

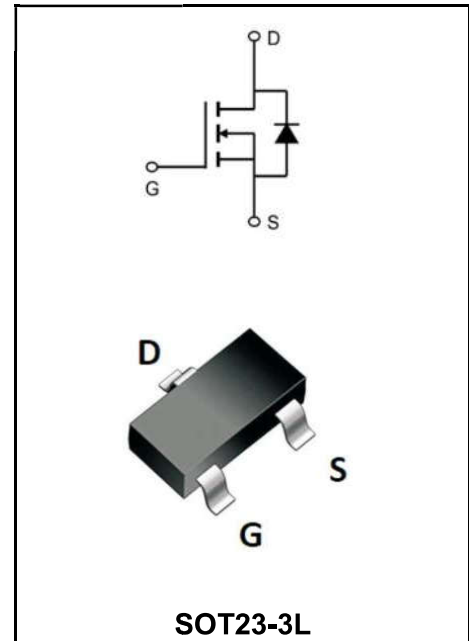
**-30V P-CHANNEL ENHANCEMENT MODE MOSFET**

**MAIN CHARACTERISTICS**

<b>I<sub>D</sub></b>	-12A
<b>V<sub>DSS</sub></b>	-30V
<b>R<sub>DS(on)-typ(@V<sub>GS</sub>=10V)</sub></b>	<30mΩ( <b>Type:25 mΩ</b> )

**Application**

- ◆ Boost driver
- ◆ Brushless motor
- ◆ Molded Plastic: UL Flammability Classification Rating 94V-0



**Product Specification Classification**

Part Number	Package	Marking	Pack
YFW3409MI	SOT-23-3L	3409M	3000PCS/Tape

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

Characteristics	Symbols	Value	Units
Drain-Source Voltage	<b>V<sub>DS</sub></b>	-30	<b>V</b>
Gate-Source Voltage	<b>V<sub>GS</sub></b>	±20	<b>V</b>
Continuous Drain Current, VGS @ -4.5 V <sup>1</sup>	<b>ID@Tc=25°C</b>	-12	<b>A</b>
Continuous Drain Current, VGS @ -4.5V <sup>1</sup>	<b>ID@Tc=70°C</b>	-7.5	<b>A</b>
Pulsed Drain Current <sup>2</sup>	<b>IDM</b>	-36	<b>A</b>
Total Power Dissipation <sup>3</sup>	<b>PD@TC=25°C</b>	1.8	<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>	125	<b>°C/W</b>
Thermal Resistance Junction-Case <sup>1</sup>	<b>R<sub>θJC</sub></b>	110	<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	$V_{GS} = 0V, I_D = 250 \mu A$	$BV_{DSS}$	-30	-33	-	<b>V</b>
Static Drain-Source On-Resistance <sup>2</sup>	$V_{GS}=-10V, I_D=-7A$	$R_{DS(on)}$	-	25	32	<b>mΩ</b>
	$V_{GS}=-4.5V, I_D=-5A$		-	37	54	
Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250 \mu A$	$V_{GS(th)}$	-1.0	-1.5	-2.5	<b>V</b>
Drain-Source Leakage Current	$V_{DS}=-24V, V_{GS}=0V, T_J=25^\circ C$	$I_{DSS}$	-	-	-1	<b>uA</b>
	$V_{DS}=-24V, V_{GS}=0V, T_J=55^\circ C$		-	-	-5	
Gate-Source Leakage Current	$V_{GS} = \pm 20V, V_{DS} = 0V$	$I_{GSS}$	-	-	±100	<b>nA</b>
Forward Transconductance	$V_{DS}=-5V, I_D=-7A$	$G_{fs}$	-	15	-	<b>S</b>
Gate Resistance	$V_{DS}=0V, V_{GS}=0V, f=1MHz$	$R_G$	-	15	30	<b>Ω</b>
Total Gate Charge (-4.5V)	$V_{DS}=-20V, V_{GS}=-4.5V, I_D=-7A$	$Q_g$	-	9.8	-	<b>nC</b>
Gate-Source Charge		$Q_{gs}$	-	2.2	-	
Gate-Drain Charge		$Q_{gd}$	-	3.4	-	
Turn-on delay time	$V_{DD}=-15V, V_{GS}=-10V, R_G=3.3\Omega, I_D=-5A$	$T_d(on)$	-	16.4	-	<b>nS</b>
Rise Time		$T_r$	-	20.2	-	<b>nS</b>
Turn-Off Delay Time		$td(OFF)$	-	55	-	<b>nS</b>
Fall Time		$T_f$	-	10	-	<b>nS</b>
Input Capacitance	$V_{DS}=-15V, V_{GS}=0V, f=1MHz$	$C_{iss}$	-	930	-	<b>pF</b>
Output Capacitance		$C_{oss}$	-	148	-	
Reverse Transfer Capacitance		$C_{rss}$	-	115	-	
Continuous Source Current <sup>1,5</sup>	$V_G=V_D=0V, \text{Force Current}$	$I_S$	-	-	-8	<b>A</b>
Diode Forward Voltage <sup>2</sup>	$V_{GS}=0V, I_S=-1A, T_J=25^\circ C$	$V_{SD}$	-	-	-1.2	<b>V</b>

