

SSG4503

N-Ch: 6.9A, 30V, $R_{DS(ON)}$ 25 m Ω
P-Ch: -6.3A, -30V, $R_{DS(ON)}$ 36 m Ω
N & P-Ch Enhancement Mode Power MOSFET

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

DESCRIPTION

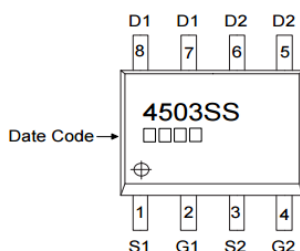
The SSG4503 is the highest performance trench N-ch and P-ch MOSFETs with extreme high cell density, which provide excellent $R_{DS(ON)}$ and gate charge for most of the synchronous buck converter applications.

The SSG4503 meet the RoHS and Green Product requirement with full function reliability approved.

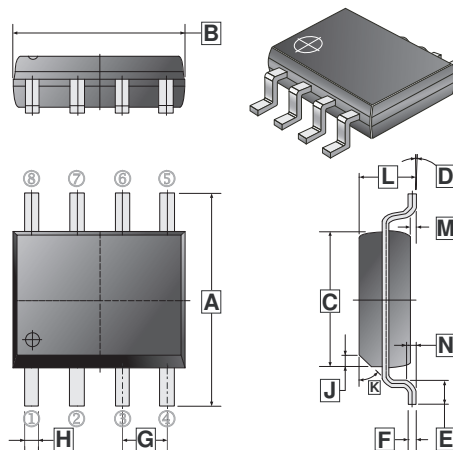
FEATURES

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

MARKING



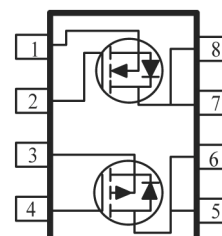
SOP-8



REF.	Millimeter		REF.	Millimeter	
	Min.	Max.		Min.	Max.
A	5.79	6.20	H	0.33	0.51
B	4.70	5.11	J	0.375 REF.	
C	3.80	4.00	K	45° REF.	
D	0°	8°	L	1.3	1.752
E	0.40	1.27	M	0	0.25
F	0.10	0.25	N	0.25 REF.	
G	1.27 TYP.				

PACKAGE INFORMATION

Package	MPQ	Leader Size
SOP-8	2.5K	13 inch



ABSOLUTE MAXIMUM RATINGS ($T_A=25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Rating		Unit	
		N-CH	P-CH		
Drain-Source Voltage	V_{DS}	30	-30	V	
Gate-Source Voltage	V_{GS}	± 20		V	
Continuous Drain Current ¹ @ $V_{GS}=10\text{V}$	I_D	$T_A=25^\circ\text{C}$	6.9	-6.3	A
		$T_A=70^\circ\text{C}$	5.5	-5	A
Pulsed Drain Current ³	I_{DM}	27	-25	A	
Total Power Dissipation	P_D	1.5		W	
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55~150		$^\circ\text{C}$	
Thermal Resistance Rating					
Thermal Resistance from Junction to Ambient ¹	$R_{\theta JA}$	85		$^\circ\text{C}/\text{W}$	
Thermal Resistance from Junction to Ambient ²	$R_{\theta JA}$	135			
Thermal Resistance from Junction to Case ¹	$R_{\theta JC}$	40			

