

SSG8603-C

N-Ch: 10.4A, 30V, $R_{DS(ON)}$ 12m Ω
P-Ch: -7.8A, -30V, $R_{DS(ON)}$ 20m Ω
N & P-Ch Enhancement Mode Power MOSFET

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

DESCRIPTION

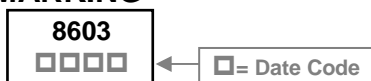
The SSG8603-C is the highest performance trench N-ch and P-ch MOSFETs with extreme high cell density, which provide excellent $R_{DS(ON)}$ and gate charge for most of the synchronous buck converter applications.

The SSG8603-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



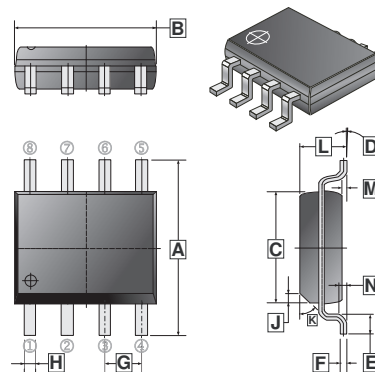
PACKAGE INFORMATION

Package	MPQ	Leader Size
SOP-8	2.5K	13 inch

ORDER INFORMATION

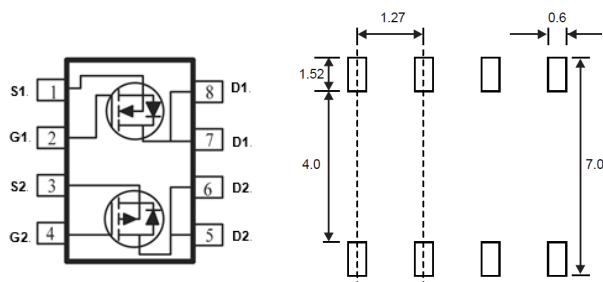
Part Number	Type
SSG8603-C	Lead (Pb)-free and Halogen-free

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.				

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		V
Continuous Drain Current ¹ @ $V_{GS}=10V$	$T_A=25^\circ C$	10.4	-7.8	A
	$T_A=70^\circ C$	8.3	-6.2	
Pulsed Drain Current ³	I_{DM}	36	-32	A
Total Power Dissipation ¹	$T_A=25^\circ C$	2		W
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55~150		$^\circ C$
Thermal Data				
Thermal Resistance Junction-Ambient ¹	$R_{\theta JA}$	$t \leq 10s, 62$		$^\circ C/W$
		Steady State, 83		
Thermal Resistance Junction-Ambient ²		135		
Thermal Resistance Junction-Case ¹	$R_{\theta JC}$	50		

N-CH 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	$V_{GS}=0, I_D=250\mu\text{A}$	
Gate Threshold Voltage	$V_{GS(th)}$	1	-	2.5	V	$V_{DS}=V_{GS}, I_D=250\mu\text{A}$	
Forward Transconductance	g_{fs}	-	34	-	S	$V_{DS}=5\text{V}, I_D=30\text{A}$	
Gate-Source Leakage Current	I_{GSS}	-	-	± 100	nA	$V_{GS}=\pm 20\text{V}$	
Drain-Source Leakage Current	I_{DSS}	$T_J=25^\circ\text{C}$	-	-	1	μA	$V_{DS}=24\text{V}, V_{GS}=0$
		$T_J=55^\circ\text{C}$	-	-	5		
Static Drain-Source On-Resistance ⁴	$R_{DS(ON)}$	-	-	12	m Ω	$V_{GS}=10\text{V}, I_D=9\text{A}$	
		-	-	18		$V_{GS}=4.5\text{V}, I_D=5\text{A}$	
Total Gate Charge	Q_g	-	9.8	-	nC	$I_D=9\text{A}$ $V_{DS}=15\text{V}$ $V_{GS}=4.5\text{V}$	
Gate-Source Charge	Q_{gs}	-	4.2	-			
Gate-Drain ("Miller") Charge	Q_{gd}	-	3.6	-			
Turn-on Delay Time	$T_{d(on)}$	-	4	-	nS	$V_{DD}=15\text{V}$ $V_{GS}=10\text{V}$ $I_D=9\text{A}$ $R_G=3.3\Omega$	
Rise Time	T_r	-	8	-			
Turn-off Delay Time	$T_{d(off)}$	-	31	-			
Fall Time	T_f	-	4	-			
Input Capacitance	C_{iss}	-	940	-	pF	$V_{GS}=0$ $V_{DS}=15\text{V}$ $f=1\text{MHz}$	
Output Capacitance	C_{oss}	-	131	-			
Reverse Transfer Capacitance	C_{rss}	-	109	-			
Source-Drain Diode							
Forward on Voltage ⁴	V_{SD}	-	-	1.2	V	$I_S=1\text{A}, V_{GS}=0$	
Continuous Source Current ¹	I_S	-	-	10.4	A		
Pulsed Source Current ³	I_{SM}	-	-	36	A		
Reverse Recovery Time	T_{rr}	-	8.5	-	nS	$I_F=9\text{A}, dI/dt=100\text{A}/\mu\text{s},$ $T_J=25^\circ\text{C}$	
Reverse Recovery Charge	Q_{rr}	-	2.2	-	nC		

