Elektronische Bauelemente

SPRD4510-C

N-Ch: 12A, 100V, $R_{DS(ON)}$ 112mΩ
P-Ch: -9A, -100V, $R_{DS(ON)}$ 210mΩ
N & P-Ch Enhancement Mode Power MOSFET

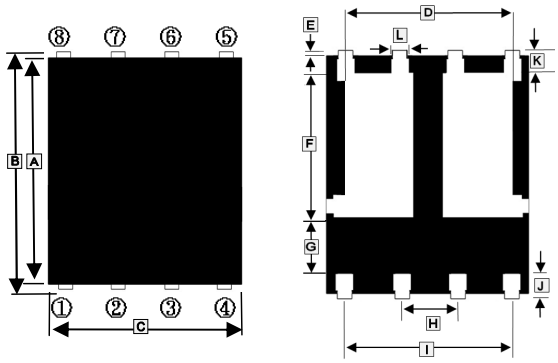
RoHS Compliant Product
A suffix of "-C" specifies halogen & lead-free

DESCRIPTION

The SPRD4510-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 SPRD4510-C meet the RoHS and Green Product requirement with full function reliability approved.

DFN5x6-8D

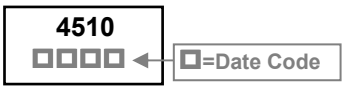


REF.	Millimeter		REF.	Millimeter	
	Min.	Max.		Min.	Max.
A	5.7	5.8	H	1.27 BSC.	
B	5.9	6.1	I	3.61	3.96
C	4.8	5	J	0.51	0.71
D	3.61	3.96	K	0.41	0.61
E	0.06	0.20	L	0.33	0.51
F	3.38	3.78	M	0.2	0.3
G	1.1	-	N	0.9	1.1

FEATURES

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

MARKING

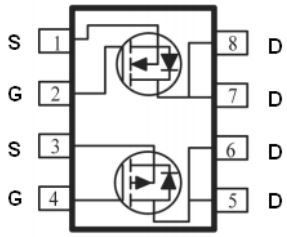


PACKAGE INFORMATION

Package	MPQ	Leader Size
DFN5x6-8D	3K	13 inch

ORDER INFORMATION

Part Number	Type
SPRD4510-C	Lead (Pb)-free and Halogen-free



ABSOLUTE MAXIMUM RATINGS (T_J=25°C unless otherwise specified)

Parameter		Symbol	Ratings		Unit
			N-Ch	P-Ch	
Drain-Source Voltage		V_{DS}	100	-100	V
Gate-Source Voltage		V_{GS}	±20		V
Continuous Drain Current, @V_{GS}=10V [1]	T_C=25°C	I_D	12	-9	A
	T_C=100°C		7.2	-5.4	
Pulsed Drain Current [3]		I_{DM}	24	-20	A
Total Power Dissipation	T_C=25°C	P_D	35.7		W
Operating Junction and Storage Temperature Range		T_J, T_{STG}	-55~150		°C
Thermal Data					
Thermal Resistance Junction-Ambient [1]		$R_{\theta JA}$	62.5		°C/W
Thermal Resistance Junction-Ambient [2]			110		
Thermal Resistance Junction-Case [1]		$R_{\theta JC}$	3.5		

N-CHANNEL ELECTRICAL CHARACTERISTICS (T_J=25°C unless otherwise specified)

