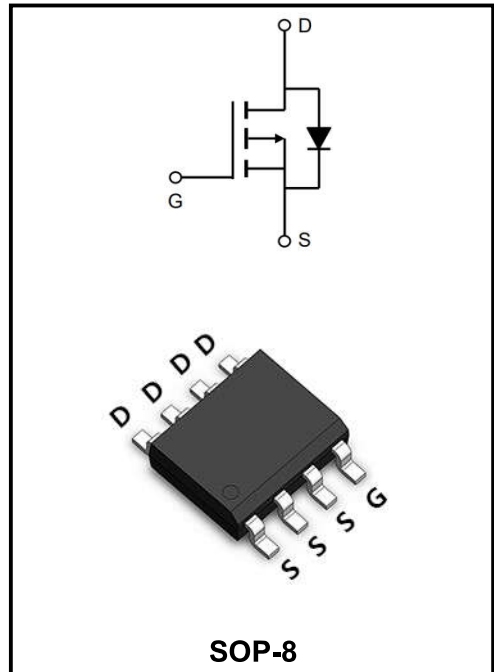


-40V P-CHANNEL ENHANCEMENT MODE MOSFET

MAIN CHARACTERISTICS

I_D	-40A
V_{DSS}	-40V
$R_{DS(on)-typ}(@V_{GS}=-10V)$	$< 15m\Omega$ (Typ:10mΩ)
$R_{DS(on)-typ}(@V_{GS}=-4.5V)$	$< 22m\Omega$ (Typ:15mΩ)



DESCRIPTION

The YFW40P04S uses advanced trench technology to provide excellent $R_{DS(on)}$, low gate charge and operation with gate voltages as low as -4.5V. This device is suitable for use as a Battery protection or in other Switching application.

APPLICATION

- ◆ Battery protection
- ◆ Load switch
- ◆ Uninterruptible power supply

Absolute Maximum Ratings (TC=25°C unless otherwise noted)

Characteristics	Symbols	Value	Units
Drain-Source Voltage	V_{DS}	-40	V
Gate - Source Voltage	V_{GS}	± 20	V
Continuous Drain Current, $V_{GS} @ -10V^1 @ T_C=25^\circ C$	I_D	-40	A
Continuous Drain Current, $V_{GS} @ -10V^1 @ T_C=100^\circ C$	I_D	-7	A
Pulsed Drain Current ²	I_{DM}	-45	A
Single Pulse Avalanche Energy ³	E_{AS}	146	mJ
Total Power Dissipation ⁴ @ $T_C=25^\circ C$	P_D	1.5	W
Storage Temperature Range	T_{STG}	-55 to +150	$^\circ C$
Operating Junction Temperature Range	T_J	-55 to +150	$^\circ C$
Thermal Resistance Junction-Ambient ¹	$R_{\theta JA}$	85	$^\circ C/W$
Thermal Resistance Junction-Case ¹	$R_{\theta JC}$	24	$^\circ C/W$

Electrical Characteristics (T_J=25°C, unless otherwise noted)

