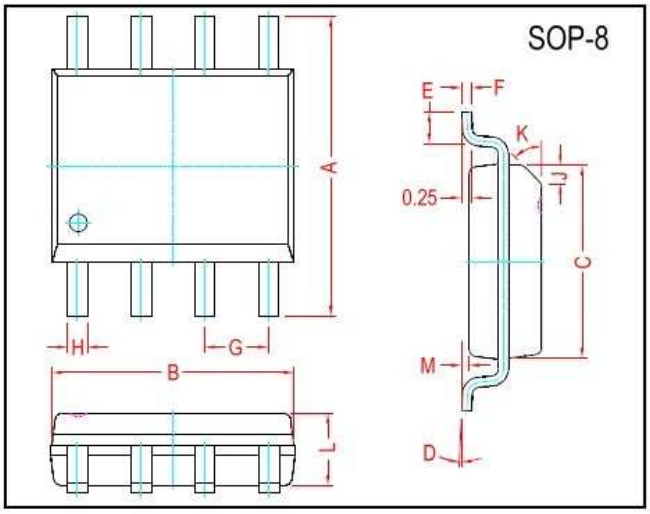
YEA SHIN TECHNOLOGY CO., LTD YS12N03M

N-Channel Enhancement MOSFET

VDS = 30V, ID = 12A



DESCRIPTION

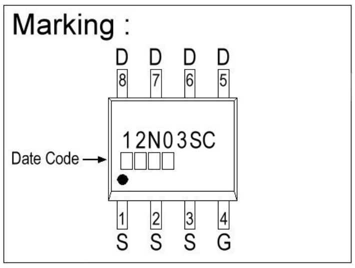
The YS12N03M is the highest performance trench N-Ch MOSFETs with extreme high cell density, which provide excellent $R_{DS(ON)}$ and gate charge for most of the synchronous buck converter applications.

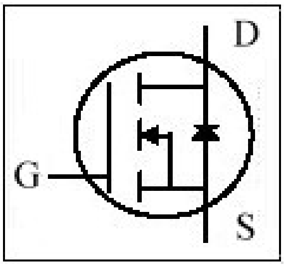
The YS12N03M meet the RoHS and Green Product requirement with full function reliability approved.

REF.	Millimeter		REF.	Millimeter	
	Min.	Max.		Min.	Max.
A	5.80	6.20	M	0.10	0.25
B	4.80	5.00	H	0.35	0.51
C	3.80	4.00	L	1.35	1.75
D	0°	8°	J	0.40 REF.	
E	0.40	0.90	K	45° REF	
F	0.19	0.26	G	1.27 TYP.	

FEATURES

- Advanced High Cell Density Trench Technology
- Excellent CdV/dt effect decline
- Green Device Available
- Super Low Gate Charge
- 100% EAS Guaranteed





Absolute Maximum Ratings

Parameter	Symbol	Ratings	Unit
Drain-Source Voltage	V_{DS}	30	V
Gate-Source Voltage	V_{GS}	±20	V
Continuous Drain Current [1]	I_D @T_A=25℃	12	A
Continuous Drain Current [1]	I_D @T_A=70℃	8.2	A
Pulsed Drain Current[1,2]	I_{DM}	52	A
Single Pulse Avalanche Energy, L=0.1mH[3]	E_{AS}	57.8	mJ
Single Pulse Avalanche Current, L=0.1mH[3]	I_{AS}	34	A
Total Power Dissipation[4]	P_D @T_A=25℃	1.5	W
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 ~ +150	℃

Thermal Data

Parameter	Symbol	Max. Value	Unit
Thermal Resistance Junction-ambient[1]	$R_{\theta JA}$	85	℃/W
Thermal Resistance Junction-case[1]	$R_{\theta JC}$	50	℃/W

