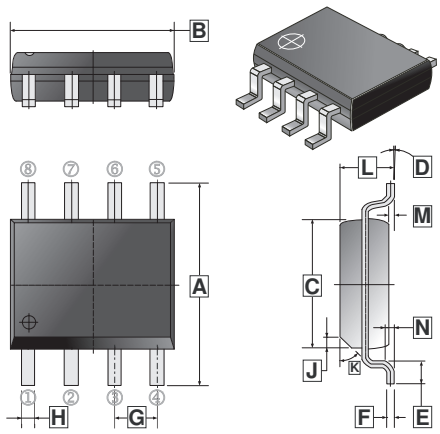
YEA SHIN TECHNOLOGY CO., LTD

YS4503M

N+P-Channel Enhancement MOSFET

N-ch: VDS= 30V, ID= 6.9A / P-ch: VDS = -30V, ID = -6.3A

SOP-8



DESCRIPTION

The YS4503M is the highest performance trench N-ch and P-ch MOSFETs with extreme high cell density, which provide excellent R_{DSON} and gate charge for most of the synchronous buck converter applications.

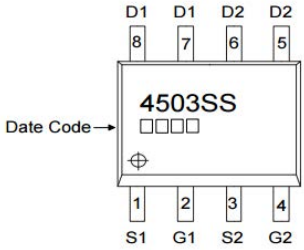
The YS4503M meet the RoHS and Green Product requirement with full function reliability approved.

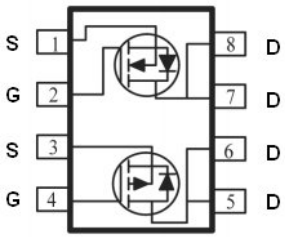
FEATURES

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

REF.	Millimeter Min.	Millimeter Max.	REF.	Millimeter Min.	Millimeter Max.
A	5.79	6.20	H	0.33	0.51
B	4.70	5.11	J	0.375 REF.	
C	3.70	4.10	K	45°REF.	
D	0°	8°	L	1.30	1.752
E	0.38	1.27	M	0.10	0.25
F	0.10	0.26	N	0.25 REF.	
G	1.27 TYP.				

MARKING





PACKAGE INFORMATION

Package	MPQ	Leader Size
SOP-8	2.5K	13 inch

ABSOLUTE MAXIMUM RATINGS (T_A=25℃ unless otherwise specified)

Parameter		Symbol	Rating N-CH	Rating P-CH	Unit
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℃	I_D	6.9	-6.3	A
	T_A=70℃		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		℃
Thermal Resistance Rating					
Thermal Resistance from Junction to Ambient [1]		$R_{\theta JA}$	85		℃/ 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℃ unless otherwise specified)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Condition
Drain-Source Breakdown Voltage	BV_{DSS}	30	-	-	V	V_{GS}=0, I_D=250μA
Gate Threshold Voltage	$V_{GS(th)}$	1	-	3	V	V_{DS}=V_{GS}, I_D=250μA
Forward Transfer conductance	gfs	-	6	-	S	V_{DS}=5V, I_D=6A
Gate-Source Leakage Current	I_{GSS}	-	-	±100	nA	V_{DS}=0, V_{GS}= ±20V
Drain-Source Leakage Current	I_{DSS}	-	-	1	μA	V_{DS}=24V, V_{GS}=0,T_J=25℃
Drain-Source Leakage Current	I_{DSS}	-	-	5	μA	V_{DS}=24V, V_{GS}=0, T_J=55℃
Drain-Source On-Resistance [4]	$R_{DS(ON)}$	-	-	25	mΩ	V_{GS}=10V, I_D=6A
		-	-	30		V_{GS}=4.5V, I_D=4A
Total Gate Charge	Q_g	-	6	-	nC	V_{DS}=15V V_{GS}=4.5V I_D=6A
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 R_G=3.3Ω I_D=6A
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}=15V V_{GS}=0 f=1MHz
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=6A, V_{GS}=0V, T_J=25℃

