

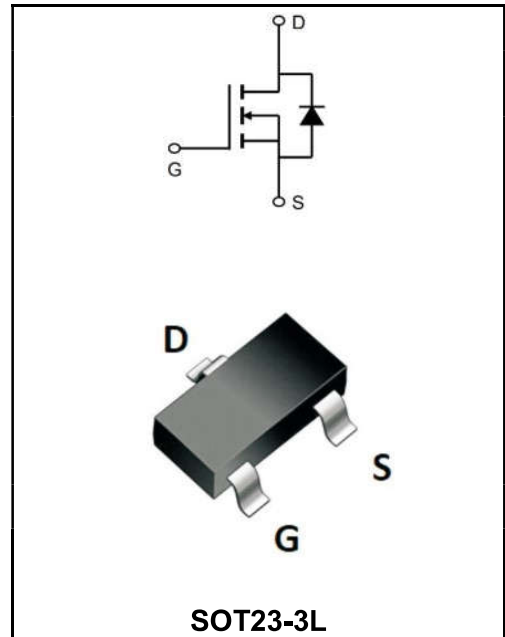
**60V N-CHANNEL ENHANCEMENT MODE MOSFET**

**MAIN CHARACTERISTICS**

<b>I<sub>D</sub></b>	5A
<b>V<sub>DSS</sub></b>	60V
<b>R<sub>DS(on)-typ(@V<sub>GS</sub>=10V)</sub></b>	< 38mΩ ( <b>Type:28 mΩ</b> )

**Application**

- ◆ Battery protection
- ◆ Load switch
- ◆ Automotive lighting



**Product Specification Classification**

Part Number	Package	Marking	Pack
YFW5N06MI	SOT23-3L	NA6-5A	3000PCS/Tape

**Maximum Ratings at Tc=25°C unless otherwise specified**

Characteristics	Symbols	Value	Units
Drain-Source Voltage	<b>V<sub>DS</sub></b>	60	<b>V</b>
Gate - Source Voltage	<b>V<sub>GS</sub></b>	±20	<b>V</b>
Continuous Drain Current, V <sub>GS</sub> @ 10V <sup>1</sup> @T <sub>A</sub> =25°C	<b>I<sub>D</sub></b>	5.8	<b>A</b>
Continuous Drain Current, V <sub>GS</sub> @ 10V <sup>1</sup> @T <sub>A</sub> =70°C	<b>I<sub>D</sub></b>	3.5	<b>A</b>
Pulsed Drain Current <sup>2</sup>	<b>I<sub>DM</sub></b>	18	<b>A</b>
Single Pulse Avalanche Energy <sup>3</sup>	<b>E<sub>AS</sub></b>	22	<b>mJ</b>
Avalanche Current	<b>I<sub>AS</sub></b>	21	<b>A</b>
Total Power Dissipation <sup>4</sup> @T <sub>A</sub> =25°C	<b>P<sub>D</sub></b>	1.5	<b>W</b>
Storage Temperature Range	<b>T<sub>STG</sub></b>	-55 to +150	<b>°C</b>
Operating Junction Temperature Range	<b>T<sub>J</sub></b>	-55 to +150	<b>°C</b>
Thermal Resistance Junction-Ambient <sup>1</sup>	<b>R<sub>θJA</sub></b>	85	<b>°C/W</b>
Thermal Resistance Junction-Case <sup>1</sup>	<b>R<sub>θJC</sub></b>	25	<b>°C/W</b>