Parameter		Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Drain-Source Breakdown Voltage		BV_{DSS}	100	-	-	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}	-	13	-	S	V_{DS}=5V, I_D=10A
Gate-Source Leakage Current		I_{GSS}	-	-	±100	nA	V_{GS}= ±20V
Drain-Source Leakage Current	T_J=25°C	I_{DSS}	-	-	1	μA	V_{DS}=80V, V_{GS}=0
	T_J=55°C		-	-	5		
Static Drain-Source On-Resistance [4]		$R_{DS(ON)}$	-	-	112	mΩ	V_{GS}=10V, I_D=6A
			-	-	120		V_{GS}=4.5V, I_D=4A
Total Gate Charge		Q_g	-	26.2	-	nC	I_D=10A V_{DS}=80V V_{GS}=10V
Gate-Source Charge		Q_{gs}	-	4.6	-		
Gate-Drain Change		Q_{gd}	-	5.1	-		
Turn-on Delay Time		$T_{d(on)}$	-	4.2	-	nS	V_{DS}=50V I_D=10A V_{GS}=10V R_G=3.3Ω
Rise Time		T_r	-	8.2	-		
Turn-off Delay Time		$T_{d(off)}$	-	35.6	-		
Fall Time		T_f	-	9.6	-		
Input Capacitance		C_{iss}	-	1535	-	pF	V_{GS}=0 V_{DS}=15V f=1MHz
Output Capacitance		C_{oss}	-	60	-		
Reverse Transfer Capacitance		C_{rss}	-	37	-		
Source-Drain Diode							
Continuous Source Current [1]		I_S	-	-	12	A	
Pulsed Source Current [3]		I_{SM}	-	-	24		
Forward on Voltage [4]		V_{SD}	-	-	1.2	V	I_S=1A, V_{GS}=0, T_J=25°C

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. The data tested by pulsed, pulse width≦300μs, duty cycle≦2%.

P-CHANNEL ELECTRICAL CHARACTERISTICS (T_J=25°C unless otherwise specified)

Parameter		Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Drain-Source Breakdown Voltage		BV_{DSS}	-100	-	-	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}	-	12	-	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°C	I_{DSS}	-	-	-1	μA	V_{DS}= -80V, V_{GS}=0
	T_J=55°C		-	-	-5		
Static Drain-Source On-Resistance [4]		$R_{DS(ON)}$	-	-	210	mΩ	V_{GS}= -10V, I_D= -5A
			-	-	230		V_{GS}= -4.5V, I_D= -3A
Total Gate Charge		Q_g	-	20	-	nC	I_D= -5A V_{DS}= -80V V_{GS}= -10V
Gate-Source Charge		Q_{gs}	-	3.5	-		
Gate-Drain Change		Q_{gd}	-	4.6	-		
Turn-on Delay Time		$T_{d(on)}$	-	18	-	nS	V_{DS}= -50V I_D= -5A V_{GS}= -10V R_G=25Ω
Rise Time		T_r	-	8	-		
Turn-off Delay Time		$T_{d(off)}$	-	100	-		
Fall Time		T_f	-	30	-		
Input Capacitance		C_{iss}	-	1419	-	pF	V_{GS}=0 V_{DS}= -25V f=1MHz
Output Capacitance		C_{oss}	-	89	-		
Reverse Transfer Capacitance		C_{rss}	-	45	-		
Source-Drain Diode							
Continuous Source Current [1]		I_S	-	-	-9	A	
Pulsed Source Current [3]		I_{SM}	-	-	-20		
Forward on Voltage [4]		V_{SD}	-	-	-1.2	V	I_S= -1A, V_{GS}=0, T_J=25°C

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. The data tested by pulsed, pulse width≦300μs, duty cycle≦2%.