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

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Condition
Drain-Source Breakdown Voltage	BV_{DSS}	-30	-	-	V	V_{GS}=0, I_D= -250μA
Gate Threshold Voltage	$V_{GS(th)}$	-1	-	-3	V	V_{DS}=V_{GS}, I_D= -250μA
Forward Transfer conductance	gfs	-	13	-	S	V_{DS}= -5V, I_D= -6A
Gate-Source Leakage Current	I_{GSS}	-	-	±100	nA	V_{DS}=0, V_{GS}= ±20V
Gate-Source Leakage Current	I_{DSS}	-	-	-1	μA	V_{DS}= -24V, V_{GS}=0,T_J=25℃
Gate-Source Leakage Current	I_{DSS}	-	-	-5	μA	V_{DS}= -24V, V_{GS}=0,T_J=55℃
Drain-Source On-Resistance [4]	$R_{DS(ON)}$	-	-	36	mΩ	V_{GS}= -10V, I_D= -6A
		-	-	45		V_{GS}= -4.5V, I_D= -4A
Total Gate Charge	Q_g	-	9.8	-	nC	V_{DS}= -20V V_{GS}= -4.5V I_D= -6A
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 R_G=3.3Ω I_D= -1A
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}= -15V V_{GS}=0 f=1MHz
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= -6A, V_{GS}=0V, 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. Pluse width limited by maximum junction temperature , pulse width ≦ 300us , duty cycle ≦ 2%
4. The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%