DEVICE CHARACTERISTICS

YS12N03M

Electrical Characteristics (T_J = 25℃ unless otherwise specified)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Drain-Source Breakdown Voltage	BV_{DSS}	30	-	-	V	V_{GS}=0, I_D=250uA
Gate Threshold Voltage	$V_{GS(th)}$	1.0	-	2.5	V	V_{DS}=V_{GS}, I_D=250uA
Forward Transconductance	g_{fs}	-	35	-	S	V_{DS}=5V, I_D=10A
Gate-Source Leakage Current	I_{GSS}	-	-	±100	nA	V_{GS}= ±20V
Drain-Source Leakage Current(T_J=25℃)	I_{DSS}	-	-	1	uA	V_{DS}=24V, V_{GS}=0
Drain-Source Leakage Current(T_J=55℃)		-	-	5		V_{DS}=24V, V_{GS}=0
Static Drain-Source On-Resistance[2]	$R_{DS(ON)}$	-	-	9	mΩ	V_{GS}=10V, I_D=10A
		-	-	13.5		V_{GS}=4.5V, I_D=8A
Total Gate Charge[2]	Q_g	-	10.6	-	nC	I_D=10A V_{DS}=15V V_{GS}=4.5V
Gate-Source Charge	Q_{gs}	-	4.2	-		
Gate-Drain ("Miller") Change	Q_{gd}	-	4.1	-		
Turn-on Delay Time[2]	$T_{d(on)}$	-	5.8	-	ns	V_{DD}=15V I_D=10A V_{GS}=10V R_G=3.3Ω
Rise Time	T_r	-	61	-		
Turn-off Delay Time	$T_{d(off)}$	-	23.6	-		
Fall Time	T_f	-	7.6	-		
Input Capacitance	C_{iss}	-	1127	-	pF	V_{GS}=0V V_{DS}=15V f=1.0MHz
Output Capacitance	C_{oss}	-	194	-		
Reverse Transfer Capacitance	C_{rss}	-	77	-		
Gate Resistance	R_g	-	-	5	Ω	f=1.0MHz

Guaranteed Avalanche Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Single Pulse Avalanche Energy[5]	EAS	20	-	-	mJ	V_{DD}=25V, L=0.1mH, I_{AS}=20A

Source-Drain Diode

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Diode Forward Voltage[2]	V_{SD}	-	-	1	V	I_S=1A, V_{GS}=0V, T_J=25℃
Continuous Source Current[1,6]	I_S	-	-	12	A	V_G=V_D=0V, Force Current
Pulsed Source Current[2,6]	I_{SM}	-	-	52	A	
Reverse Recovery Time	t_{rr}	-	14.1	-	ns	I_F=10A, dI/dt=100A/μs, T_J=25℃
Reverse Recovery Charge	Q_{rr}	-	5.9	-	nC	

Notes: **1. The data tested by surface mounted on a 1 inch^2 FR-4 board with 2OZ copper.**