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

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Condition
Drain-Source Breakdown Voltage	BV_{DSS}	30	-	-	V	$V_{GS}=0, I_D=250\mu\text{A}$
Gate Threshold Voltage	$V_{GS(th)}$	1	-	3	V	$V_{DS}=V_{GS}, I_D=250\mu\text{A}$
Forward Transfer conductance	gfs	-	6	-	S	$V_{DS}=5\text{V}, I_D=6\text{A}$
Gate-Source Leakage Current	I_{GSS}	-	-	± 100	nA	$V_{DS}=0, V_{GS}=\pm 20\text{V}$
Drain-Source Leakage Current	I_{DSS}	-	-	1	μA	$V_{DS}=24\text{V}, V_{GS}=0, T_J=25^\circ\text{C}$
Drain-Source Leakage Current	I_{DSS}	-	-	5	μA	$V_{DS}=24\text{V}, V_{GS}=0, T_J=55^\circ\text{C}$
Drain-Source On-Resistance ⁴	$R_{DS(ON)}$	-	-	25	m Ω	$V_{GS}=10\text{V}, I_D=6\text{A}$
		-	-	30		$V_{GS}=4.5\text{V}, I_D=4\text{A}$
Total Gate Charge	Q_g	-	6	-	nC	$V_{DS}=15\text{V}$ $V_{GS}=4.5\text{V}$ $I_D=6\text{A}$
Gate-Source Charge	Q_{gs}	-	2.5	-		
Gate-Drain Charge	Q_{gd}	-	2.1	-		
Turn-On Delay Time	$T_{d(on)}$	-	2.4	-	nS	$V_{DS}=15\text{V}$ $V_{GS}=10\text{V}$ $R_G=3.3\Omega$ $I_D=6\text{A}$
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	$V_{DS}=15\text{V}$ $V_{GS}=0$ $f=1\text{MHz}$
Output Capacitance	C_{oss}	-	80	-		
Reverse Transfer Capacitance	C_{rss}	-	65	-		
Source-Drain Diode						
Continuous Source Current ¹	I_S	-	-	6.9	A	
Pulsed Source Current ³	I_{SM}	-	-	27	A	
Forward On Voltage ⁴	V_{SD}	-	-	1.2	V	$I_S=6\text{A}, V_{GS}=0\text{V}, T_J=25^\circ\text{C}$

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

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Condition
Drain-Source Breakdown Voltage	BV_{DSS}	-30	-	-	V	$V_{GS}=0, I_D = -250\mu\text{A}$
Gate Threshold Voltage	$V_{GS(th)}$	-1	-	-3	V	$V_{DS}=V_{GS}, I_D = -250\mu\text{A}$
Forward Transfer conductance	g_{fs}	-	13	-	S	$V_{DS} = -5\text{V}, I_D = -6\text{A}$
Gate-Source Leakage Current	I_{GSS}	-	-	± 100	nA	$V_{DS}=0, V_{GS} = \pm 20\text{V}$
Gate-Source Leakage Current	I_{DSS}	-	-	-1	μA	$V_{DS} = -24\text{V}, V_{GS}=0, T_J=25^\circ\text{C}$
Gate-Source Leakage Current	I_{DSS}	-	-	-5	μA	$V_{DS} = -24\text{V}, V_{GS}=0, T_J=55^\circ\text{C}$
Drain-Source On-Resistance ⁴	$R_{DS(ON)}$	-	-	36	m Ω	$V_{GS} = -10\text{V}, I_D = -6\text{A}$
		-	-	45		$V_{GS} = -4.5\text{V}, I_D = -4\text{A}$
Total Gate Charge	Q_g	-	9.8	-	nC	$V_{DS} = -20\text{V}$ $V_{GS} = -4.5\text{V}$ $I_D = -6\text{A}$
Gate-Source Charge	Q_{gs}	-	2.2	-		
Gate-Drain Charge	Q_{gd}	-	3.4	-		
Turn-On Delay Time	$T_{d(on)}$	-	16.4	-	nS	$V_{DS} = -24\text{V}$ $V_{GS} = -10\text{V}$ $R_G = 3.3\Omega$ $I_D = -1\text{A}$
Rise Time	T_r	-	20.2	-		
Turn-Off Delay Time	$T_{d(off)}$	-	55	-		
Fall Time	T_f	-	10	-		
Input Capacitance	C_{iss}	-	1050	-	pF	$V_{DS} = -15\text{V}$ $V_{GS} = 0$ $f = 1\text{MHz}$
Output Capacitance	C_{oss}	-	148	-		
Reverse Transfer Capacitance	C_{rss}	-	115	-		
Source-Drain Diode						
Continuous Source Current ¹	I_S	-	-	-6.3	A	
Pulsed Source Current ³	I_{SM}	-	-	-25	A	
Forward On Voltage ⁴	V_{SD}	-	-	-1.2	V	$I_S = -6\text{A}, V_{GS} = 0\text{V}, T_J = 25^\circ\text{C}$

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 $\leq 300\mu\text{s}$, duty cycle $\leq 2\%$
4. The data tested by pulsed, pulse width $\leq 300\mu\text{s}$, duty cycle $\leq 2\%$