Characteristics	Test Condition	Symbols	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =-250uA	BV_{DSS}	-40	-44	-	V
BV _{DSS} Temperature Coefficient	Reference to 25°C, I _D =-1mA	$\Delta BV_{DSS}/\Delta T_J$	-	-0.023	-	V/°C
Static Drain-Source On-Resistance ²	V _{GS} =-10V, I _D =-8A	R_{DS(ON)}	-	10	15	mΩ
	V _{GS} =-4.5V, I _D =-6A		-	15	22	
Gate Threshold Voltage	V _{GS} =V _{DS} I _D =-250uA	V_{GS(th)}	-1.0	-1.7	-2.5	V
V _{GS(th)} Temperature Coefficient		$\Delta V_{GS(th)}$	-	4.74	-	mV/°C
Drain-Source Leakage Current	V _{DS} =-32V, V _{GS} =0V, T _J =25°C	I_{DSS}	-	-	1	uA
	V _{DS} =-32V, V _{GS} =0V, T _J =55°C		-	-	5	
Gate-Source Leakage Current	V _{GS} =±20V, V _{DS} =0V	I_{GSS}	-	-	±100	nA
Forward Transconductance	V _{DS} =-5V, I _D =-8A	g_{fs}	-	24	-	S
Gate Resistance	V _{DS} =0V, V _{GS} =0V, f=1MHz	R_g	-	7	14	Ω
Total Gate Charge (-4.5V)	V _{DS} =-20V V _{GS} =-4.5V I _D =-6A	Q_g	-	27.9	-	nC
Gate-Source Charge		Q_{gs}	-	7.7	-	
Gate-Drain Charge		Q_{gd}	-	7.5	-	
Turn-On Delay Time	V _{DD} =-15V V _{GS} =-10V R _G =3.3Ω I _D =-1A	t_{d(on)}	-	40	-	ns
Rise Time		T_r	-	35.2	-	
Turn-Off Delay Time		t_{d(OFF)}	-	100	-	
Fall Time		t_f	-	9.6	-	
Input Capacitance	V _{DS} =-15V V _{GS} =0V f=1MHz	C_{iss}	-	3500	-	pF
Output Capacitance		C_{oss}	-	323	-	
Reverse Transfer Capacitance		C_{rss}	-	222	-	
Continuous Source Current ^{1,5}	V _G =V _D =0V, Force Current	I_S	-	-	-15	A
Pulsed Source Current ²		I_{SM}	-	-	-50	A
Diode Forward Voltage ²	V _{GS} =0V, I _S =-1A, T _J =25°C	V_{SD}	-	-	-1	V

Note :

- 1、The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper.
- 2、The data tested by pulsed , pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$
- 3、The power dissipation is limited by 150°C junction temperature
- 4、The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation.

