

-30V P-CHANNEL ENHANCEMENT MODE MOSFET

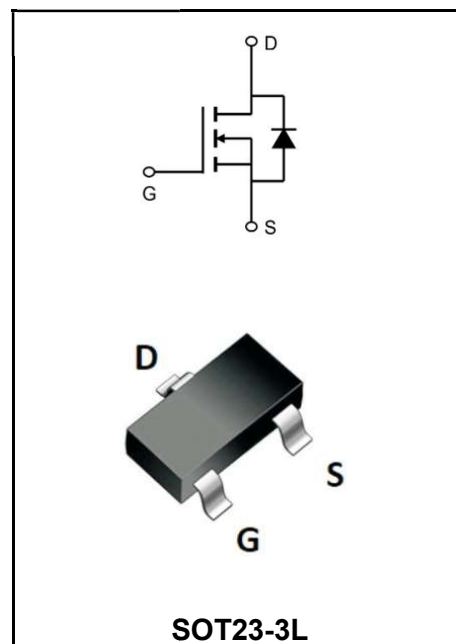
MAIN CHARACTERISTICS

I_D	-12A
V_{DSS}	-30V
$R_{DS(on)-typ}(@V_{GS}=10V)$	<30mΩ (Type:25 mΩ)



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	V_{DS}	-30	V
Gate-Source Voltage	V_{GS}	±20	V
Continuous Drain Current, $V_{GS} @ -4.5 V^1$	$I_{D@T_C=25^\circ C}$	-12	A
Continuous Drain Current, $V_{GS} @ -4.5V^1$	$I_{D@T_C=70^\circ C}$	-7.5	A
Pulsed Drain Current ²	I_{DM}	-36	A
Total Power Dissipation ³	$P_{D@T_C=25^\circ C}$	1.8	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	$R_{\theta JA}$	125	°C/W
Thermal Resistance Junction-Case ¹	$R_{\theta JC}$	110	°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}	-30	-33	-	V
Static Drain-Source On-Resistance ²	$V_{GS} = -10V, I_D = -7A$	$R_{DS(on)}$	-	25	32	mΩ
	$V_{GS} = -4.5V, I_D = -5A$		-	37	54	
Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250 \mu A$	$V_{GS(th)}$	-1.0	-1.5	-2.5	V
Drain-Source Leakage Current	$V_{DS} = -24V, V_{GS} = 0V, T_J = 25^\circ C$	I_{DSS}	-	-	-1	uA
	$V_{DS} = -24V, V_{GS} = 0V, T_J = 55^\circ C$		-	-	-5	
Gate-Source Leakage Current	$V_{GS} = \pm 20V, V_{DS} = 0V$	I_{GSS}	-	-	±100	nA
Forward Transconductance	$V_{DS} = -5V, I_D = -7A$	G_{fs}	-	15	-	S
Gate Resistance	$V_{DS} = 0V, V_{GS} = 0V, f = 1MHz$	R_G	-	15	30	Ω
Total Gate Charge (-4.5V)	$V_{DS} = -20V, V_{GS} = -4.5V, I_D = -7A$	Q_g	-	9.8	-	nC
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	-	nS
Rise Time		T_r	-	20.2	-	nS
Turn-Off Delay Time		$t_d(OFF)$	-	55	-	nS
Fall Time		T_f	-	10	-	nS
Input Capacitance	$V_{DS} = -15V, V_{GS} = 0V, f = 1MHz$	C_{iss}	-	930	-	pF
Output Capacitance		C_{oss}	-	148	-	
Reverse Transfer Capacitance		C_{rss}	-	115	-	
Continuous Source Current ^{1,5}	$V_G = V_D = 0V, \text{Force Current}$	I_S	-	-	-8	A
Diode Forward Voltage ²	$V_{GS} = 0V, I_S = -1A, T_J = 25^\circ C$	V_{SD}	-	-	-1.2	V

Note :

- 1、The data tested by surface mounted on a 1 inch² 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