N-Ch TYPICAL CHARACTERISTIC CURVES

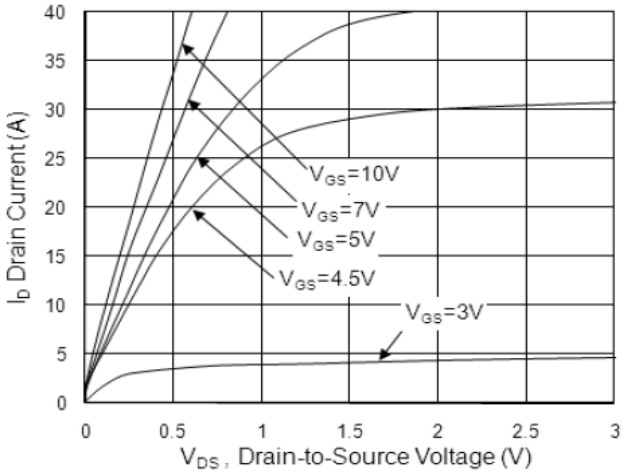


Fig.1 Typical Output Characteristics

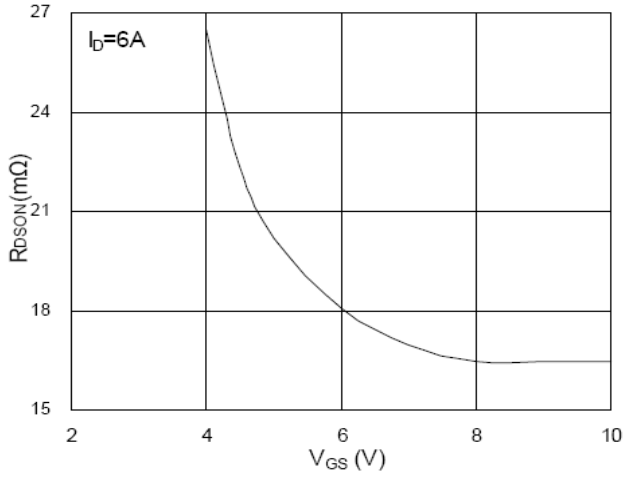


Fig.2 On-Resistance vs. Gate-Source

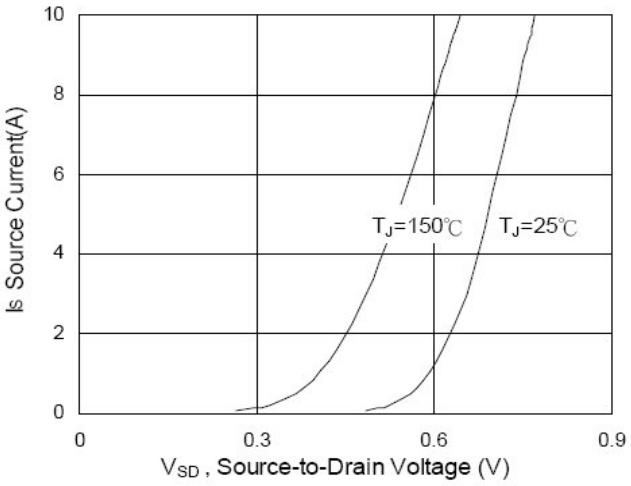


Fig.3 Forward Characteristics Of Reverse

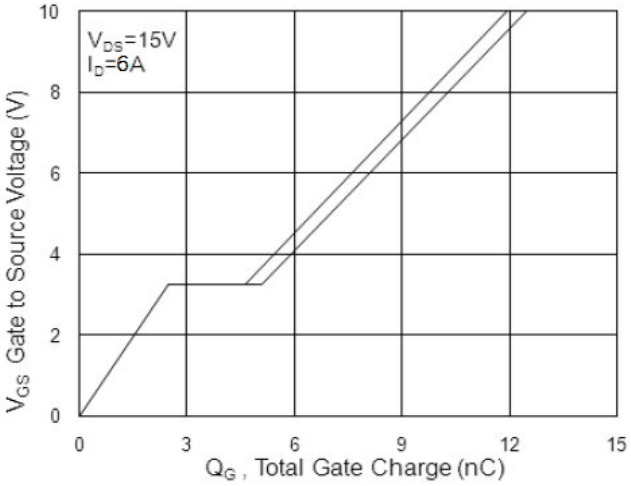