Typical Characteristics

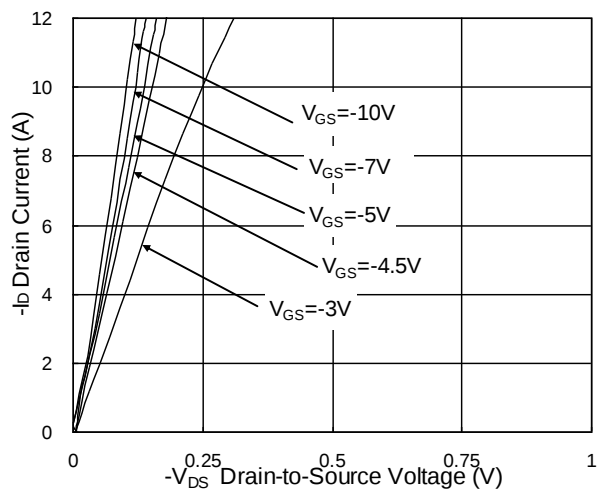


Fig.1 Typical Output Characteristics

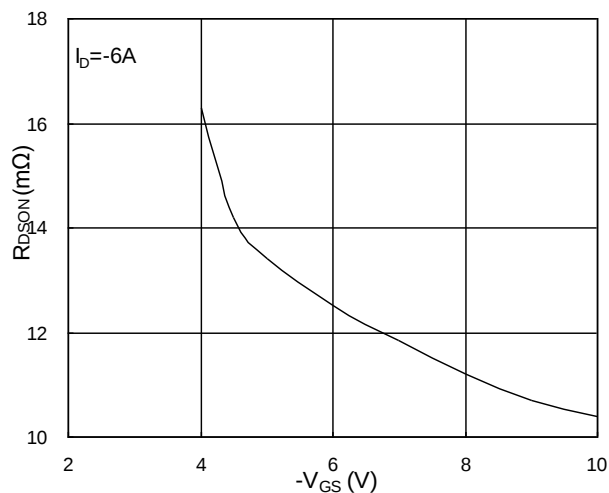


Fig.2 On-Resistance v.s Gate-Source

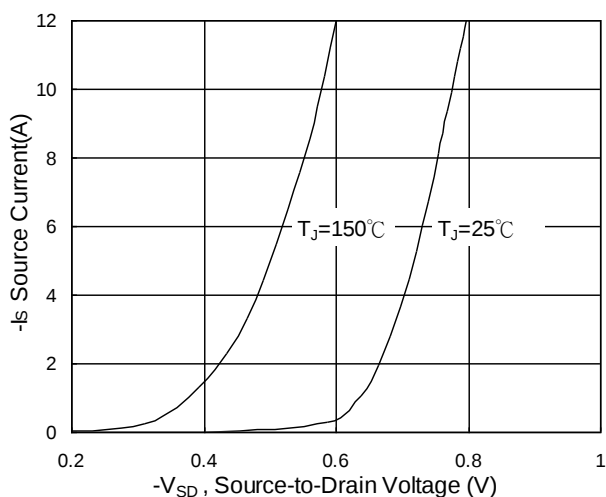


Fig.3 Forward Characteristics Of Reverse

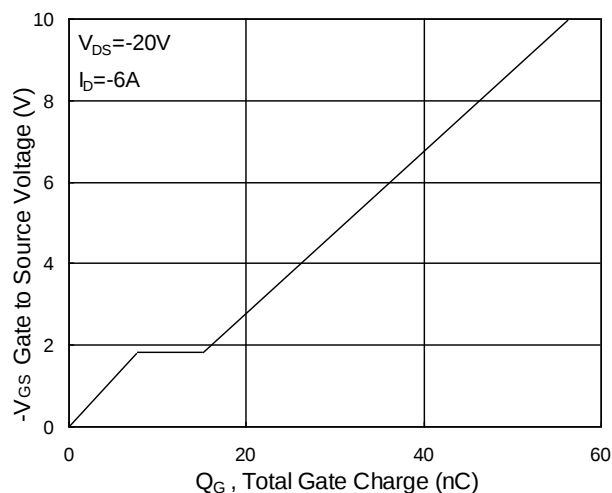


Fig.4 Gate-Charge Characteristics

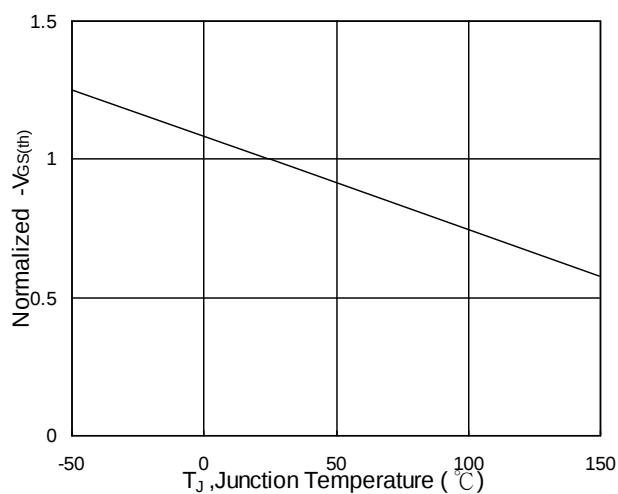


Fig.5 Normalized $V_{GS(th)}$ v.s T_J

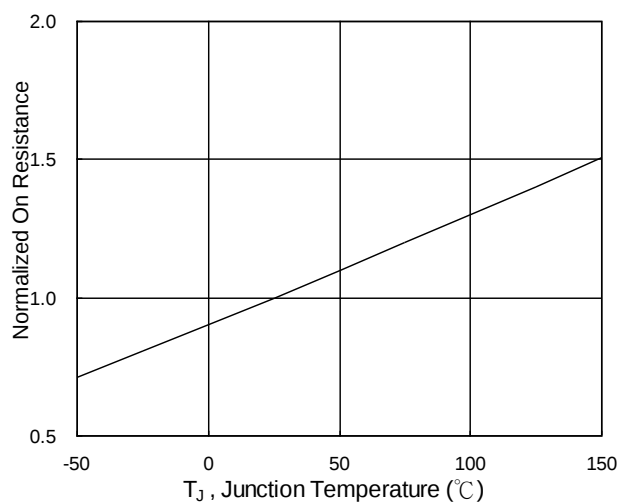


Fig.6 Normalized $R_{DS(on)}$ v.s T_J

Typical Characteristics

