Elektronische Bauelemente

SSPRDJ4501-C

N-Ch: 8A, 30V, $R_{DS(ON)}$ 20mΩ
P-Ch: -5A, -30V, $R_{DS(ON)}$ 52mΩ
N & P-Ch Enhancement Mode Power MOSFET

RoHS Compliant Product
A suffix of "-C" specifies halogen & lead-free

DESCRIPTION

The SSPRDJ4501-C is the highest performance trench N-Ch and P-Ch MOSFETs with extreme high cell density, which provide excellent $R_{DS(ON)}$ and gate charge for most of the synchronous buck converter applications.

The SSPRDJ4501-C meet the RoHS and Green Product requirement with full function reliability approved.

FEATURES

- Advanced High Cell Density Trench Technology
- Super Low Gate Charge
- Green Device Available

MARKING

J4501
□□□□ ← □= Date Code

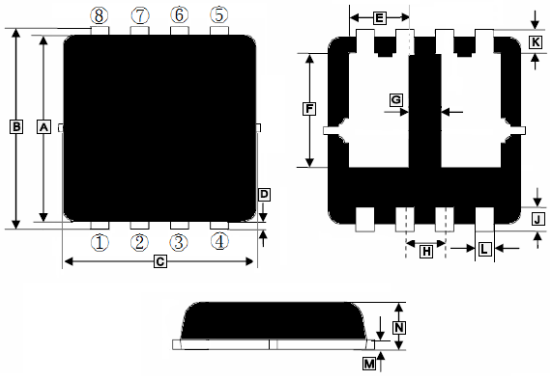
PACKAGE INFORMATION

Package	MPQ	Leader Size
DFN3x3-8DJ	5K	13 inch

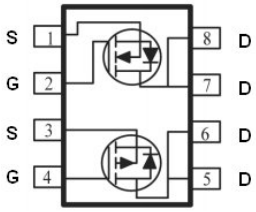
ORDER INFORMATION

Part Number	Type
SSPRDJ4501-C	Lead (Pb)-free and Halogen-free

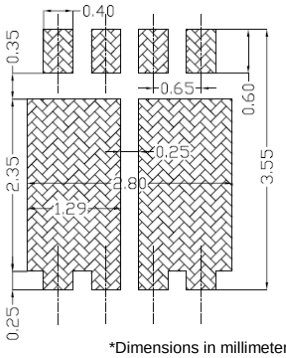
DFN3x3-8DJ



REF.	Millimeter		REF.	Millimeter	
	Min.	Max.		Min.	Max.
A	2.9	3.1	H	0.55	0.75
B	3.15	3.45	J	0.3	0.5
C	2.9	3.1	K	0.315	0.515
D	0.15 BSC		L	0.2	0.4
E	0.935	1.135	M	0.152 REF.	
F	1.535	1.935	N	0.65	0.85
G	0.28	0.48			



Mounting Pad Layout



*Dimensions in millimeters

ABSOLUTE MAXIMUM RATINGS

Parameter		Symbol	Ratings		Unit
			N-Ch	P-Ch	
Drain-Source Voltage		V_{DS}	30	-30	V
Gate-Source Voltage		V_{GS}	±20	±20	V
Continuous Drain Current [1] @V_{GS}=10V	T_A=25℃	I_D	8	-5	A
	T_A=70℃		6.4	-4	
Pulsed Drain Current [3]		I_{DM}	28	-20	A
Total Power Dissipation	T_A=25℃	P_D	2		W
Operating Junction & Storage Temperature Range		T_J, T_{STG}	-55~150		℃
Thermal Data					
Thermal Resistance Junction-Ambient [1]		$R_{\theta JA}$	62.5		℃/W
Thermal Resistance Junction-Ambient [2]			135		
Thermal Resistance Junction-Case [1]		$R_{\theta JC}$	6		

N-CH ELECTRICAL CHARACTERISTICS (T_J=25℃ unless otherwise specified)

