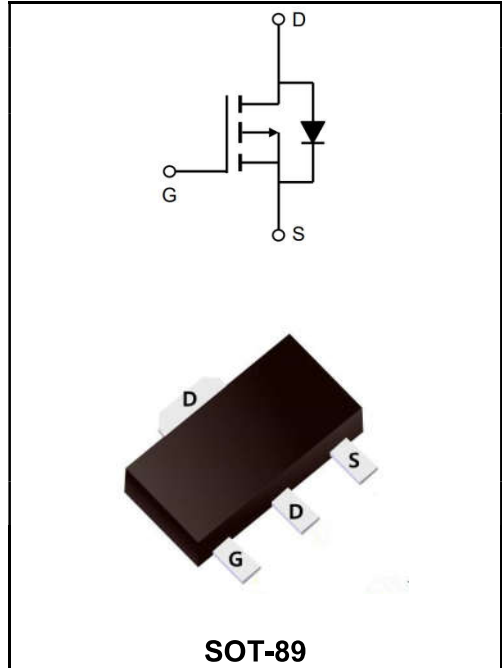


-20V P-CHANNEL ENHANCEMENT MODE MOSFET

MAIN CHARACTERISTICS

I_D	-20A
V_{DSS}	-20V
R_{DS(on)-typ}(@V_{GS}=-4.5V)	< 38mΩ (Type:32 mΩ)



Application

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

Product Specification Classification

Part Number	Package	Marking	Pack
YFW20P02SI	SOT-89	YFW 20P02SI XXXXX	1000PCS/Tape

Maximum Ratings at Tc=25°C unless otherwise specified

Characteristics	Symbols	Value	Units
Drain-Source Voltage	V_{DS}	-20	V
Gate - Source Voltage	V_{GS}	± 12	V
Continuous Drain Current, V _{GS} @ -4.5V ¹ @T _A =25°C	I_D	-20	A
Continuous Drain Current, V _{GS} @ -4.5V ¹ @T _A =70°C	I_D	-5.9	A
Pulsed Drain Current ²	I_{DM}	-60	A
Total Power Dissipation ³ @T _A =25°C	P_D	431	W
Total Power Dissipation ³ @T _A =70°C	P_D	0.84	W
Storage Temperature Range	T_{STG}	-55 to +150	°C
Operating Junction Temperature Range	T_J	-55 to +150	°C
Thermal Resistance Junction-Ambient ¹	R_{θJA}	250	°C/W
Thermal Resistance Junction to Case	R_{θJC}	7.4	°C/W

Maximum Ratings at Tc=25°C unless otherwise specified

Characteristics	Test Condition	Symbols	Min	Typ	Max	Units
Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=-250\mu A$	BV_{DSS}	-20	-	-	V
BV_{DSS} Temperature Coefficient	Reference to 25°C, $I_D=-1mA$	$\Delta BV_{DSS}/\Delta T_J$	-	-0.014	-	V/°C
Static Drain-Source On-Resistance ²	$V_{GS}=-4.5V, I_D=-4.9A$	$R_{DS(ON)}$	-	32	38	mΩ
	$V_{GS}=-2.5V, I_D=-3.4A$		-	45	55	
	$V_{GS}=-1.8V, I_D=-2A$		-	65	85	
Gate -Threshold Voltage	$V_{DS}=V_{GS}, I_D=-250\mu A$	$V_{GS(th)}$	-0.4	-	-1.0	V
$V_{GS(th)}$ Temperature Coefficient		$\Delta V_{GS(th)}$	-	3.95	-	mV/°C
Drain-Source Leakage Current	$V_{DS}=-16V, V_{GS}=0V, T_J=25^\circ C$	I_{DSS}	-	-	1	μA
	$V_{DS}=-16V, V_{GS}=0V, T_J=55^\circ C$		-	-	-5	
Gate -Source Leakage Current	$V_{GS}=\pm 12V, V_{DS}=0V$	I_{GSS}	-	-	±100	nA
Forward Transconductance	$V_{DS}=-5V, I_D=-3A$	g_{fs}	-	12.8	-	S
Total Gate Charge(-4.5V)	$V_{DS}=-15V$ $V_{GS}=-4.5V$ $I_D=-3A$	Q_g	-	10.2	14.3	nC
Gate-Source Charge		Q_{gs}	-	1.89	2.6	
Gate-Drain Charge		Q_{gd}	-	3.1	4.3	
Turn-on delay time	$V_{DD}=-10V$ $V_{GS}=-4.5V$ $I_D=-3A$ $R_G=3.3$	$t_{d(on)}$	-	5.6	11.2	ns
Rise Time		T_r	-	40.8	73	
Turn-Off Delay Time		$t_{d(OFF)}$	-	33.6	67	
Fall Time		t_f	-	18	36	
Input Capacitance	$V_{DS}=-15V$ $V_{GS}=0V$ $f=1MHz$	C_{iss}	-	857	1200	pF
Output Capacitance		C_{oss}	-	114	160	
Reverse Transfer Capacitance		C_{rss}	-	108	151	
Continuous Source Current ^{1,4}	$V_G=V_D=0V, \text{Force Current}$	I_S	-	-	-4.9	A
Pulsed Source Current ^{2,4}		I_{SM}	-	-	-14	A
Diode Forward Voltage ²	$V_{GS}=0V, I_S=-1A, T_J=25^\circ C$	V_{SD}	-	-	-1	V
Reverse Recovery Time	$I_F=-3A, dI/dt=100A/\mu s, T_J=25^\circ C$	t_{rr}	-	21.8	-	ns
Reverse Recovery Charge		Q_{rr}	-	6.9	-	nC

