

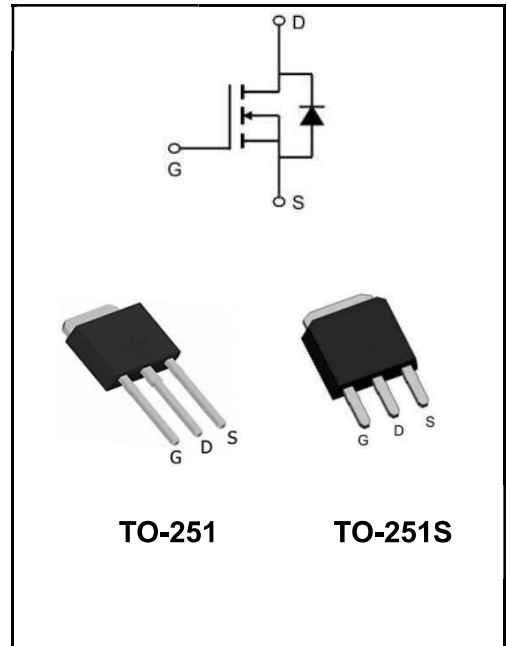
60V N-CHANNEL ENHANCEMENT MODE MOSFET

MAIN CHARACTERISTICS

I_D	50A
V_{DSS}	60V
R_{DS(on)-typ(@V_{GS}=10V)}	< 20mΩ (Type:14 mΩ)

Application

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



Product Specification Classification

Part Number	Package	Marking	Pack
YFW50N06AMJ	TO-251	YFW 50N06AMJ XXXXX	4000PCS/Tape
YFW50N06AMJ	TO-251S	YFW 50N06AMJ XXXXX	4000PCS/Tape

Maximum Ratings at T_c=25°C unless otherwise specified

Characteristics	Symbols	Value	Units
Drain-Source Voltage	V_{DS}	60	V
Gate - Source Voltage	V_{GS}	±20	V
Continuous Drain Current, V _{GS} @ 10V ¹ @T _C =25°C	I_D	50	A
Continuous Drain Current, V _{GS} @ 10V ¹ @T _C =100°C	I_D	25	A
Pulsed Drain Current ²	I_{DM}	90	A
Single Pulse Avalanche Energy ³	E_{AS}	39.2	mJ
Avalanche Current	I_{AS}	28	A
Power Dissipation ⁴ @T _C =25°C	P_D	45	W
Power Dissipation ⁴ @T _A =25°C	P_D	2	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}	62	°C/W
Thermal Resistance Junction-Case ¹	R_{θJC}	2.8	°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}	60	65	-	V
BVDSS Temperature Coefficient	Reference to 25°C, $I_D=1mA$	$\Delta BV_{DSS}/\Delta T_J$	-	0.057	-	V/°C
Static Drain-Source On-Resistance ²	$V_{GS}=10V, I_D=20A$	$R_{DS(ON)}$	-	14	20	mΩ
	$V_{GS}=4.5V, I_D=10A$		-	18	25	
Gate -Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	$V_{GS(th)}$	1.2	1.8	2.5	V
$V_{GS(th)}$ Temperature Coefficient		$\Delta V_{GS(th)}$	-	-5.68	-	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	$V_{DS}=5V, I_D=15A$	g_{FS}	-	45	-	S
Gate Resistance	$V_{DS}=0V, V_{GS}=0V, f=1MHz$	R_g	-	1.7	-	Ω
Total Gate Charge(4.5V)	$V_{DS}=48V$ $V_{GS}=4.5V$ $I_D=15A$	Q_g	-	19.3	-	nC
Gate-Source Charge		Q_{gs}	-	7.1	-	
Gate-Drain Charge		Q_{gd}	-	7.6	-	
Turn-on delay time	$V_{DD}=30V$ $V_{GS}=10V$ $R_G=3.3\Omega$ $I_D=15A$	$t_{d(on)}$	-	7.2	-	ns
Rise Time		T_r	-	50	-	
Turn-Off Delay Time		$t_{d(OFF)}$	-	36.4	-	
Fall Time		t_f	-	7.6	-	
Input Capacitance	$V_{DS}=15V$ $V_{GS}=0V$ $f=1.0MHz$	C_{iss}	-	2423	-	pF
Output Capacitance		C_{oss}	-	145	-	
Reverse Transfer Capacitance		C_{rss}	-	97	-	
Continuous Source Current ^{1,5}	$V_G=V_D=0V, \text{ Force Current}$	I_S	-	-	35	A
Pulsed Source Current ^{2,5}		I_{SM}	-	-	80	A
Diode Forward Voltage ²	$V_{GS}=0V, I_S=A, T_J=25^\circ C$	V_{SD}	-	-	1	V
Reverse Recovery Time	$I_F=15A, di/dt=100A/\mu s, T_J=25^\circ C$	t_{rr}	-	16.3	-	nS
Reverse Recovery Charge		Q_{rr}	-	11	-	nC