Parameter		Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Drain-Source Breakdown Voltage		BV_{DSS}	30	-	-	V	V_{GS}=0, I_D=250μA
Gate Threshold Voltage		$V_{GS(th)}$	1	-	2.5	V	V_{DS}=V_{GS}, I_D=250μA
Forward Transfer Conductance		g_{fs}	-	4.5	-	S	V_{DS}=5V, I_D=8A
Gate-Source Leakage Current		I_{GSS}	-	-	±100	nA	V_{GS}= ±20V
Drain-Source Leakage Current	T_J=25℃	I_{DSS}	-	-	1	μA	V_{DS}=24V, V_{GS}=0
	T_J=55℃		-	-	5		
Static Drain-Source On-Resistance [4]		$R_{DS(ON)}$	-	-	20	mΩ	V_{GS}=10V, I_D=8A
			-	-	30		V_{GS}=4.5V, I_D=4A
Total Gate Charge		Q_g	-	7.2	-	nC	I_D=8A V_{DS}=20V V_{GS}=4.5V
Gate-Source Charge		Q_{gs}	-	1.4	-		
Gate-Drain (“Miller”) Change		Q_{gd}	-	2.2	-		
Turn-on Delay Time		$T_{d(on)}$	-	4.1	-	nS	V_{DD}=12V I_D=5A V_{GS}=10V R_G=3.3Ω
Rise Time		T_r	-	9.8	-		
Turn-off Delay Time		$T_{d(off)}$	-	15.5	-		
Fall Time		T_f	-	6	-		
Input Capacitance		C_{iss}	-	572	-	pF	V_{GS}=0 V_{DS}=15V f=1MHz
Output Capacitance		C_{oss}	-	81	-		
Reverse Transfer Capacitance		C_{rss}	-	65	-		
Source-Drain Diode							
Continuous Source Current [1]		I_S	-	-	8	A	
Pulsed Source Current [3]		I_{SM}	-	-	28		
Forward on Voltage [4]		V_{SD}	-	-	1.2	V	V_{GS}=0, I_S=1A, T_J=25℃

Notes:
1. Surface mounted on a 1 inch^2 FR-4 board with 2oz copper.
2. When mounted on Min. copper pad.
3. Pulse width limited by maximum junction temperature, Pulse Width≤300μs, Duty Cycle≤2%.
4. Pulse Test: Pulse Width≤300μs, Duty Cycle≤2%.

P-CH ELECTRICAL CHARACTERISTICS (T_J=25℃ unless otherwise specified)

Parameter		Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Drain-Source Breakdown Voltage		BV_{DSS}	-30	-	-	V	V_{GS}=0, I_D= -250μA
Gate Threshold Voltage		$V_{GS(th)}$	-1	-	-2.5	V	V_{DS}=V_{GS}, I_D= -250μA
Forward Transfer Conductance		g_{fs}	-	11	-	S	V_{DS}= -5V, I_D= -5A
Gate-Source Leakage Current		I_{GSS}	-	-	±100	nA	V_{GS}= ±20V
Drain-Source Leakage Current	T_J=25℃	I_{DSS}	-	-	-1	μA	V_{DS}= -24V, V_{GS}=0
	T_J=55℃		-	-	-5		
Static Drain-Source On-Resistance [4]		$R_{DS(ON)}$	-	-	52	mΩ	V_{GS}= -10V, I_D= -5A
			-	-	90		V_{GS}= -4.5V, I_D= -2.5A
Total Gate Charge		Q_g	-	6.4	-	nC	I_D= -3A V_{DS}= -15V V_{GS}= -4.5V
Gate-Source Charge		Q_{gs}	-	2.3	-		
Gate-Drain (“Miller”) Change		Q_{gd}	-	1.9	-		
Turn-on Delay Time		$T_{d(on)}$	-	2.8	-	nS	V_{DS}= -15V I_D= -3A V_{GS}= -10V R_G=3.3Ω
Rise Time		T_r	-	8.4	-		
Turn-off Delay Time		$T_{d(off)}$	-	39	-		
Fall Time		T_f	-	6	-		
Input Capacitance		C_{iss}	-	583	-	pF	V_{GS}=0 V_{DS}= -15V f=1MHz
Output Capacitance		C_{oss}	-	100	-		
Reverse Transfer Capacitance		C_{rss}	-	80	-		
Source-Drain Diode							
Continuous Source Current [1]		I_S	-	-	-5	A	
Pulsed Source Current [3]		I_{SM}	-	-	-20		
Forward on Voltage [4]		V_{SD}	-	-	-1.2	V	V_{GS}=0, I_S= -1A, T_J=25℃

