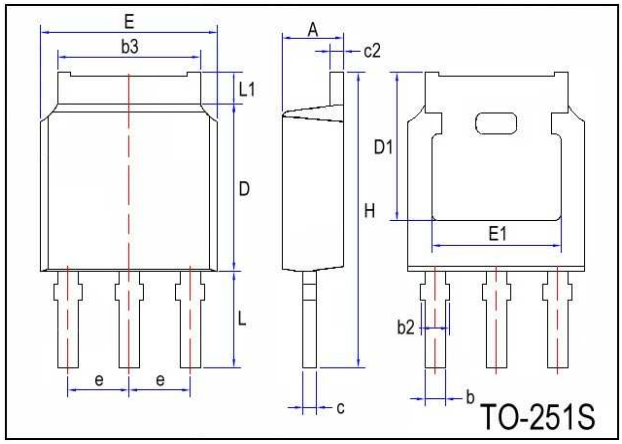
YEA SHIN TECHNOLOGY CO., LTD

YS60N04R

N-Channel Enhancement MOSFET

VDS= 60V, ID= 45A



REF.	Millimeter			REF.	Millimeter		
	Min.	Nom.	Max.		Min.	Nom.	Max.
A	2.20	2.30	2.38	D1	5.10	-	-
b	0.64	-	0.88	E	6.40	6.60	6.73
b2	0.72	-	1.14	E1	4.40	-	-
b3	5.13	5.33	5.46	e	2.286 BSC		
c	0.40	0.50	0.60	H	10.40	-	11.45
c2	0.40	-	0.60	L	3.30	-	4.30
D	6.00	6.10	6.22	L1	0.90	-	1.25

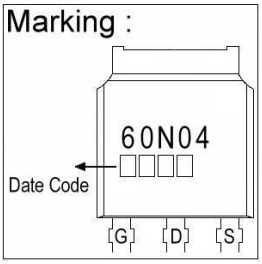
DESCRIPTION

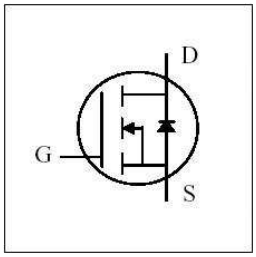
The YS60N04R uses advanced Trench technology and designs to provide excellent $R_{DS(ON)}$ with low gate charge. This device is suitable for use in PWM, load switching and general purpose applications.

The YS60N04R meet the RoHS and Green Product requirement, 100% EAS and Rg guaranteed with full function reliability approved.

FEATURES

- Low On-Resistance
- Low Input Capacitance
- Green Device Available
- Low Miller Charge
- 100% EAS Guaranteed





Absolute Maximum Ratings

Parameter	Symbol	Ratings	Unit
Drain-Source Voltage	V_{DS}	60	V
Gate-Source Voltage	V_{GS}	±20	V
Continuous Drain Current[1]	I_D @T_C=25℃	45	A
	I_D @T_C=100℃	29	A
Pulsed Drain Current[2]	I_{DM}@T_C=25℃	180	A
Total Power Dissipation[4]	P_D @T_C=25℃	63	W
	P_D @T_A=25℃	2.5	W
Single Pulse Avalanche Energy, L=0.1mH[3]	E_{AS}	61	mJ
Single Pulse Avalanche Current, L=0.1mH[3]	I_{AS}	35	A
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 ~ +150	℃

Thermal Data

Parameter	Symbol	Conditions	Max. Value	Unit
Thermal Resistance Junction-ambient[1]	$R_{\theta JA}$	Steady State	50	℃/W
Thermal Resistance Junction-case[1]	$R_{\theta JC}$	Steady State	2.0	℃/W