Notes:

- Surface mounted on a 1 inch² FR-4 board with 2oz copper.
- When mounted on Min. copper pad.
- Pulse width limited by maximum junction temperature, Pulse Width $\leq 300\mu\text{s}$, Duty Cycle $\leq 2\%$.
- Pulse Test: Pulse Width $\leq 300\mu\text{s}$, Duty Cycle $\leq 2\%$.

P-CH 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	$V_{GS}=0, I_D = -250\mu\text{A}$	
Gate Threshold Voltage	$V_{GS(th)}$	-1	-	-2.5	V	$V_{DS}=V_{GS}, I_D = -250\mu\text{A}$	
Forward Transconductance	g_{fs}	-	17	-	S	$V_{DS} = -5V, I_D = -6A$	
Gate-Source Leakage Current	I_{GSS}	-	-	± 100	nA	$V_{GS} = \pm 20V$	
Drain-Source Leakage Current	I_{DSS}	$T_J=25^\circ\text{C}$	-	-	-1	μA	$V_{DS} = -24V, V_{GS}=0$
		$T_J=55^\circ\text{C}$	-	-	-5		
Static Drain-Source On-Resistance ⁴	$R_{DS(ON)}$	-	-	20	m Ω	$V_{GS} = -10V, I_D = -6A$	
		-	-	32		$V_{GS} = -4.5V, I_D = -4A$	
Total Gate Charge	Q_g	-	12.6	-	nC	$I_D = -6A$ $V_{DS} = -15V$ $V_{GS} = -4.5V$	
Gate-Source Charge	Q_{gs}	-	4.8	-			
Gate-Drain ("Miller") Charge	Q_{gd}	-	4.8	-			
Turn-on Delay Time	$T_{d(on)}$	-	4.6	-	nS	$V_{DD} = -15V$ $V_{GS} = -10V$ $I_D = -6A$ $R_G = 3.3\Omega$	
Rise Time	T_r	-	14.8	-			
Turn-off Delay Time	$T_{d(off)}$	-	41	-			
Fall Time	T_f	-	19.6	-			
Input Capacitance	C_{iss}	-	1345	-	pF	$V_{GS}=0$ $V_{DS} = -15V$ $f=1\text{MHz}$	
Output Capacitance	C_{oss}	-	194	-			
Reverse Transfer Capacitance	C_{rss}	-	158	-			
Source-Drain Diode							
Forward On Voltage ⁴	V_{SD}	-	-	-1.2	V	$I_S = -1A, V_{GS}=0V$	
Continuous Source Current ¹	I_S	-	-	-7.8	A		
Pulsed Source Current ³	I_{SM}	-	-	-32	A		
Reverse Recovery Time	T_{rr}	-	16.3	-	nS	$I_F = -6A, di/dt=100A/\mu\text{s},$ $T_J=25^\circ\text{C}$	
Reverse Recovery Charge	Q_{rr}	-	5.9	-	nC		

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. Pulse Test: Pulse Width $\leq 300\mu\text{s}$, Duty Cycle $\leq 2\%$.

