Electrical Characteristics (T_C = 25 °C unless otherwise noted)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
Off Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS} = 0V, I_D = 250uA	30	-	-	V
$\Delta BV_{DSS}/\Delta T_J$	Breakdown Voltage Temperature coefficient	I_D = 250uA, referenced to 25 °C	-	0.02	-	V/°C
I_{DSS}	Drain-Source Leakage Current	V_{DS} = 30V, V_{GS} = 0V	-	-	1	uA
		V_{DS} = 24V, T_C = 125 °C	-	-	10	uA
I_{GSS}	Gate-Source Leakage, Forward	V_{GS} = 20V, V_{DS} = 0V	-	-	100	nA
	Gate-Source Leakage, Reverse	V_{GS} = -20V, V_{DS} = 0V	-	-	-100	nA
On Characteristics						
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = 250uA	1.0	-	3.0	V
$R_{DS(ON)}$	Static Drain-Source On-state Resistance	V_{GS} = 10 V, I_D = 24A V_{GS} = 5 V, I_D = 24A	- -	0.0116 0.0146	0.0135 0.0190	Ω
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{GS} =0 V, V_{DS} =25V, f = 1MHz	-	1010	1320	pF
C_{oss}	Output Capacitance		-	450	585	
C_{rss}	Reverse Transfer Capacitance		-	130	170	
Dynamic Characteristics						
$t_{d(on)}$	Turn-on Delay Time	V_{DD} =15V, I_D =30A, R_G =50Ω ※ **see fig. 13.** (Note 4, 5)	-	20	50	ns
t_r	Rise Time		-	55	120	
$t_{d(off)}$	Turn-off Delay Time		-	50	110	
t_f	Fall Time		-	75	160	
Q_g	Total Gate Charge	V_{DS} =24V, V_{GS} =5V, I_D =60A ※ **see fig. 12.** (Note 4, 5)	-	21.5	28	nC
Q_{gs}	Gate-Source Charge		-	3.6	-	
Q_{gd}	Gate-Drain Charge(Miller Charge)		-	10.7	-	

Source-Drain Diode Ratings and Characteristics

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit.
I_S	Continuous Source Current	Integral Reverse p-n Junction Diode in the MOSFET	-	-	48	A
I_{SM}	Pulsed Source Current		-	-	192	
V_{SD}	Diode Forward Voltage	I_S =48A, V_{GS} =0V	-	-	1.5	V
t_{rr}	Reverse Recovery Time	I_S=60A,V_{GS}=0V,dI_F/dt=100A/us	-	40	-	ns
Q_{rr}	Reverse Recovery Charge		-	35	-	nC

※ NOTES

1. Repeativity rating : pulse width limited by junction temperature
2. L = 115uH, I_{AS} =48A, V_{DD} = 15V, R_G = 0Ω , Starting T_J = 25°C
3. ISD ≤ 60A, di/dt ≤ 300A/us, V_{DD} ≤ BV_{DSS}, Starting T_J = 25°C
4. Pulse Test : Pulse Width ≤ 300us, Duty Cycle ≤ 2%
5. Essentially independent of operating temperature.