Notes:
1. Surface mounted on a 1 inch^2 FR-4 board with 2oz copper.
2. When mounted on Min. copper pad.
3. Pulse width limited by maximum junction temperature, Pulse Width≤300μs, Duty Cycle≤2%.
4. Pulse Test: Pulse Width≤300μs, Duty Cycle≤2%.

CHARACTERISTIC CURVE (N-Ch)

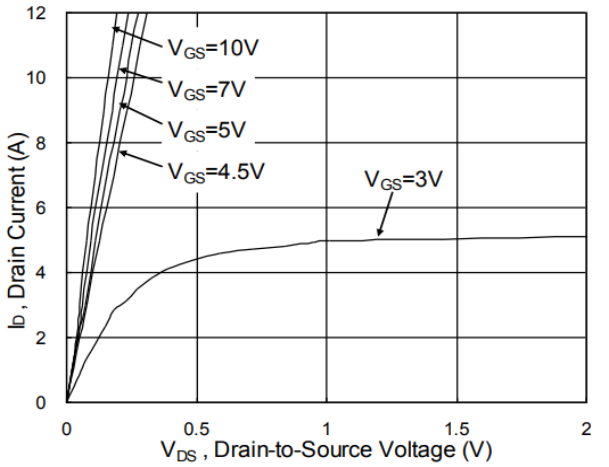


Fig.1 Typical Output Characteristics

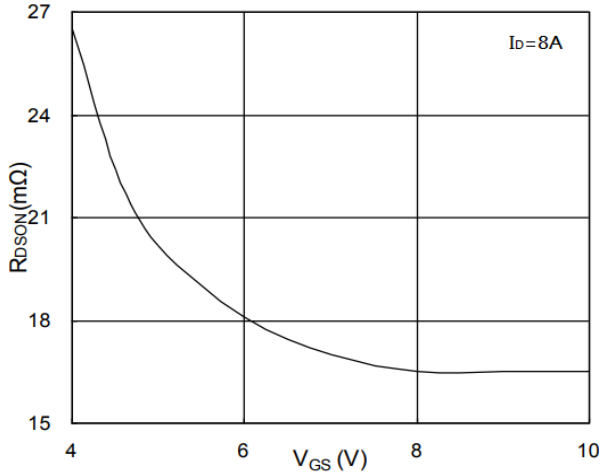