**Maximum Ratings at Tc=25°C unless otherwise specified**

Characteristics	Test Condition	Symbols	Min	Typ	Max	Units
Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	$BV_{DSS}$	60	-	-	V
BVDSS Temperature Coefficient	Reference to 25°C , $I_D=1mA$	$\Delta BV_{DSS}/\Delta T_J$	-	0.044	-	V/°C
Static Drain-Source On-Resistance <sup>2</sup>	$V_{GS}=10V, I_D=4A$	$R_{DS(ON)}$	-	28	38	mΩ
	$V_{GS}=4.5V, I_D=2A$		-	35	50	
Gate -Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	$V_{GS(th)}$	1.0	1.76	2.5	V
$V_{GS(th)}$ Temperature Coefficient		$\Delta V_{GS(th)}$	-	-4.8	-	mV/°C
Drain -Source Leakage Current	$V_{DS}=48V, V_{GS}=0V, T_J=25^\circ C$	$I_{DSS}$	-	-	1	μA
	$V_{DS}=48V, V_{GS}=0V, T_J=55^\circ C$		-	-	5	
Gate-Source Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$	$I_{GSS}$	-	-	±100	nA
Forward Transconductance	$V_{DS}=5V, I_D=4A$	$g_{FS}$	-	28.3	-	S
Gate Resistance	$V_{DS}=0V, V_{GS}=0V, f=1MHz$	$R_g$	-	2.5	-	Ω
Total Gate Charge(10V)	$V_{DS}=48V$ $V_{GS}=10V$ $I_D=4A$	$Q_g$	-	19	-	nC
Gate-Source Charge		$Q_{gs}$	-	2.6	-	
Gate-Drain Charge		$Q_{gd}$	-	4.1	-	
Turn-on delay time	$V_{DD}=30V$ $V_{GS}=10V$ $R_G=3.3\Omega$ $I_D=4A$	$t_{d(on)}$	-	3	-	nS
Rise Time		$T_r$	-	34	-	
Turn-Off Delay Time		$t_{d(OFF)}$	-	23	-	
Fall Time		$t_f$	-	6	-	
Input Capacitance	$V_{DS}=15V$ $V_{GS}=0V$ $f=1.0MHz$	$C_{iss}$	-	1027	-	pF
Output Capacitance		$C_{oss}$	-	65	-	
Reverse Transfer Capacitance		$C_{rss}$	-	46	-	
Continuous Source Current <sup>1,5</sup>	$V_G=V_D=0V, \text{Force Current}$	$I_S$	-	-	4.5	A
Pulsed Source Current <sup>2,5</sup>		$I_{SM}$	-	-	18	A
Diode Forward Voltage <sup>2</sup>	$V_{GS}=0V, I_S=1A, T_J=25^\circ C$	$V_{SD}$	-	-	1.2	V
Reverse Recovery Time	$I_F=4A, dI/dt=100A/\mu s,$ $T_J=25^\circ C$	$t_{rr}$	-	12.1	-	nS
Reverse Recovery Charge		$Q_{rr}$	-	6.7	-	nC

Note :

- 1、 The data tested by surface mounted on a 1 inch<sup>2</sup> FR-4 board with 2OZ copper.
- 2、 The data tested by pulsed , pulse width  $\leq 300\mu s$  , duty cycle  $\leq 2\%$
- 3、 The EAS data shows Max. rating . The test condition is  $V_{DD}=25V, V_{GS}=10V, L=0.1mH, I_{AS}=21A$
- 4、 The power dissipation is limited by 150°C junction temperature
- 5、 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