CHARACTERISTIC CURVE (N-Ch)

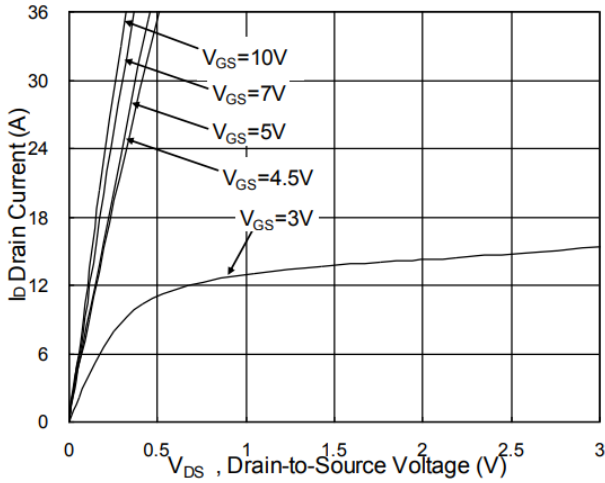


Fig.1 Typical Output Characteristics

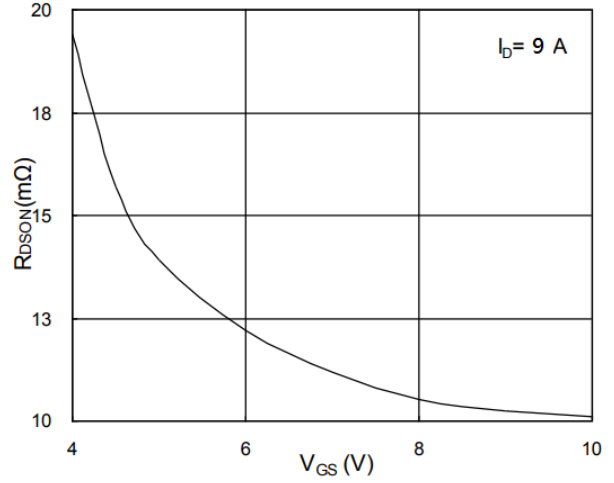


Fig.2 On-Resistance vs. G-S Voltage

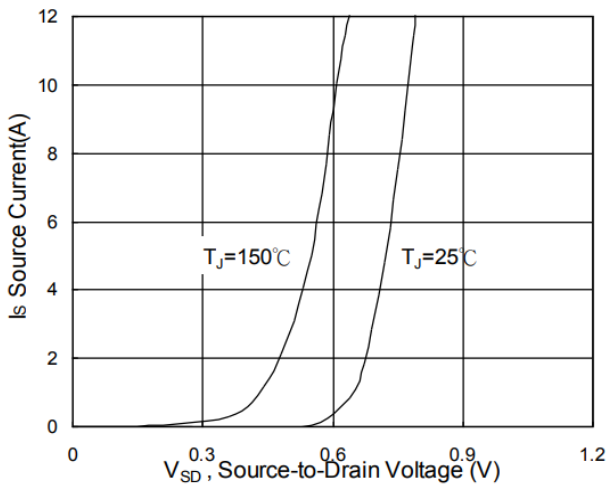


Fig.3 Forward Characteristics of Reverse