Fig.4 Gate-Charge Characteristics

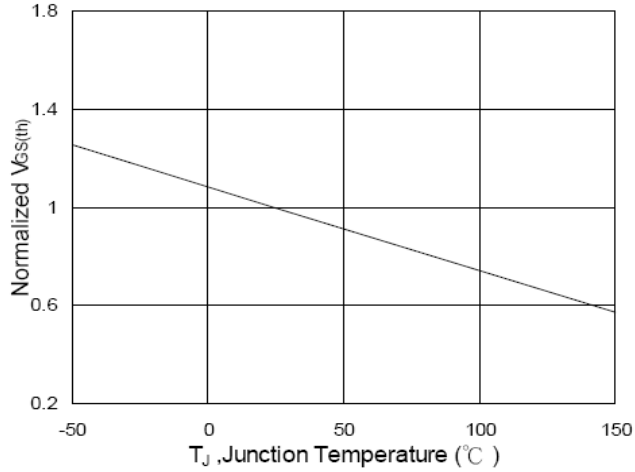


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

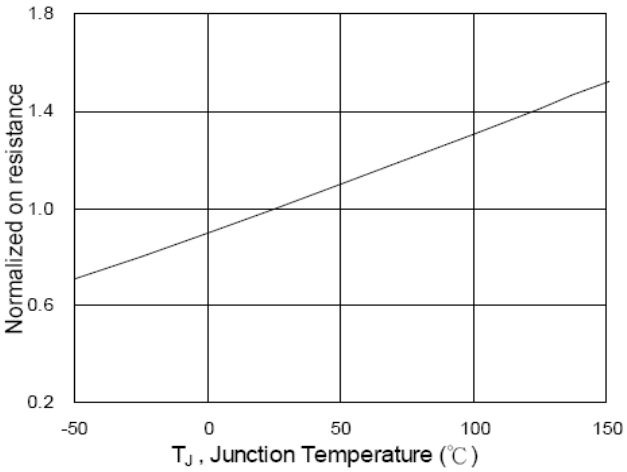


Fig.6 Normalized R_{DSON} vs. T_J

N-Ch TYPICAL CHARACTERISTIC CURVES

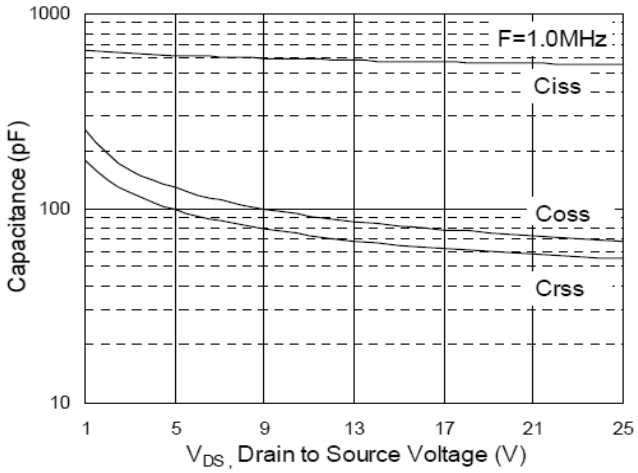


Fig.7 Capacitance

