

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

DESCRIPTION

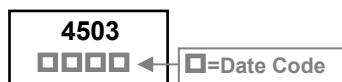
The SPRD4503-C is the highest performance trench N-Ch and P-Ch MOSFETs with extreme high cell density, which provide excellent $R_{DS(ON)}$ and gate charge for most of the synchronous buck converter applications.

The SPRD4503-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



PACKAGE INFORMATION

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

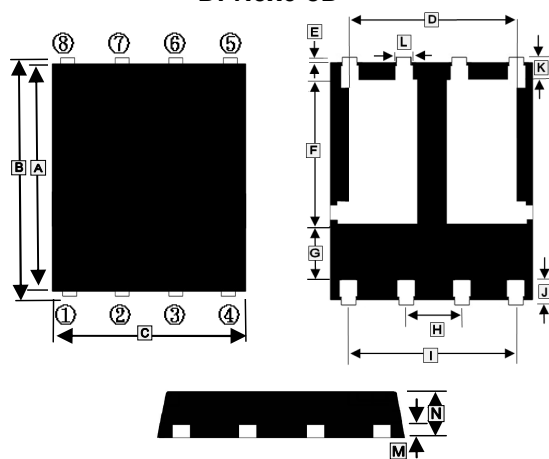
ORDER INFORMATION

Part Number	Type
SPRD4503-C	Lead (Pb)-free and Halogen-free

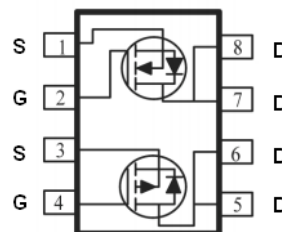
ABSOLUTE MAXIMUM RATINGS

Parameter		Symbol	Ratings		Unit
			N-Ch	P-Ch	
Drain-Source Voltage		V_{DS}	30	-30	V
Gate-Source Voltage		V_{GS}	±20		V
Continuous Drain Current, @ $V_{GS}=10V$ ¹	$T_C=25^{\circ}C$	I_D	28	-22	A
	$T_C=100^{\circ}C$		18	-14	
	$T_A=25^{\circ}C$		7	-5.4	
	$T_A=70^{\circ}C$		5.6	-4.3	
Pulsed Drain Current ³		I_{DM}	62	-48	A
Total Power Dissipation	$T_C=25^{\circ}C$	P_D	22		W
Total Power Dissipation	$T_A=25^{\circ}C$	P_D	1.7		
Operating Junction and Storage Temperature Range		T_J, T_{STG}	-55~150		°C
Thermal Data					
Thermal Resistance Junction-Ambient ¹		$R_{\theta JA}$	73.5		°C/W
Thermal Resistance Junction-Ambient ²			125		
Thermal Resistance Junction-Case ¹		$R_{\theta JC}$	5.7		

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



N-CHANNEL ELECTRICAL CHARACTERISTICS ($T_J=25^\circ\text{C}$ unless otherwise specified)

Parameter		Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Drain-Source Breakdown Voltage		BV_{DSS}	30	-	-	V	$V_{GS}=0$, $I_D=250\mu A$
Gate Threshold Voltage		$V_{GS(th)}$	1	-	3	V	$V_{DS}=V_{GS}$, $I_D=250\mu A$
Forward Transfer Conductance		g_{fs}	-	6	-	S	$V_{DS}=5V$, $I_D=7A$
Gate-Source Leakage Current		I_{GSS}	-	-	± 100	nA	$V_{GS}= \pm 20V$
Drain-Source Leakage Current	$T_J=25^{\circ}C$	I_{DSS}	-	-	1	μA	$V_{DS}=24V$, $V_{GS}=0$
	$T_J=55^{\circ}C$		-	-	5		
Static Drain-Source On-Resistance ⁴		$R_{DS(ON)}$	-	-	18	m Ω	$V_{GS}=10V$, $I_D=6A$
			-	-	28		$V_{GS}=4.5V$, $I_D=4A$
Total Gate Charge		Q_g	-	6	-	nC	$I_D=6A$ $V_{DS}=15V$ $V_{GS}=4.5V$
Gate-Source Charge		Q_{gs}	-	2.5	-		
Gate-Drain Charge		Q_{gd}	-	2.1	-		
Turn-on Delay Time		$T_{d(on)}$	-	2.4	-	nS	$V_{DS}=15V$ $V_{GS}=10V$ $I_D=6A$ $R_G=3.3\Omega$
Rise Time		T_r	-	7.8	-		
Turn-off Delay Time		$T_{d(off)}$	-	22	-		
Fall Time		T_f	-	4	-		
Input Capacitance		C_{iss}	-	572	-	pF	$V_{GS}=0$ $V_{DS}=15V$ $f=1MHz$
Output Capacitance		C_{oss}	-	80	-		
Reverse Transfer Capacitance		C_{rss}	-	65	-		
Source-Drain Diode							
Forward on Voltage ⁴		V_{SD}	-	-	1.2	V	$I_S=1A$, $V_{GS}=0$, $T_J=25^{\circ}C$
Continuous Source Current ¹		I_S	-	-	7	A	
Pulsed Source Current ³		I_{SM}	-	-	28		