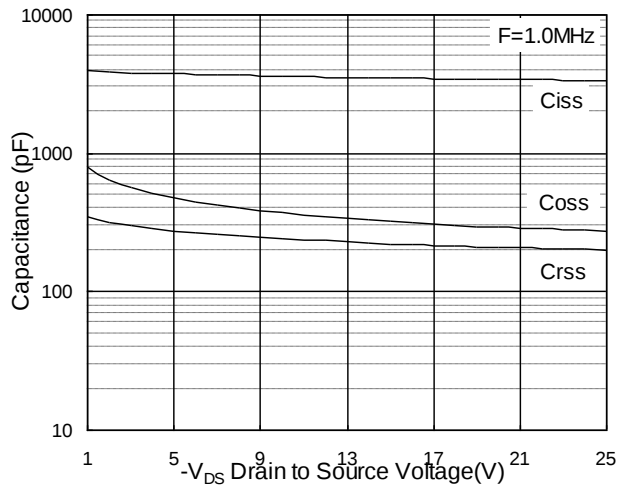


Fig.7 Capacitance

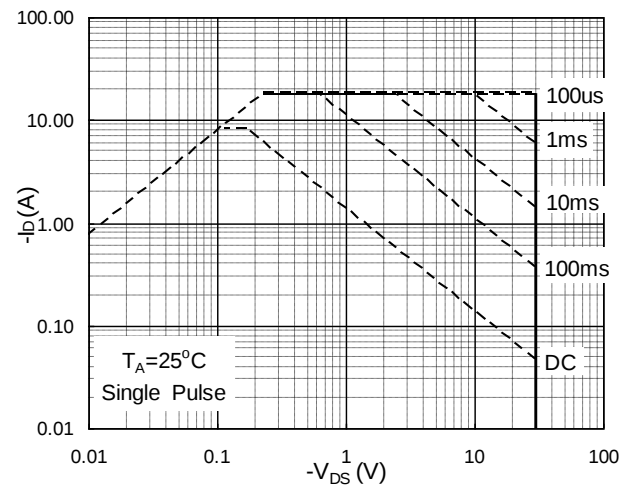


Fig.8 Safe Operating Area

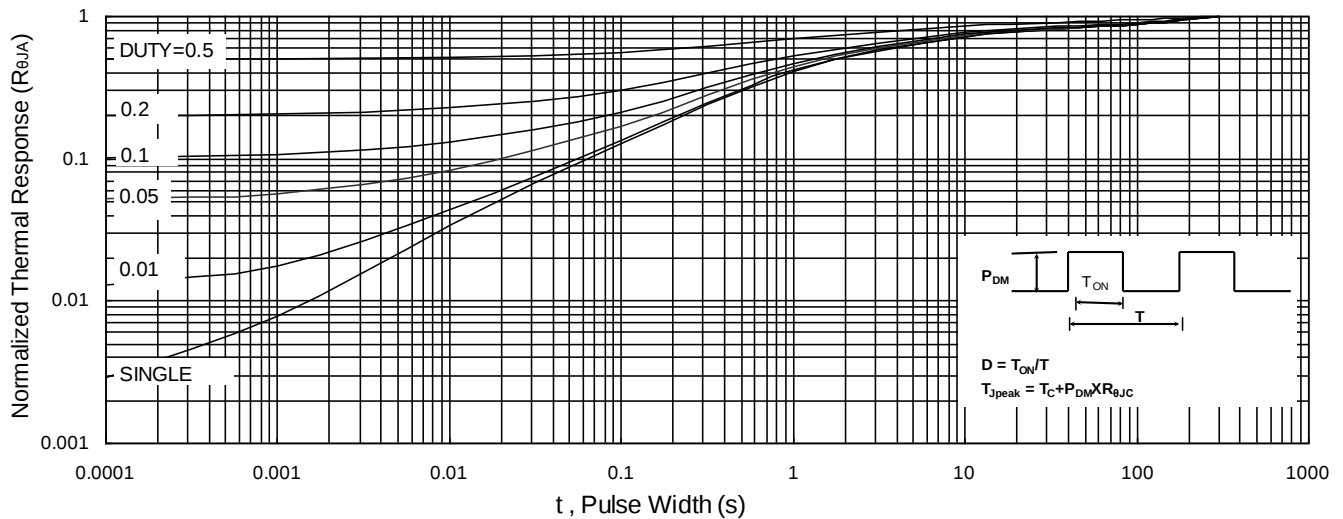


Fig.9 Normalized Maximum Transient Thermal Impedance

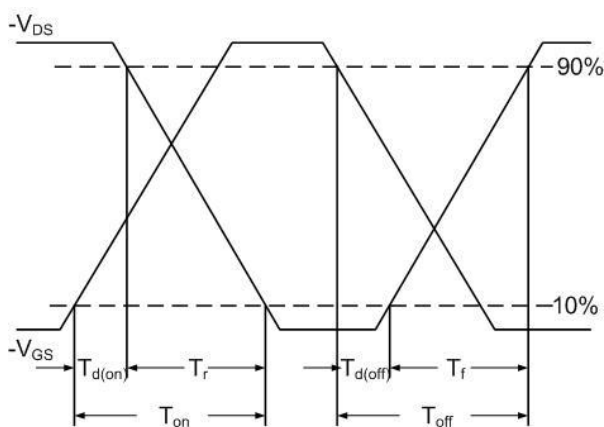


Fig.10 Switching Time Waveform

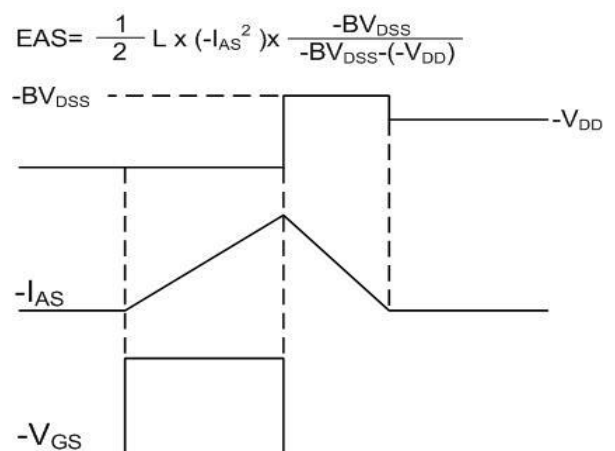
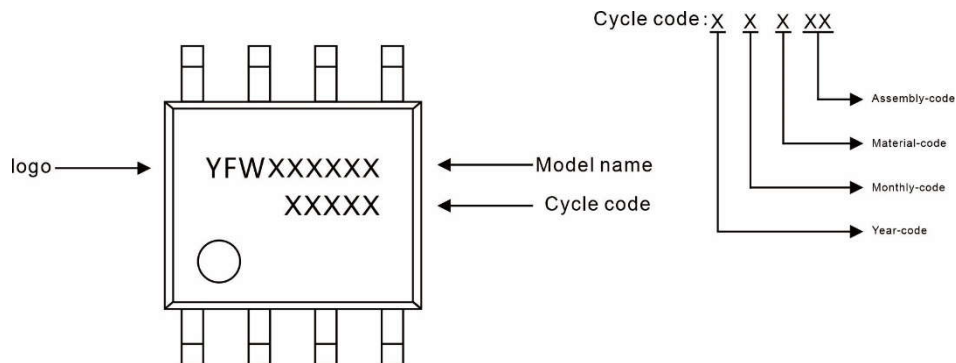


Fig.11 Unclamped Inductive Waveform

Marking Diagram



Ordering information

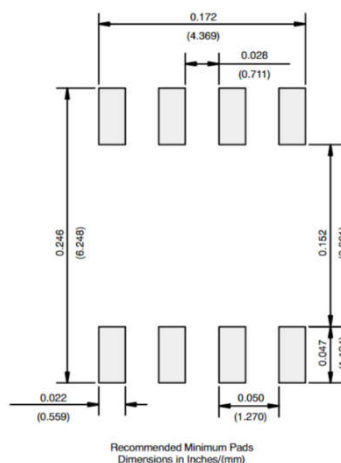
Package	Packing Description	Packing Quantity
SOP-8	Tape/Reel, 13" reel	3000PCS/Reel 30000PCS/Carton

Package Dimensions

SOP-8

Dim	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	1.35	1.75	0.053	0.069
A1	0.10	0.25	0.004	0.010
A2	1.35	1.50	0.053	0.059
b	0.35	0.55	0.014	0.022
c	0.15	0.25	0.006	0.010
D	4.80	5.00	0.189	0.197
D1	3.10	3.50	0.122	0.138
E	5.80	6.20	0.228	0.244
E1	3.80	4.00	0.150	0.157
E2	2.20	2.60	0.087	0.102
e	1.27 (BSC)		0.050 (BSC)	
L	0.40	1.27	0.016	0.050
θ	0°	8°	0°	8°

The recommended mounting pad size



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