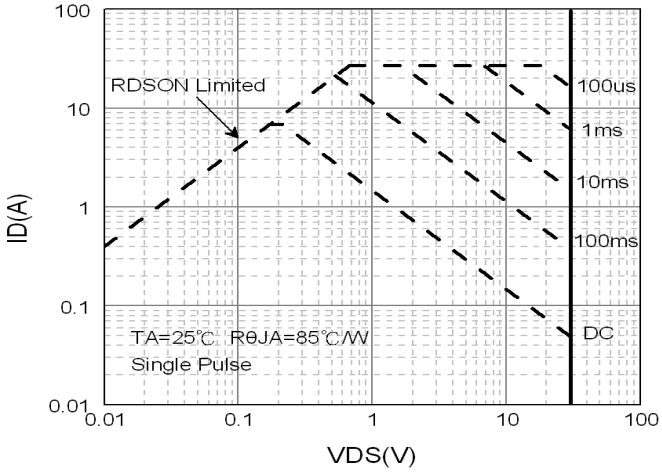


Fig.8 Safe Operating Area

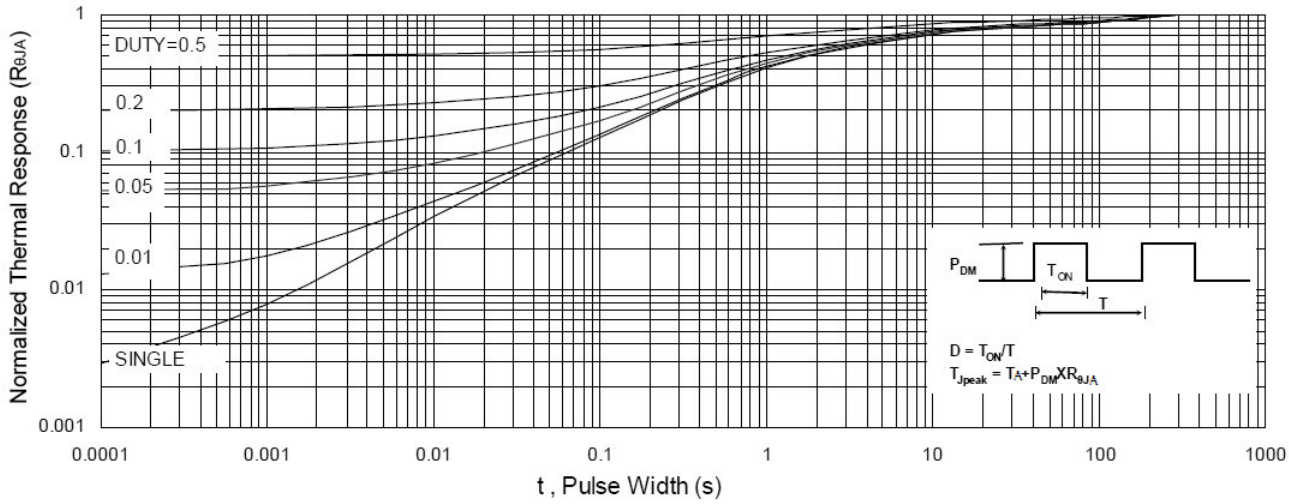


Fig.9 Normalized Maximum Transient Thermal Impedance

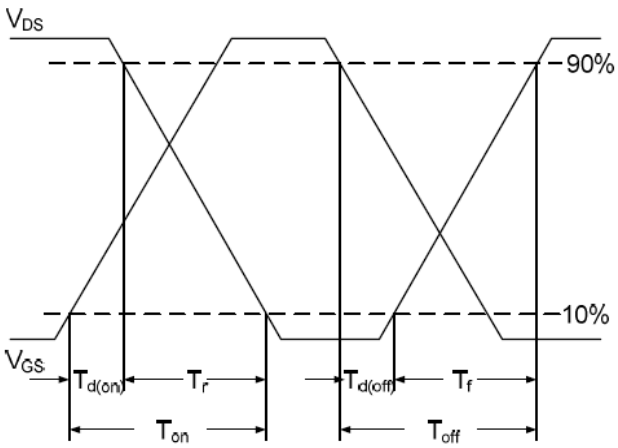


Fig.10 Switching Time Waveform

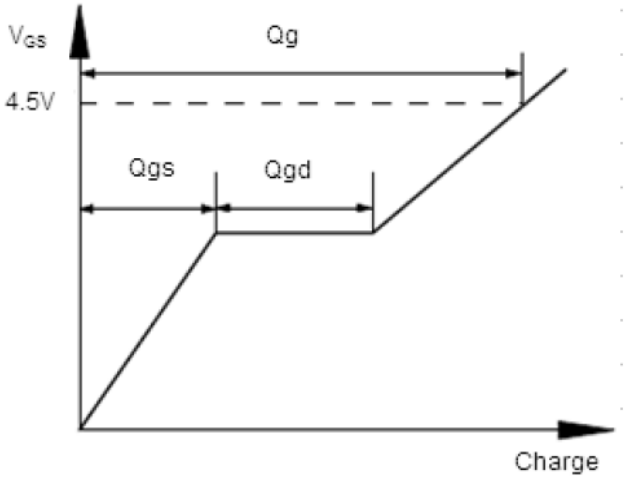


Fig.11 Gate Charge Waveform