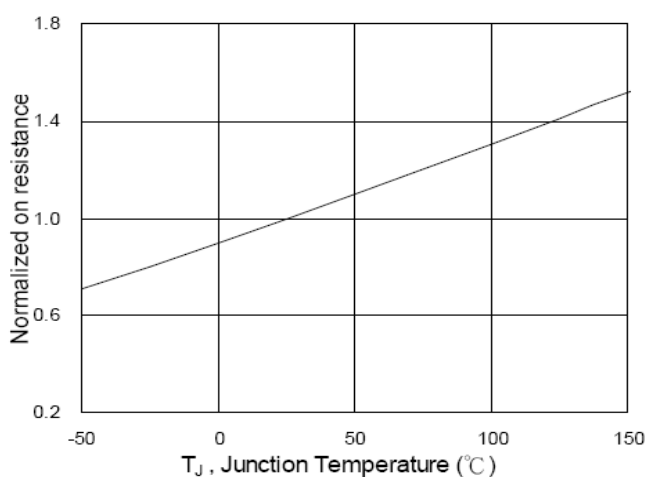
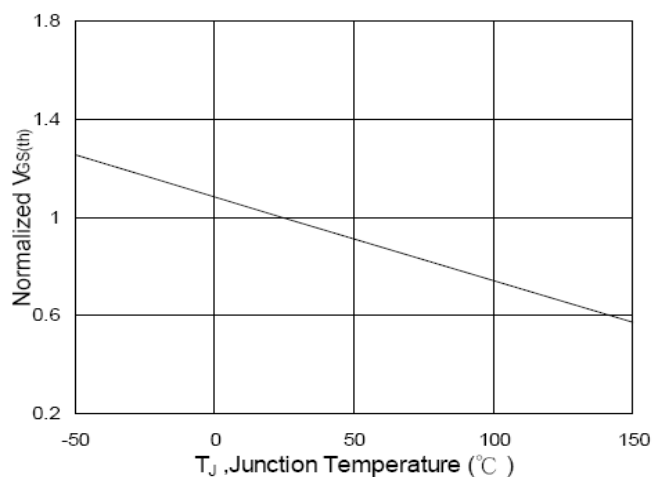
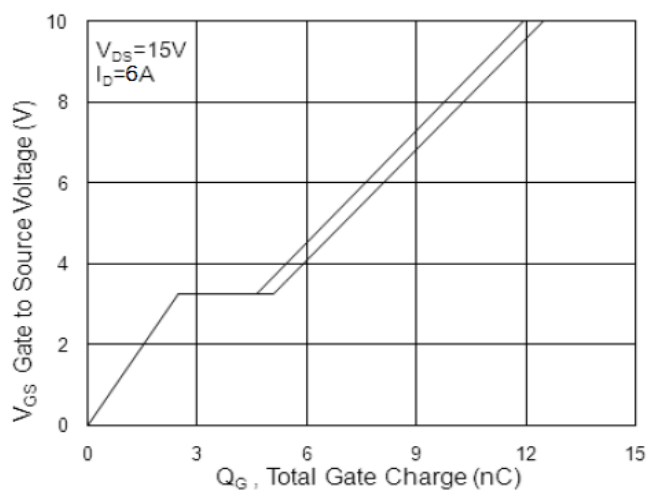
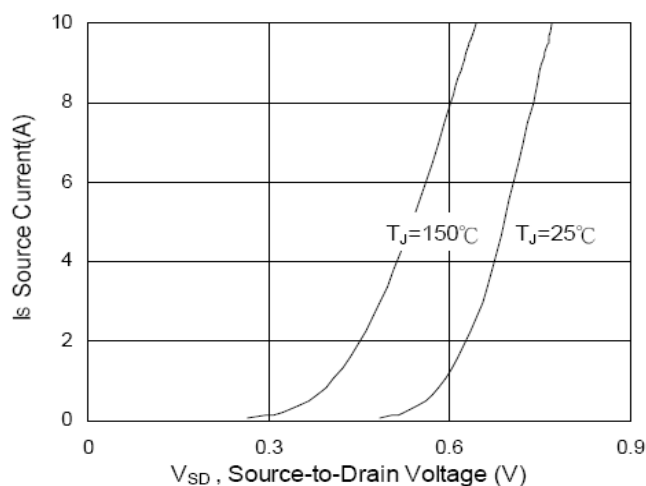
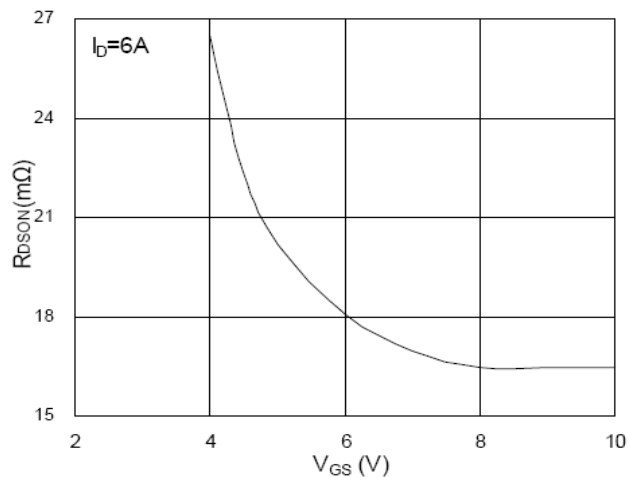
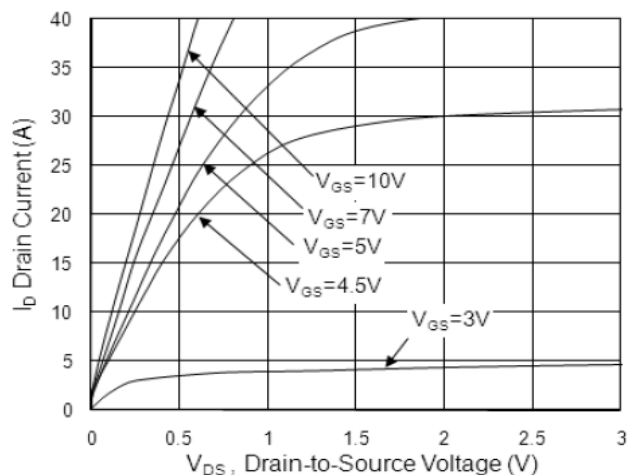
P-CHANNEL ELECTRICAL CHARACTERISTICS (T_J=25°C unless otherwise specified)

