

30V N+N-CHANNEL ENHANCEMENT MODE MOSFET

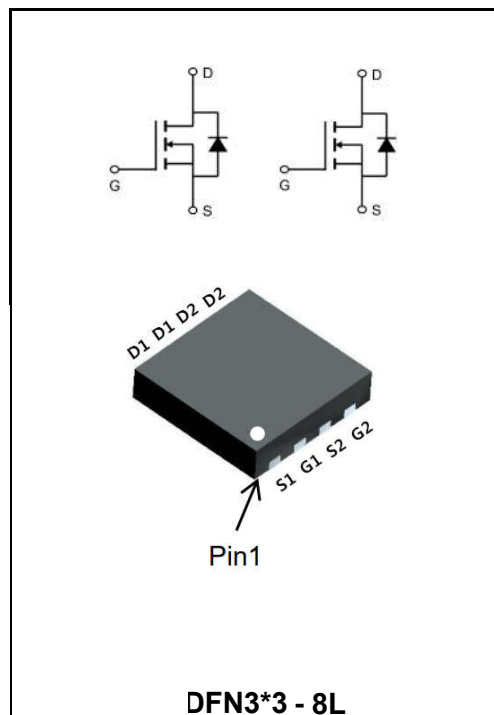
MAIN CHARACTERISTICS

I_D	7A
V_{DSS}	30V
$R_{DS(on)-typ}(@V_{GS}=10V)$	< 18.5mΩ (Type:15.5 mΩ)



Application

- ◆ Battery protection
- ◆ Brushless Motor
- ◆ Wirelesscharge technology



Product Specification Classification

Part Number	Package	Marking	Pack
YFW7H03DF	DFN3*3-8L	YFW 7H03DF XXXXX	5000PCS/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} @ 10V ¹ @T _C =25°C	I_D	7	A
Continuous Drain Current, V_{GS} @ 10V ¹ @T _C =100°C	I_D	5	A
Continuous Drain Current, V_{GS} @ 10V ¹ @T _A =25°C	I_D	6.4	A
Continuous Drain Current, V_{GS} @ 10V ¹ @T _A =70°C	I_D	6	A
Pulsed Drain Current ²	I_{DM}	56	A
Single Pulse Avalanche Energy ³	E_{AS}	22.1	mJ
Avalanche Current	I_{AS}	21	A
Total Power Dissipation ⁴ @T _C =25°C	P_D	20.8	W
Total Power Dissipation ⁴ @T _A =25°C	P_D	1.67	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	$R_{\theta JA}$	75	°C/W
Thermal Resistance Junction-Case1	$R_{\theta JC}$	6	°C/W

Maximum Ratings at Tc=25°C unless otherwise specified

Characteristics	Test Condition	Symbols	Min	Typ	Max	Units
Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	$B_{V_{DSS}}$	30	32	-	V
BVDSS Temperature Coefficient	Reference to 25°C, $I_D=1mA$	$\Delta B_{V_{DSS}}/\Delta T_J$	-	0.022	-	V/°C
Static Drain-Source On-Resistance ²	$V_{GS}=10V, I_D=10A$	$R_{DS(ON)}$	-	15.5	18.5	mΩ
	$V_{GS}=4.5V, I_D=5A$		-	26.5	30	mΩ
Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	$V_{GS(th)}$	1.0	1.6	2.5	V
$V_{GS(th)}$ Temperature Coefficient		$\Delta V_{GS(th)}$	-	-5.1	-	mV/°C
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	$V_{DS}=5V, I_D=10A$	g_{fs}	-	4.5	-	S
Gate Resistance	$V_{DS}=0V, V_{GS}=0V, f=1MHz$	R_g		2.5	5	Ω
Total Gate Charge (4.5V)	$V_{DS}=20V$ $V_{GS}=4.5V$ $I_D=10A$	Q_g	-	7.2	-	nC
Gate-Source Charge		Q_{gs}	-	1.4	-	nC
Gate-Drain Charge		Q_{gd}	-	2.2	-	nC
Turn-on delay time	$V_{DD}=12V$ $V_{GS}=10V$ $R_G=3.3\Omega$ $I_D=5A$	$t_{d(on)}$	-	4.1	-	ns
Rise Time		T_r	-	9.8	-	ns
Turn-Off Delay Time		$t_{d(OFF)}$	-	15.5	-	ns
Fall Time		t_f	-	6.0	-	ns
Input Capacitance	$V_{DS}=15V$ $V_{GS}=0V$ $f=1.0MHz$	C_{iss}	-	572	-	pF
Output Capacitance		C_{oss}	-	81	-	pF
Reverse Transfer Capacitance		C_{rss}	-	65	-	pF
Continuous Source Current ^{1,5}	$V_G=V_D=0V$, Force Current	I_S	-	-	28	A
Pulsed Source Current ^{2,5}		I_{SM}	-	-	56	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 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 I_D and I_{DM} , in real applications , should be limited by total power dissipation.