N-CHANNEL CHARACTERISTIC CURVES

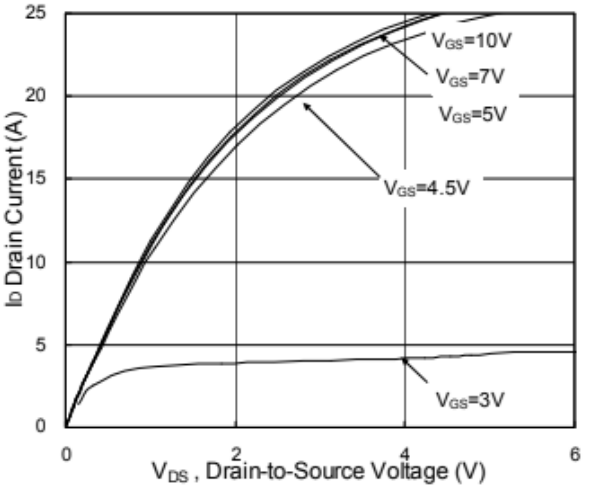


Fig.1 Typical Output Characteristics

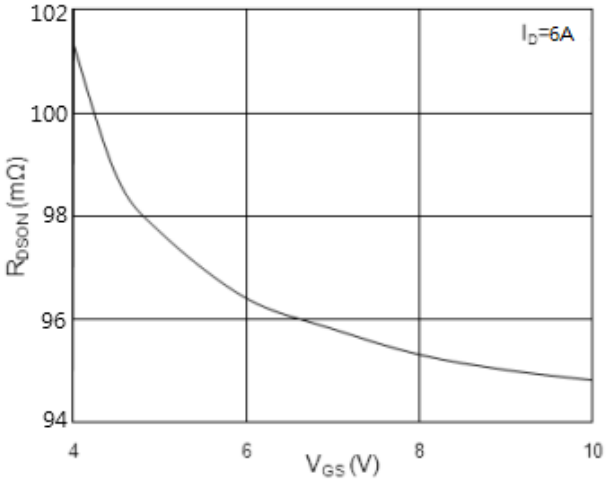


Fig.2 On-Resistance vs. Gate-Source

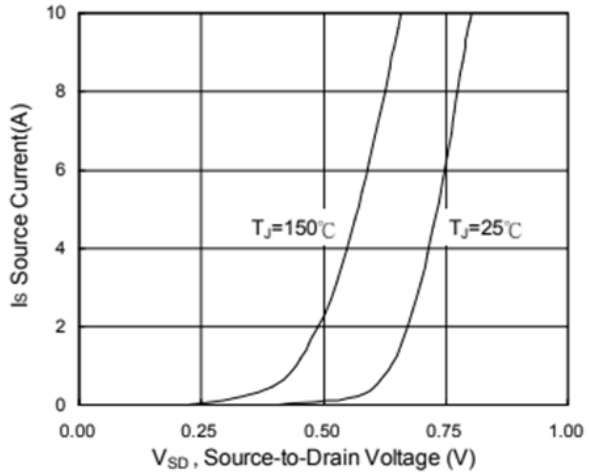


Fig.3 Forward Characteristics Of Reverse

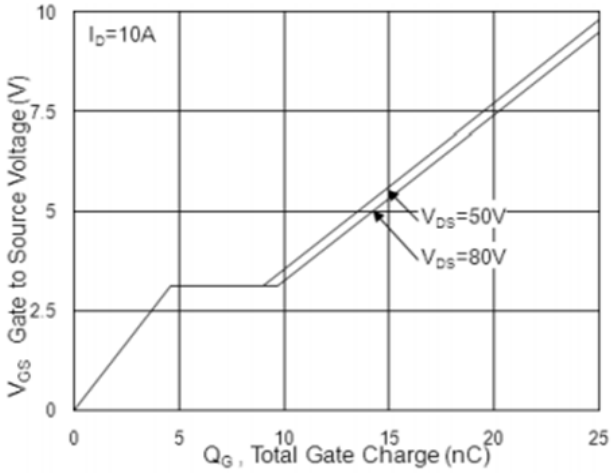