Parameter		Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Drain-Source Breakdown Voltage		BV_{DSS}	-30	-	-	V	$V_{GS}=0$, $I_D= -250\mu A$
Gate Threshold Voltage		$V_{GS(th)}$	-1	-	-3	V	$V_{DS}=V_{GS}$, $I_D= -250\mu A$
Forward Transfer Conductance		g_{fs}	-	13	-	S	$V_{DS}= -5V$, $I_D= -7A$
Gate-Source Leakage Current		I_{GSS}	-	-	± 100	nA	$V_{GS}= \pm 20V$
Drain-Source Leakage Current	$T_J=25^{\circ}C$	I_{DSS}	-	-	-1	μA	$V_{DS}= -24V$, $V_{GS}=0$
	$T_J=55^{\circ}C$		-	-	-5		
Static Drain-Source On-Resistance ⁴		$R_{DS(ON)}$	-	-	30	m Ω	$V_{GS}= -10V$, $I_D= -6A$
			-	-	45		$V_{GS}= -4.5V$, $I_D= -4A$
Total Gate Charge		Q_g	-	9.8	-	nC	$I_D= -6A$ $V_{DS}= -20V$ $V_{GS}= -4.5V$
Gate-Source Charge		Q_{gs}	-	2.2	-		
Gate-Drain Charge		Q_{gd}	-	3.4	-		
Turn-on Delay Time		$T_{d(on)}$	-	16.4	-	nS	$V_{DS}= -24V$ $V_{GS}= -10V$ $I_D= -1A$ $R_G=3.3\Omega$
Rise Time		T_r	-	20.2	-		
Turn-off Delay Time		$T_{d(off)}$	-	55	-		
Fall Time		T_f	-	10	-		
Input Capacitance		C_{iss}	-	930	-	pF	$V_{GS}=0$ $V_{DS}= -15V$ $f=1MHz$
Output Capacitance		C_{oss}	-	148	-		
Reverse Transfer Capacitance		C_{rss}	-	115	-		
Source-Drain Diode							
Forward on Voltage ⁴		V_{SD}	-	-	-1.2	V	$I_S= -1A$, $V_{GS}=0$, $T_J=25^{\circ}C$
Continuous Source Current ¹		I_S	-	-	-5.4	A	
Pulsed Source Current ³		I_{SM}	-	-	-21.6		