Fig.2 On-Resistance vs G-S Voltage

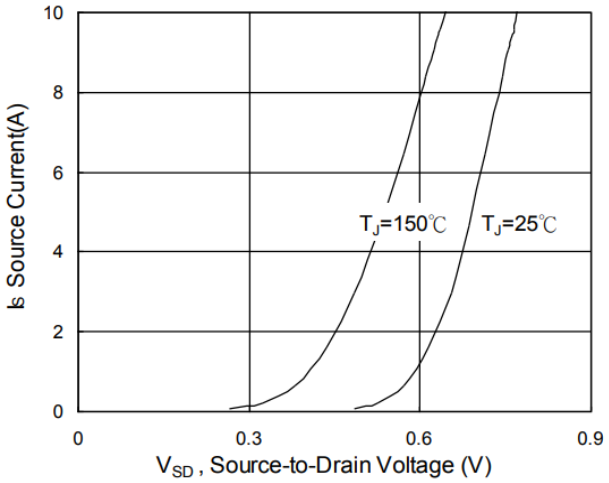


Fig.3 Source Drain Forward Characteristics

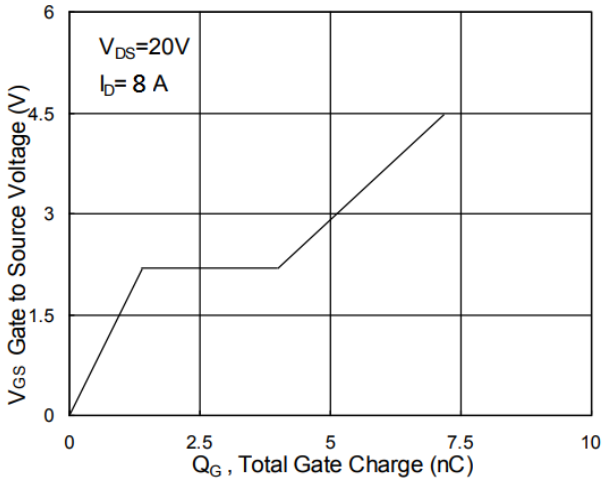


Fig.4 Gate-Charge Characteristics

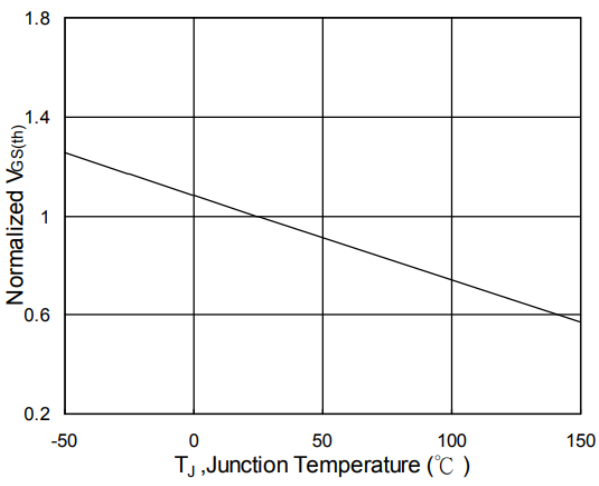


Fig.5 Normalized $V_{GS(th)}$ vs T_J

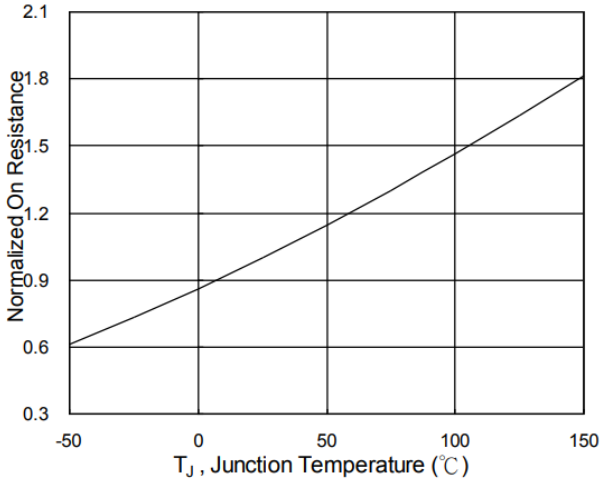


Fig.6 Normalized R_{DSON} vs T_J

CHARACTERISTIC CURVE (N-Ch)