Fig.4 Gate-Charge Characteristics

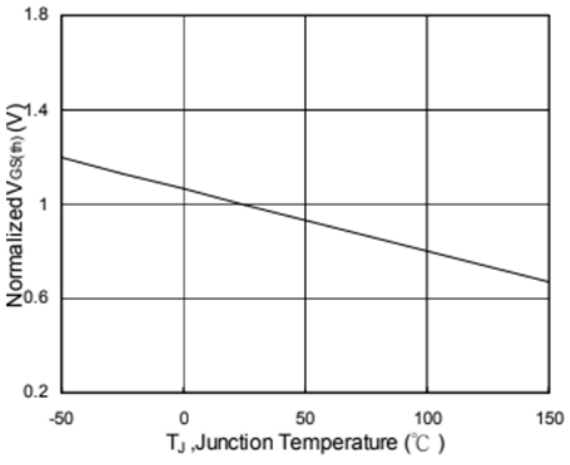


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

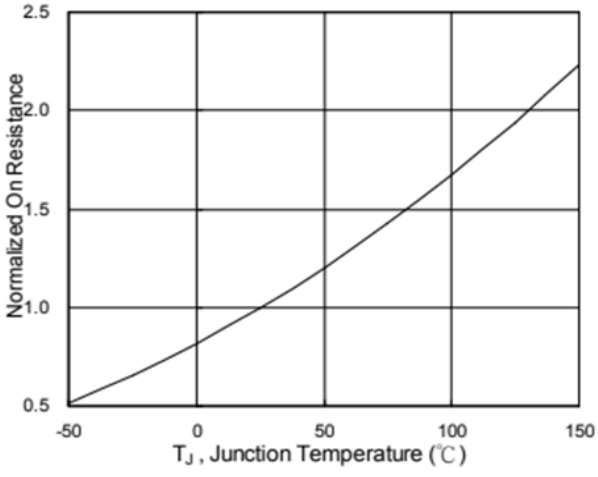


Fig.6 Normalized R_{DSON} vs. T_J

N-CHANNEL CHARACTERISTIC CURVES

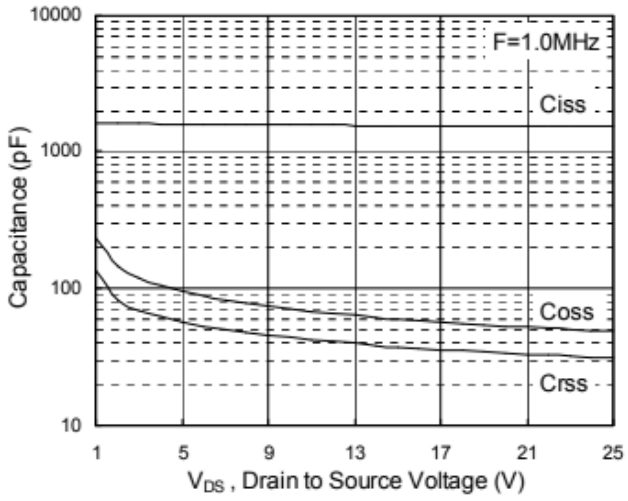


Fig.7 Capacitance

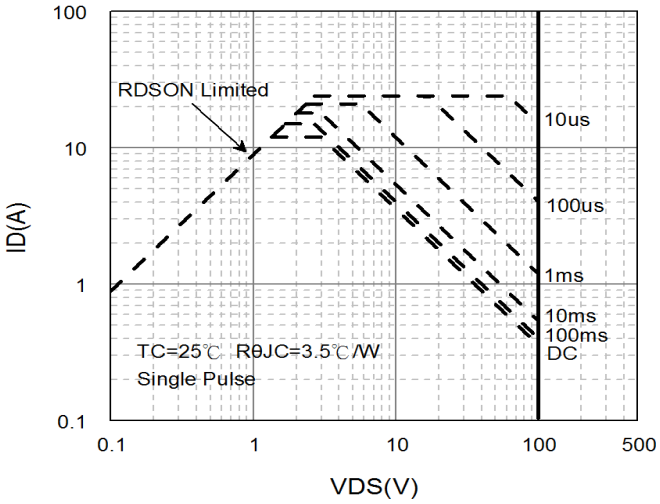