Notes:

1. Surface mounted on a 1 inch² FR-4 board with 2OZ copper.
2. When mounted on Min. copper pad.
3. Pulse width limited by maximum junction temperature, pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.
4. The data tested by pulsed, pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.

N-CHANNEL CHARACTERISTIC CURVE



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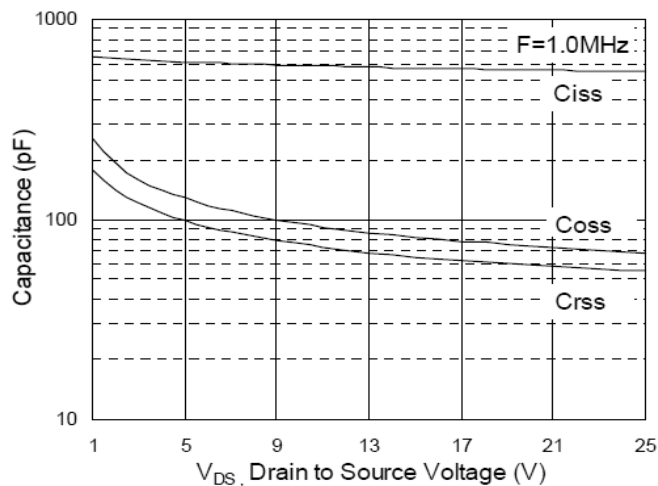