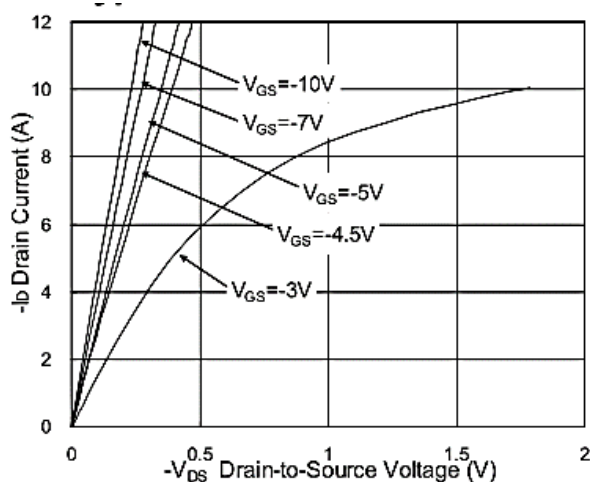


Fig.1 Typical Output Characteristics

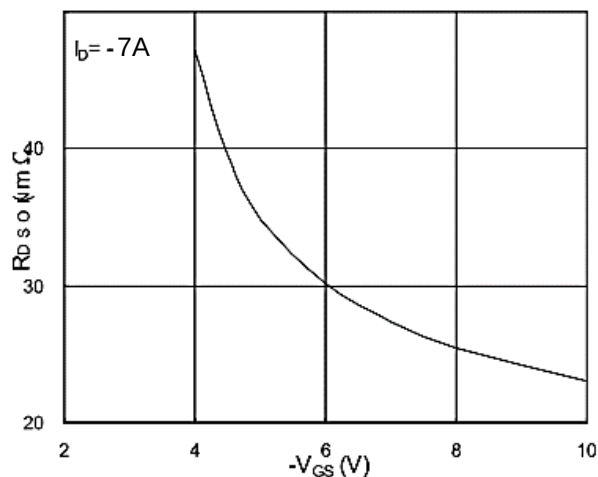


Fig.2 On-Resistance v.s Gate-Source

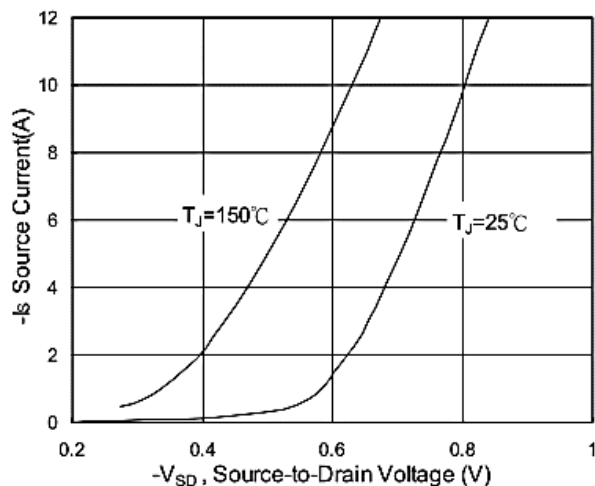


Fig.3 Forward Characteristics Of Reverse

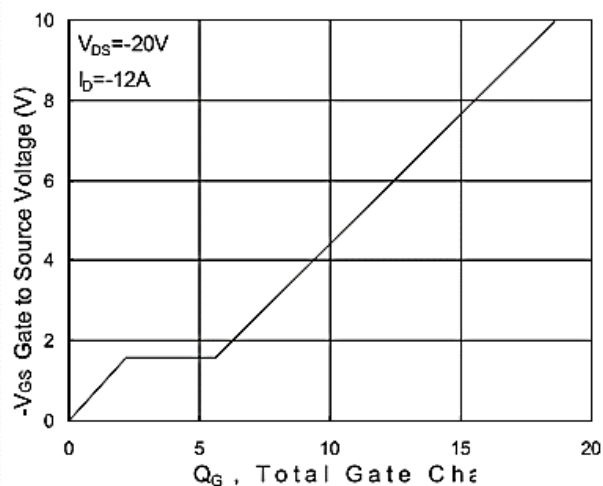


Fig.4 Gate-Charge Characteristics