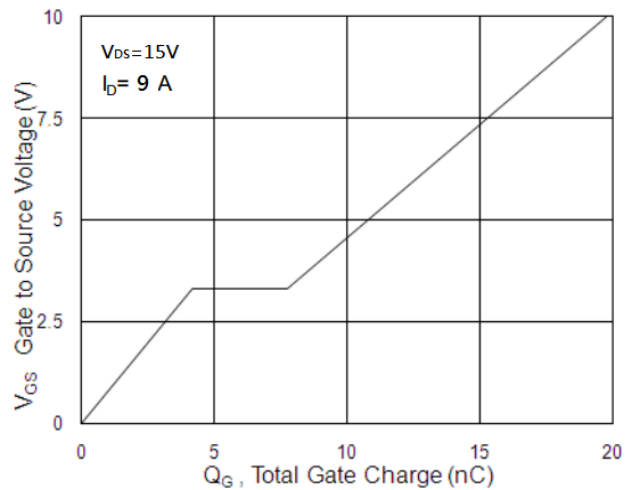


Fig.4 Gate-Charge Characteristics

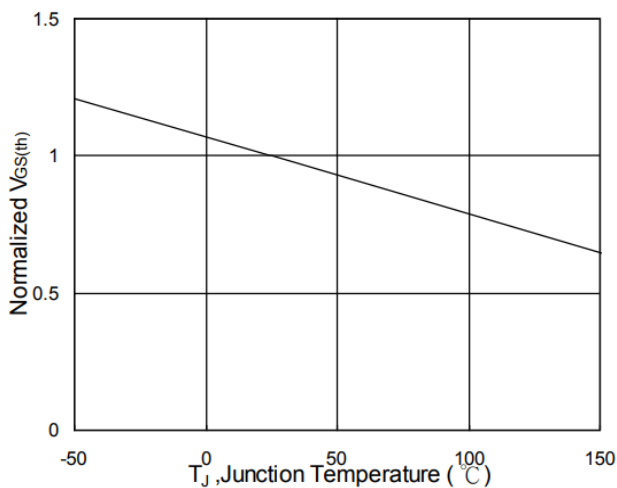


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

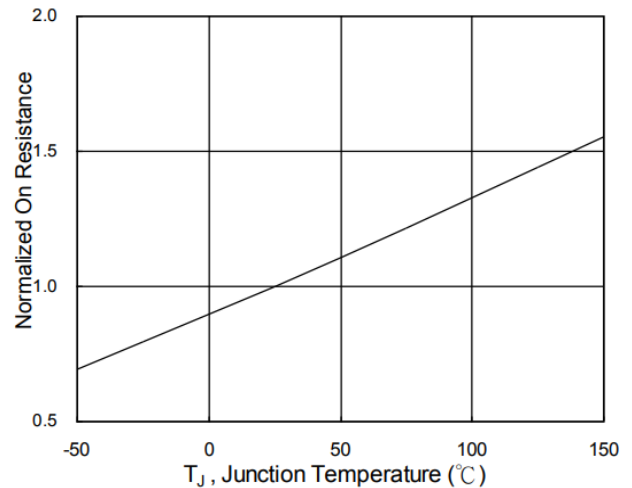


Fig.6 Normalized $R_{DS(ON)}$ vs. T_J

CHARACTERISTIC CURVE (N-Ch)