Fig.8 Safe Operating Area

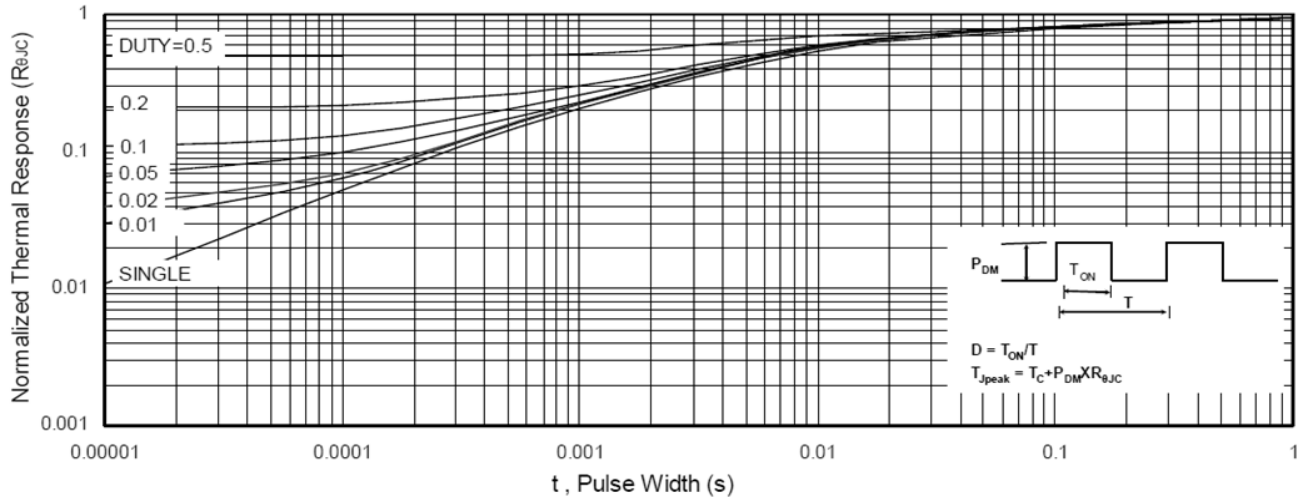


Fig.9 Normalized Maximum Transient Thermal Impedance

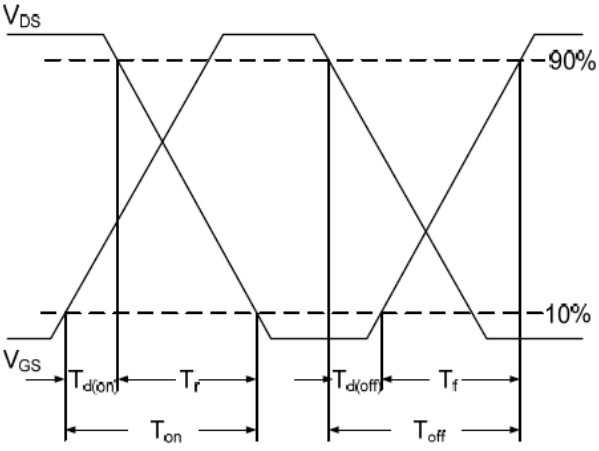


Fig.10 Switching Time Waveform

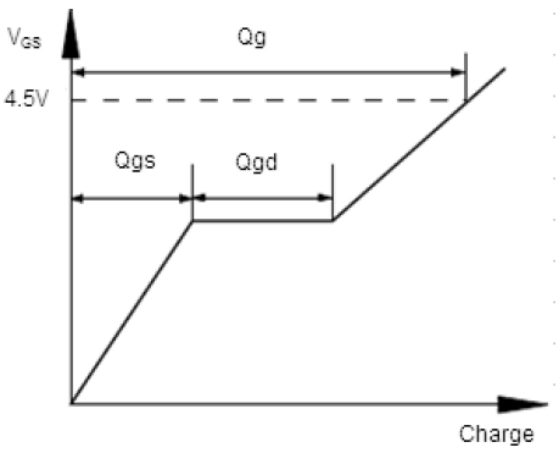


Fig.11 Gate Charge Waveform

P-CHANNEL CHARACTERISTIC CURVES