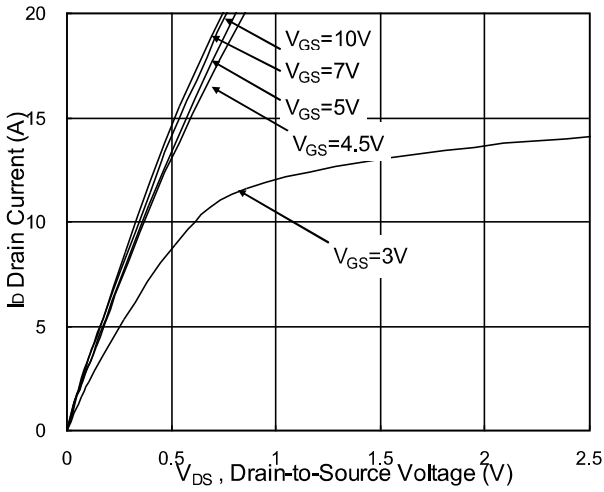


Fig.1 Typical Output Characteristics

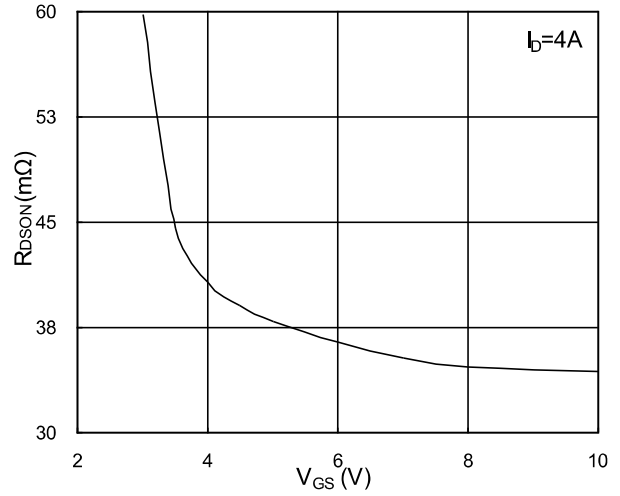


Fig.2 On-Resistance vs. Gate-Source

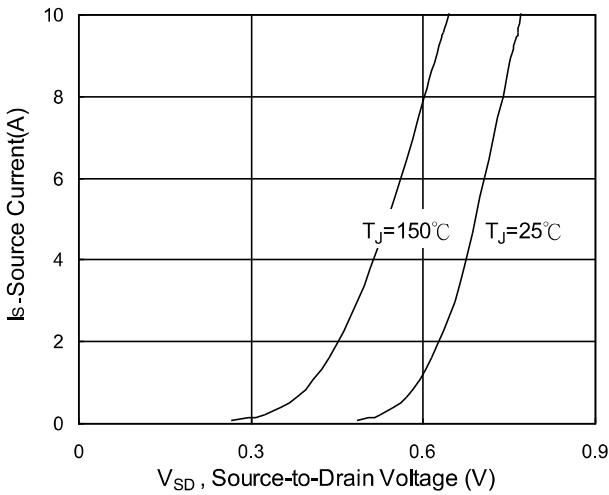


Fig.3 Forward Characteristics Of Reverse

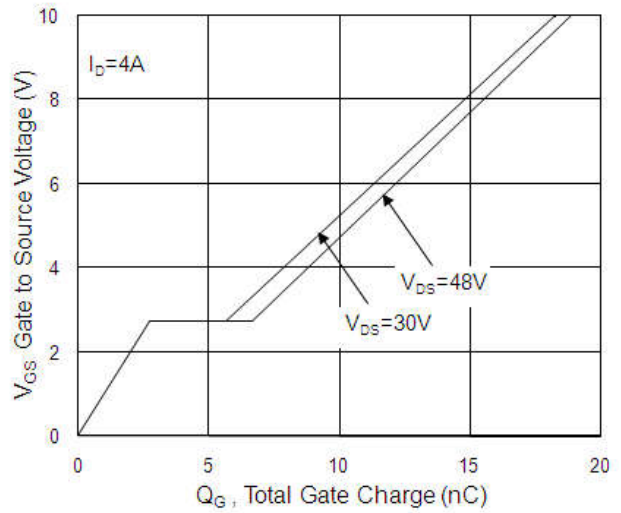


Fig.4 Gate-Charge Characteristics

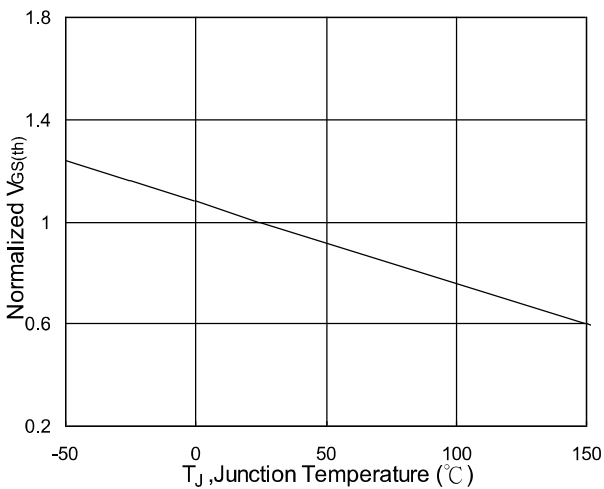


Fig.5 Normalized  $V_{GS(th)}$  vs.  $T_J$