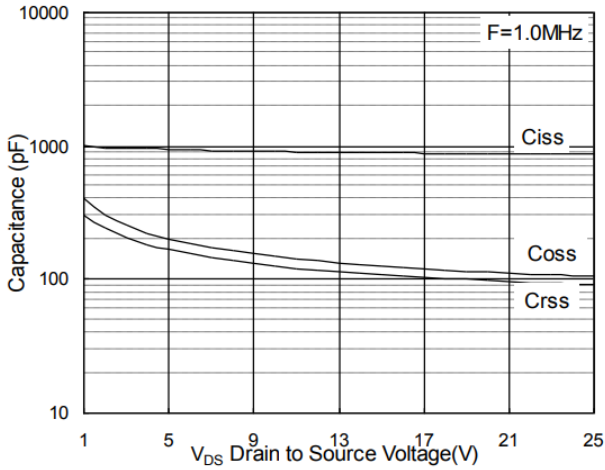


Fig.7 Capacitance

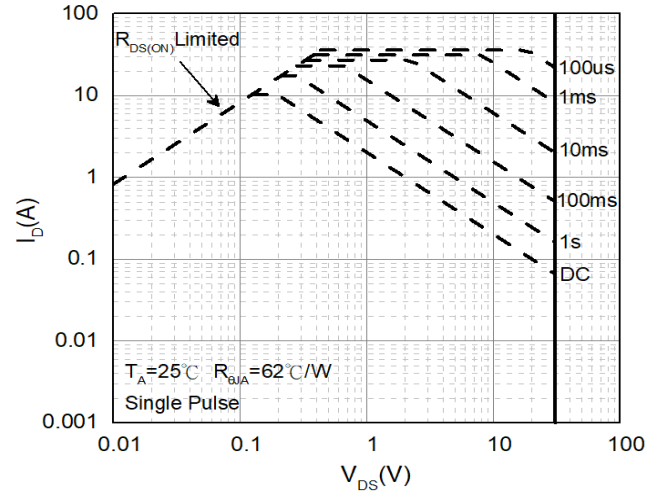


Fig.8 Safe Operating Area

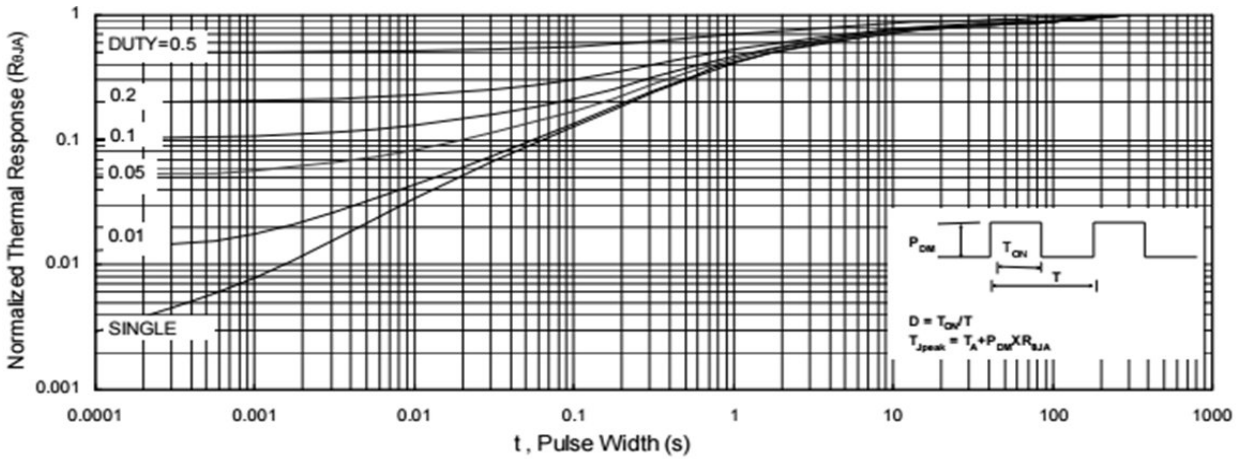


Fig.9 Normalized Maximum Transient Thermal Impedance

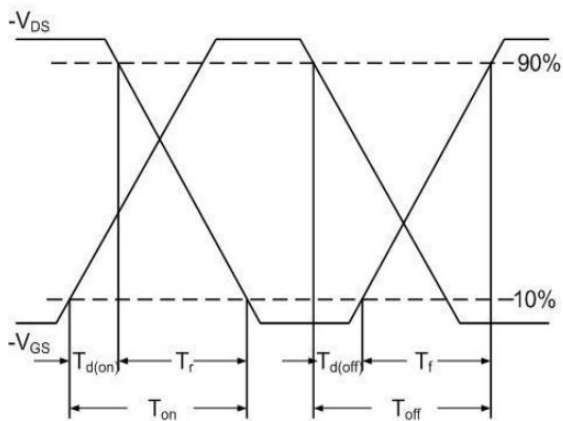


Fig.10 Switching Time Waveform

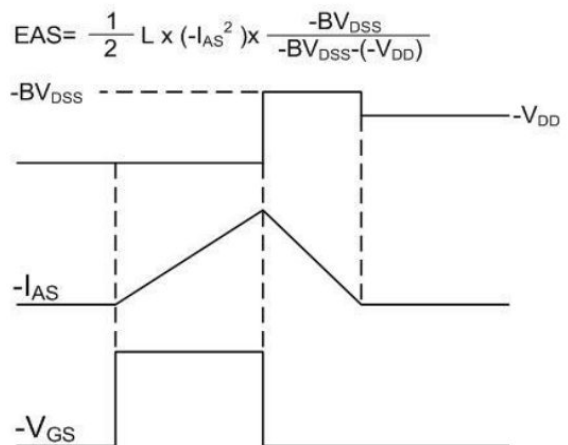


Fig.11 Unclamped Inductive Switching Waveform

CHARACTERISTIC CURVE (P-Ch)