Fig.7 Capacitance

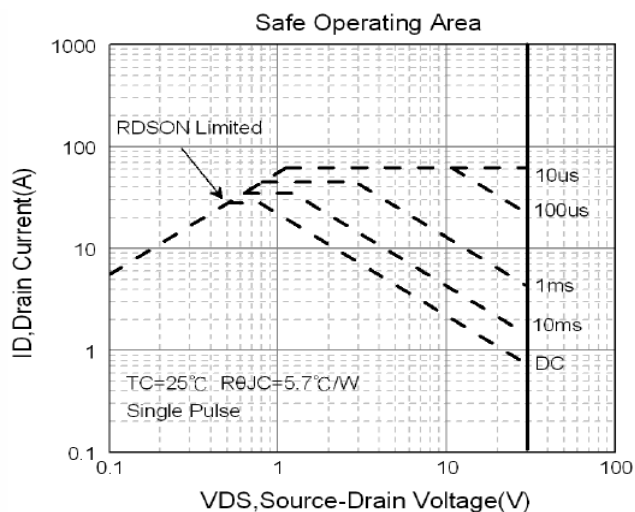


Fig.8 Safe Operating Area

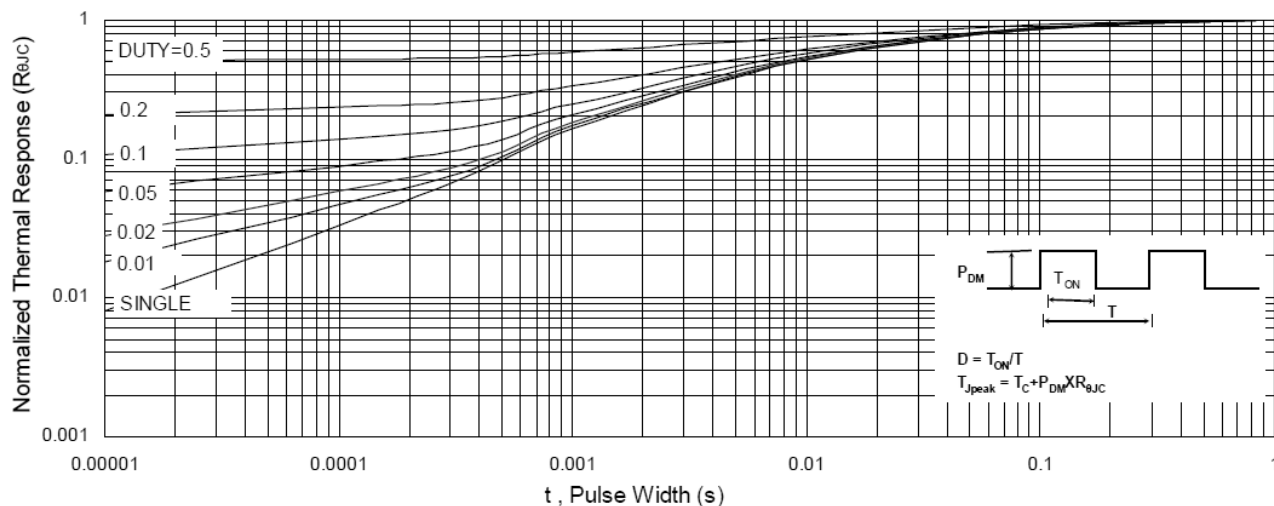


Fig.9 Normalized Maximum Transient Thermal Impedance

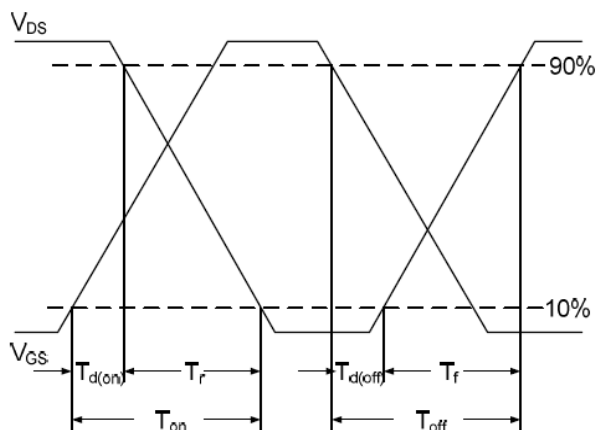


Fig.10 Switching Time Waveform

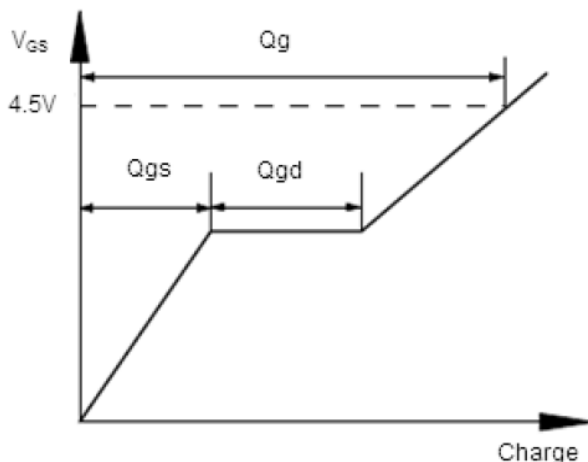


Fig.11 Gate Charge Waveform