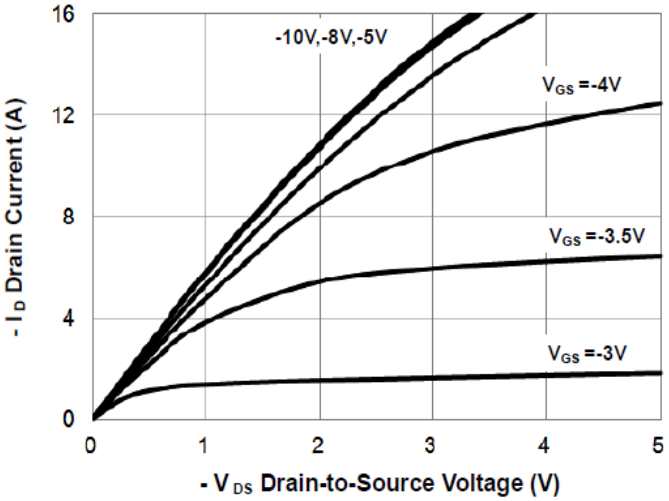


Fig.1 Typical Output Characteristics

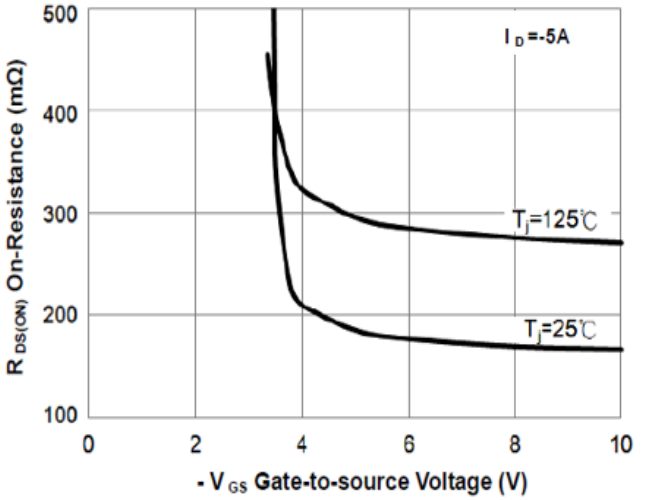


Fig.2 On-Resistance vs. G-S Voltage

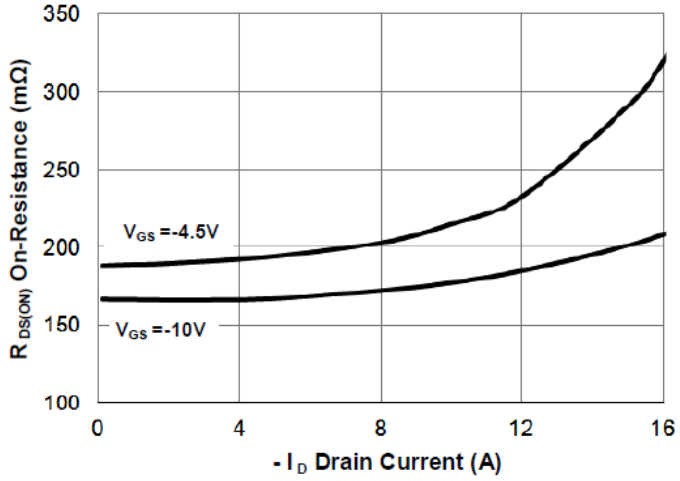


Fig.3 On-Resistance vs. Drain Current

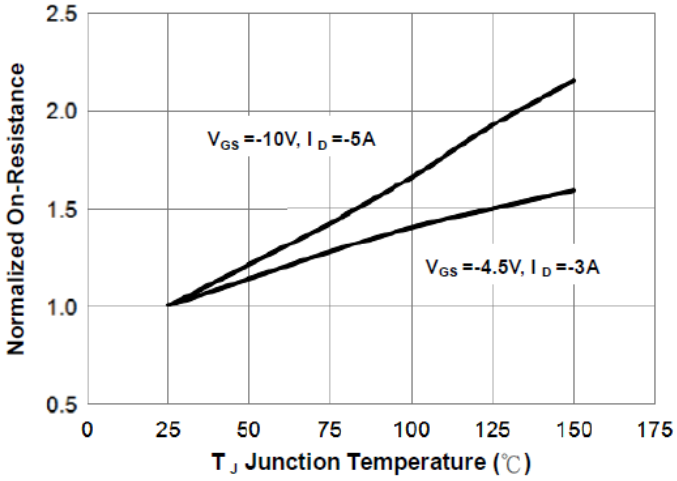
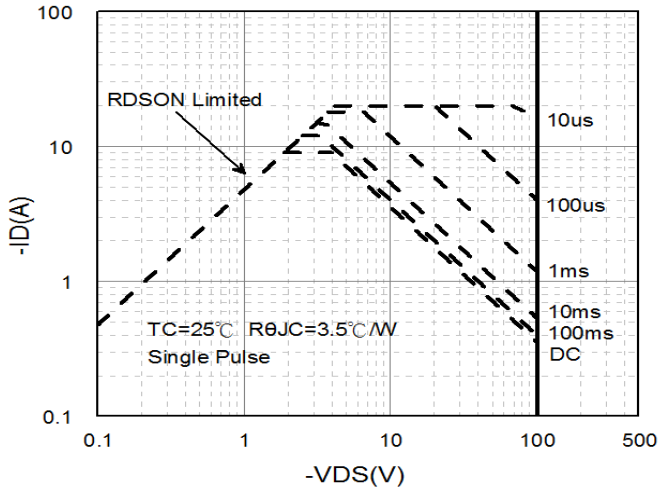