Ratings and Characteristic Curves

Typical Characteristics

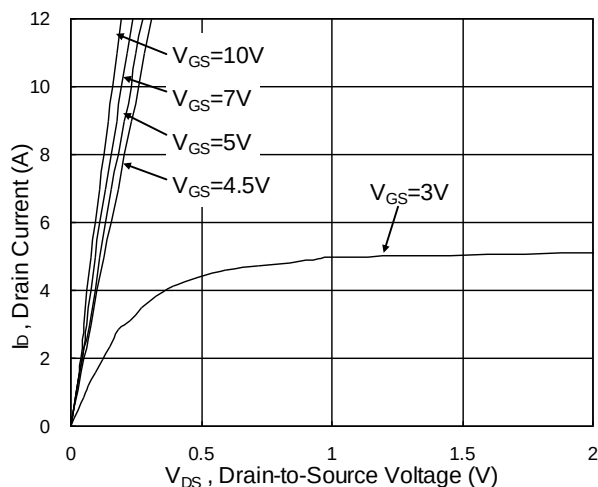


Fig.1 Typical Output Characteristics

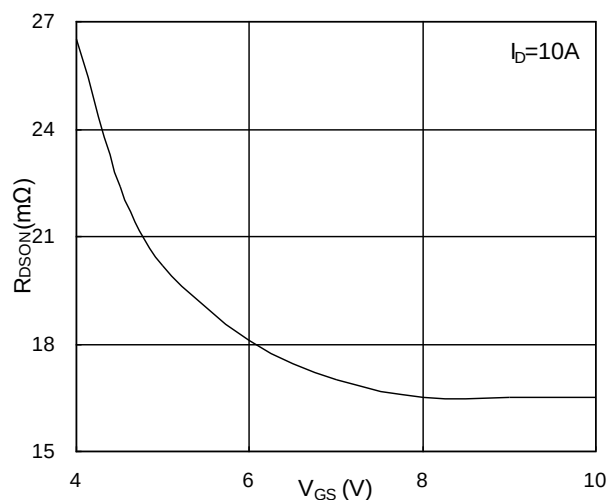


Fig.2 On-Resistance vs. Gate-Source

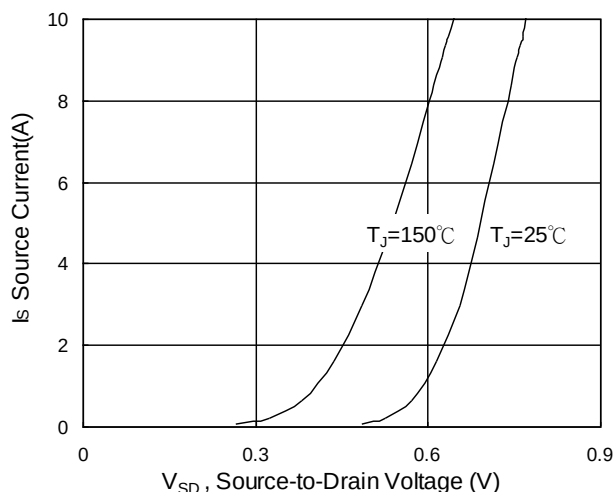


Fig.3 Forward Characteristics Of Reverse

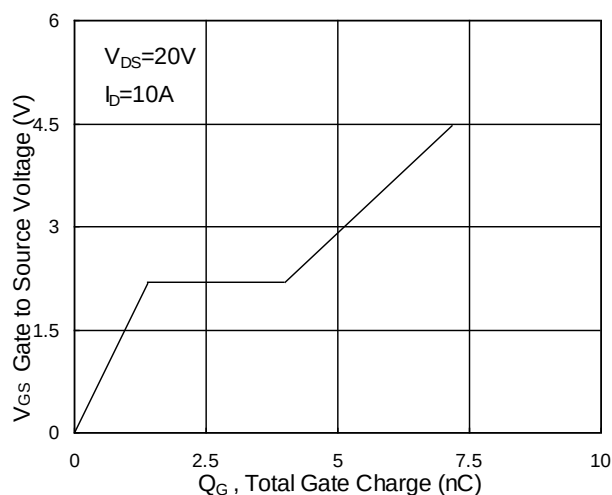


