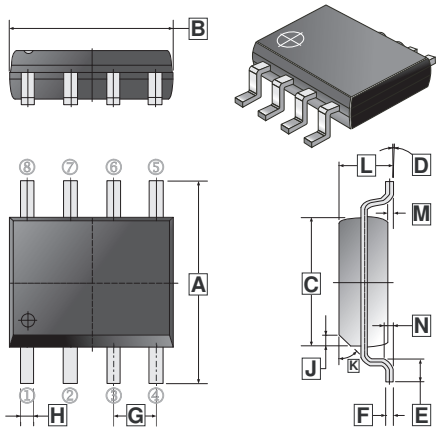
YEA SHIN TECHNOLOGY CO., LTD

YS9904M

Dual N-Channel Enhancement MOSFET

VDS= 40V, ID= 6.2A

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	3.70	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.				

DESCRIPTION

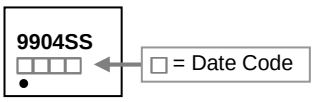
The YS9904M is the highest performance trench dual N-ch MOSFETs with extreme high cell density, which provide excellent R_{DSON} and gate charge for most of the synchronous buck converter applications.

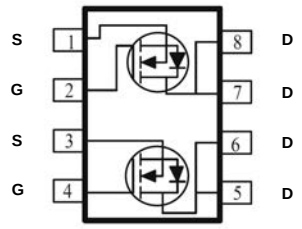
The YS9904M meet the RoHS and Green Product requirement, 100% EAS guaranteed with full function reliability approved.

FEATURES

- Advanced high cell density Trench technology
- Super Low Gate Charge
- 100% EAS Guaranteed
- Green Device Available

MARKING CODE





PACKAGE INFORMATION

Package	MPQ	Leader Size
SOP-8	2.5K	13’ inch

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

Parameter		Symbol	Ratings	Unit
Drain-Source Voltage		V_{DS}	40	V
Gate-Source Voltage		V_{GS}	±20	V
Continuous Drain Current@ V_{GS} =10V [1]	T_C = 25℃	I_D	7.2	A
	T_C = 100℃		5.6	
Pulsed Drain Current [3]		I_{DM}	14.5	A
Single Pulse Avalanche Energy [5]		EAS	28	mJ
Avalanche Current		I_{AS}	7.5	A
Power Dissipation@ T_C=25℃		P_D	2.5	W
Operating Junction & Storage Temperature Range		T_J, T_{STG}	-55~150	℃
Thermal Resistance Ratings				
Thermal Resistance Junction-ambient [1]		$R_{\theta JA}$	85	℃ / W
Thermal Resistance Junction-ambient [2]			135	
Thermal Resistance Junction-Case [1]		$R_{\theta JC}$	50	

ELECTRICAL CHARACTERISTICS (T_J=25℃ unless otherwise specified)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Static						
Drain-Source Breakdown Voltage	BV_{DSS}	40	-	-	V	V_{GS}=0V, I_D=250μA
Breakdown Voltage Temp. Coefficient	$\triangle BV_{DS}/\triangle T_J$	-	0.034	-	V / ℃	Reference to 25℃, I_D=1mA
Gate-Threshold Voltage	$V_{GS(th)}$	1	-	2.5	V	V_{DS}=V_{GS}, I_D =250μA
Forward Transfer conductance	g_{fs}	-	14	-	S	V_{DS}=5V, I_D =6A
Gate-Body Leakage	I_{GSS}	-	-	±100	nA	V_{GS}=±20V
Zero Gate Voltage Drain Current	I_{DSS}	-	-	1	μA	V_{DS}=32V,V_{GS}=0, T_J=25℃
		-	-	5		V_{DS}=32V,V_{GS}=0, T_J=55℃
Drain-Source On-Resistance [4]	$R_{DS(ON)}$	-	-	30	mΩ	V_{GS}=10V, I_D=6A
		-	-	40		V_{GS}=4.5V, I_D=4A
Total Gate Charge	Q_g	-	5.5	-	nC	I_D=6A V_{DS}=20V V_{GS}=4.5V
Gate-Source Charge	Q_{gs}	-	1.25	-		
Gate-Drain (“Miller”) Charge	Q_{gd}	-	2.5	-		
Turn-On Delay Time	$T_{d(on)}$	-	8.9	-	nS	V_{DS}=20V I_D=1A V_{GS}=10V R_G=3.3Ω R_D=20Ω
Rise Time	T_r	-	2.2	-		
Turn-Off Delay Time	$T_{d(off)}$	-	41	-		
Fall Time	T_f	-	2.7	-		
Input Capacitance	C_{iss}	-	593	-	pF	V_{GS}=0V V_{DS}=15V f=1.0MHz
Output Capacitance	C_{oss}	-	76	-		
Reverse Transfer Capacitance	C_{rss}	-	56	-		
Guaranteed Avalanche Characteristics						
Single Pulse Avalanche Energy [6]	EAS	8	-	-	mJ	V_{DD}=25V, L=1mH, I_{AS}=4A
Source-Drain Diode						
Forward On Voltage [4]	V_{DS}	-	-	1.2	V	I_S=1A, V_{GS}=0V
Continuous Source Current [1]	I_S	-	7.2	-	A	
Pulsed Source Current [3]	I_{SM}	-	14.5	-	A	