Fig.4 Normalized R_{DSON} vs. T_J



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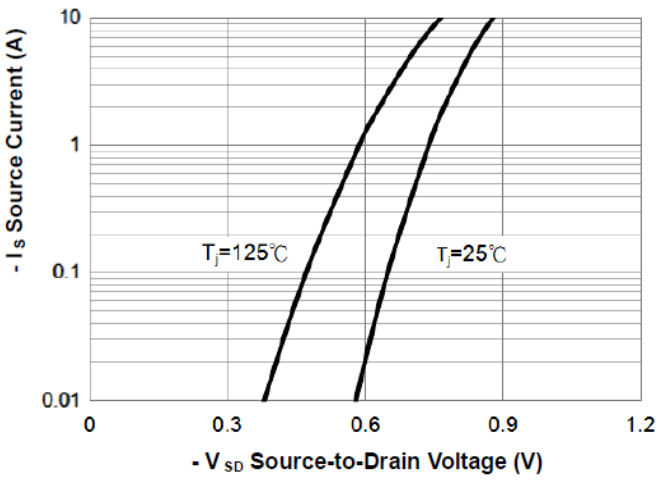


Fig.6 Forward Characteristics of Reverse

P-CHANNEL CHARACTERISTIC CURVES

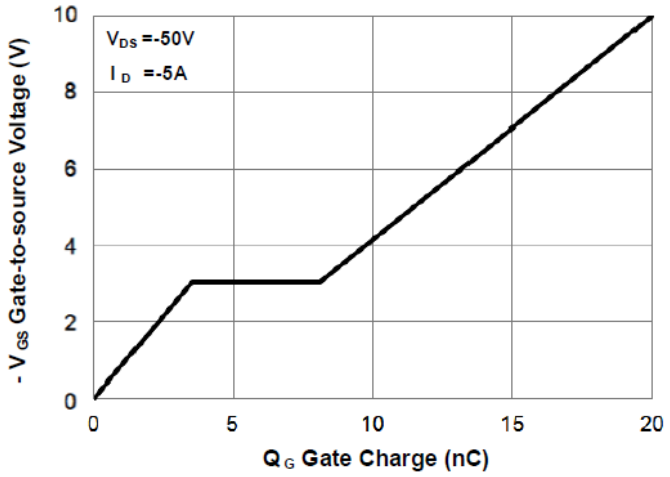


Fig.7 Gate Charge Characteristics