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 Δ 300us , duty cycle Δ 2%
- 3、The power dissipation is limited by 150°C junction temperature
- 4、The data is theoretically the same as ID and IDM , in real applications , should be limited by total power dissipation.

Ratings and Characteristic Curves

Typical Characteristics

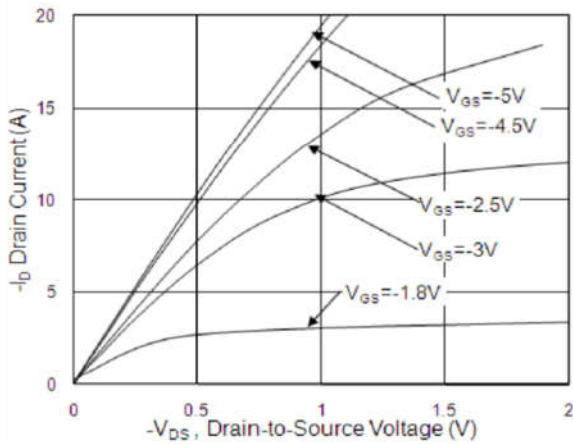


Fig.1 Typical Output Characteristics

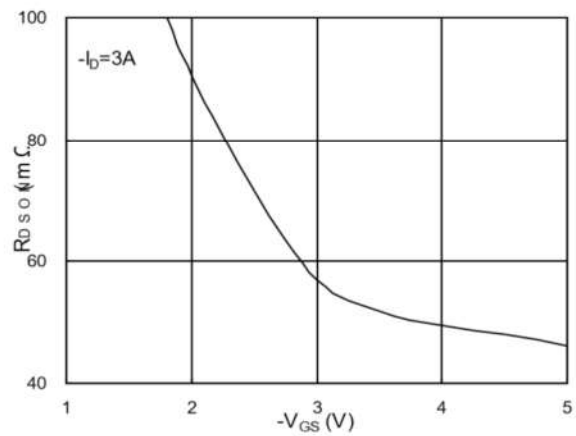


Fig.2 On-Resistance vs. G-S Voltage

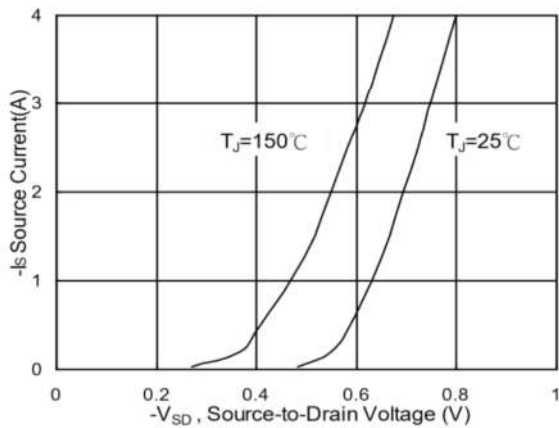


Fig.3 Forward Characteristics of Reverse

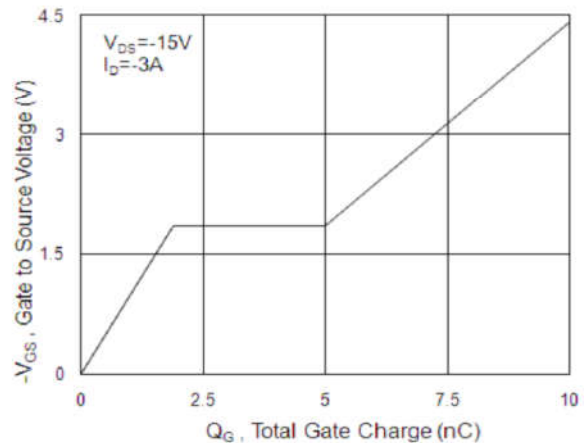


Fig.4 Gate-charge Characteristics

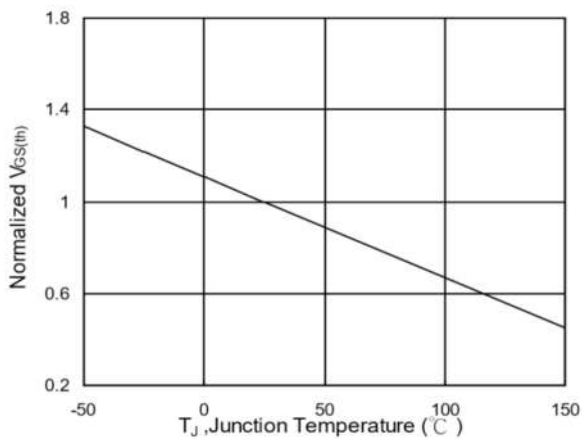


Fig.5 Normalized V_{GS(th)} vs. T_J

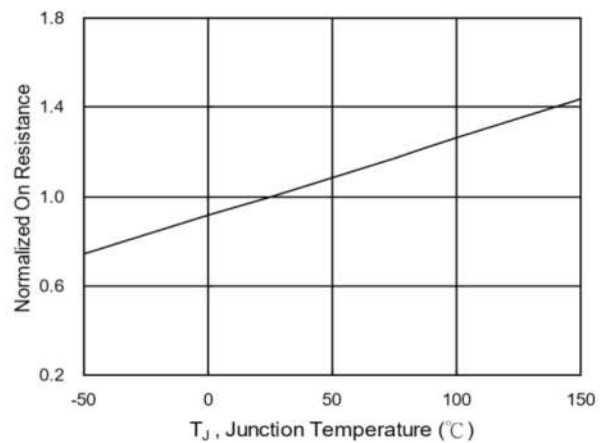


Fig.6 Normalized R_{DS(on)} vs. T_J