Notes:

1. Surface mounted on a 1 inch^2 FR-4 board with 2OZ copper.
2. When mounted on Min. copper pad.
3. The power dissipation is limited by 150℃ junction temperature
4. The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%
5. The EAS data shows Max. rating . The test condition is V_{DD}=25V,V_{GS}=10V,L=1mH,I_{AS}=7.5A
6. The Min. value is 100% EAS tested guarantee.

CHARACTERISTICS CURVE

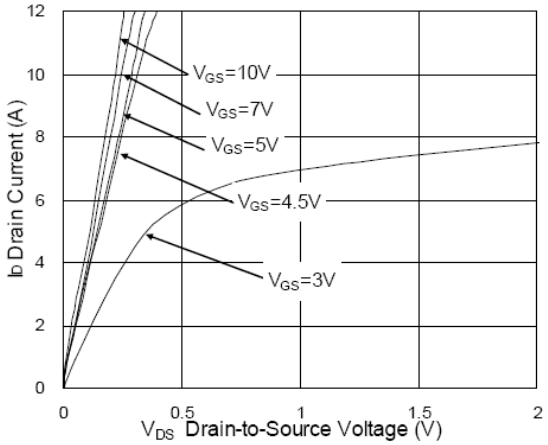


Fig.1 Typical Output Characteristics

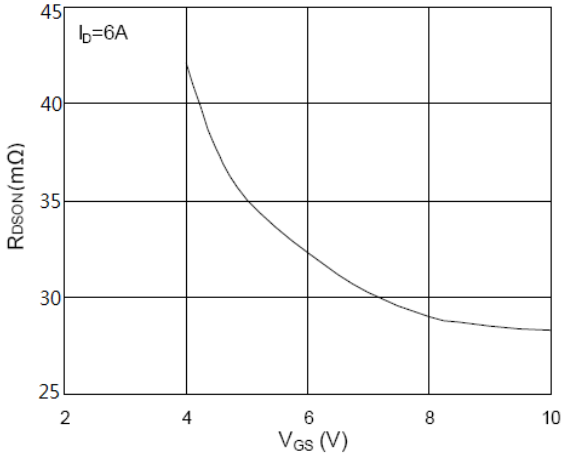


Fig.2 On-Resistance vs. G-S Voltage

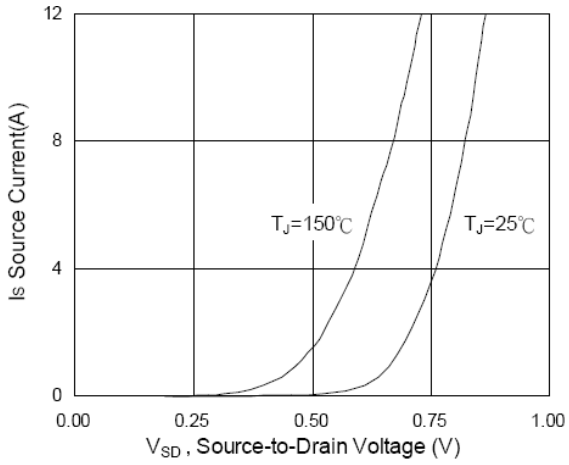


Fig.3 Forward Characteristics of Reverse

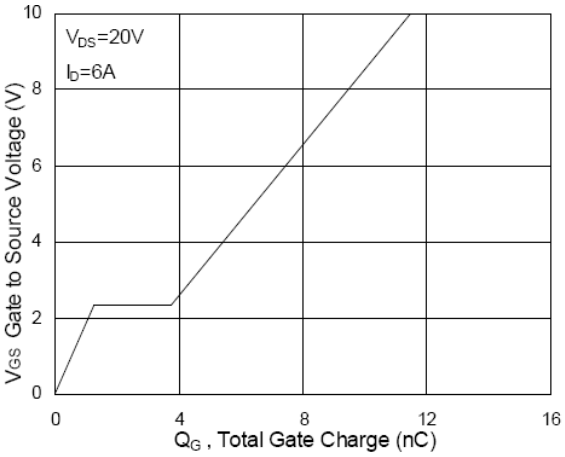


Fig.4 Gate-Charge Characteristics

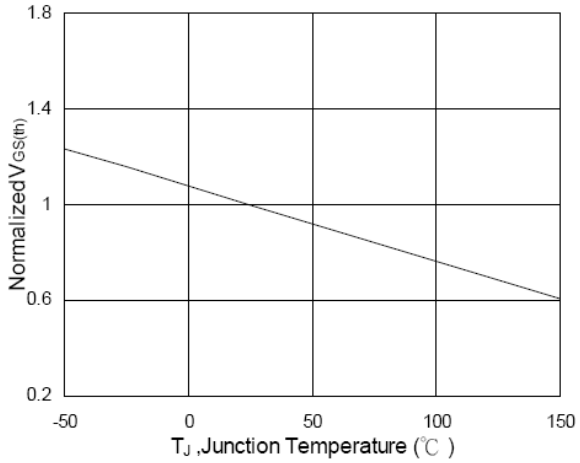


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

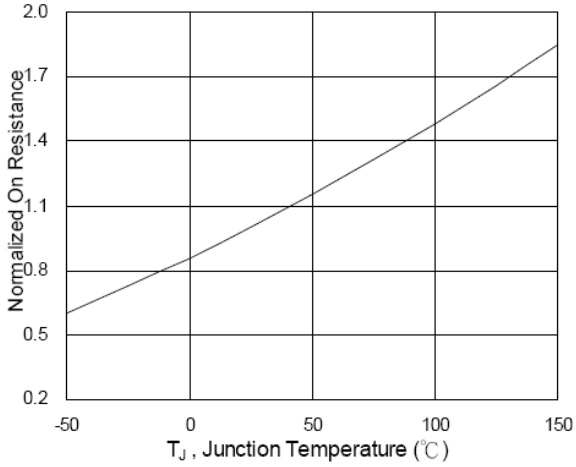