Note :

- 1、 The data tested by surface mounted on a 1 inch<sup>2</sup> FR-4 board with 20Z 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 ID and IDM , in real applications , should be limited by total power dissipation.

Typical Characteristics

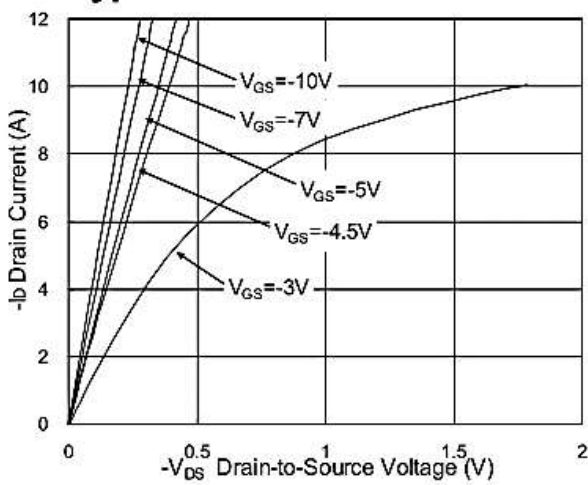


Fig.1 Typical Output Characteristics

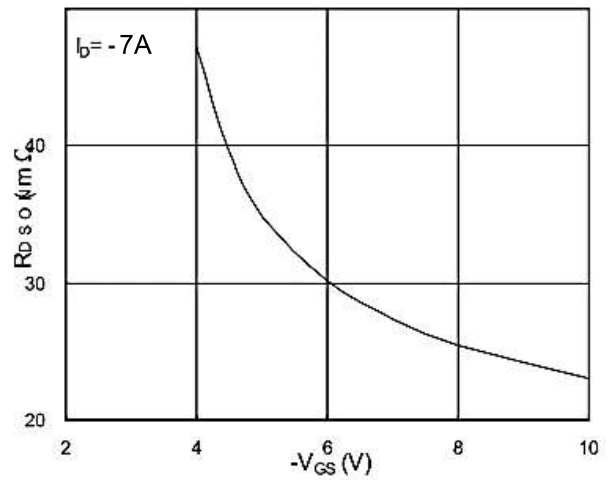


