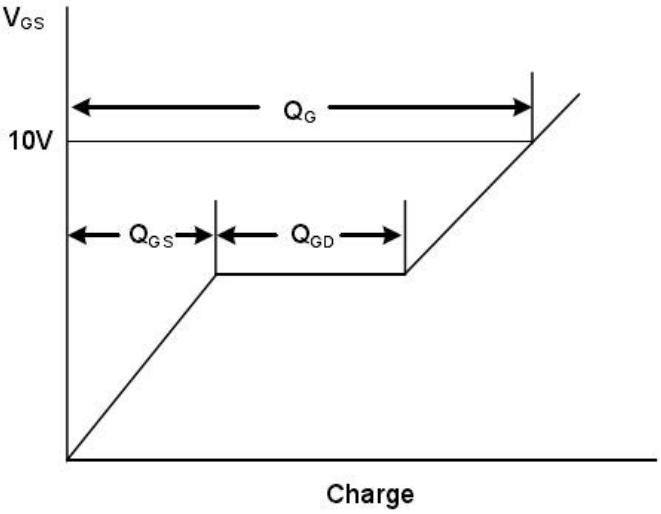
Switching Test Circuit



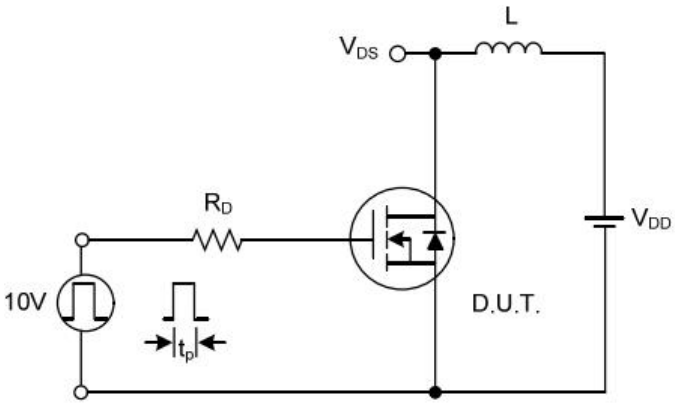
Switching Waveforms



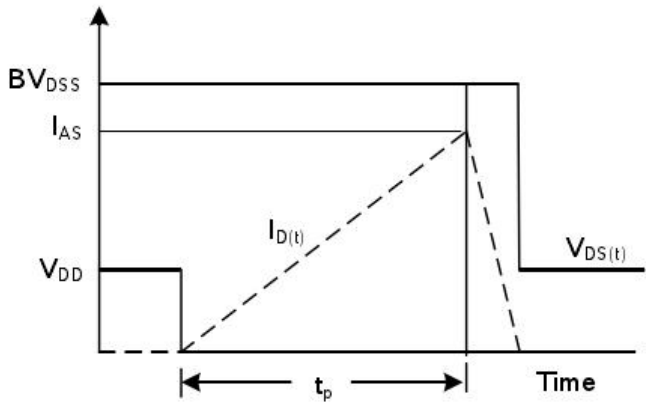
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