N-Ch TYPICAL CHARACTERISTIC CURVES

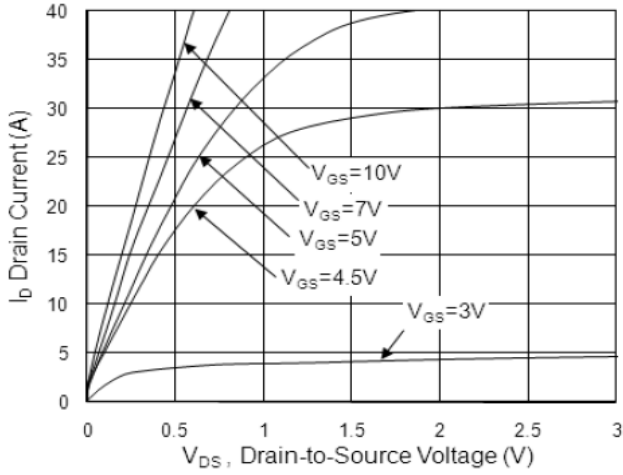


Fig.1 Typical Output Characteristics

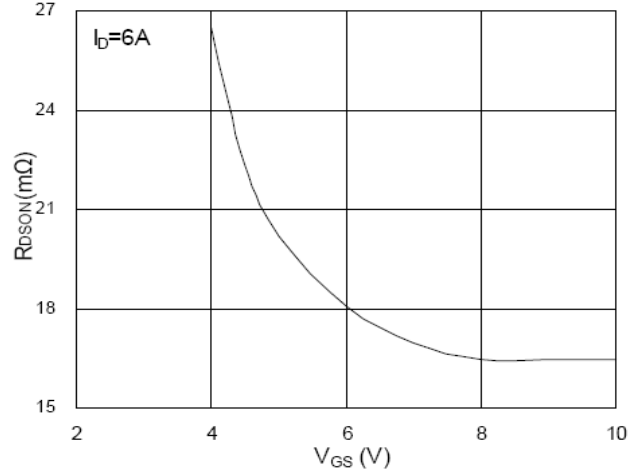


Fig.2 On-Resistance vs. Gate-Source

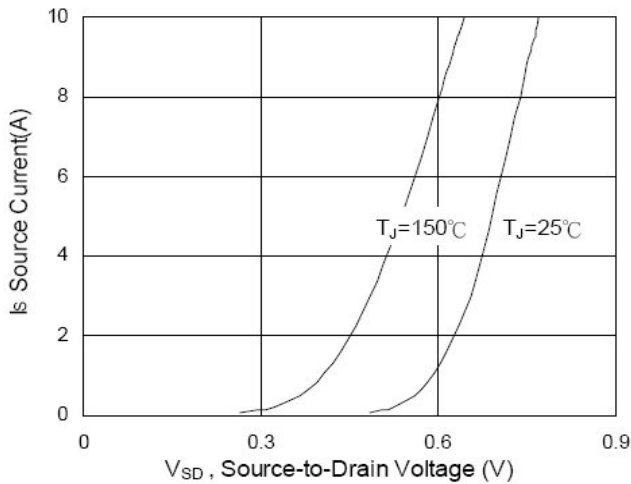


Fig.3 Forward Characteristics Of Reverse

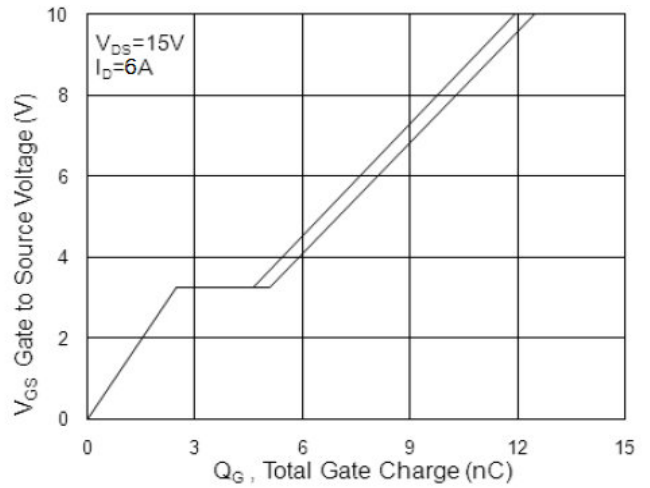