Fig 1. On-State Characteristics

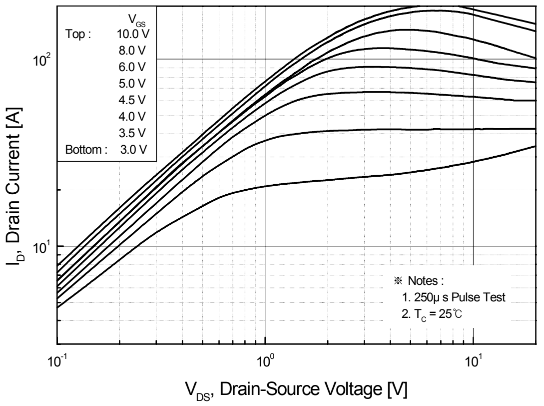


Fig 2. Transfer Characteristics

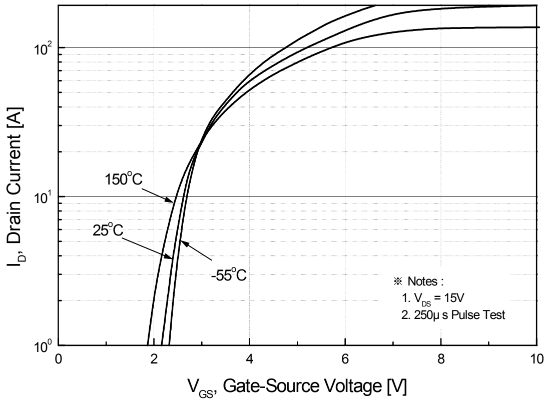


Fig 3. On Resistance Variation vs. Drain Current and Gate Voltage

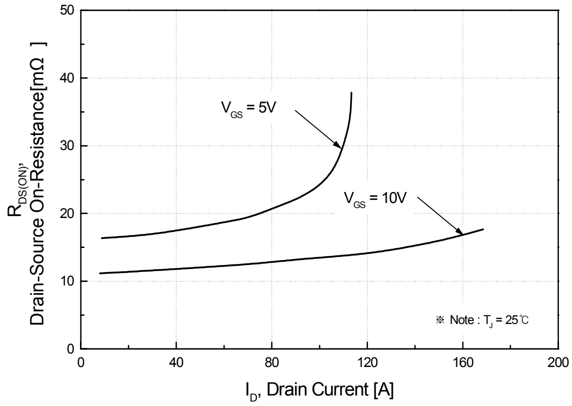


Fig 4. On State Current vs. Allowable Case Temperature

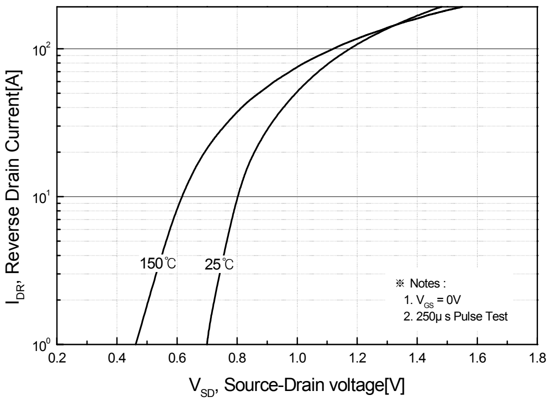


Fig 5. Capacitance Characteristics

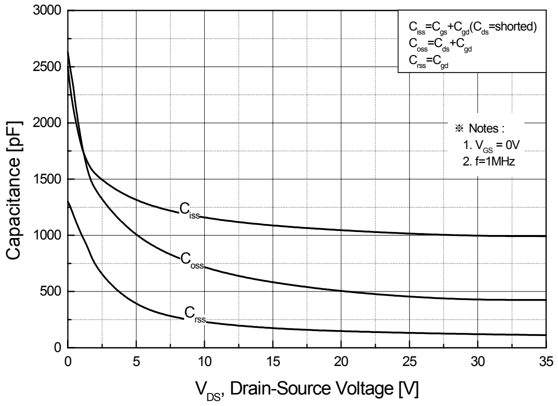