P-CHANNEL CHARACTERISTIC CURVE

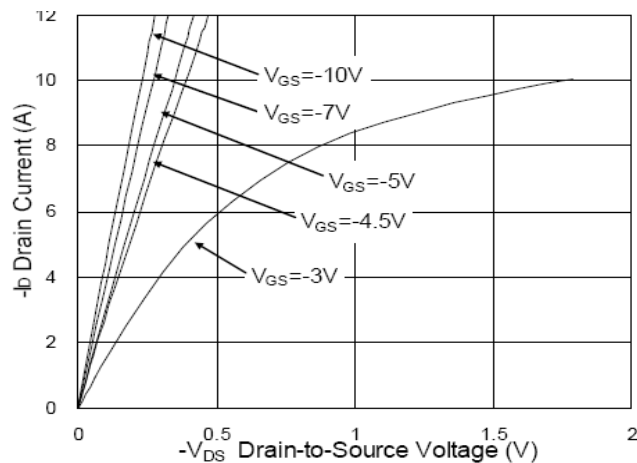


Fig.1 Typical Output Characteristics

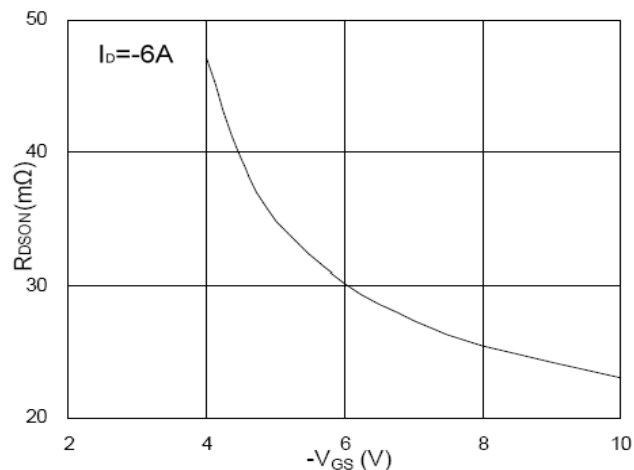


Fig.2 On-Resistance v.s Gate-Source

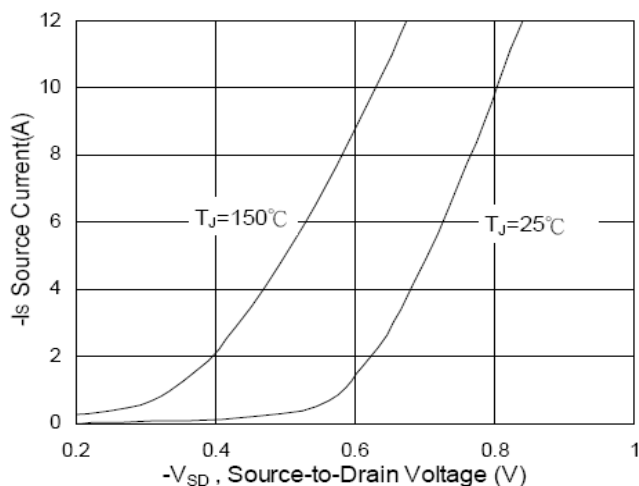


Fig.3 Forward Characteristics of Reverse

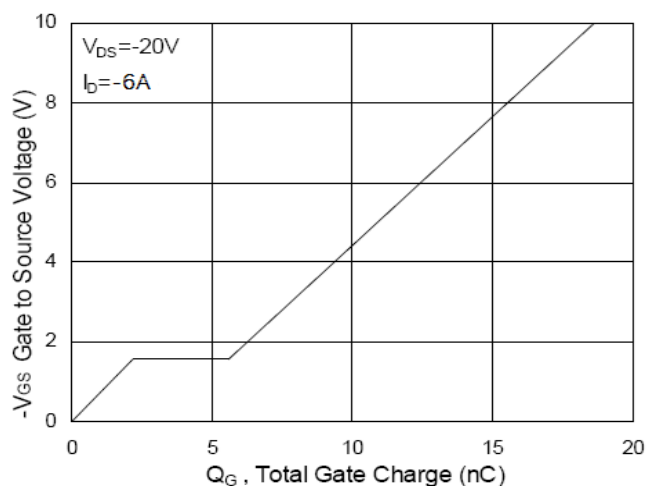