DEVICE CHARACTERISTICS

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Electrical Characteristics (Tj = 25℃ unless otherwise specified)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Drain-Source Breakdown Voltage	BV_{DSS}	60	-	-	V	V_{GS}=0, I_D=250uA
Gate Threshold Voltage	$V_{GS(th)}$	1.0	1.7	2.5	V	V_{DS}=V_{GS}, I_D=250uA
Gate-Source Leakage Current	I_{GSS}	-	-	±100	nA	V_{GS}= ±20V
Drain-Source Leakage Current(Tj=25℃)	I_{DSS}	-	-	1	uA	V_{DS}=60V, V_{GS}=0
Drain-Source Leakage Current(Tj=125℃)		-	-	10	uA	V_{DS}=48V, V_{GS}=0
Static Drain-Source On-Resistance[2]	$R_{DS(ON)}$	-	10.5	12	mΩ	V_{GS}=10V, I_D=30A
		-	12	15		V_{GS}=4.5V, I_D=15A
Total Gate Charge[2]	Q_g	-	39.2	-	nC	I_D=10A V_{DS}=30V V_{GS}=10V
Gate-Source Charge	Q_{gs}	-	5.9	-		
Gate-Drain (“Miller”) Change	Q_{gd}	-	8.8	-		
Turn-on Delay Time[2]	$T_{d(on)}$	-	9.6	-	ns	V_{DS}=15V I_D=10A V_{GS}=10V R_G=6Ω
Rise Time	T_r	-	28.2	-		
Turn-off Delay Time	$T_{d(off)}$	-	45.3	-		
Fall Time	T_f	-	10.9	-		
Input Capacitance	C_{iss}	-	2100	-	pF	V_{GS}=0V V_{DS}=25V f=1.0MHz
Output Capacitance	C_{oss}	-	165	-		
Reverse Transfer Capacitance	C_{rss}	-	80	-		
Gate Resistance	R_g	-	1.6	3.2	Ω	f=1.0MHz

Guaranteed Avalanche Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Single Pulse Avalanche Energy[5]	EAS	33.8	-	-	mJ	V_{DD}=25V, L=0.1mH, I_{AS}=26A

Source-Drain Diode

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Diode Forward Voltage[2]	V_{SD}	-	-	1.2	V	I_S=10A, V_{GS}=0V, T_J=25℃
Continuous Source Current[1,6]	I_S	-	-	45	A	V_G=V_D=0V, Force Current
Pulsed Source Current[2,6]	I_{SM}	-	-	180	A	

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=35A.

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.