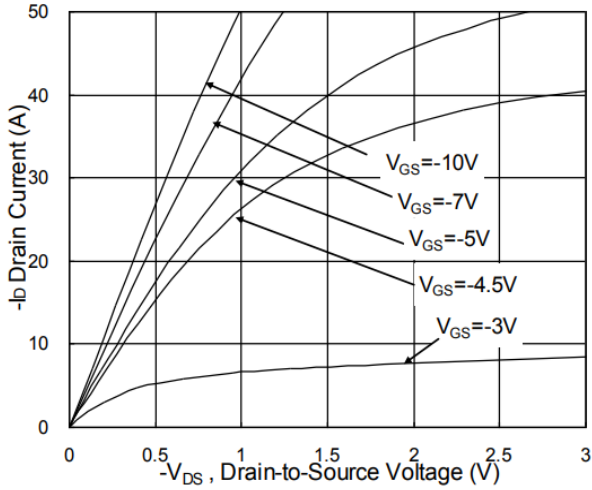


Fig.1 Typical Output Characteristics

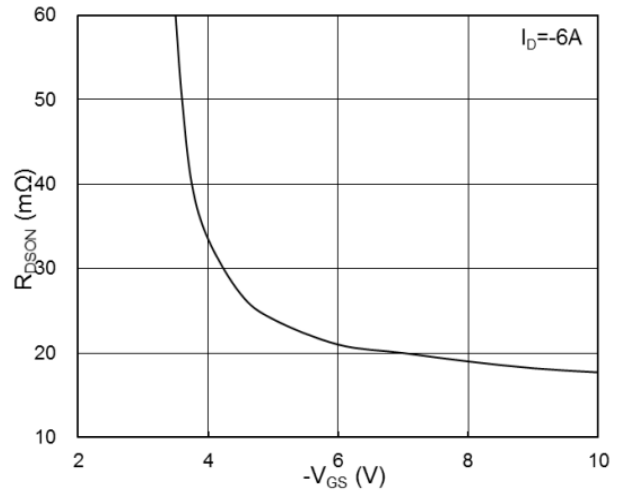


Fig.2 On-Resistance v.s Gate-Source

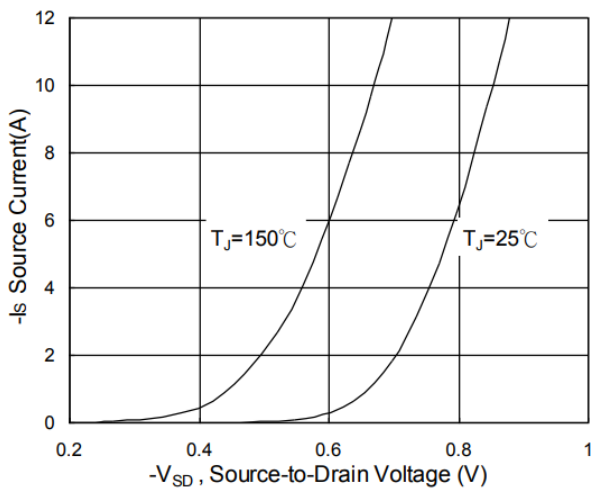


Fig.3 Forward Characteristics of Reverse