Fig.4 Gate-Charge Characteristics

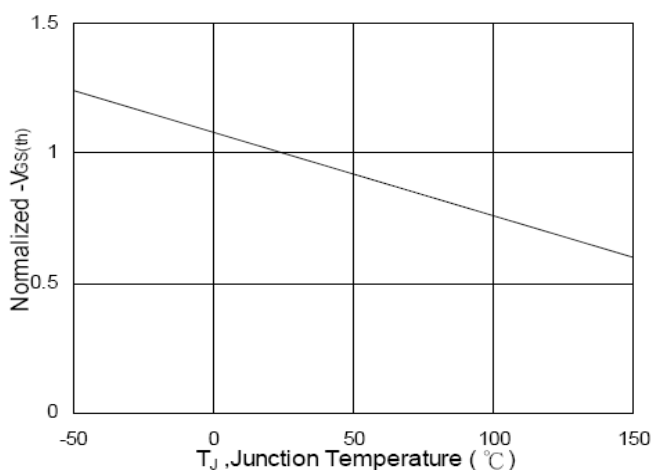


Fig.5 Normalized $V_{GS(th)}$ v.s T_J

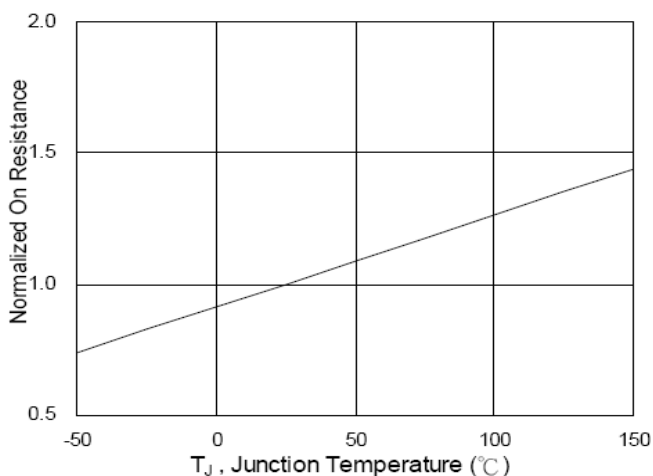


Fig.6 Normalized $R_{DS(ON)}$ v.s T_J

P-CHANNEL CHARACTERISTIC CURVE

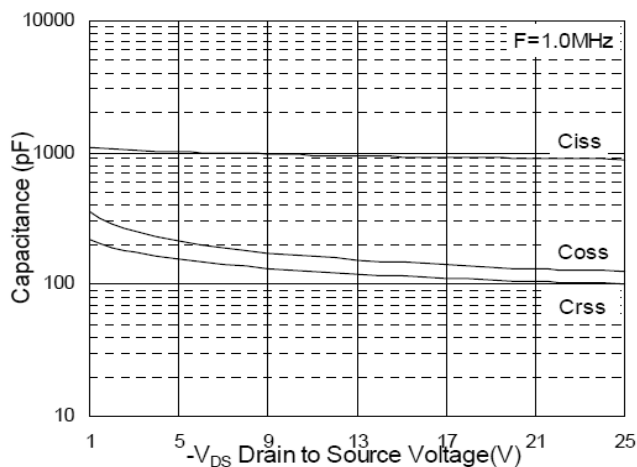


Fig.7 Capacitance