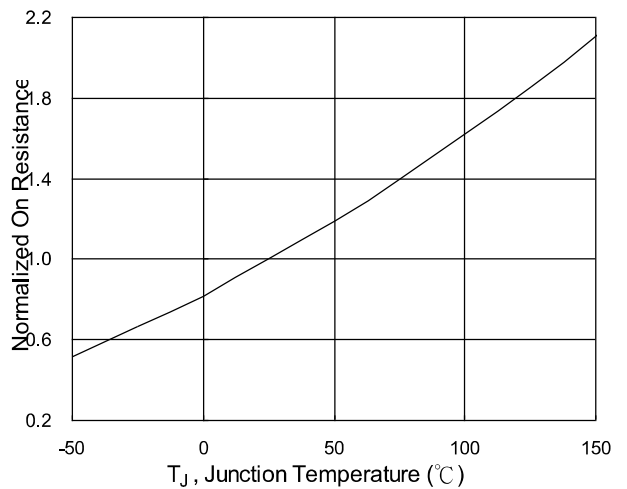


Fig.6 Normalized  $R_{DS(on)}$  vs.  $T_J$

Ratings and Characteristic Curves

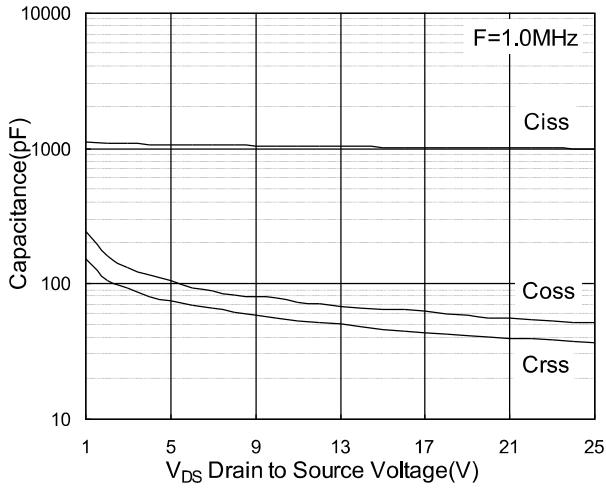


Fig.7 Capacitance

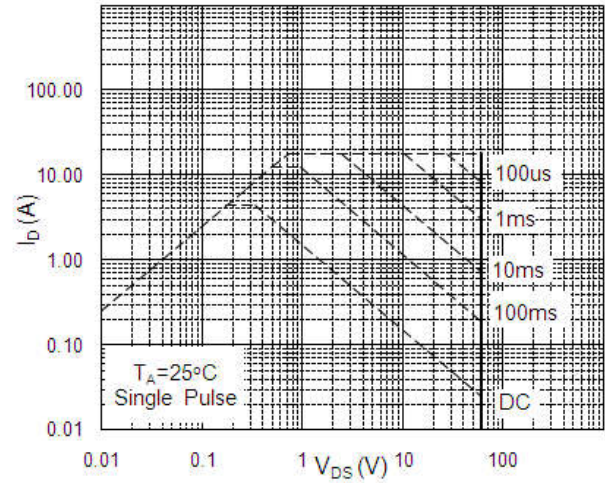


Fig.8 Safe Operating Area

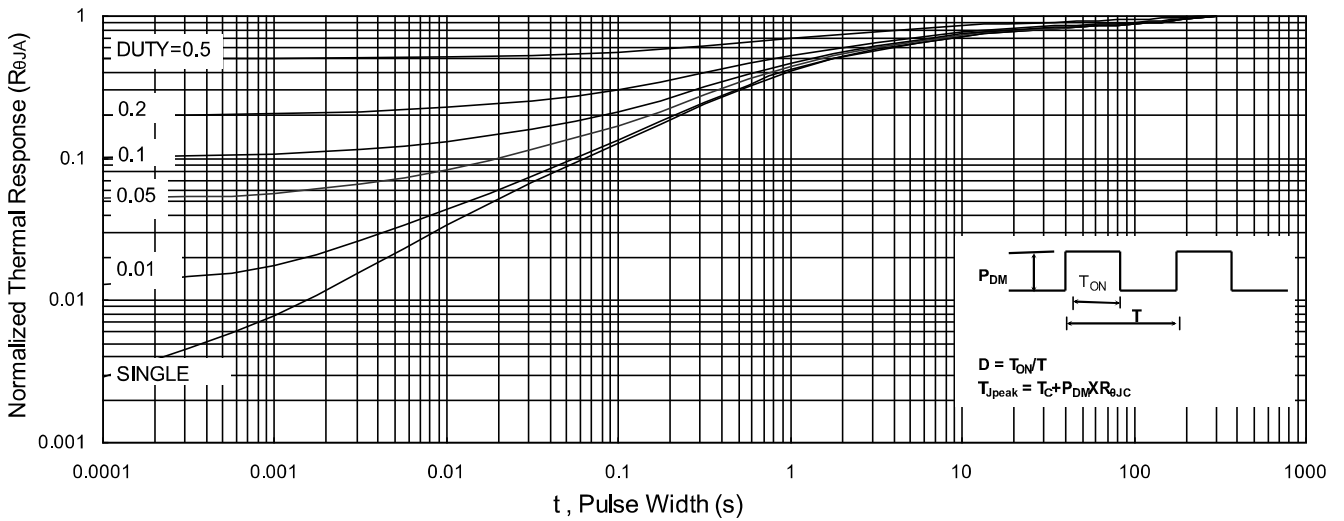


Fig.9 Normalized Maximum Transient Thermal Impedance

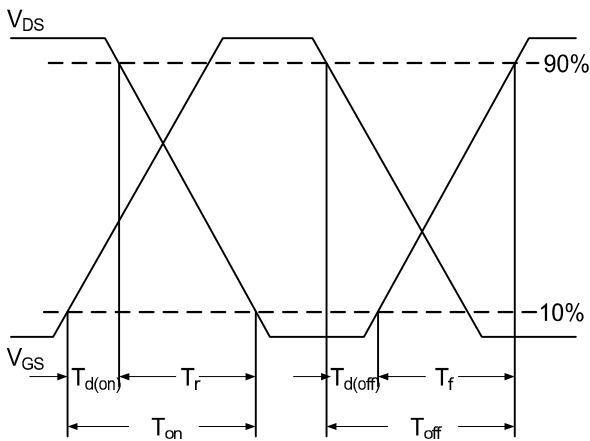