Fig.6 Normalized R_{DSON} vs. T_J

CHARACTERISTICS CURVE

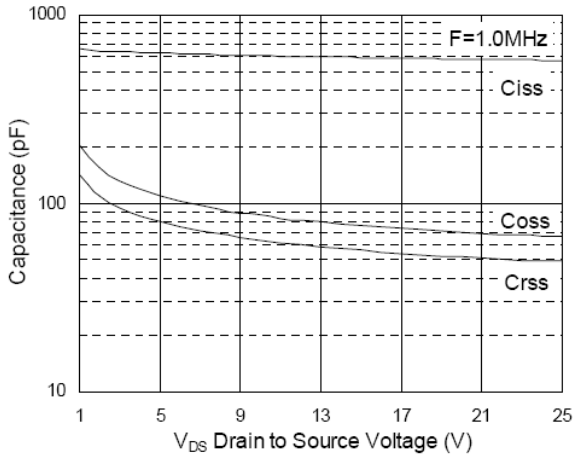


Fig.7 Capacitance

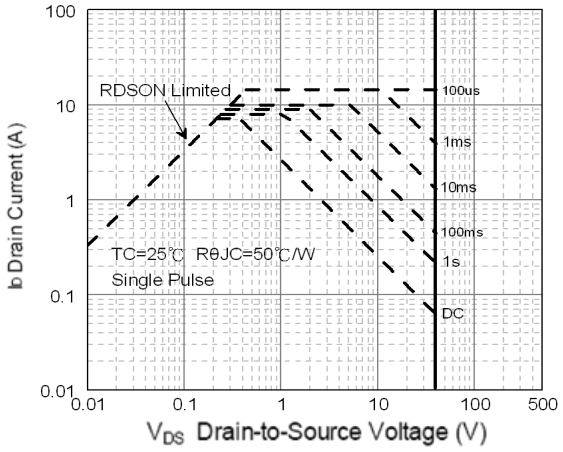


Fig.8 Safe Operating Area

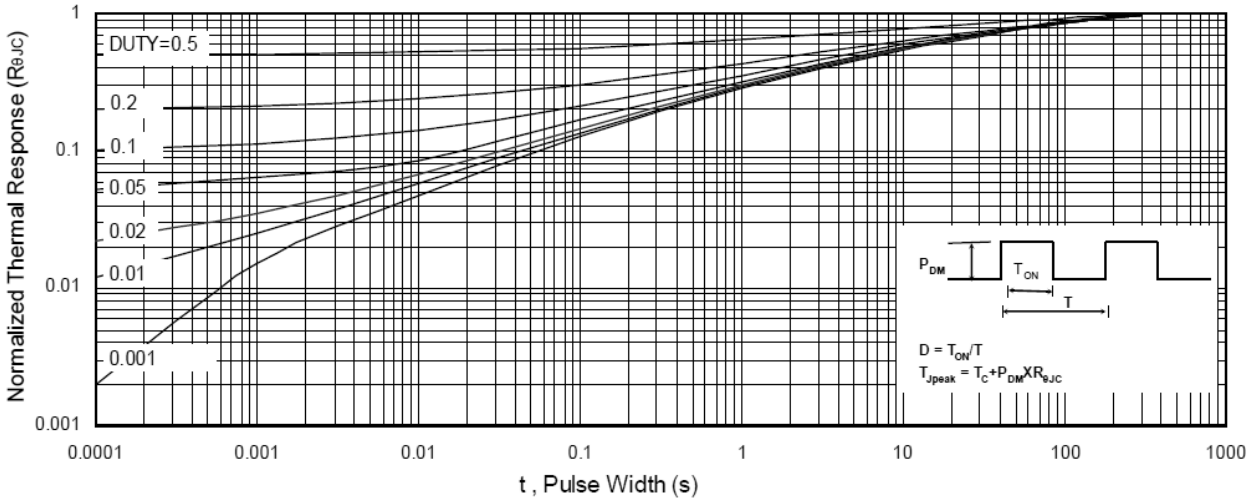


Fig.9 Normalized Maximum Transient Thermal Impedance

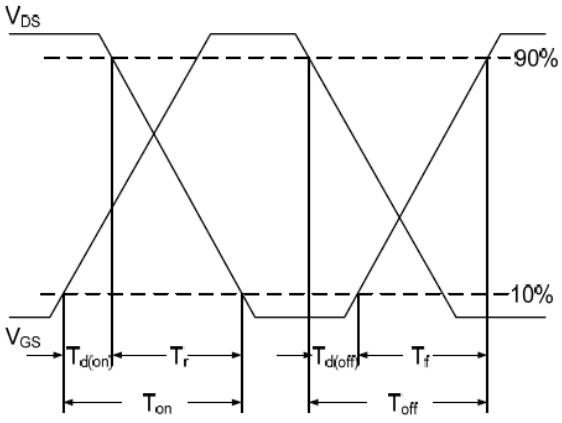


Fig.10 Switching Time Waveform

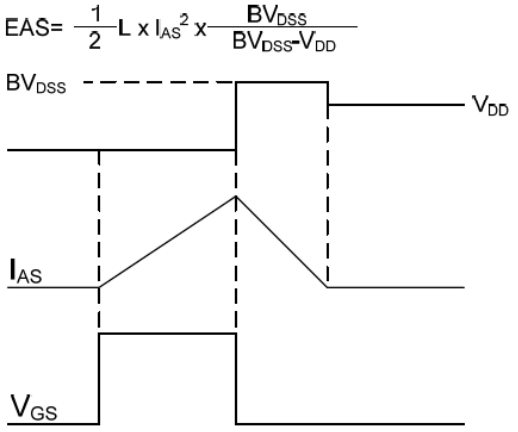


Fig.11 Unclamped Inductive Switching Wave