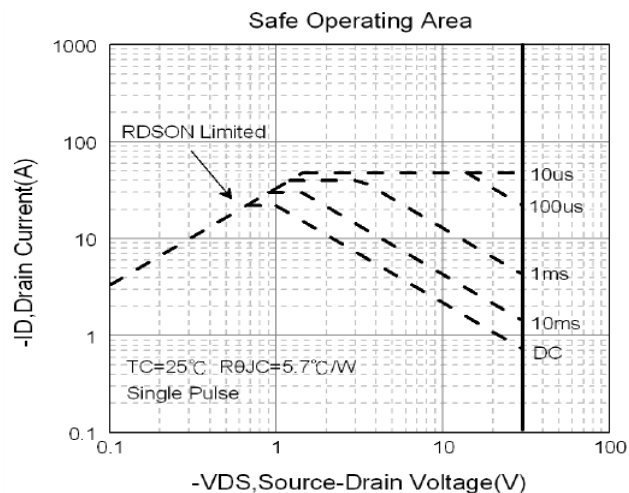


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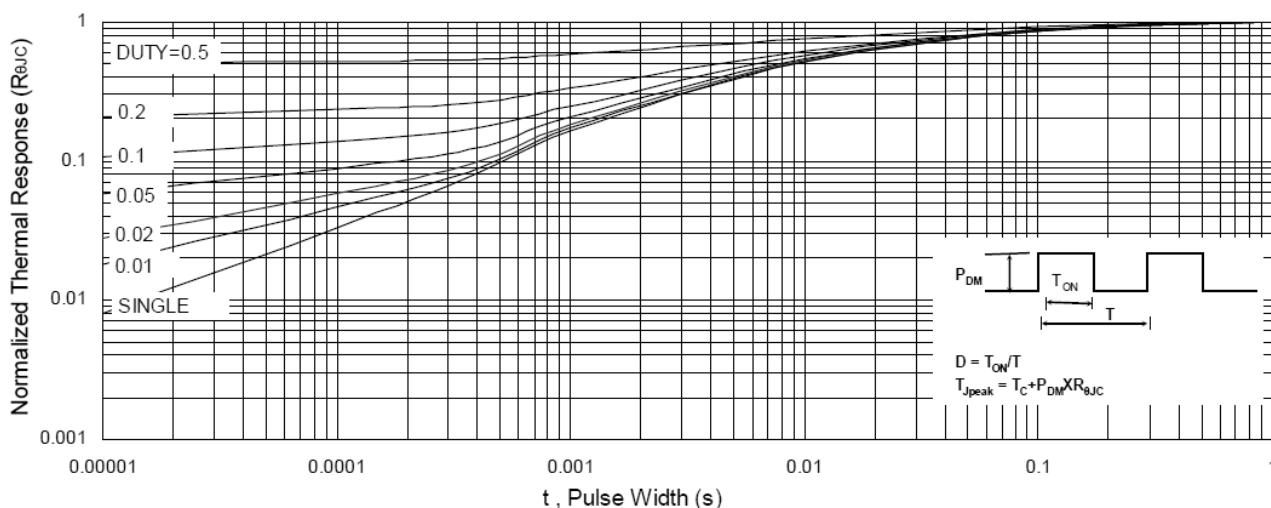


Fig.9 Normalized Maximum Transient Thermal Impedance

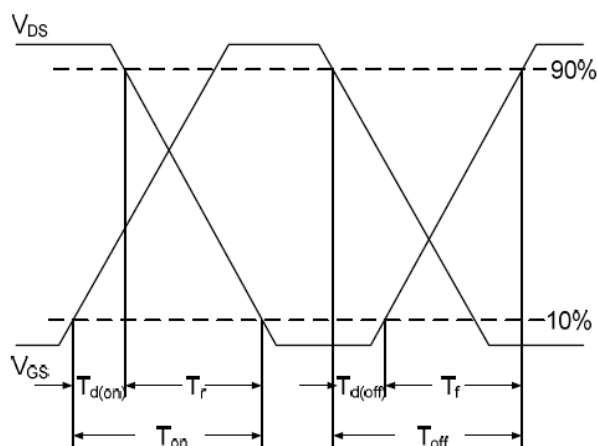


Fig.10 Switching Time Waveform

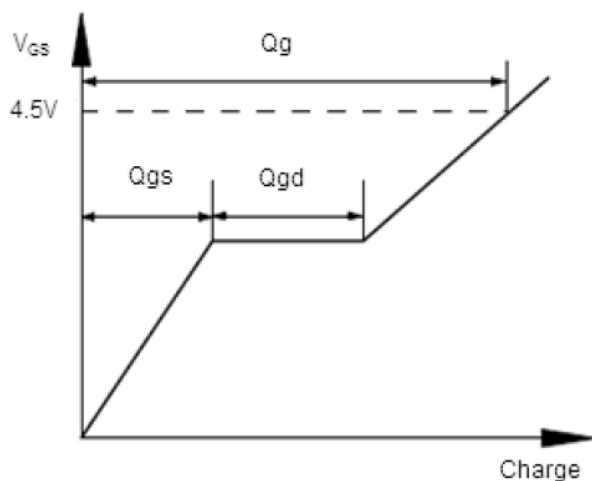


Fig.11 Gate Charge Waveform