RATINGAND CHARACTERISTIC CURVES

Figure.1 Typical Output Characteristics

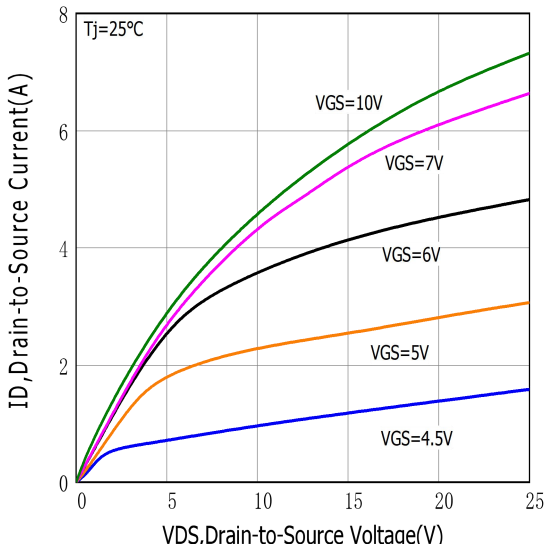


Figure.2 Typical Gate Charge vs Gate to Source Voltage

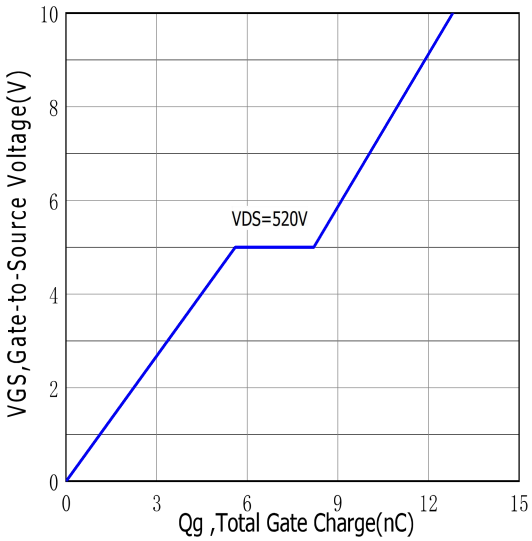


Figure.3 Typical Body Diode Transfer Characteristics

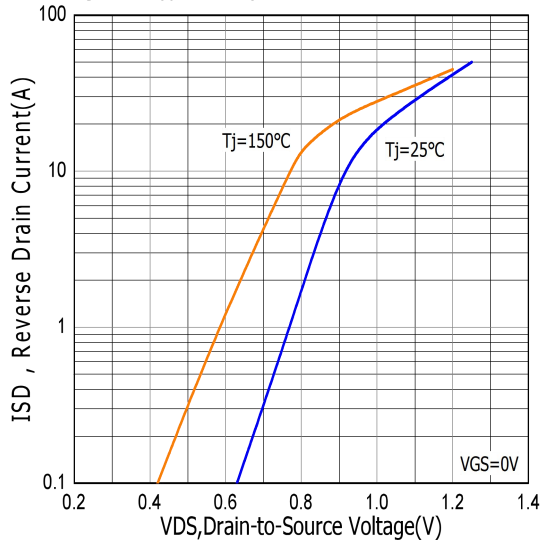


Figure.4 Typical Capacitance vs Drain to Source Voltage