Note :

- 1、he data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper.
- 2、he data tested by pulsed , pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$
- 3、he EAS data shows Max. rating . The test condition is $V_{DD}=25V, V_{GS}=10V, L=0.1mH, I_{AS}=28A$
- 4、he power dissipation is limited by 150°C junction temperature
- 5、he data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation

Ratings and Characteristic Curves

Typical Characteristics

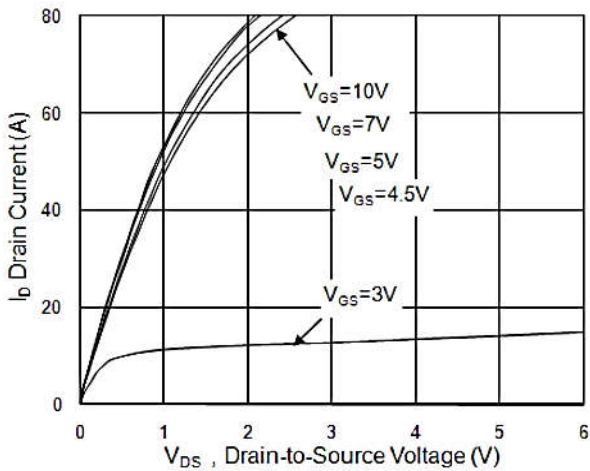


Fig.1 Typical Output Characteristics