Fig 6. Gate Charge Characteristics

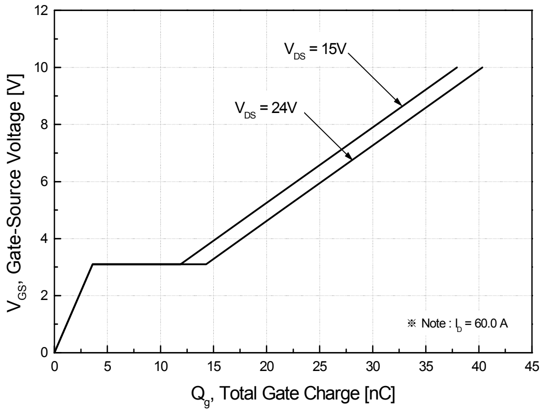


Fig 7. Breakdown Volatage Variation vs. Junction Temperature

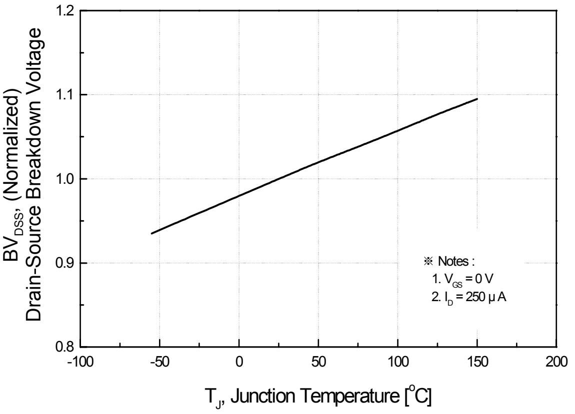


Fig 8. On-Resistance Variation vs. Junction Temperature

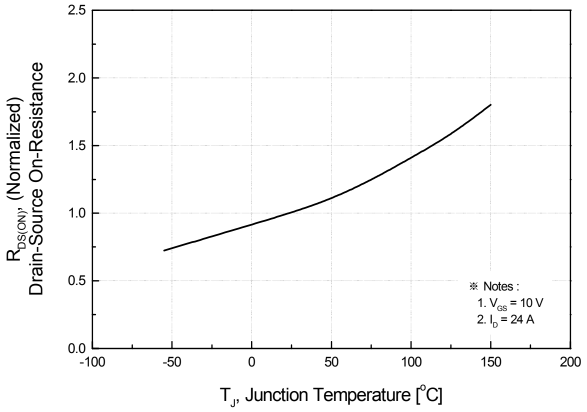


Fig 9. Maximum Safe Operating Area

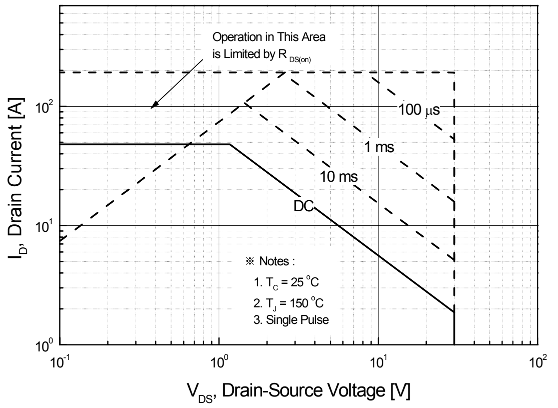


Fig 10. Maximum Drain Current vs. Case Temperature

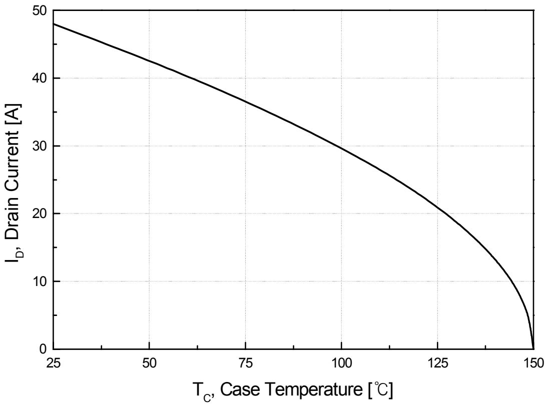