Ratings and Characteristic Curves

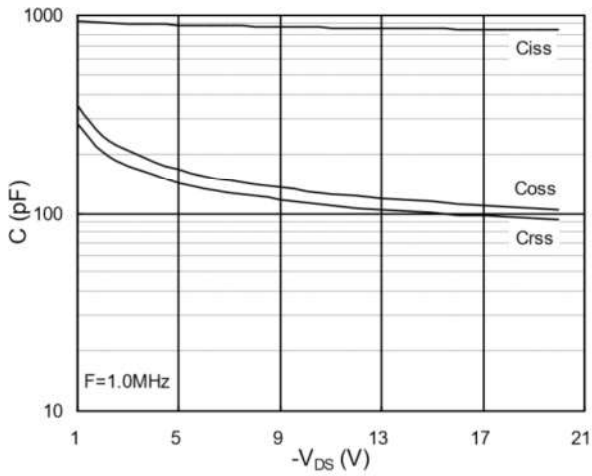


Fig.7 Capacitance

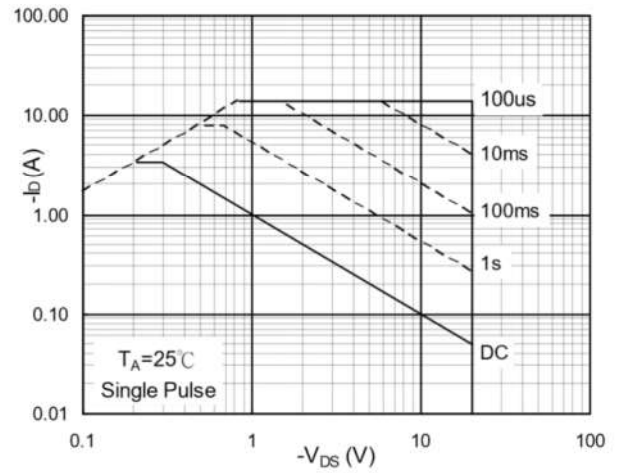


Fig.8 Safe Operating Area

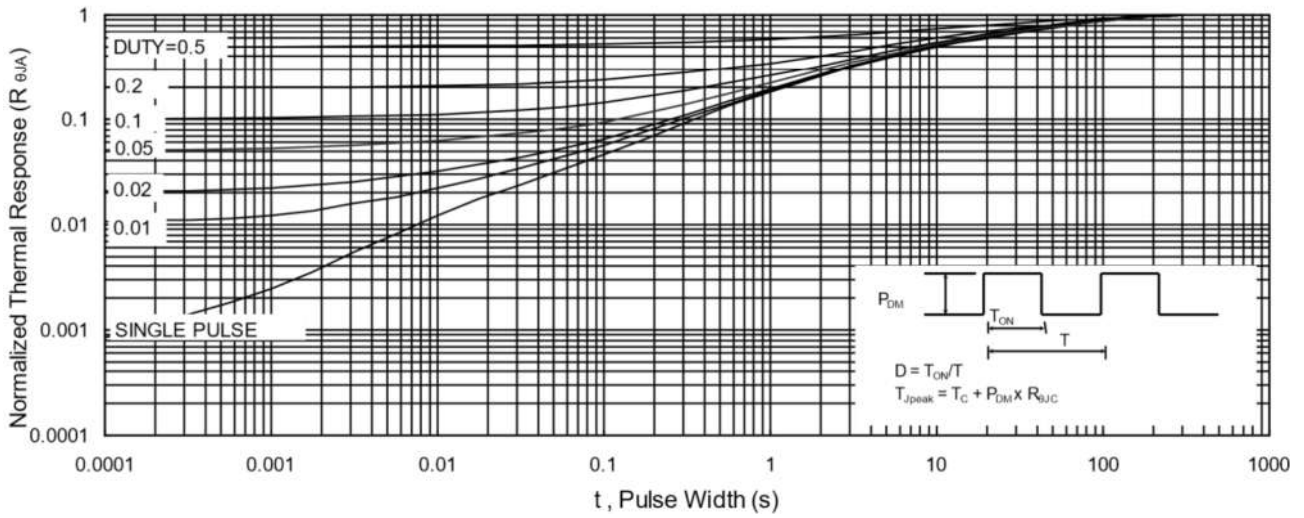


Fig.9 Normalized Maximum Transient Thermal Impedance

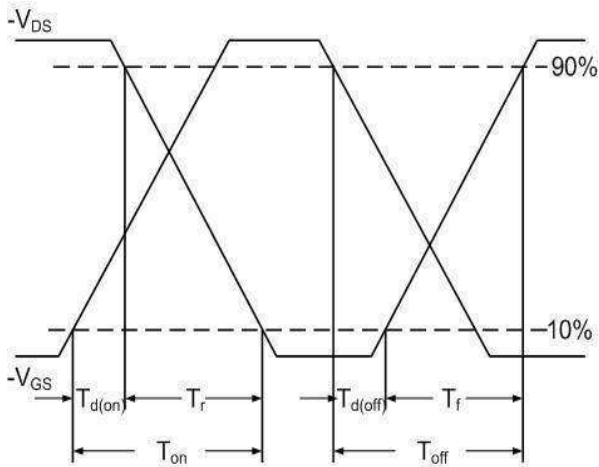


Fig.10 Switching Time Waveform

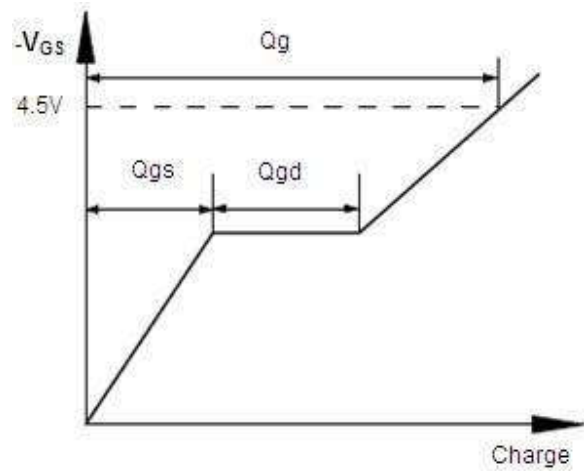