P-Ch TYPICAL CHARACTERISTIC CURVES

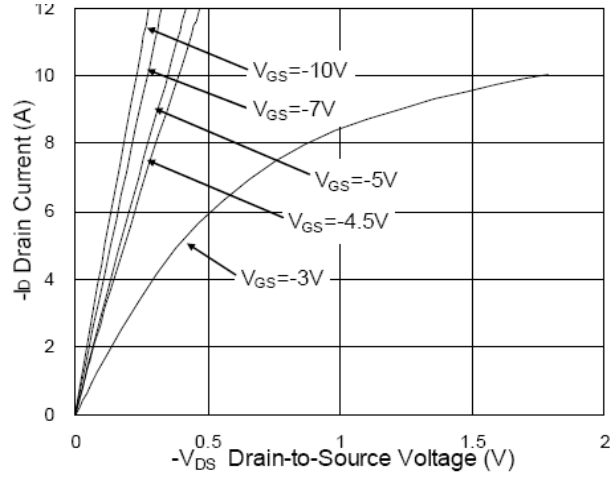


Fig.1 Typical Output Characteristics

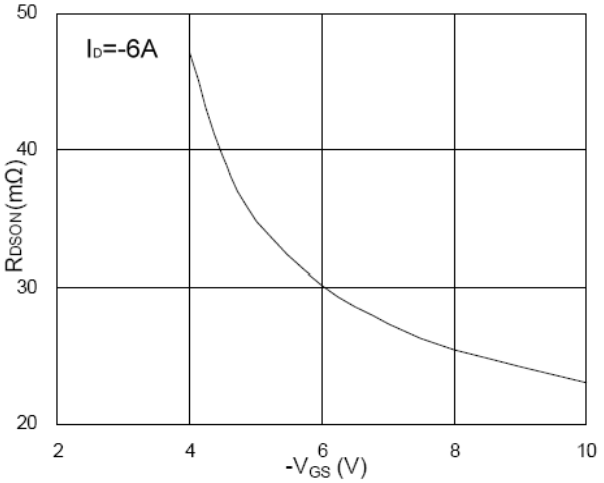


Fig.2 On-Resistance v.s Gate-Source

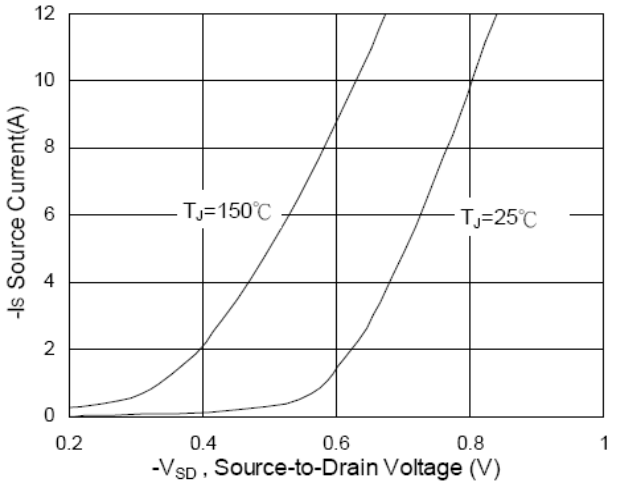


Fig.3 Forward Characteristics of Reverse

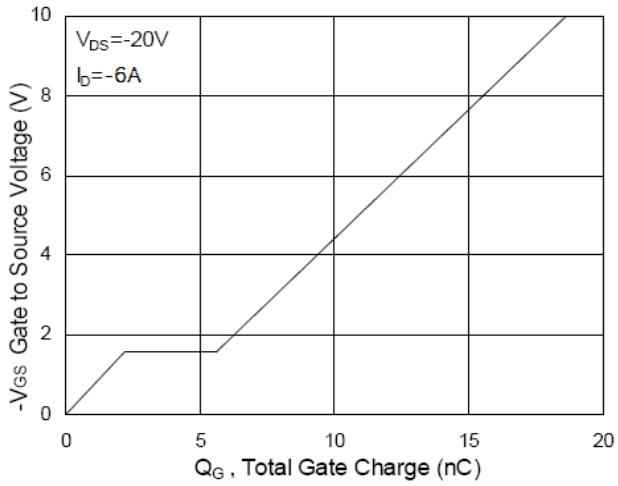