Fig.4 Gate-Charge Characteristics

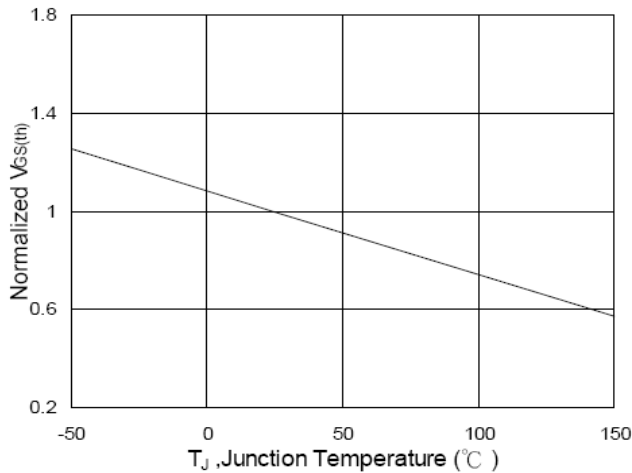


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

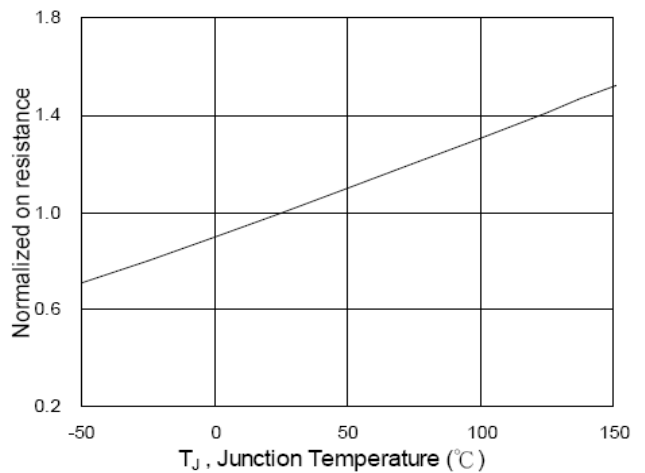


Fig.6 Normalized $R_{DS(on)}$ vs. T_J

N-Ch TYPICAL CHARACTERISTIC CURVES

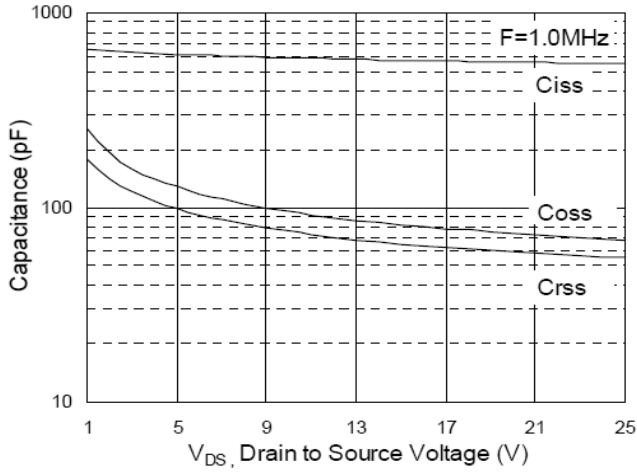


Fig.7 Capacitance