Fig 11. Transient Thermal Response Curve

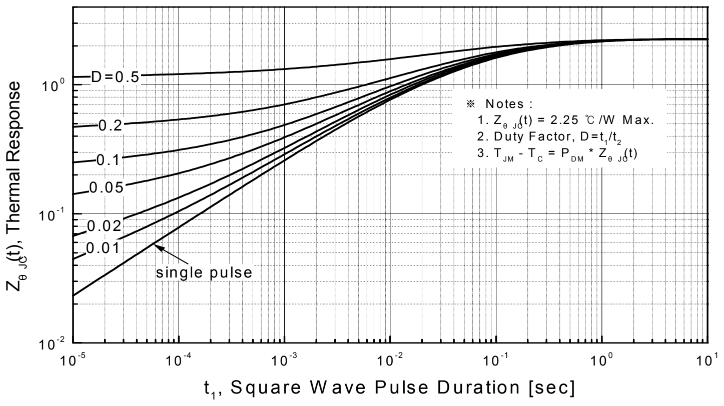


Fig. 12. Gate Charge Test Circuit & Waveforms

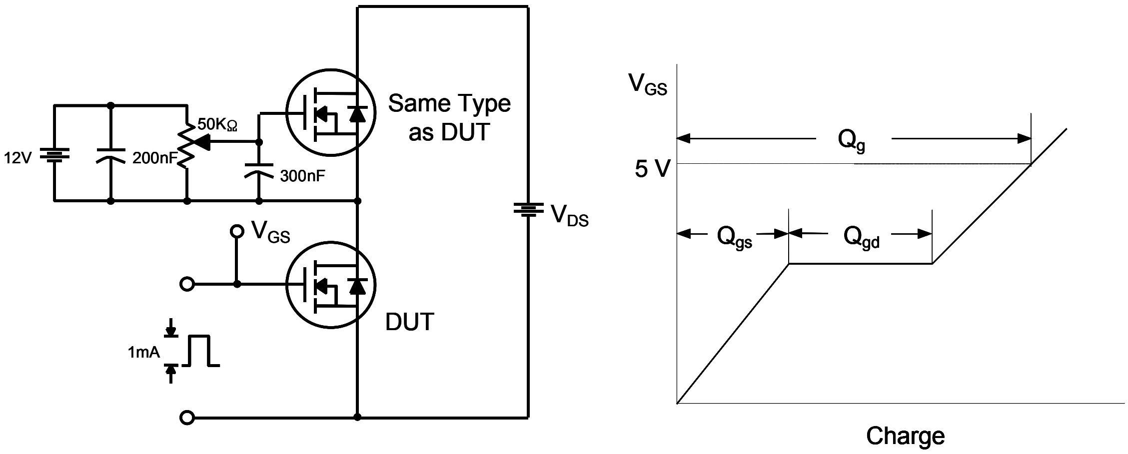


Fig 13. Switching Time Test Circuit & Waveforms

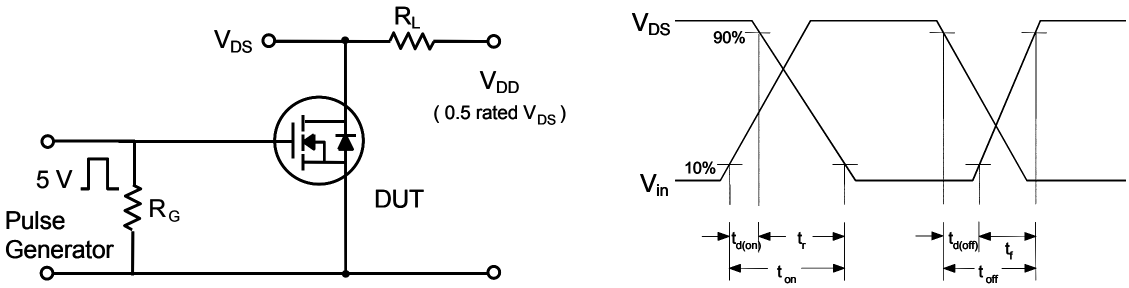


Fig 14. Unclamped Inductive Switching Test Circuit & Waveforms

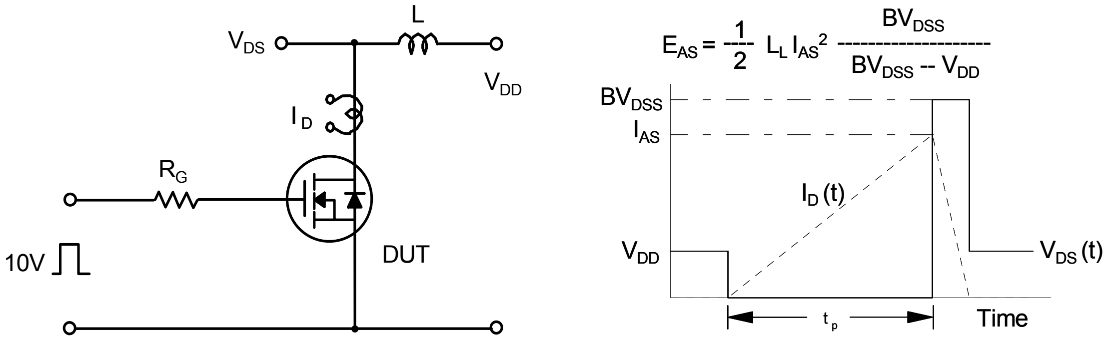
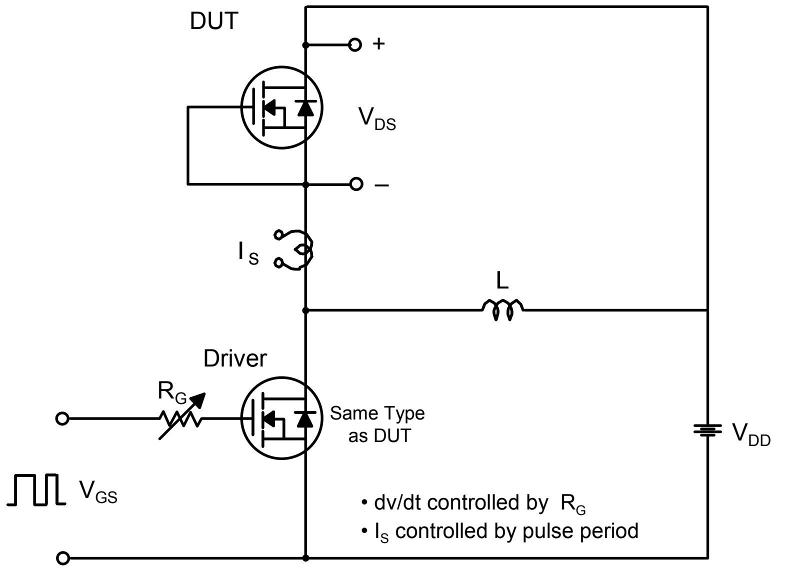
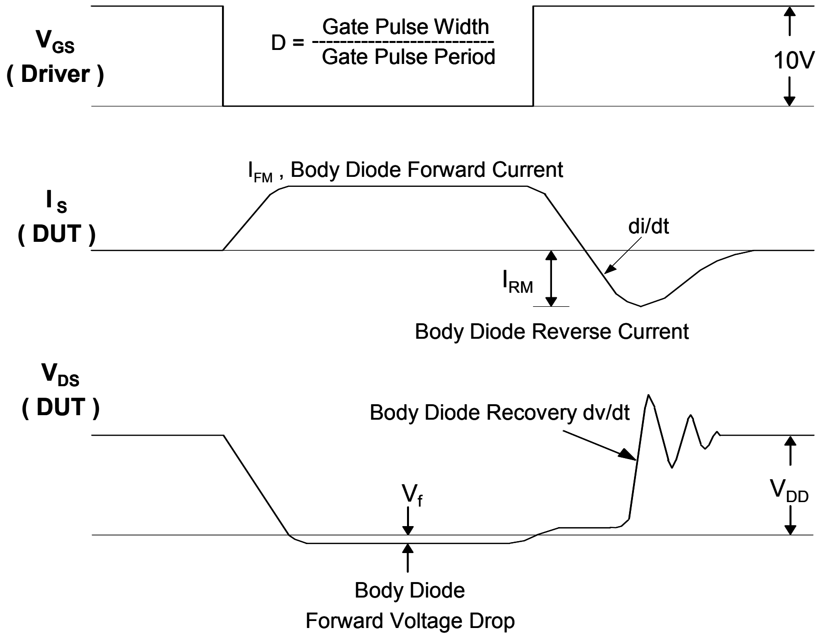