Fig.4 Gate-Charge Characteristics

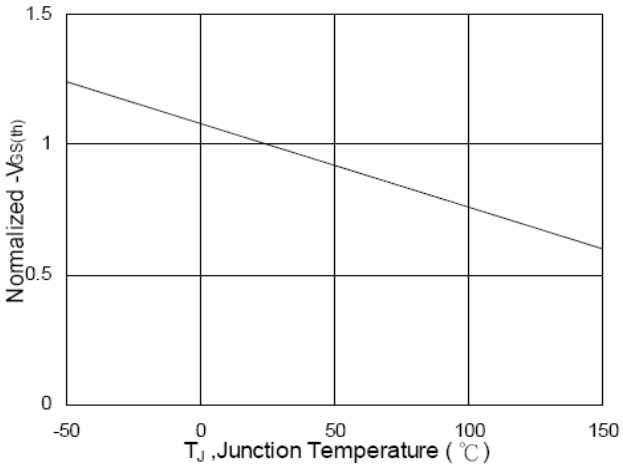


Fig.5 Normalized $V_{GS(th)}$ v.s T_J

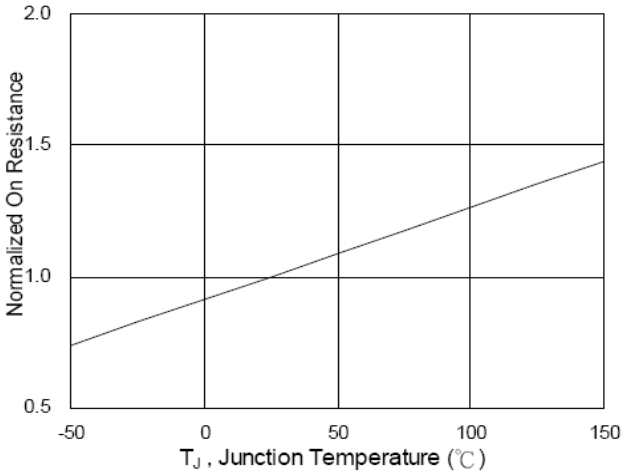


Fig.6 Normalized R_{DSON} v.s T_J

P-Ch TYPICAL CHARACTERISTIC CURVES

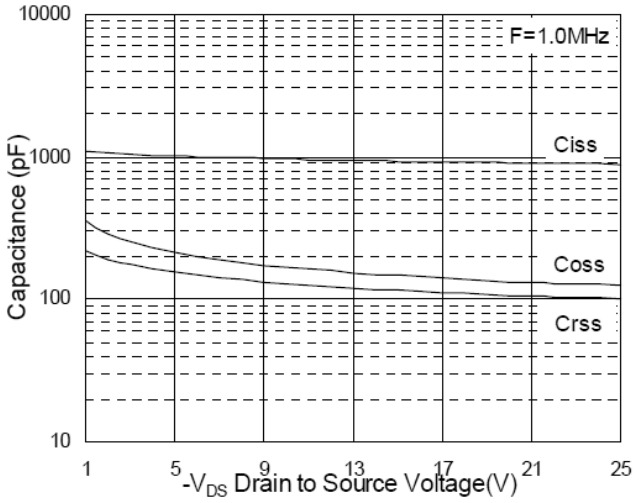


Fig.7 Capacitance