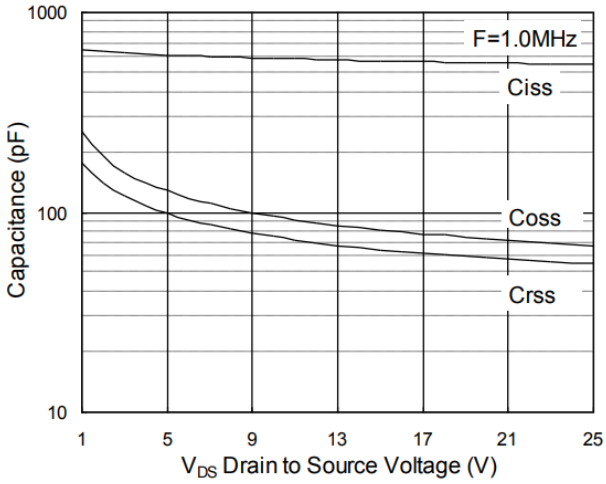


Fig.7 Capacitance

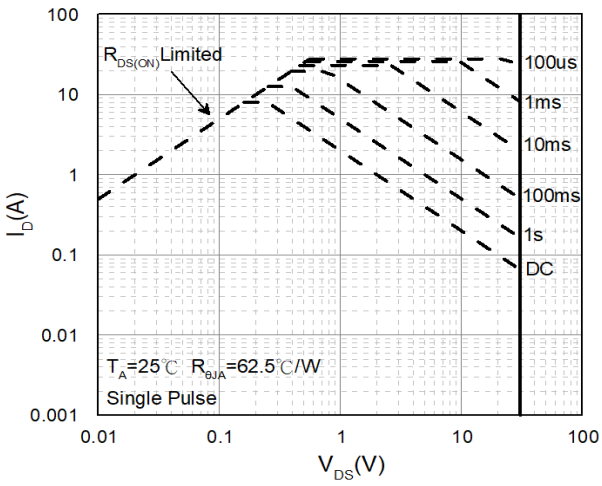


Fig.8 Safe Operating Area

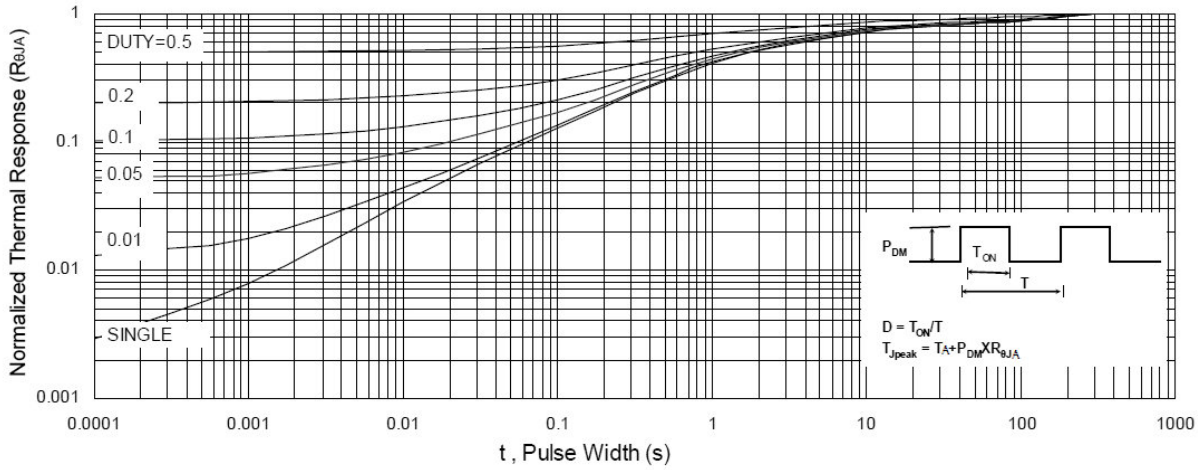


Fig.9 Normalized Maximum Transient Thermal Impedance

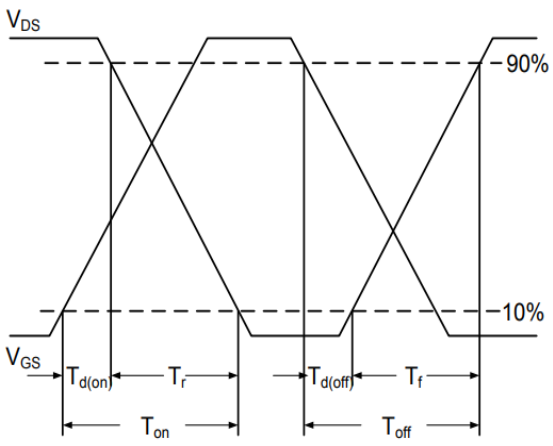


Fig.10 Switching Time Waveform

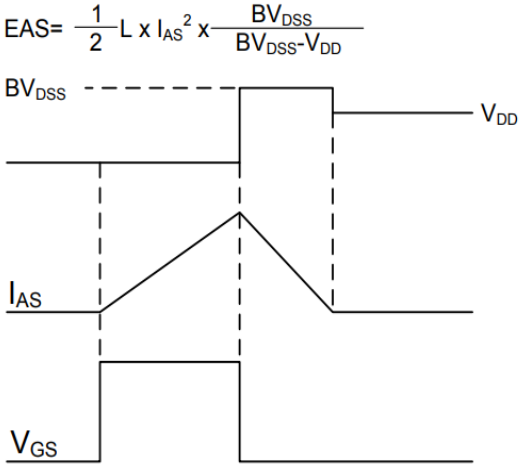


Fig.11 Unclamped Inductive Switching Waveform

CHARACTERISTIC CURVE (P-CH)