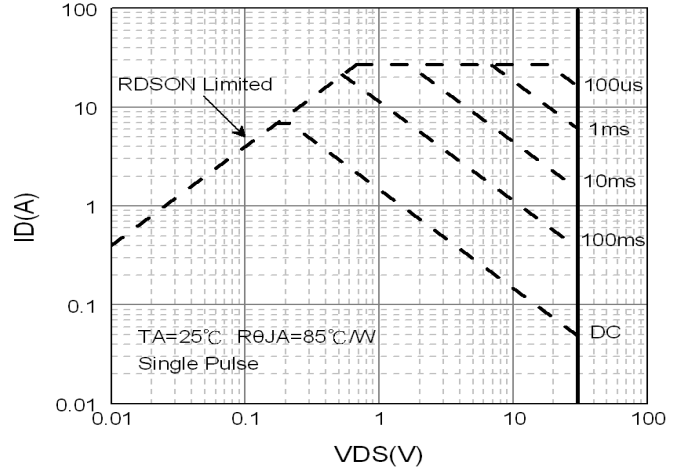


Fig.8 Safe Operating Area

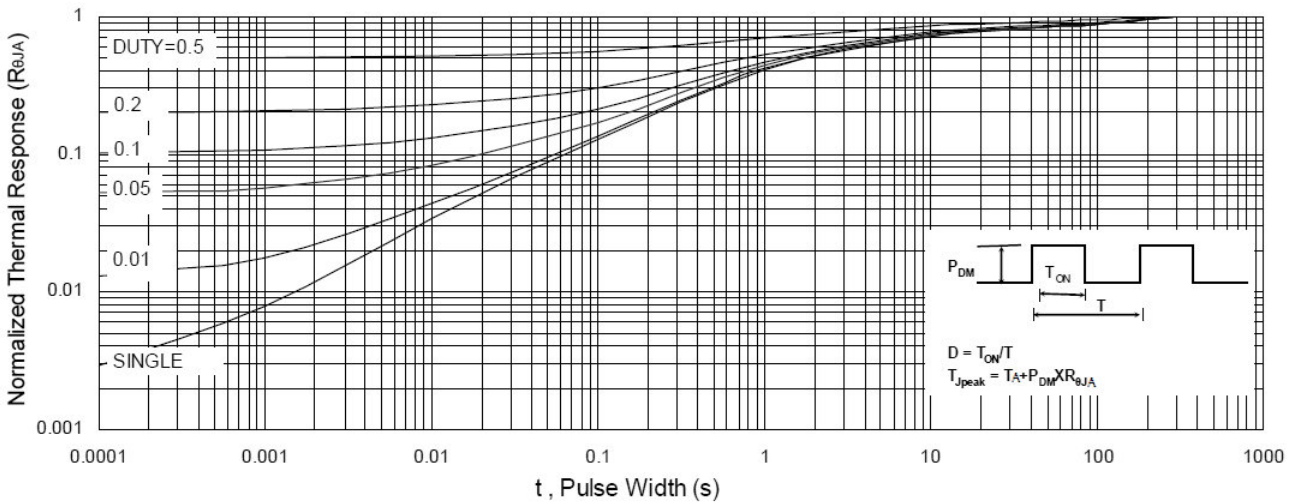


Fig.9 Normalized Maximum Transient Thermal Impedance

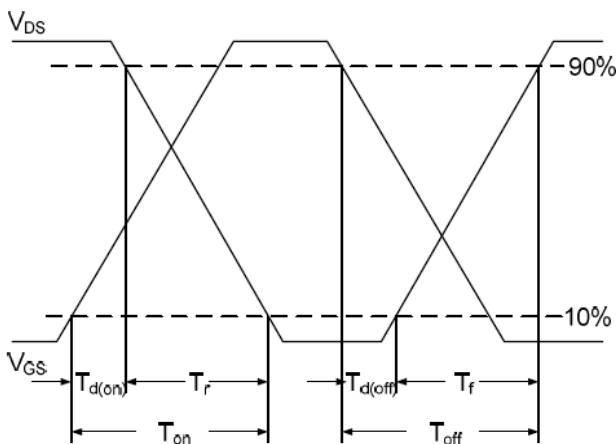


Fig.10 Switching Time Waveform

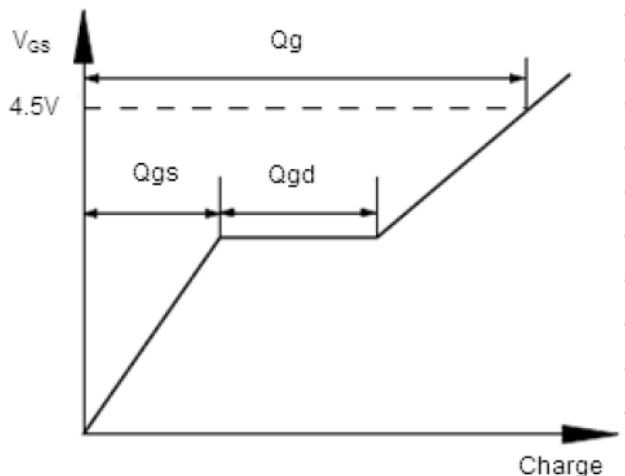


Fig.11 Gate Charge Waveform