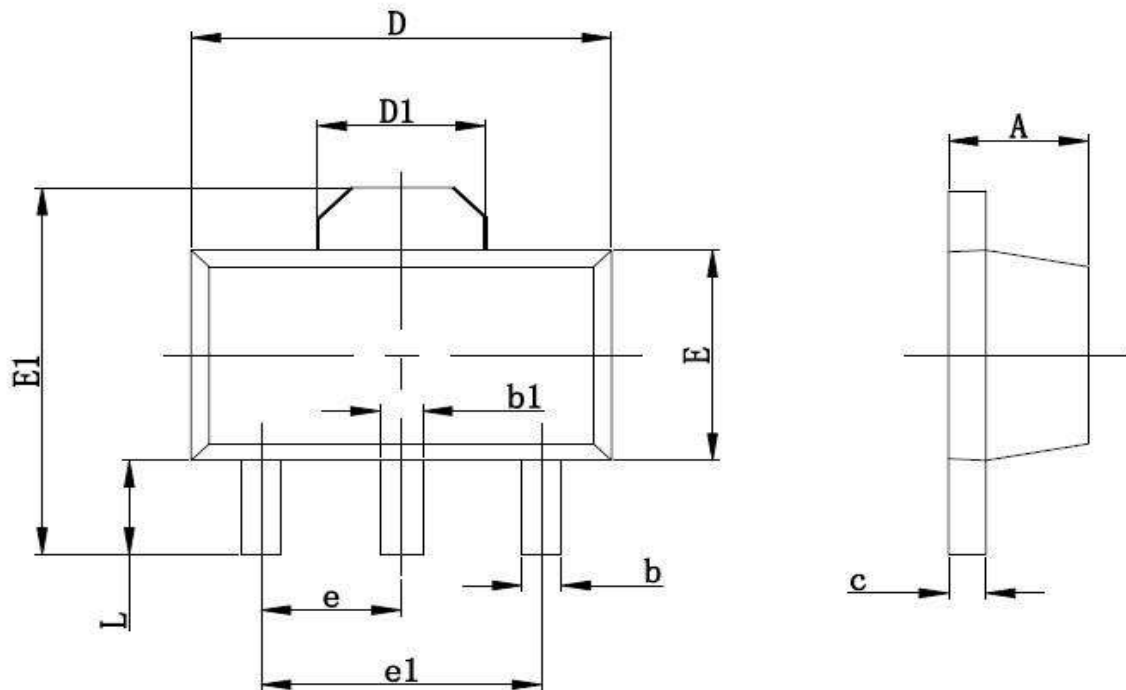


Fig.11 Gate Charge Waveform

SOT-89



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.400	1.600	0.055	0.063
b	0.350	0.520	0.013	0.197
b1	0.400	0.580	0.016	0.023
c	0.350	0.440	0.014	0.017
D	4.400	4.600	0.173	0.181
D1	1.550 REF		0.061 REF	
E	2.350	2.550	0.091	0.102
E1	3.940	4.250	0.155	0.167
e	1.500 TYP		0.060TYP	
e1	3.000 TYP		0.118TYP	
L	0.900	1.100	0.035	0.047