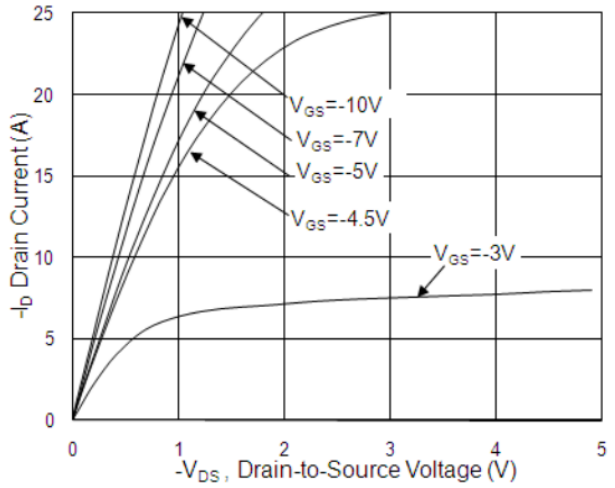
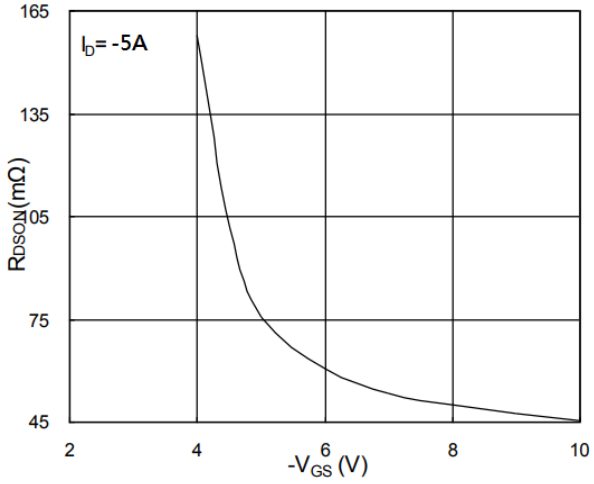


Fig.1 Typical Output Characteristics



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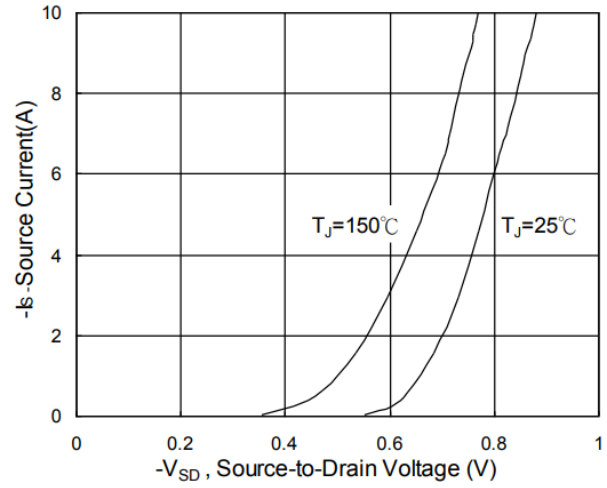