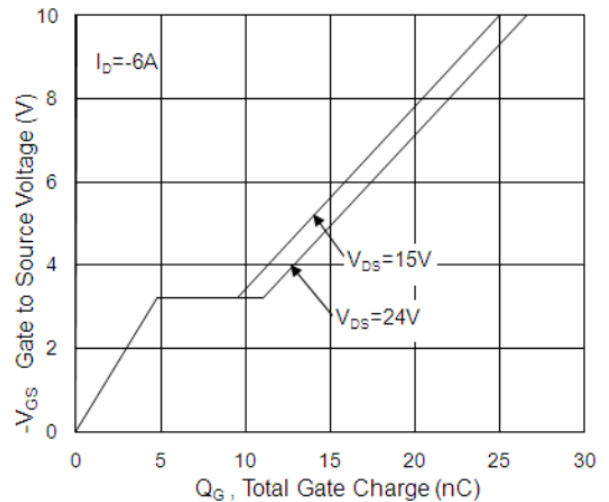


Fig.4 Gate-Charge Characteristics

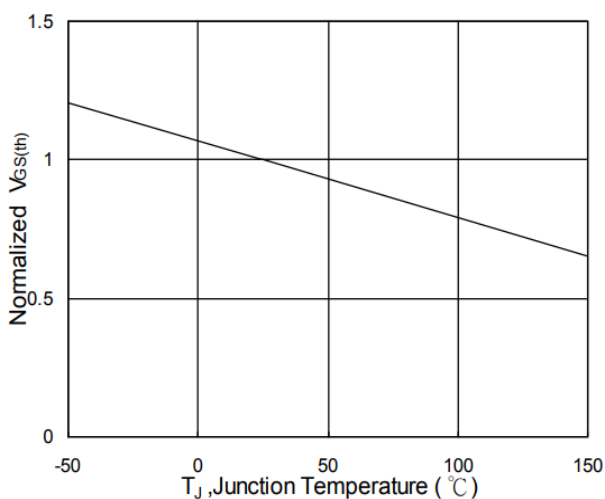


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

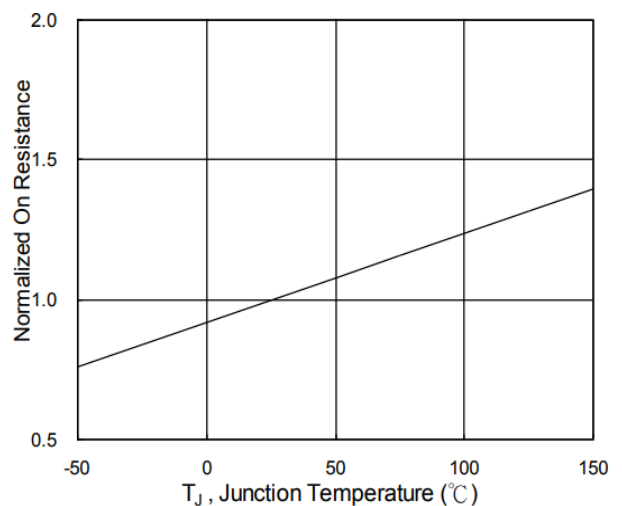


Fig.6 Normalized $R_{DS(ON)}$ vs. T_J

CHARACTERISTIC CURVE (P-Ch)