2. The data tested by pulsed, pulse width ≦ 300us, duty cycle ≦ 2%.

3. The EAS data shows Max. rating. The test condition is VDD=25V, VGS=10V, L=0.1mH, IAS=34A.

4. The power dissipation is limited by 150℃ junction temperature.

5. The Min. value is 100% EAS tested guarantee.

6. The data is theoretically the same as ID and IDM, in real applications, should be limited by total power dissipation.

DEVICE CHARACTERISTICS

YS12N03M

Typical Characteristics

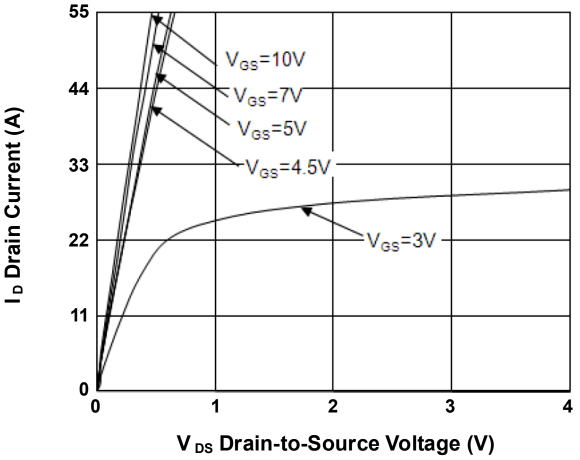


Fig.1 Typical Output Characteristics

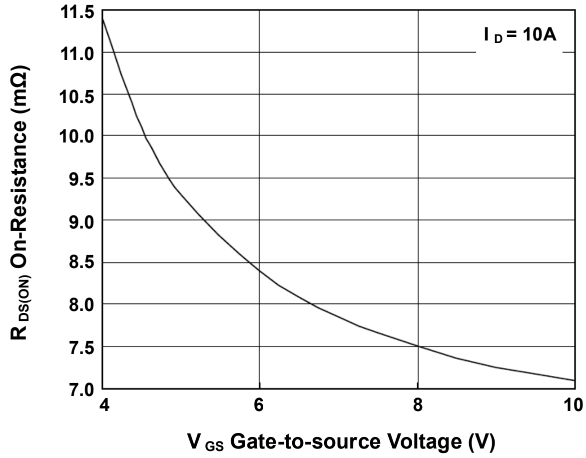


Fig.2 On-Resistance vs. G-S Voltage

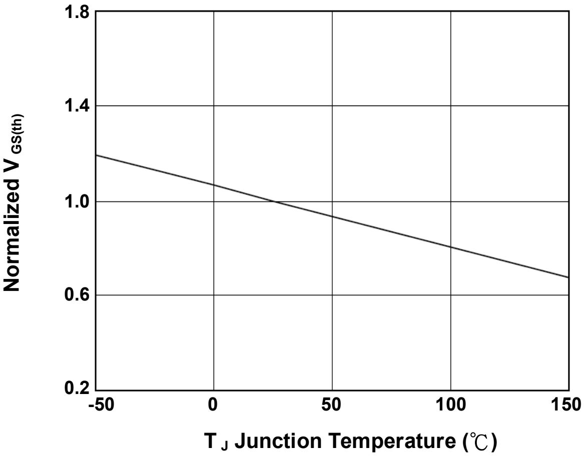