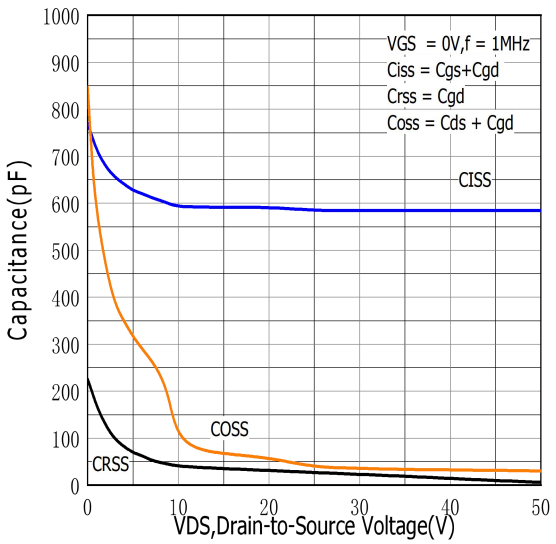


Figure.5 Typical Breakdown Voltage vs Junction Temperature

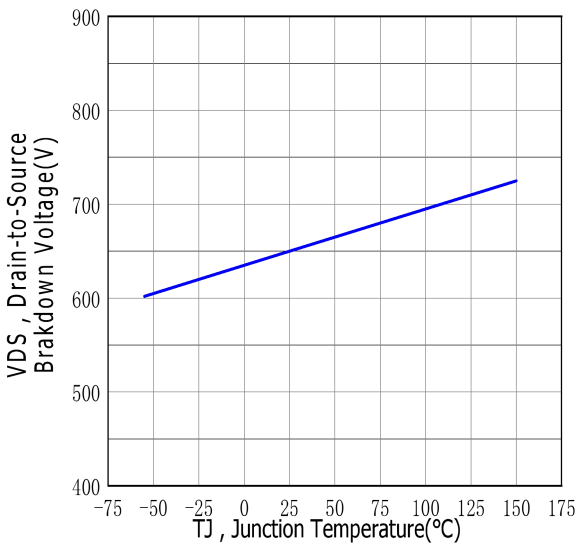


Figure.6 Typical Drian to Source on Resistance vs Junction Temperature

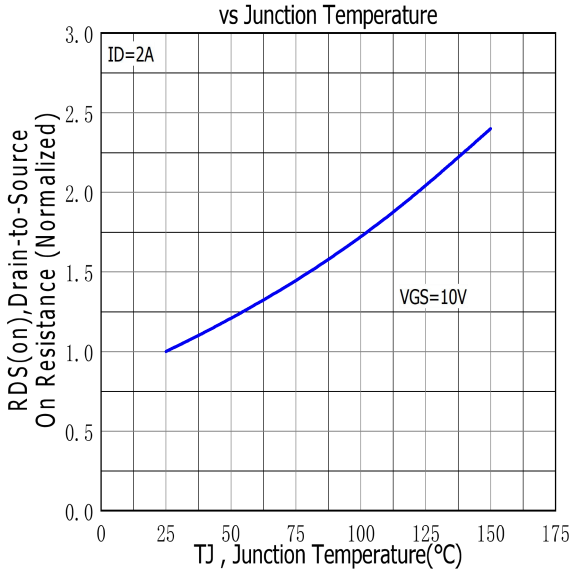


Figure.7 Maximum Forward Bias Safe Operating Area

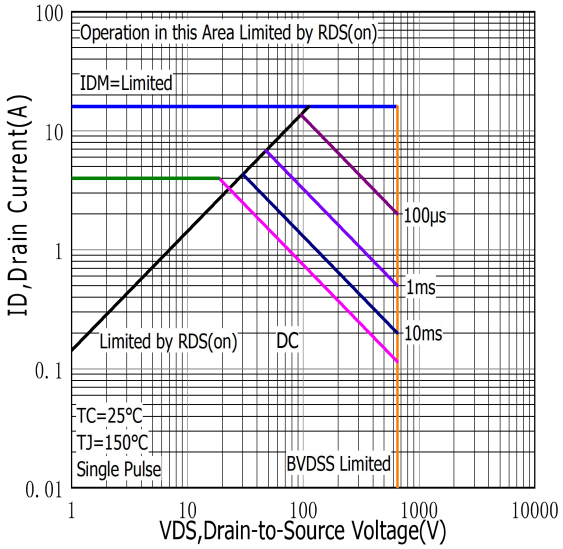


Figure.8 Typical Drain to Source ON Resistance vs Drain Current