P-Ch TYPICAL CHARACTERISTIC CURVES

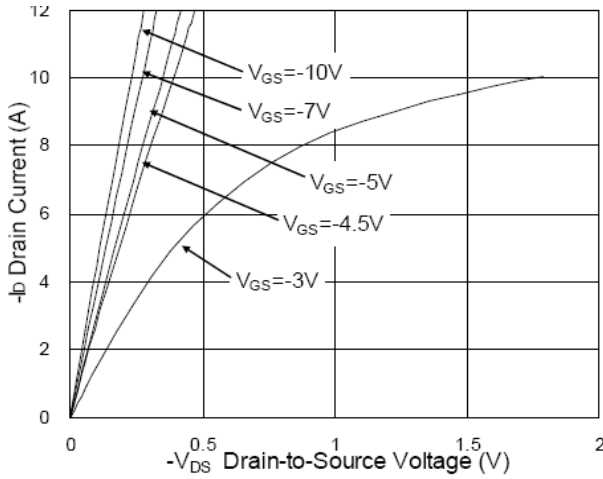


Fig.1 Typical Output Characteristics

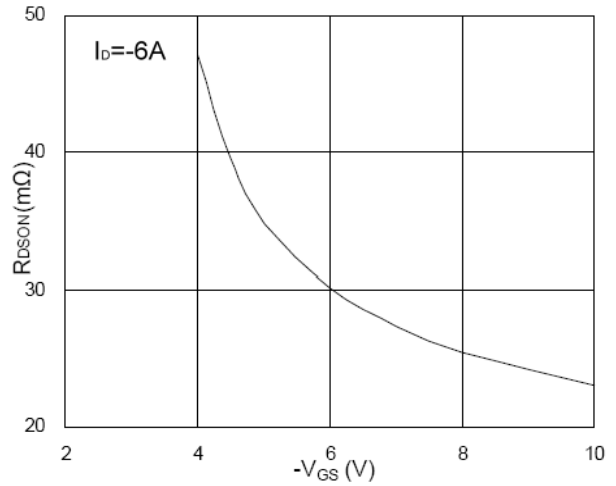


Fig.2 On-Resistance v.s Gate-Source

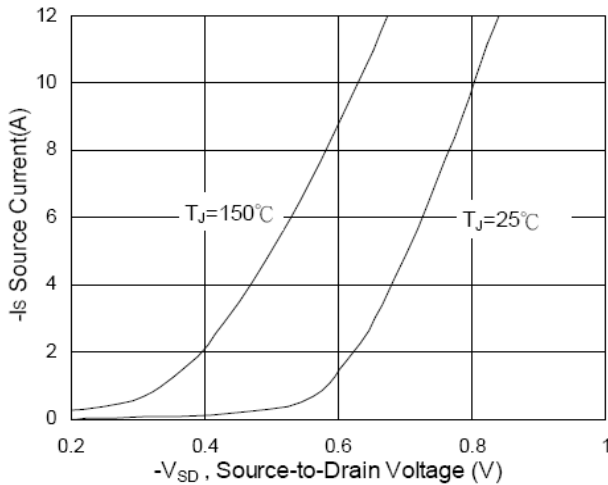


Fig.3 Forward Characteristics of Reverse

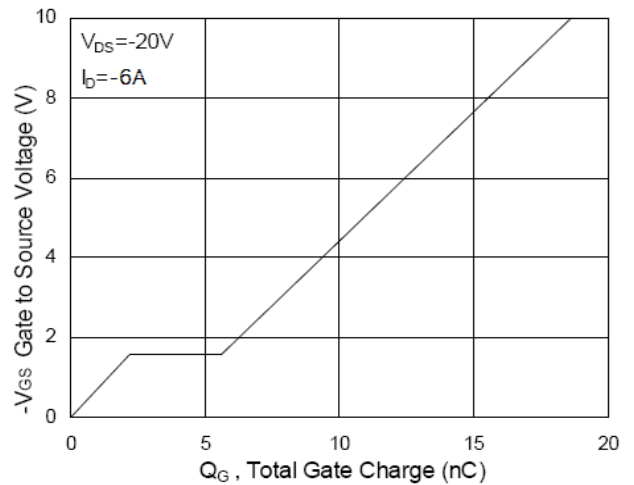