Fig.2 On-Resistance v.s Gate-Source

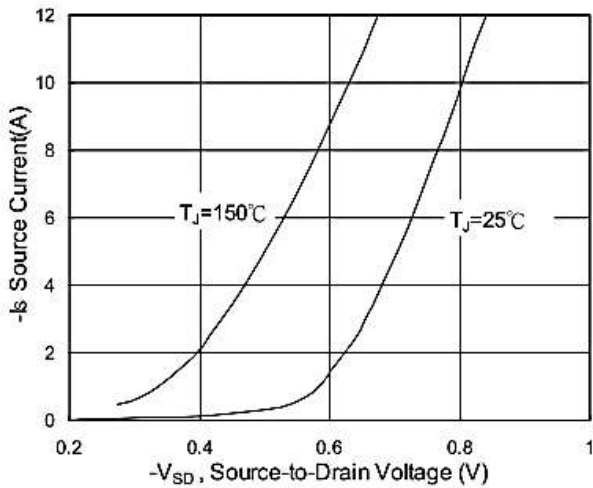


Fig.3 Forward Characteristics Of Reverse

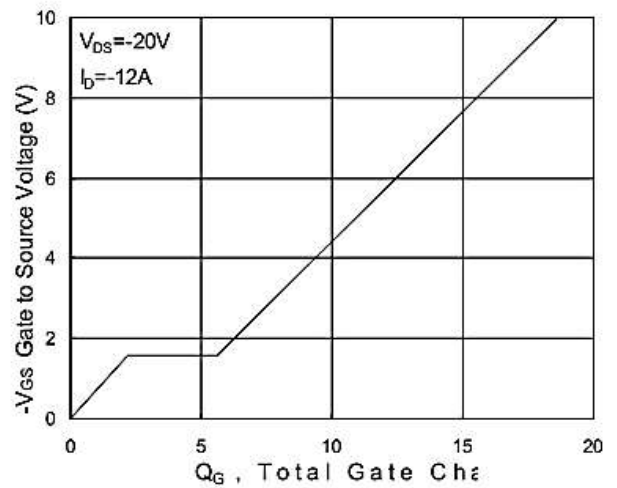


Fig.4 Gate-Charge Characteristics

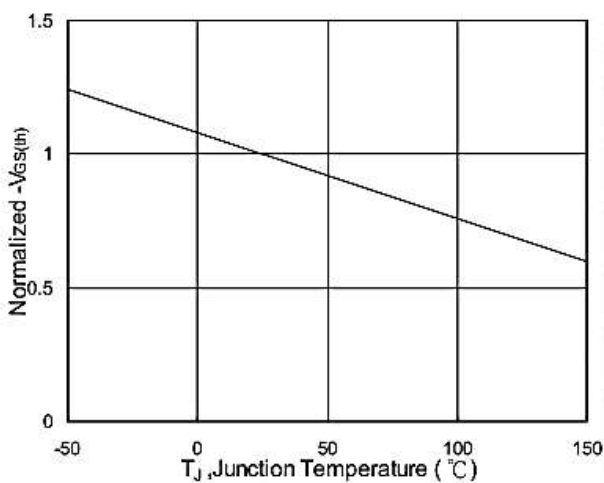


Fig.5 Normalized  $V_{GS(th)}$  v.s  $T_J$

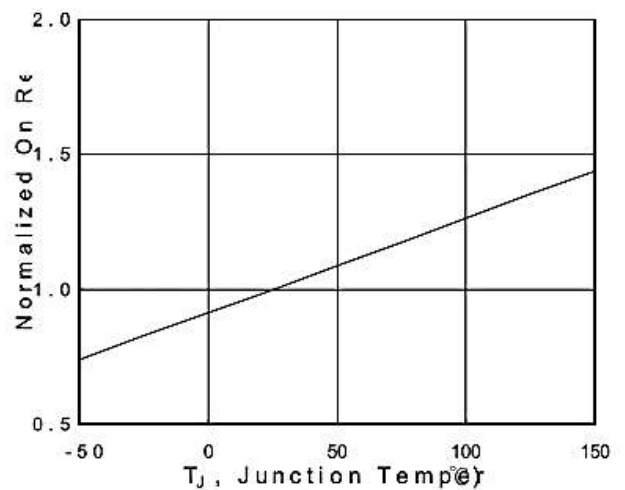


Fig.6 Normalized  $R_{DS(on)}$  v.s  $T_J$