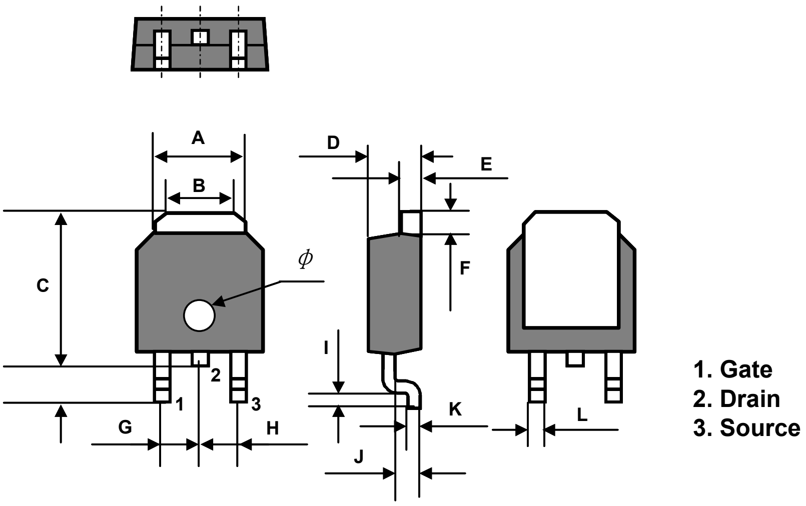
Fig. 15. Peak Diode Recovery dv/dt Test Circuit & Waveforms





TO-252(D-PAK) Package Dimension

Dim.	mm			Inch		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	6.48	6.604	6.73	0.255	0.26	0.265
B	5.0	5.08	5.21	0.197	0.2	0.205
C	7.42	7.8	8.18	0.292	0.307	0.322
D	2.184	2.286	2.388	0.086	0.09	0.094
E	0.762	0.813	0.864	0.03	0.032	0.034
F	1.016	1.067	1.118	0.04	0.042	0.044
G		2.286			0.09	
H		2.286			0.09	
I	0.534	0.61	0.686	0.021	0.024	0.027
J	1.016	1.067	1.118	0.04	0.042	0.044
K		0.508			0.02	
L		0.762			0.03	
ϕ		1.57			0.06	



1. Gate
2. Drain
3. Source