Fig.4 Gate-Charge Characteristics

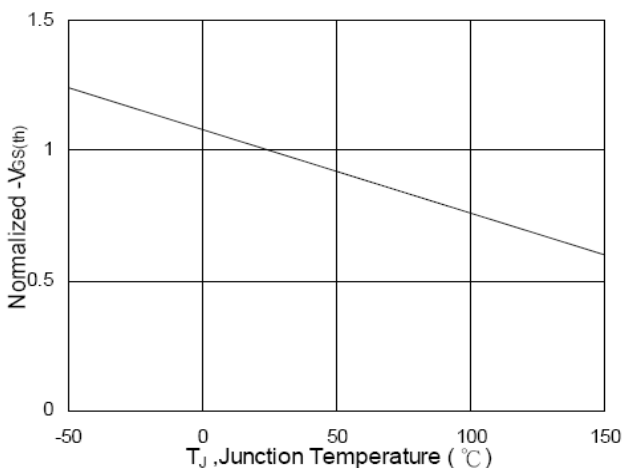


Fig.5 Normalized $V_{GS(th)}$ v.s T_J

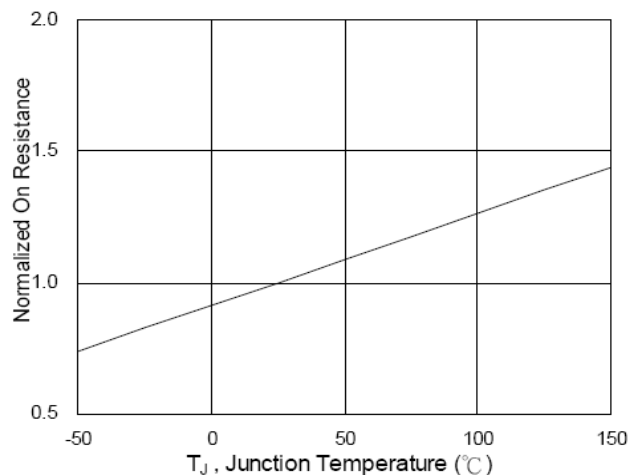


Fig.6 Normalized $R_{DS(ON)}$ v.s T_J

P-Ch TYPICAL CHARACTERISTIC CURVES

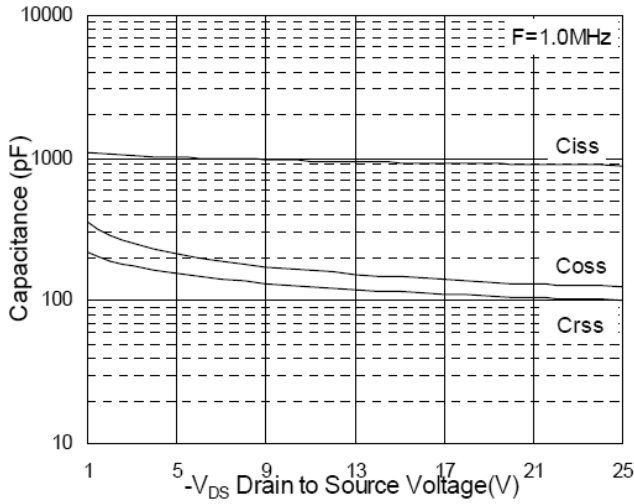


Fig.7 Capacitance