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Typical Characteristics

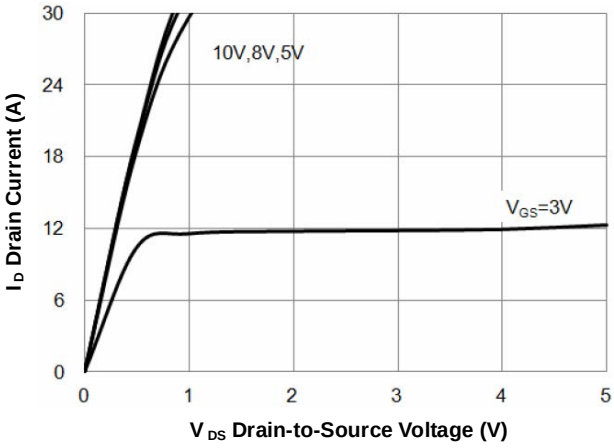

Fig.1 Typical Output Characteristics

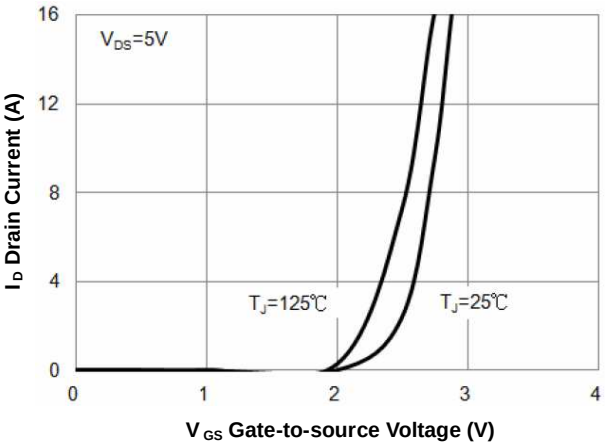

Fig.2 Transfer Characteristics

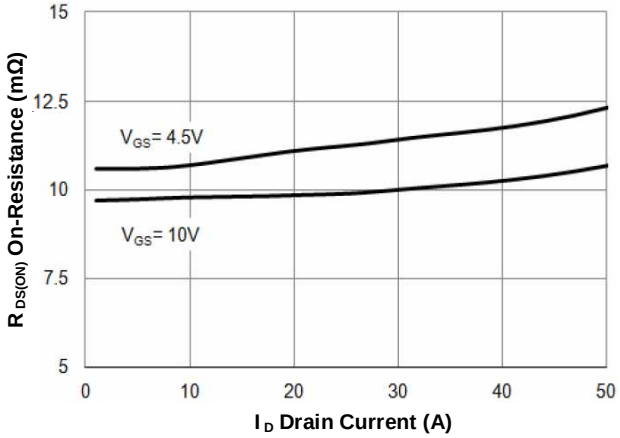

Fig.3 On-Resistance vs. Drain Current

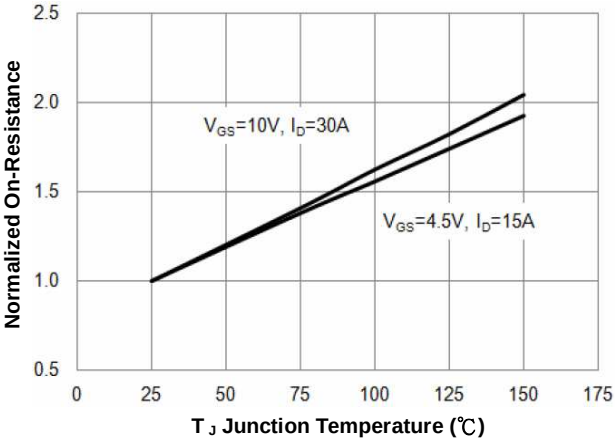

Fig.4 Normalized R_{DSON} vs. T_J

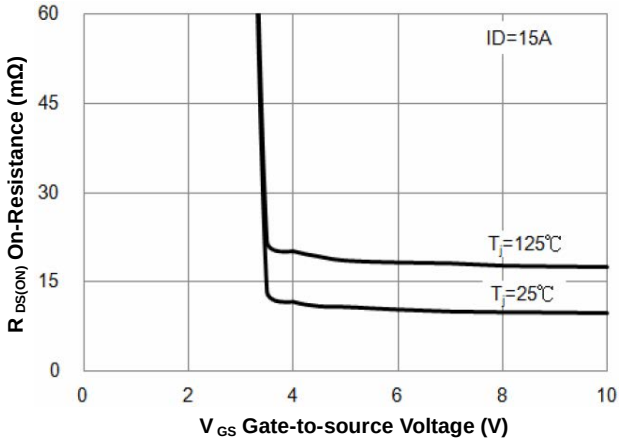

Fig.5 On-Resistance vs. G-S Voltage

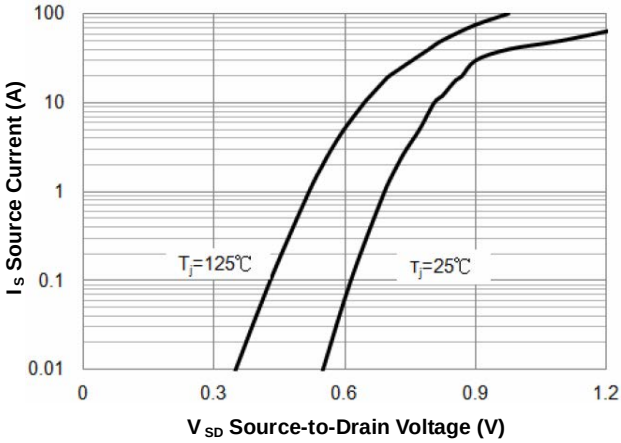

Fig.6 Forward Characteristics of Reverse

DEVICE CHARACTERISTICS

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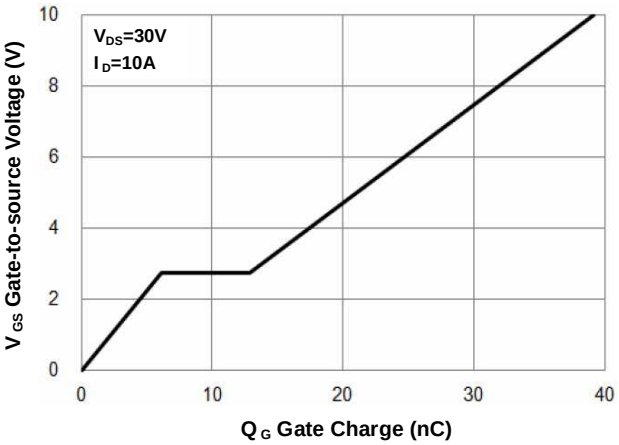