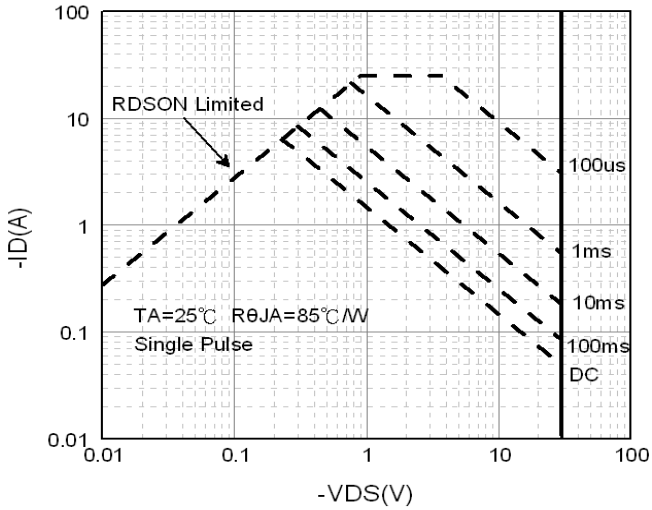


Fig.8 Safe Operating Area

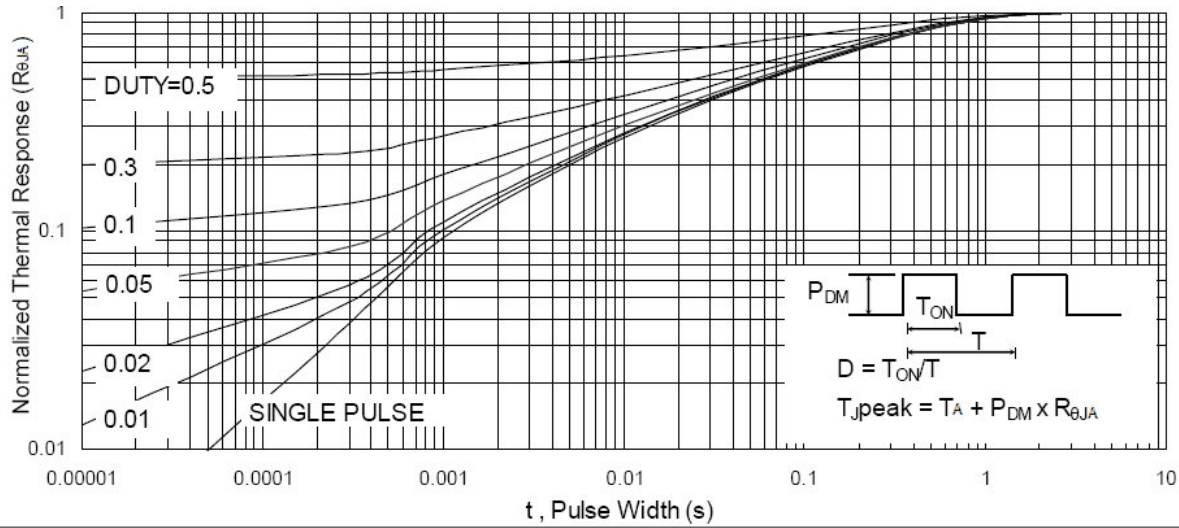


Fig.9 Normalized Maximum Transient Thermal Impedance

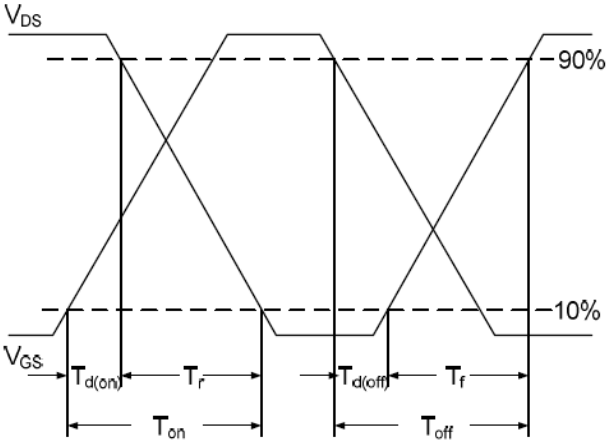


Fig.10 Switching Time Waveform

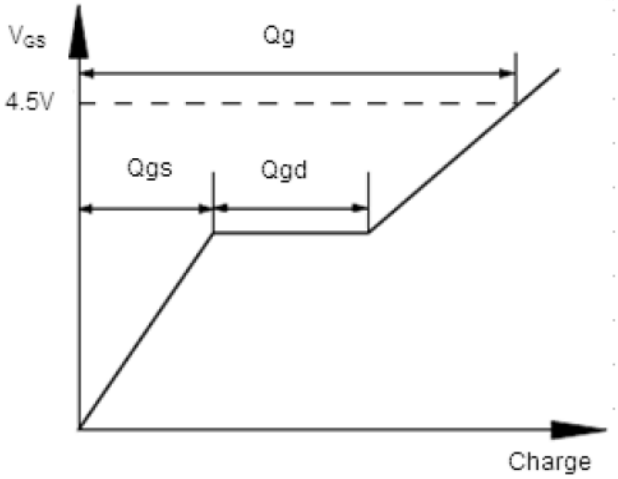


Fig.11 Gate Charge Waveform