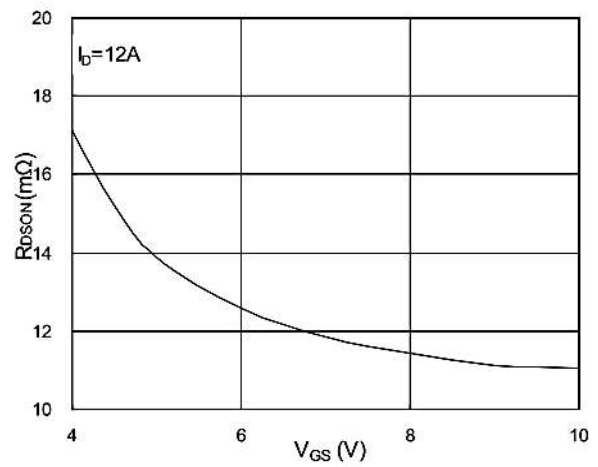


Fig.2 On-Resistance v.s Gate-Source

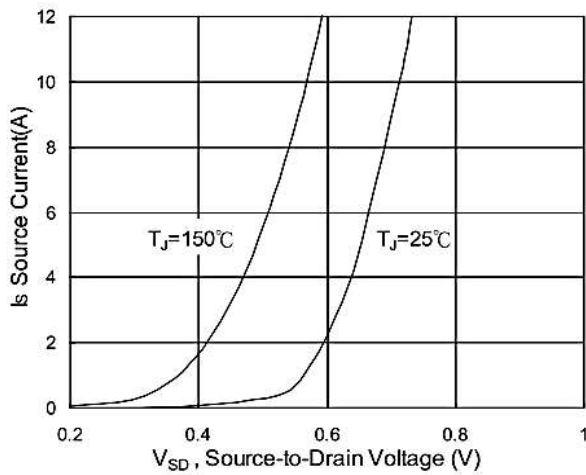


Fig.3 Forward Characteristics of Reverse

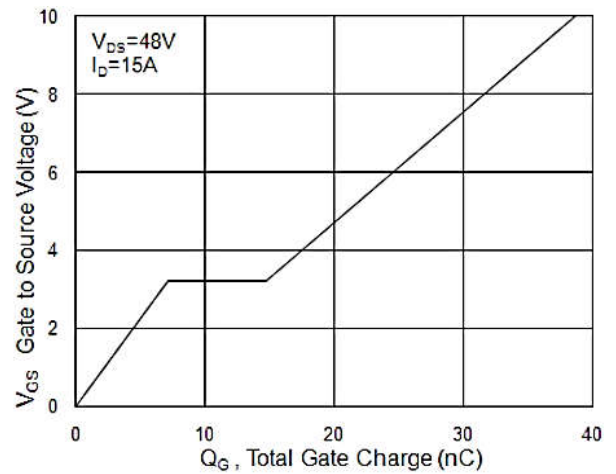


Fig.4 Gate-Charge Characteristics

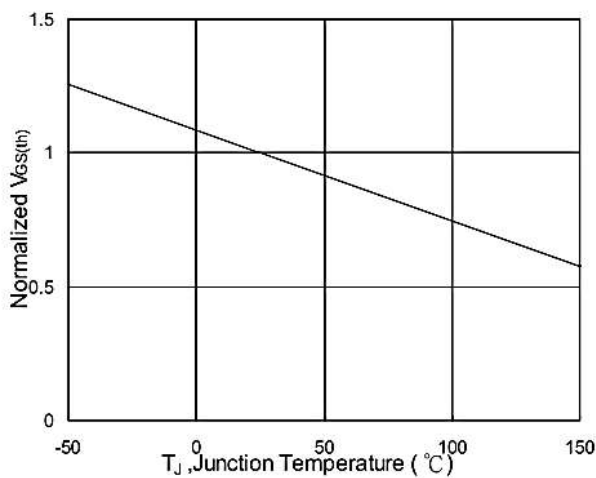


Fig.5 Normalized V_{GS} v.s T_J

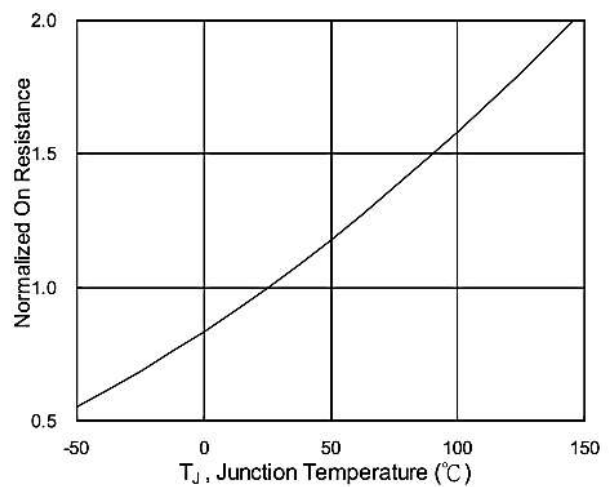


Fig.6 Normalized $R_{DS(on)}$ v.s T_J

Ratings and Characteristic Curves

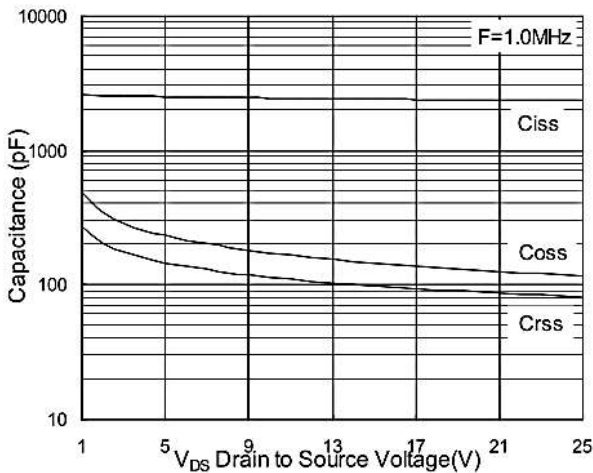


Fig.7 Capacitance

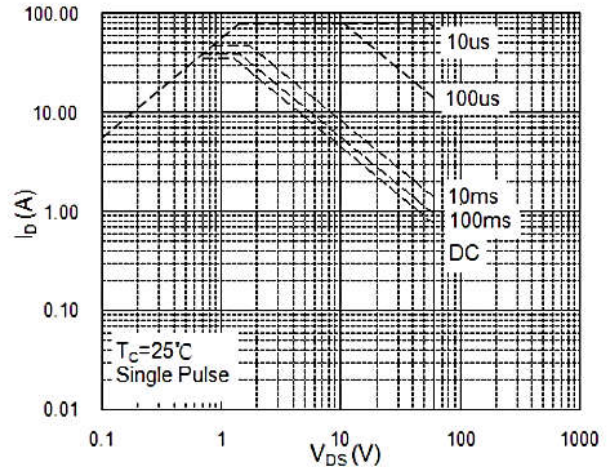


Fig.8 Safe Operating Area