Fig.3 Source Drain Forward Characteristics

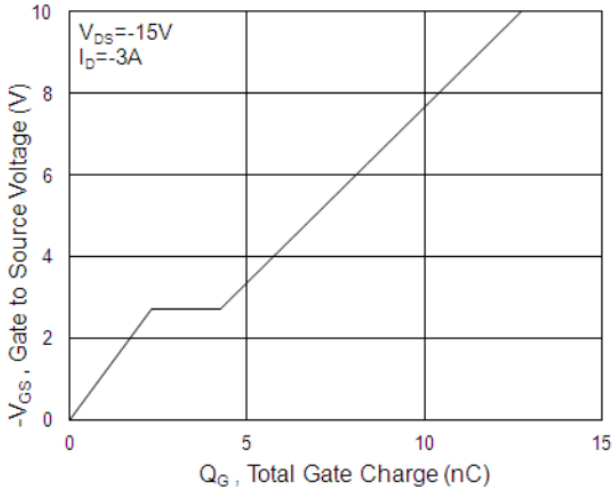


Fig.4 Gate-Charge Characteristics

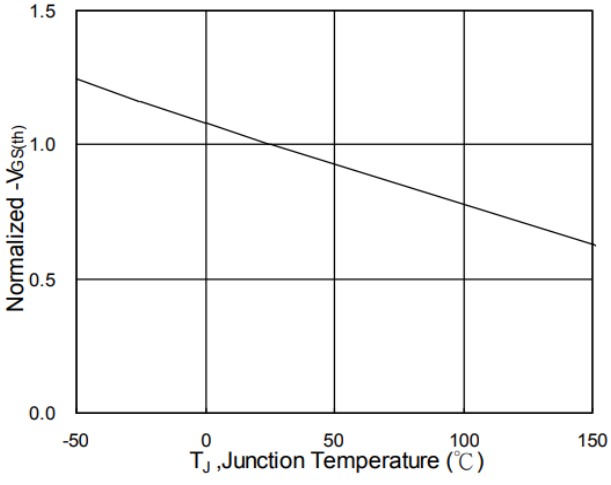


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

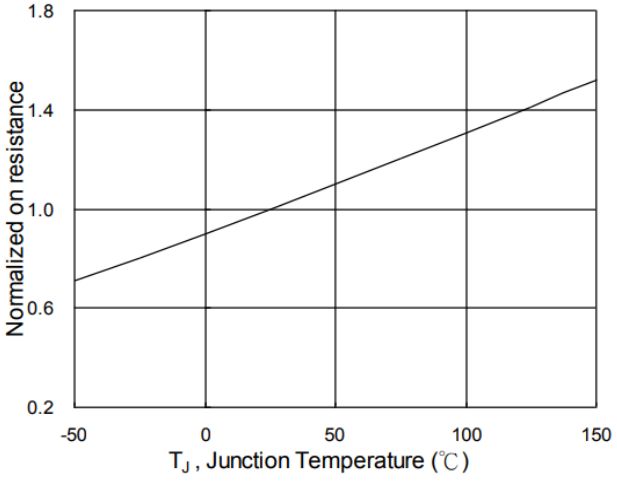


Fig.6 Normalized R_{DSON} vs T_J

CHARACTERISTIC CURVE (P-CH)