Fig.3 Normalized $V_{GS(th)}$ vs. T_J

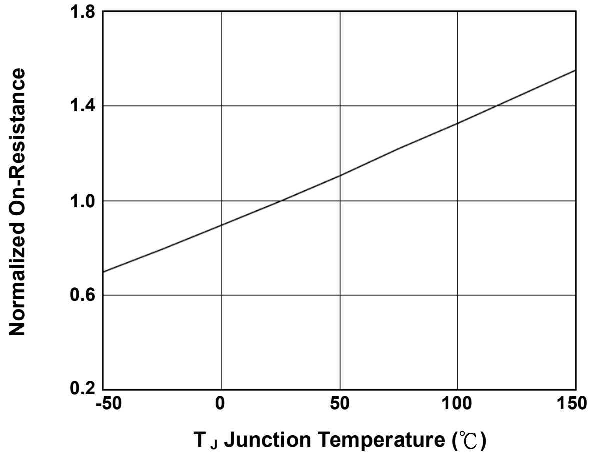


Fig.4 Normalized R_{DSON} vs. T_J

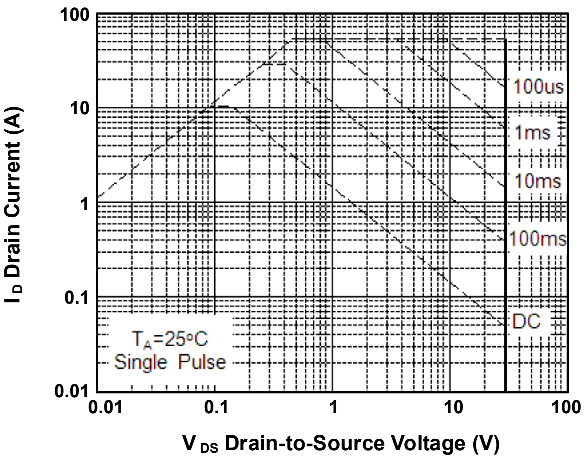


Fig.5 Safe Operating Area

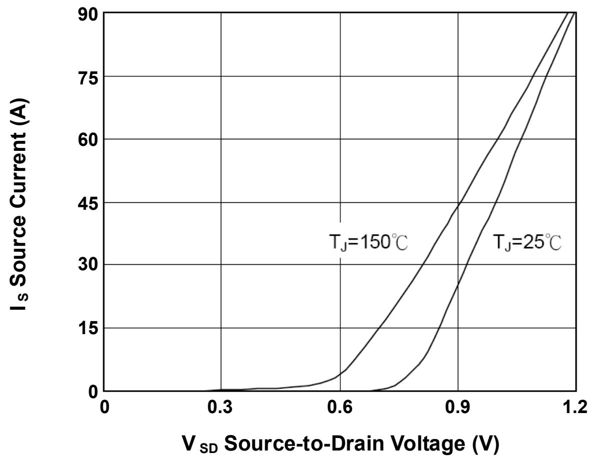


Fig.6 Forward Characteristics of Reverse

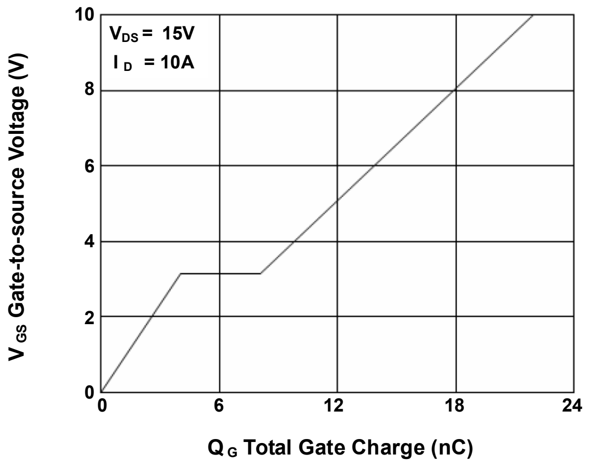


Fig.7 Gate Charge Characteristics

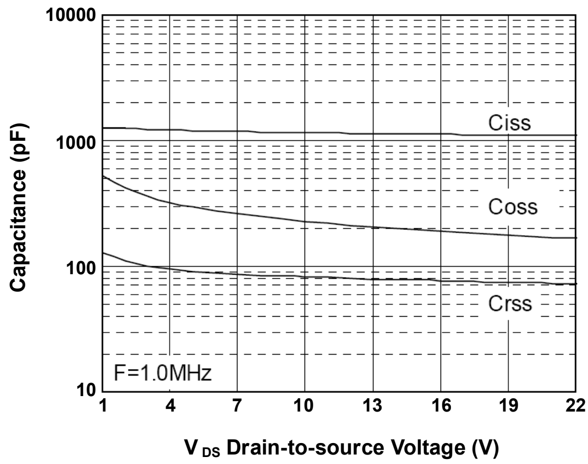


Fig.8 Capacitance Characteristics

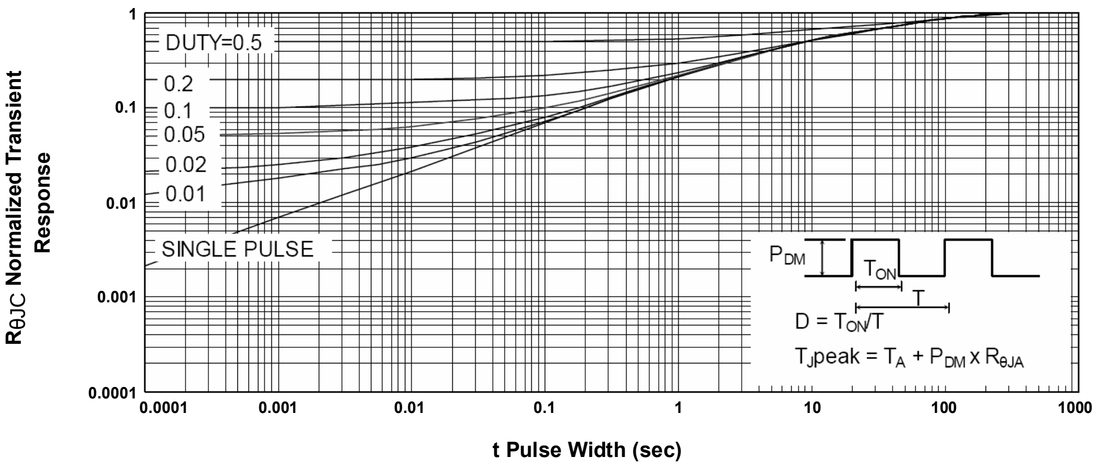


Fig.9 Normalized Maximum Transient Thermal Impedance

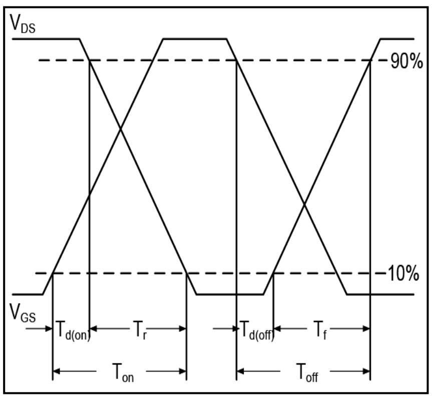


Fig.10 Switching Time Waveform

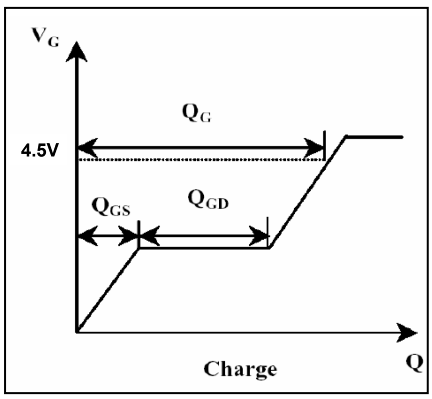


Fig.11 Gate Charge Waveform