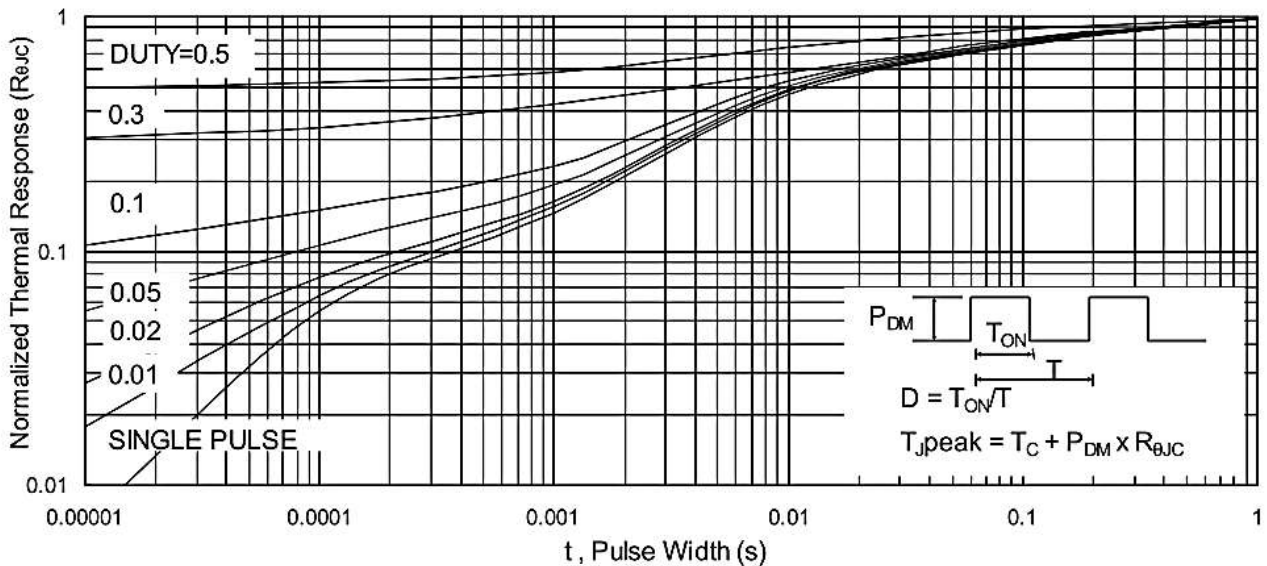


Fig.9 Normalized Maximum Transient Thermal Impedance

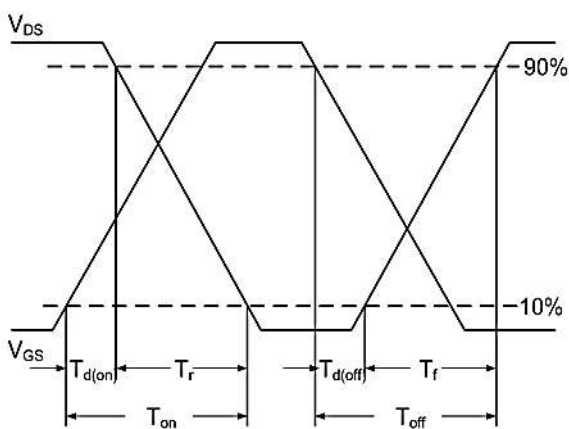


Fig.10 Switching Time Waveform

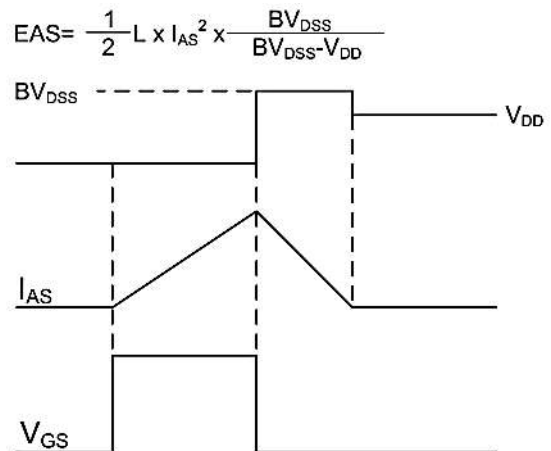
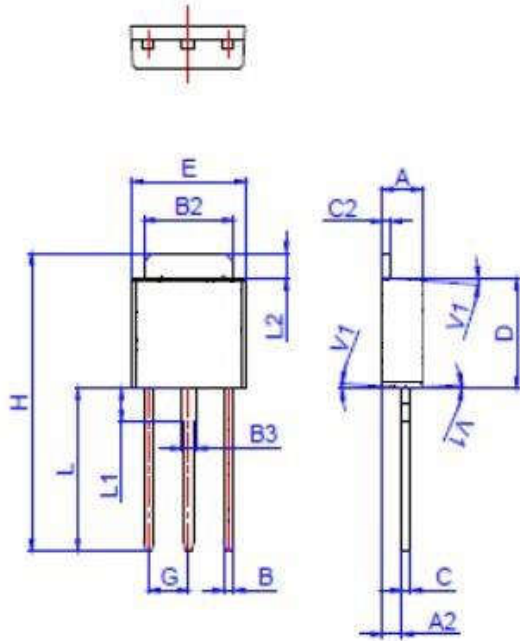


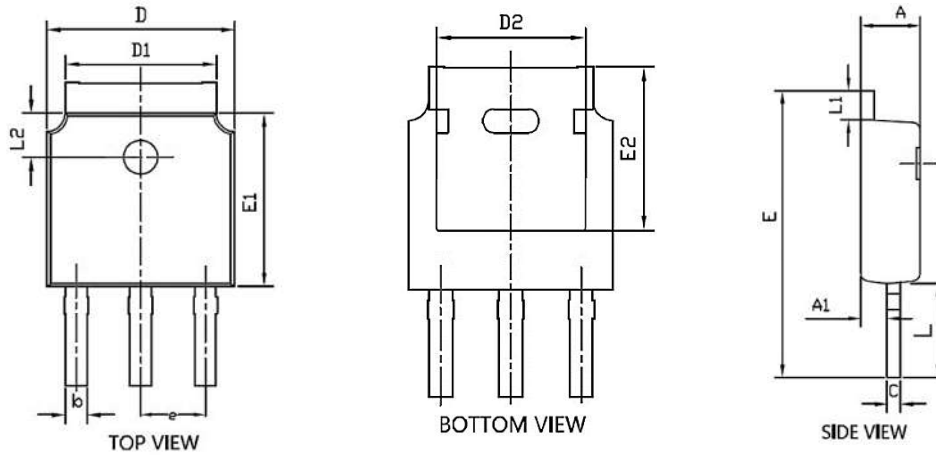
Fig.11 Unclamped Inductive Switching Waveform

TO-251



Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	2.20		2.40	0.086		0.095
A2	0.90		1.20	0.035		0.047
B	0.55		0.65	0.022		0.026
B2	5.10		5.40	0.200		0.213
B3	0.76		0.85	0.030		0.033
C	0.45		0.62	0.018		0.024
C2	0.48		0.62	0.019		0.024
D	6.00		6.20	0.236		0.244
E	6.40		6.70	0.252		0.264
G		2.30			0.091	
H	16.0		17.0	0.630		0.669
L	8.90		9.40	0.350		0.370
L1	1.80		1.90	0.071		0.075
L2	1.37		1.50	0.054		0.059
V1		4°			4°	

TO-251S



Symbol	Common		
	mm		
	Mim	Nom	Max
A	2.2	2.3	2.4
A1	0.9	1.0	1.1
b	0.66	0.76	0.86
C	0.46	0.52	0.58
D	6.50	6.6	6.7
D1	5.15	5.3	5.45
D2	4.6	4.8	4.95
E	10.4	---	11.5
E1	6.0	6.1	6.2
E2	5.400REF		
e	2.286BSC		
L	3.5	4.0	4.3
L1	0.9	---	1.27
L2	1.4	---	1.9

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