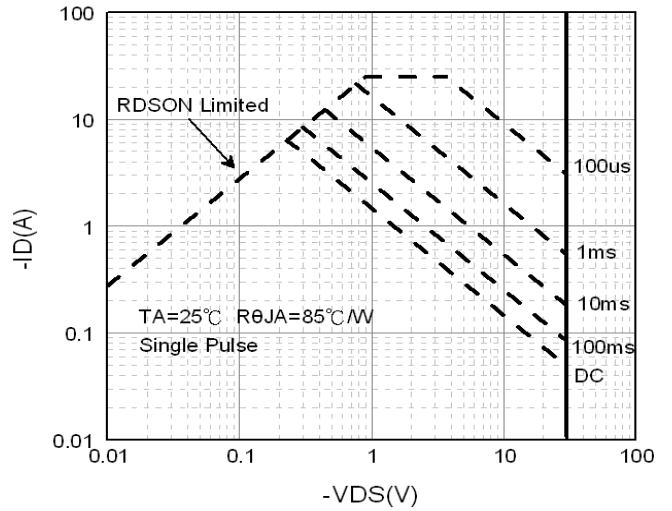


Fig.8 Safe Operating Area

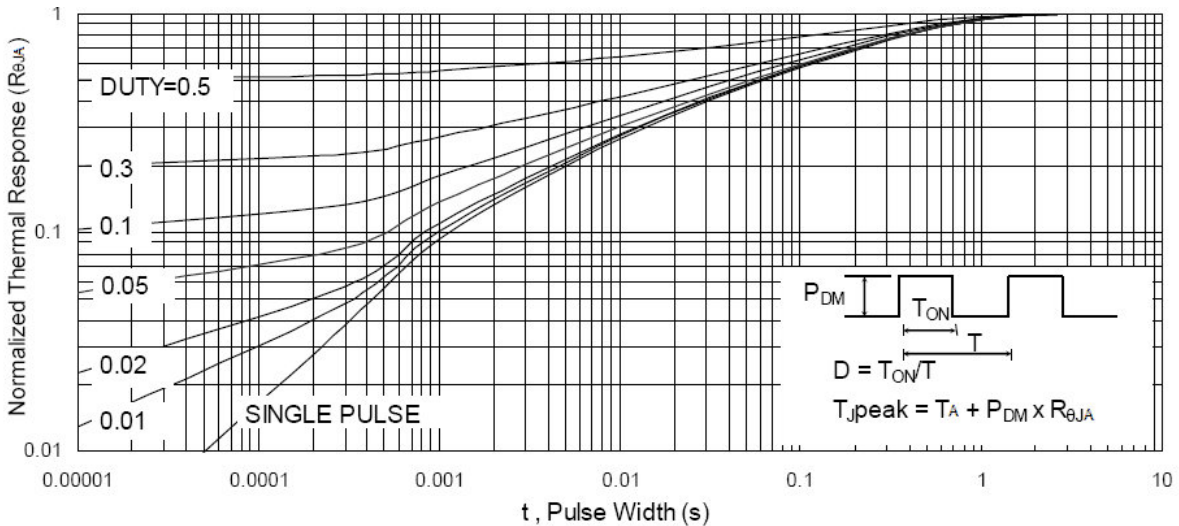


Fig.9 Normalized Maximum Transient Thermal Impedance

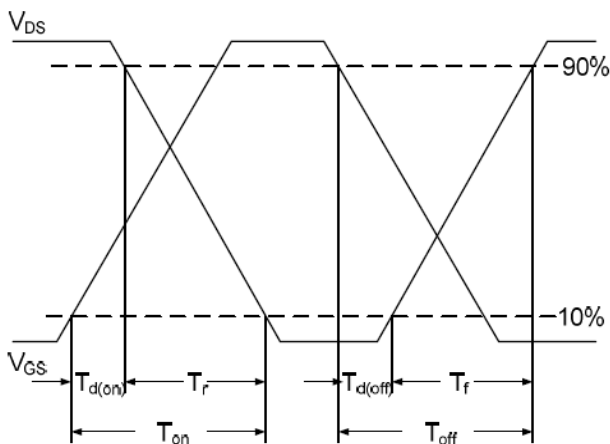


Fig.10 Switching Time Waveform

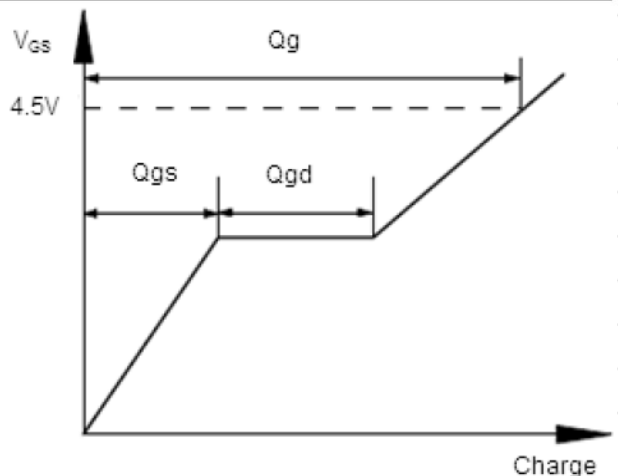


Fig.11 Gate Charge Waveform