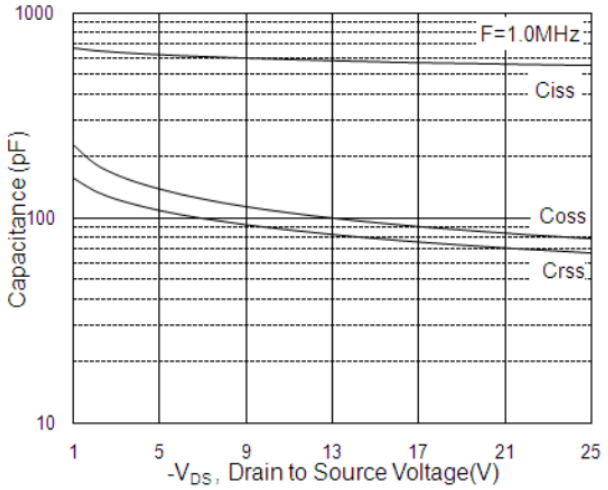


Fig.7 Capacitance

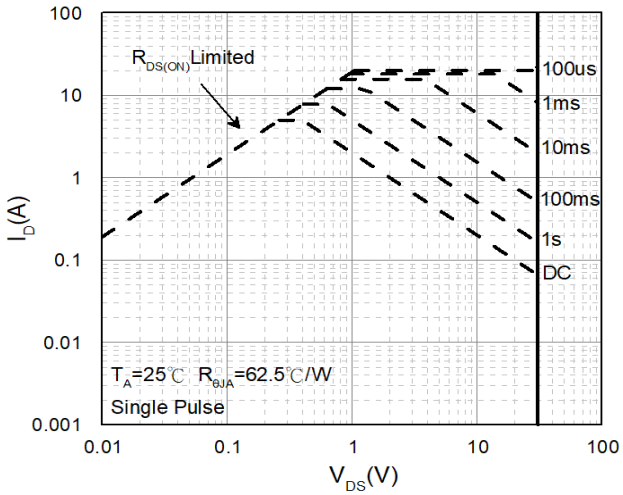
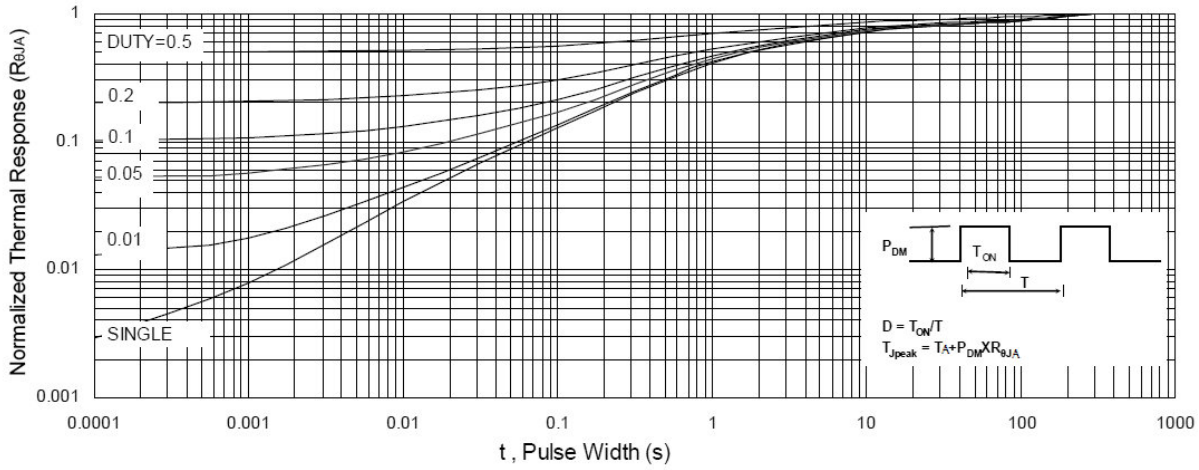


Fig.8 Safe Operating Area



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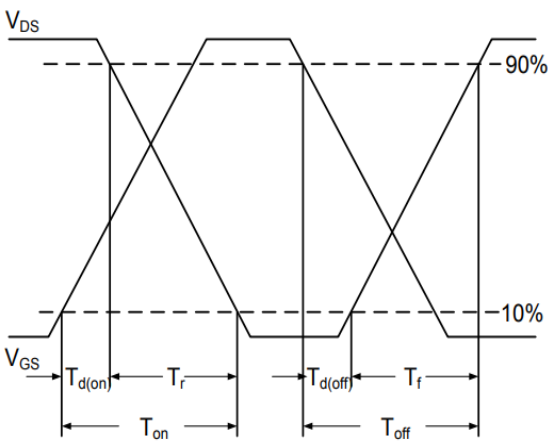

Fig.10 Switching Time Waveform

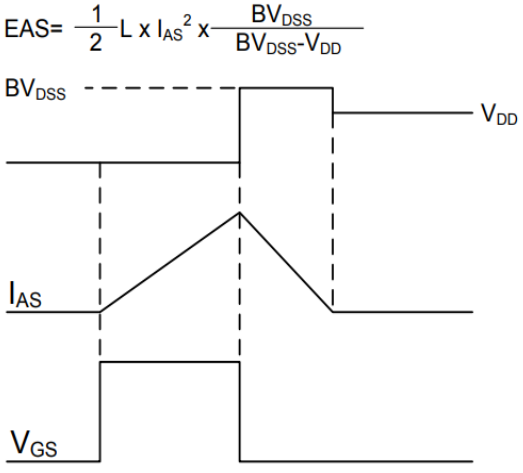

Fig.11 Unclamped Inductive Switching Waveform