Fig.10 Switching Time Waveform

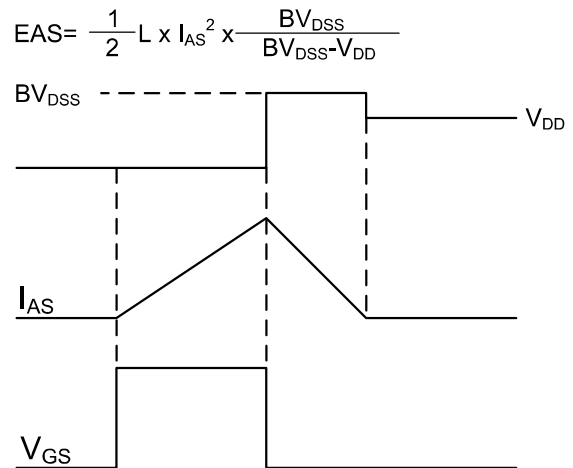
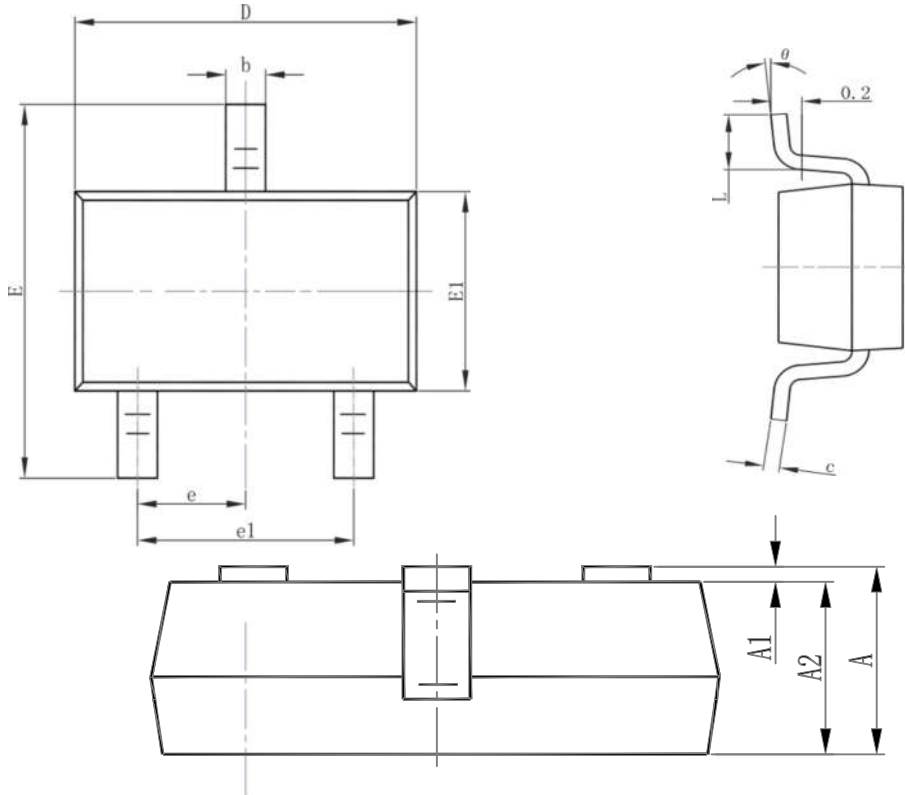


Fig.11 Unclamped Inductive Switching Waveform

**SOT23-3L**



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E1	1.500	1.700	0.059	0.067
E	2.650	2.950	0.104	0.116
e	0.950(BSC)		0.037(BSC)	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
$\theta$	0°	8°	0°	8°