Fig.7 Gate Charge Characteristics

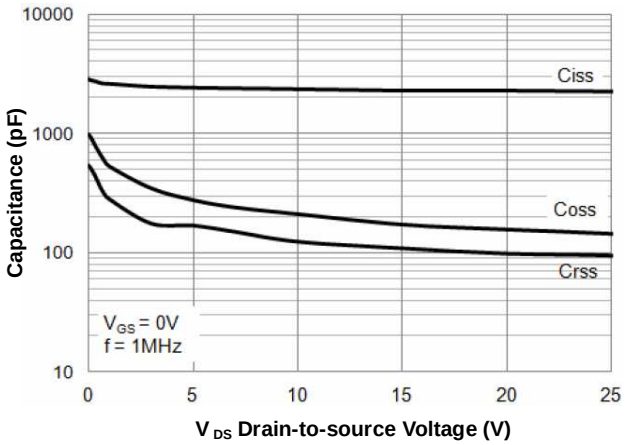

Fig.8 Capacitance Characteristics

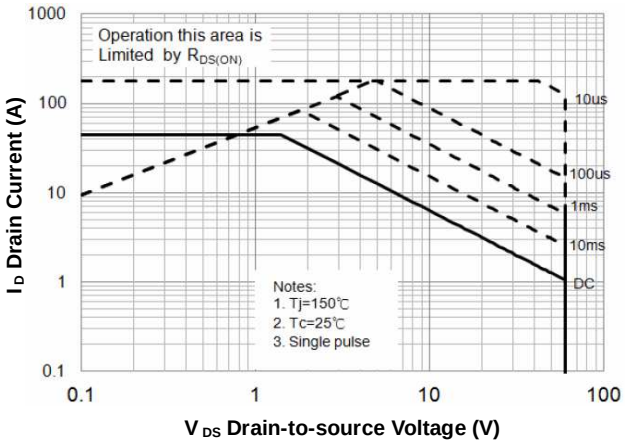

Fig.9 Safe Operating Area

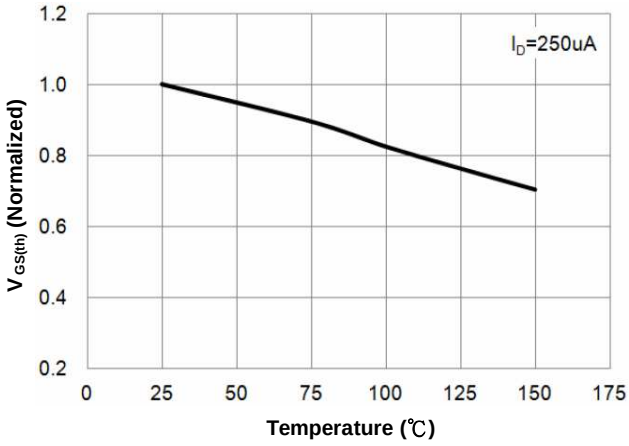

Fig.10 Normalized $V_{GS(th)}$ vs. Temperature

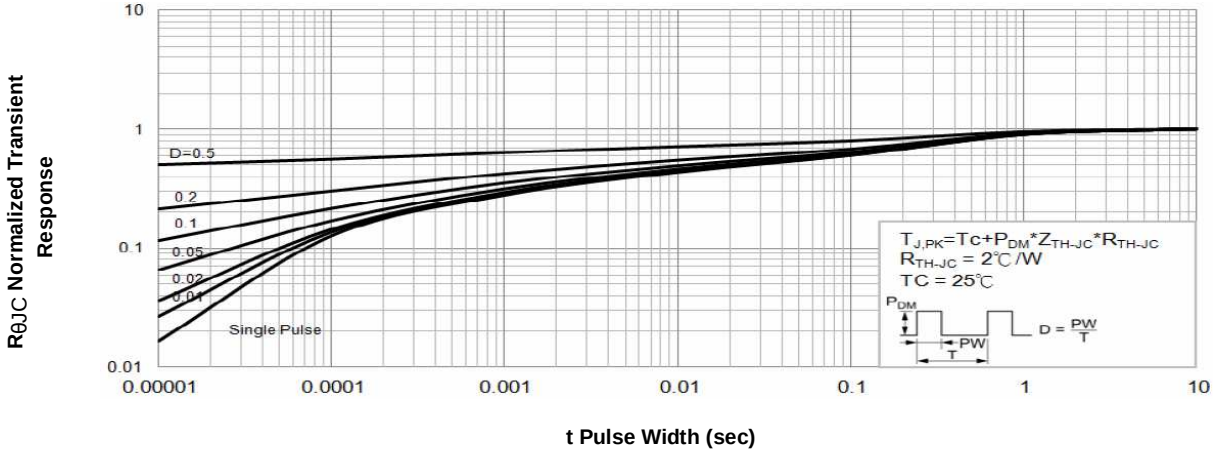

Fig.11 Normalized Maximum Transient Thermal Impedance