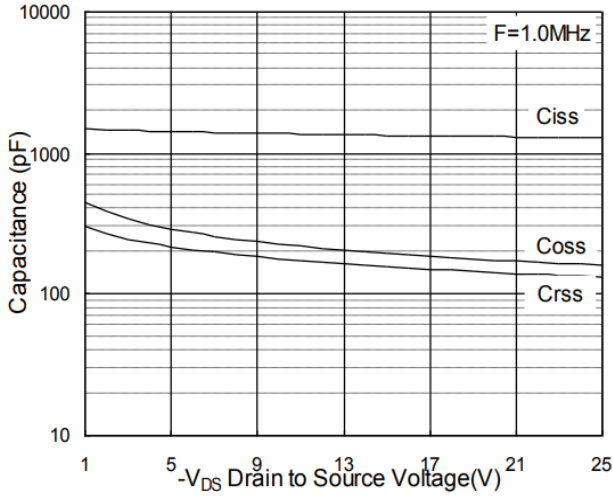


Fig.7 Capacitance

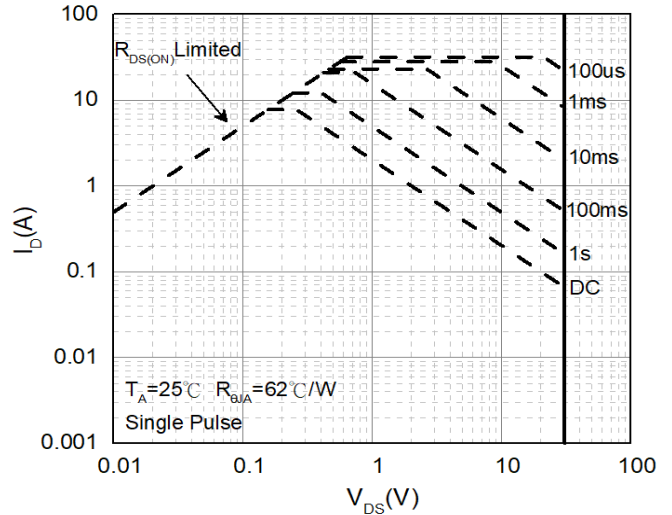


Fig.8 Safe Operating Area

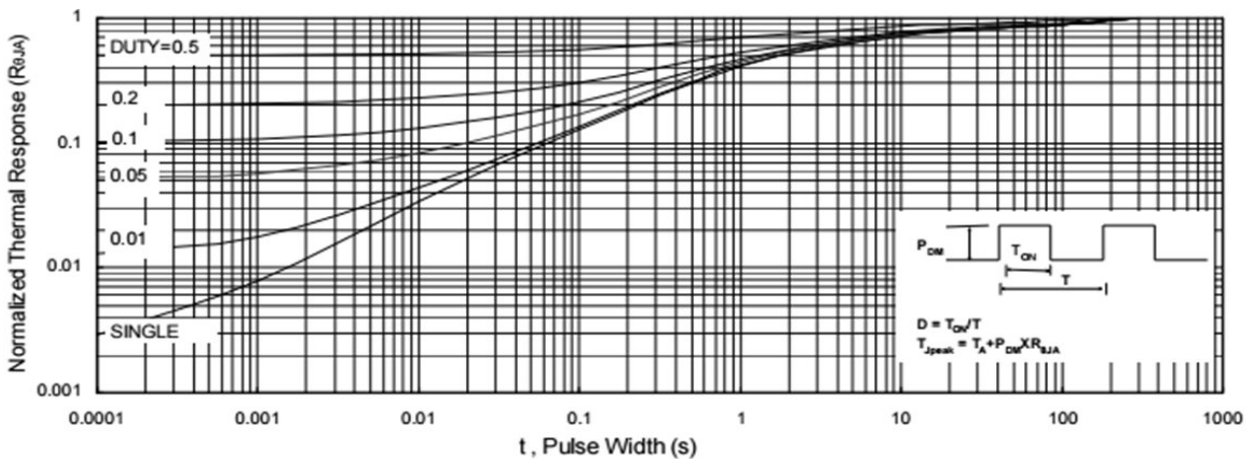


Fig.9 Normalized Maximum Transient Thermal Impedance

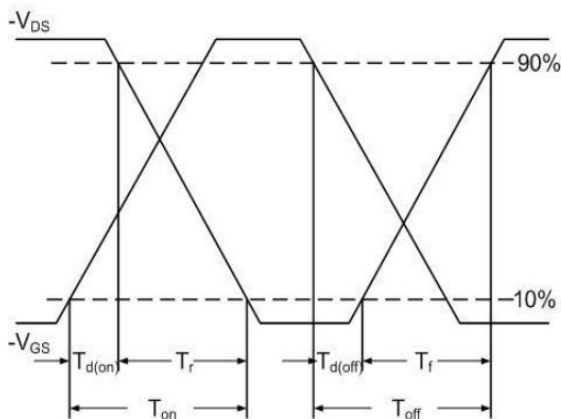


Fig.10 Switching Time Waveform

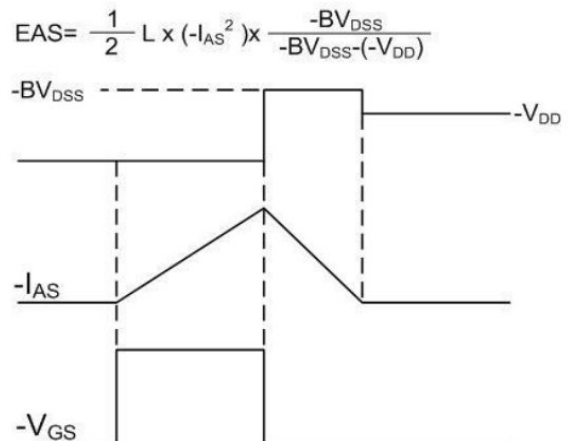


Fig.11 Unclamped Inductive Switching Waveform