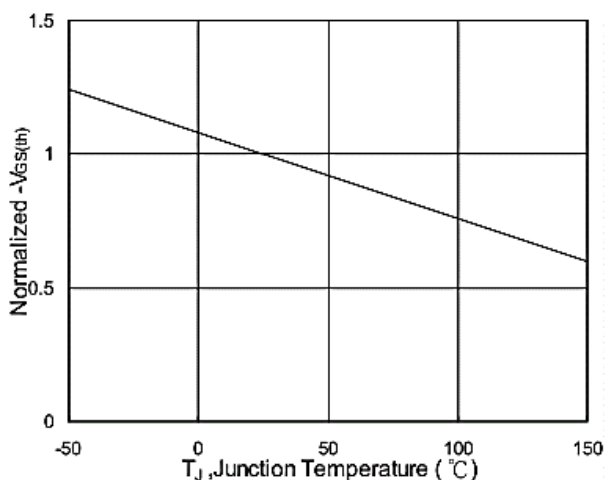


Fig.5 Normalized $V_{GS(th)}$ v.s T_J

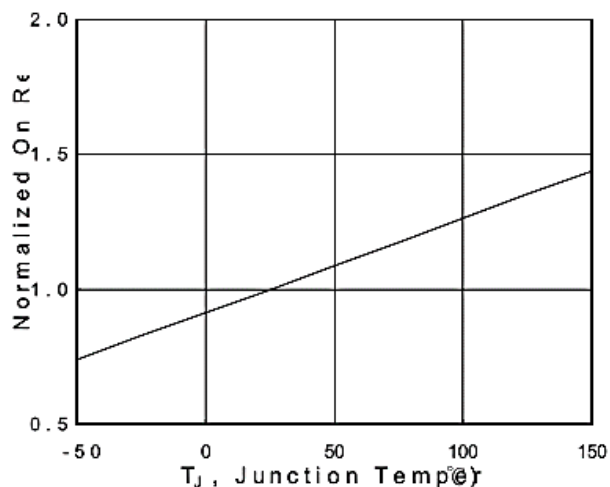


Fig.6 Normalized $R_{DS(on)}$ v.s T_J

Ratings and Characteristic Curves

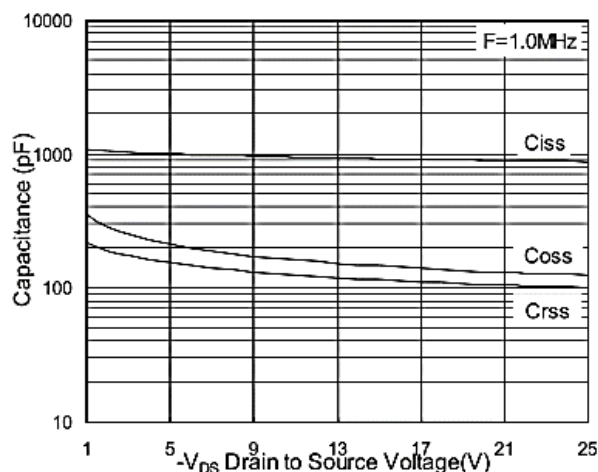


Fig.7 Capacitance

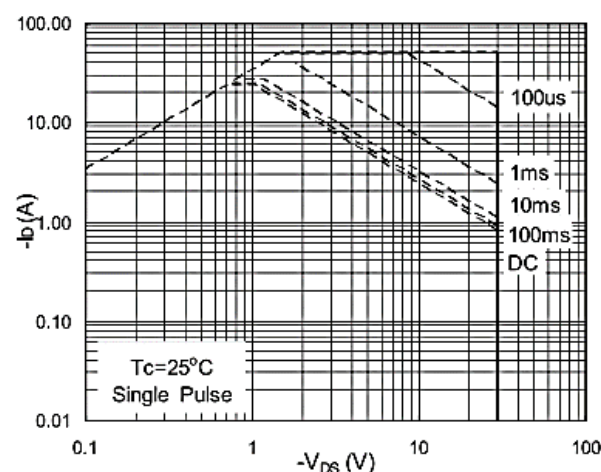


Fig.8 Safe Operating Area