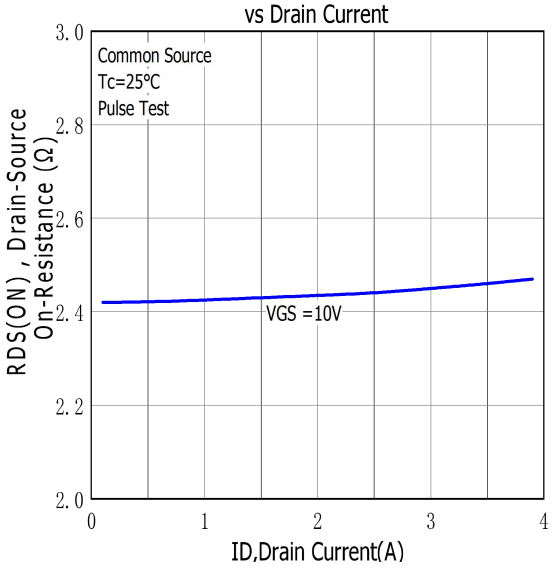


Figure.9 Maximum EAS vs Channel Temperature

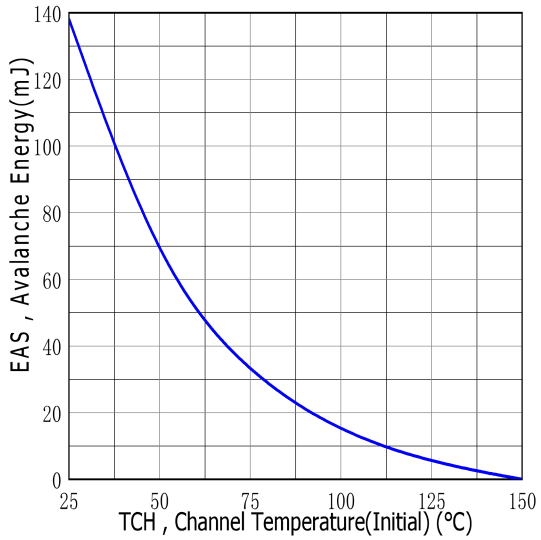


Figure.10 Typical Threshold Voltage vs Case Temperature

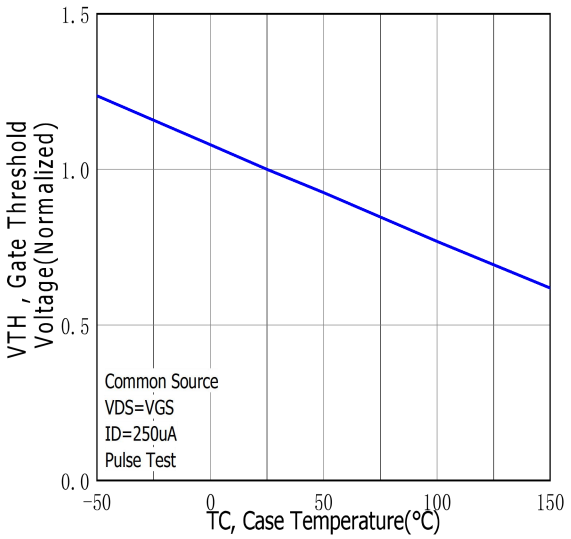


Figure.11 Maximum Effective Thermal Impedance , Junction to Case

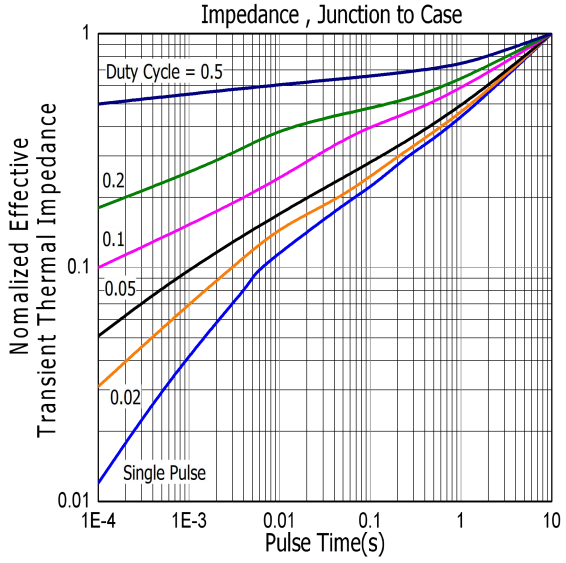
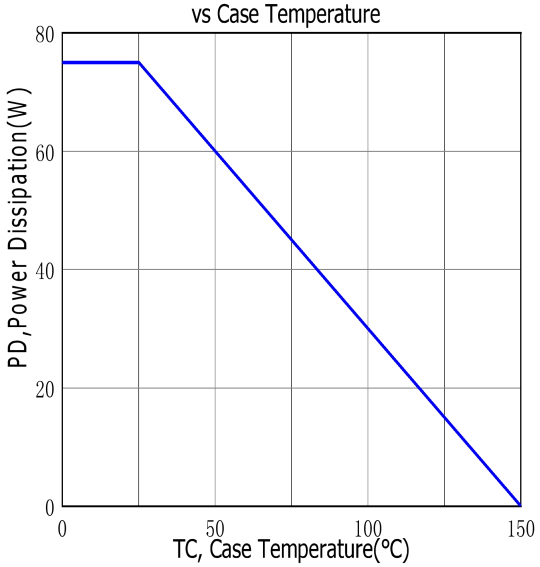