Ratings and Characteristic Curves

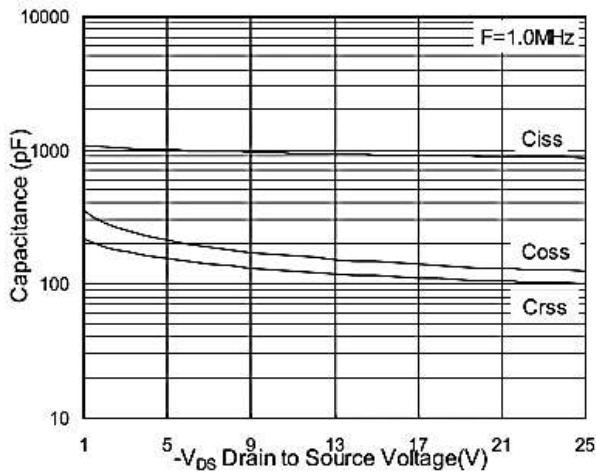


Fig.7 Capacitance

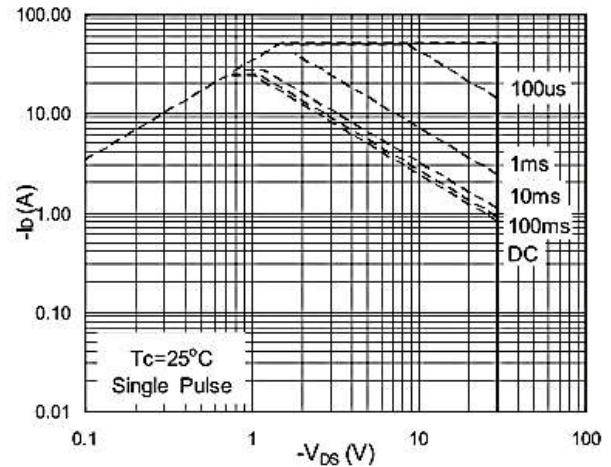


Fig.8 Safe Operating Area

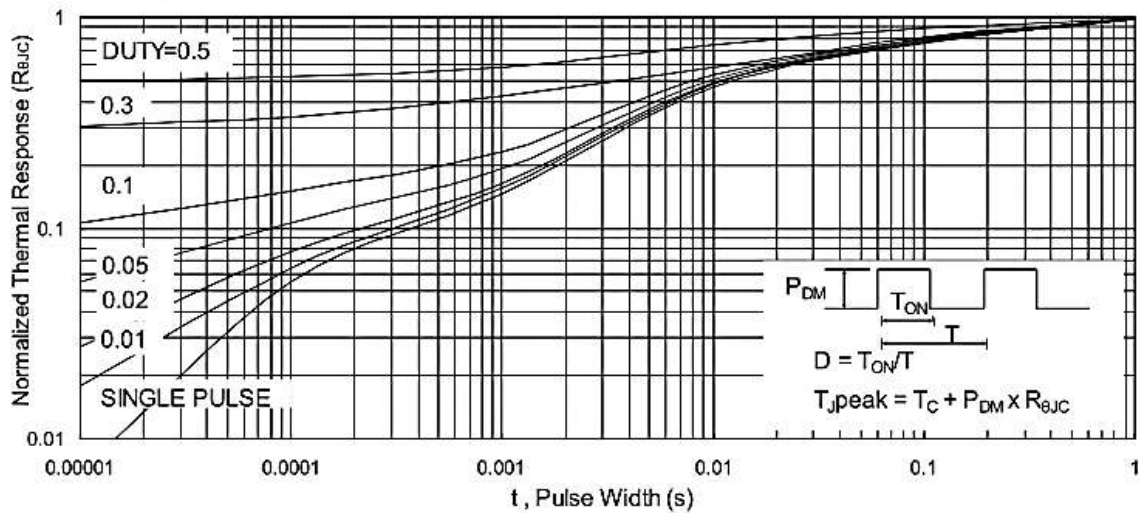


Fig.9 Normalized Maximum Transient Thermal Impedance

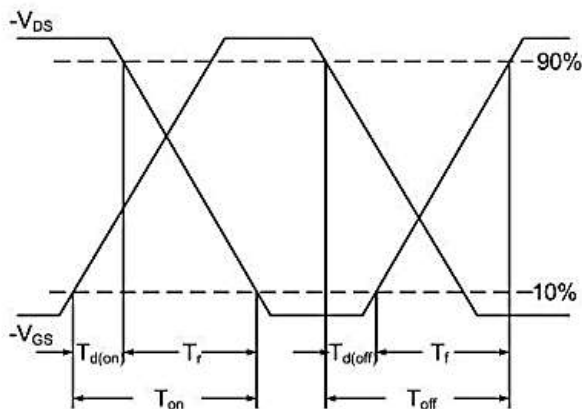


Fig.10 Switching Time Waveform

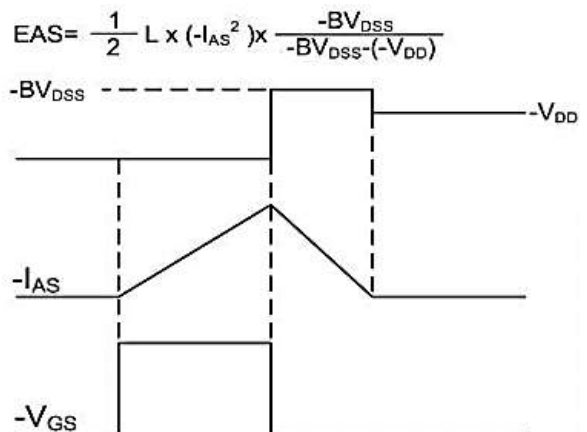