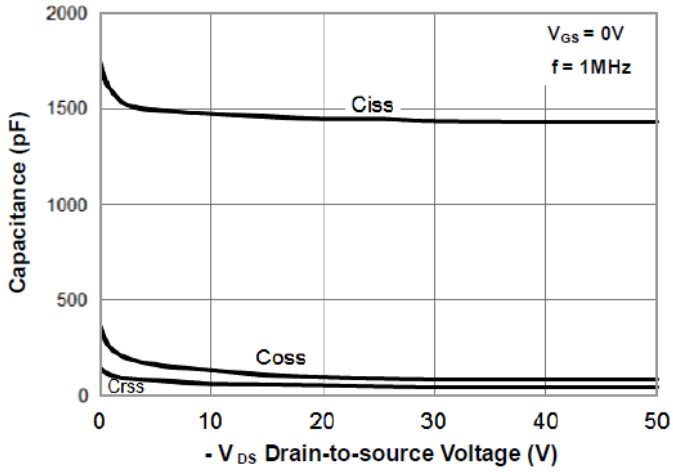
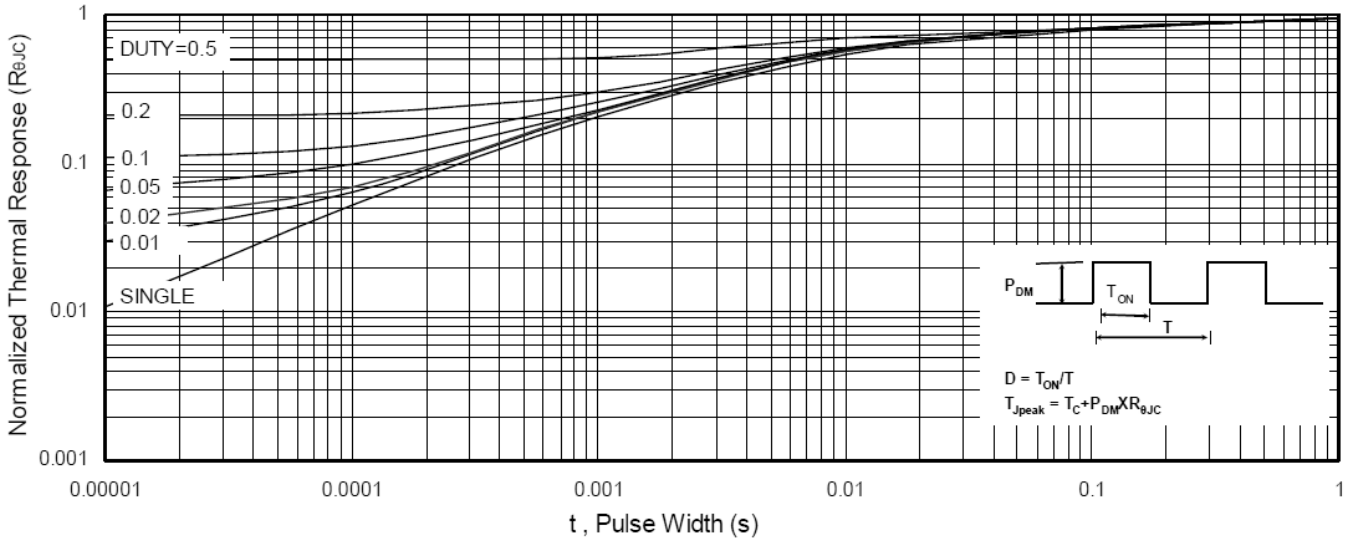


Fig.8 Capacitance Characteristics



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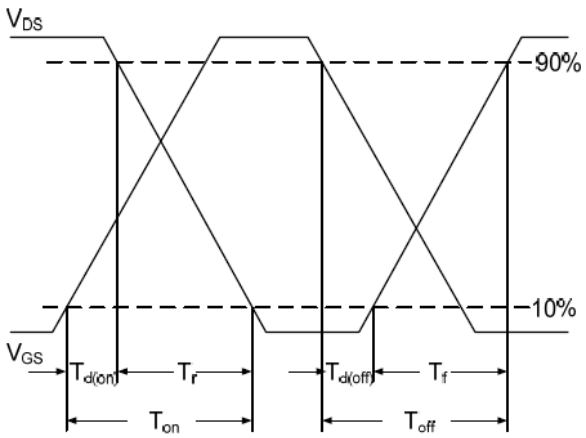

Fig.10 Switching Time Waveform

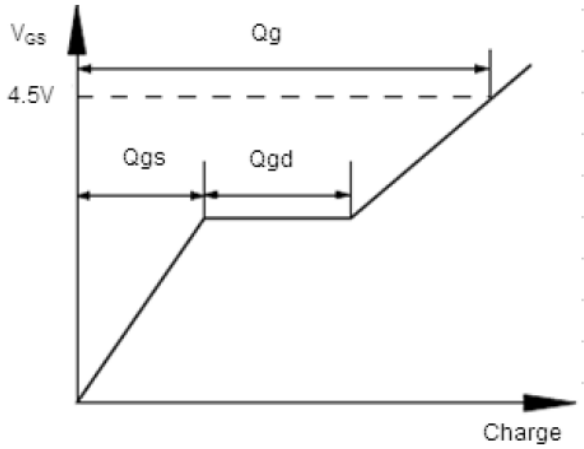

Fig.11 Gate Charge Waveform