Figure.12 Maximum Power Dissipation vs Case Temperature



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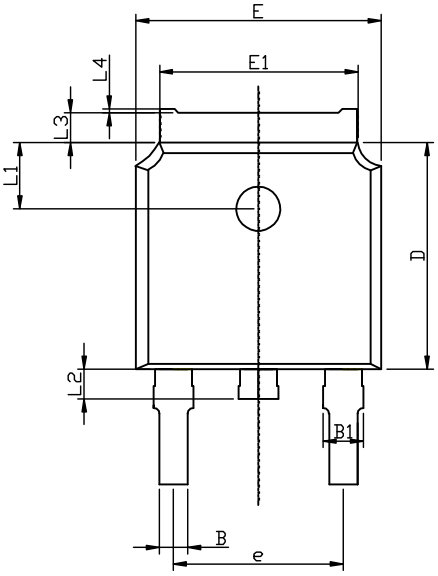
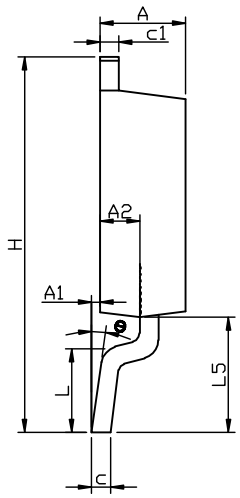
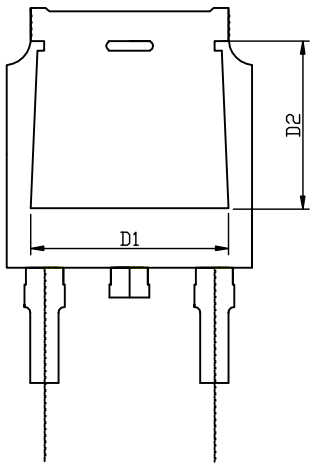
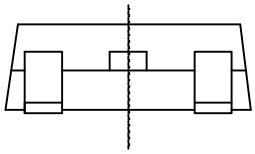
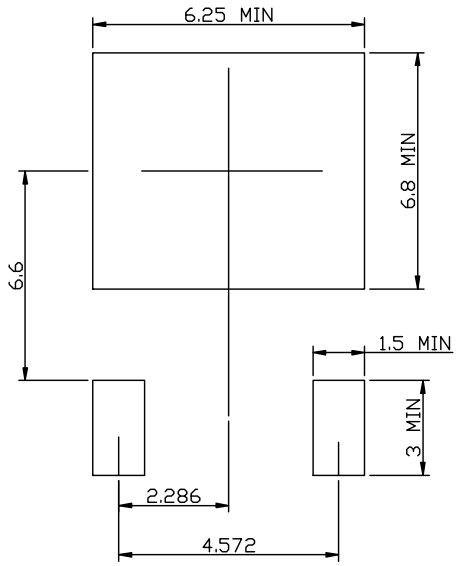








RECOMMENDED LAND PATTERN



	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	

UNIT: mm

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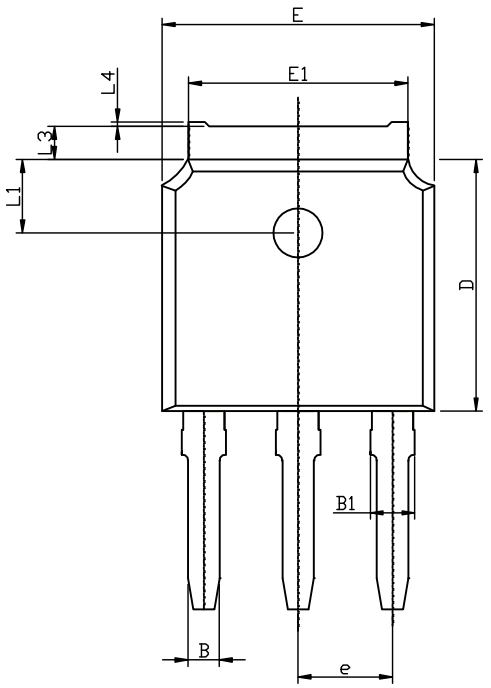
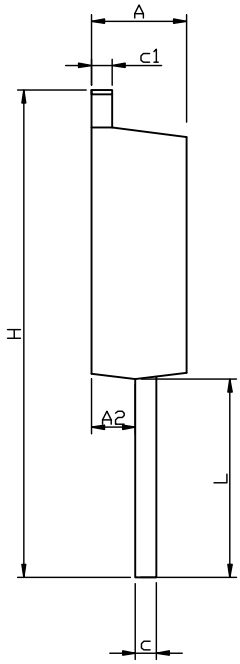
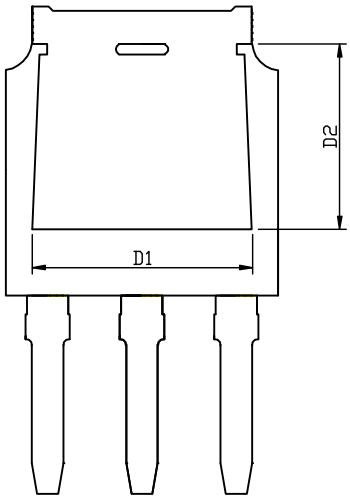
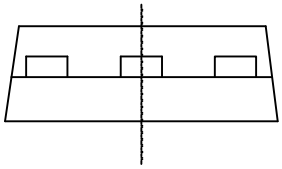
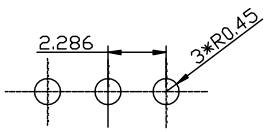








RECOMMENDED LAND PATTERN



UNIT: mm

	MIN	NOM	MAX
A	2.15	2.30	2.45
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	4.50	4.80	5.10
L1	1.58	1.78	1.98
L3	0.70	0.85	1.00
L4	0.00	0.05	0.20
H	11.50	11.80	12.10
e		2.286REF	