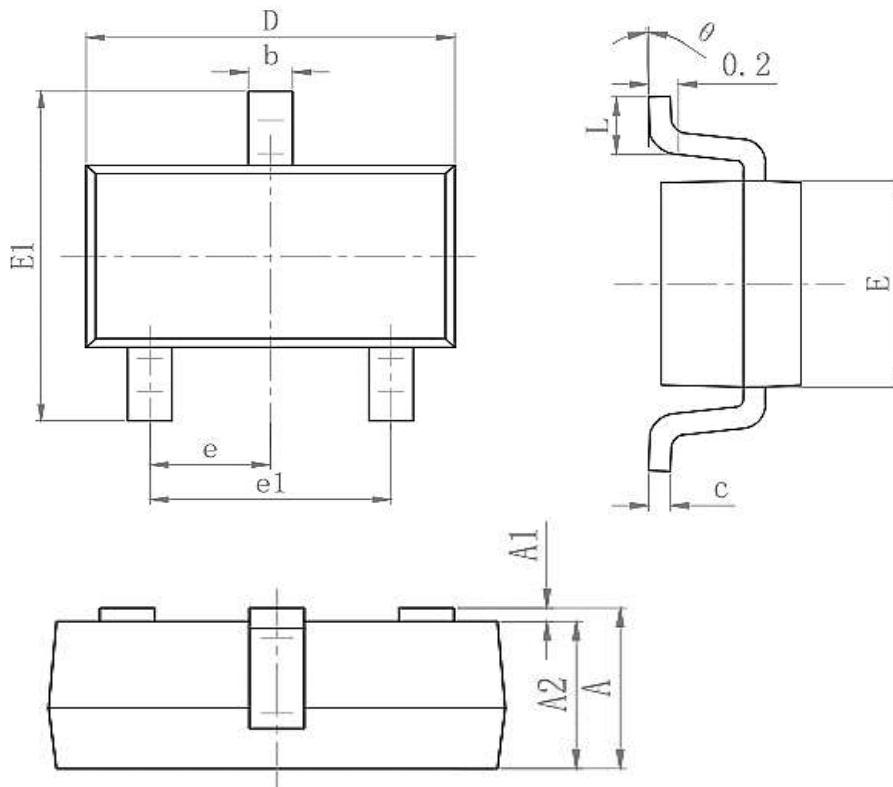


Fig.11 Unclamped Inductive Waveform

**SOT23-3L**



Symbol	Dimensions In Millimeters	
	Min.	Max.
A	1.050	1.250
A1	0.000	0.100
A2	1.050	1.150
b	0.25	0.45
c	0.100	0.200
D	2.820	3.020
E	1.5	1.7
E1	2.650	2.950
e	0.950(BSC)	
e1	1.800	2.000
L	0.300	0.500
θ	0°	8°

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