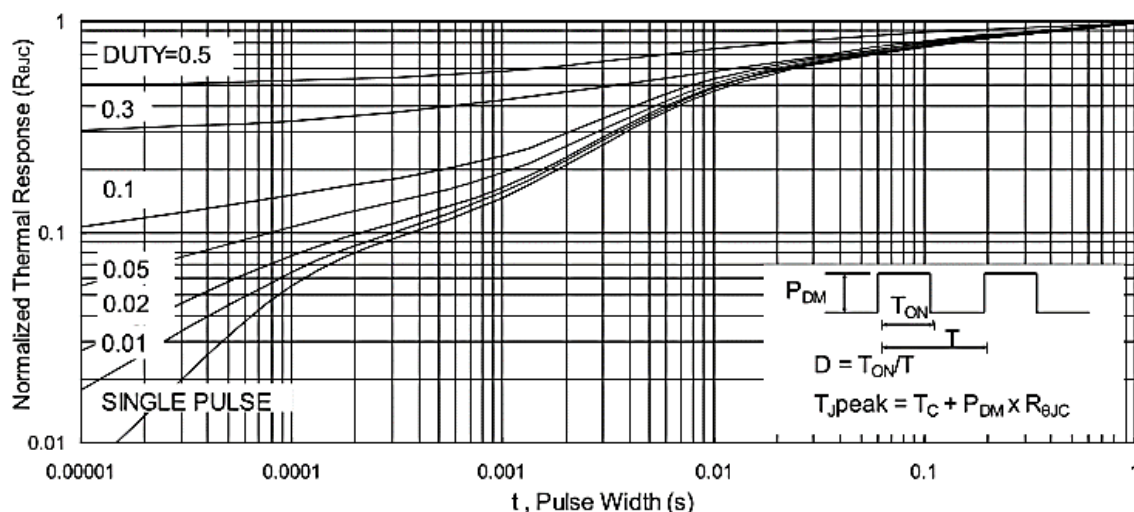


Fig.9 Normalized Maximum Transient Thermal Impedance

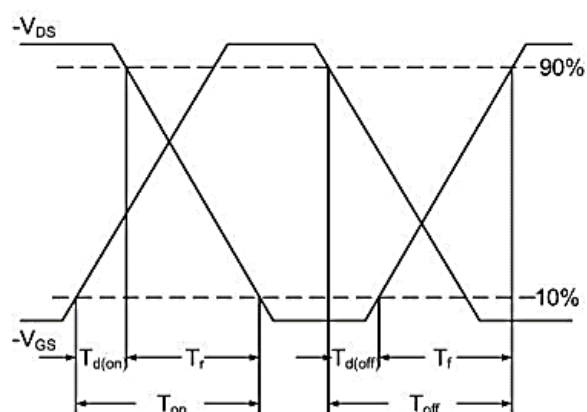


Fig.10 Switching Time Waveform

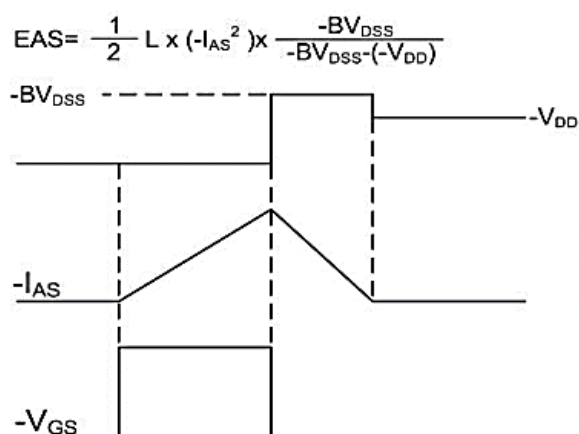
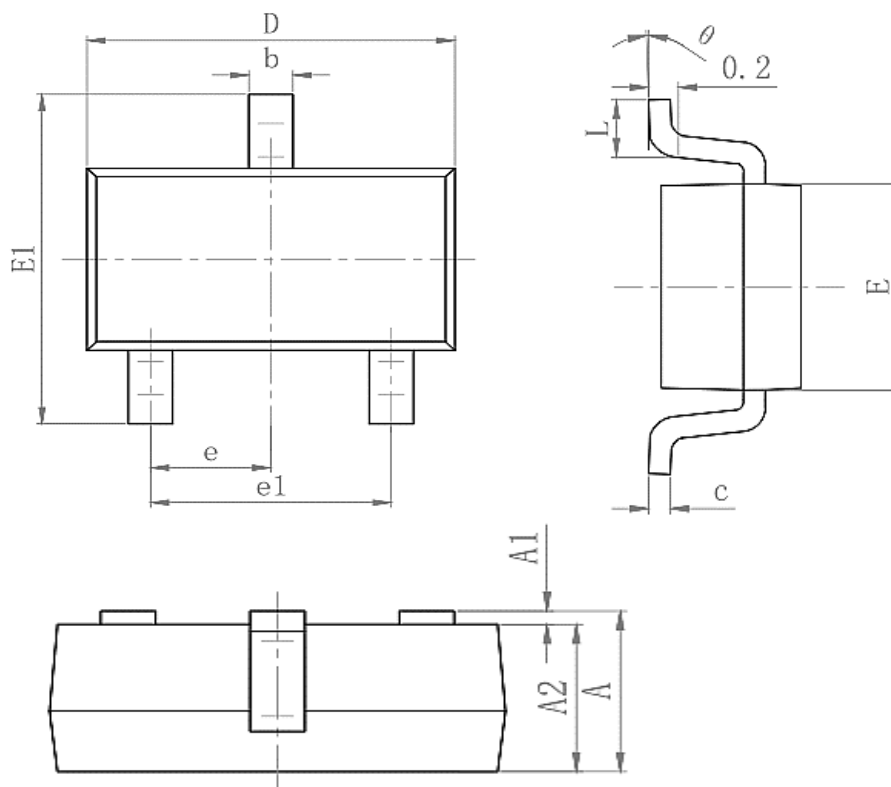


Fig.11 Unclamped Inductive Waveform

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°