Fig.4 Gate-Charge Characteristics

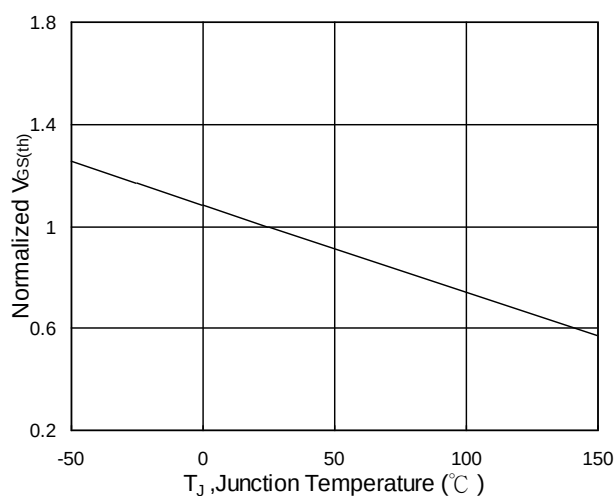


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

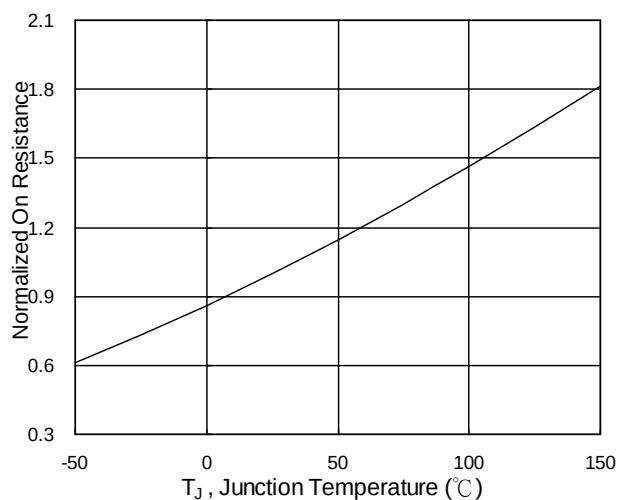


Fig.6 Normalized $R_{DS(on)}$ vs. T_J

Ratings and Characteristic Curves

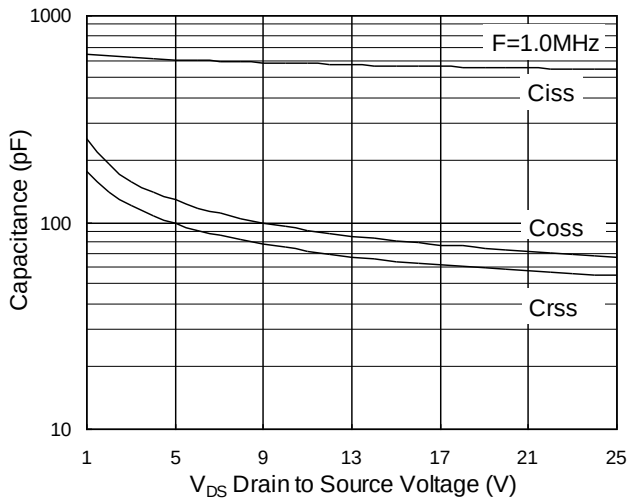


Fig.7 Capacitance

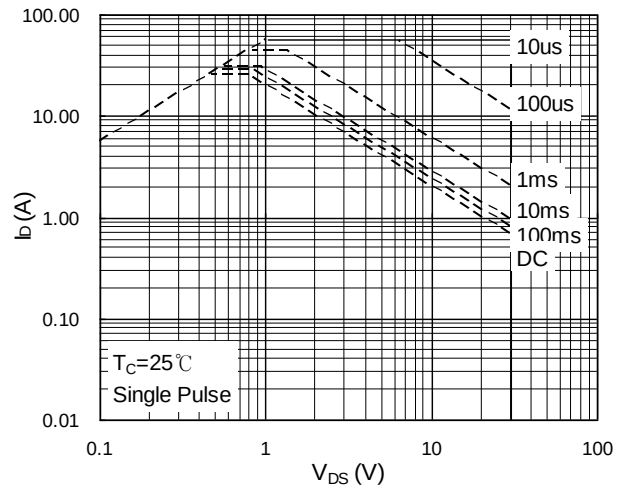


Fig.8 Safe Operating Area

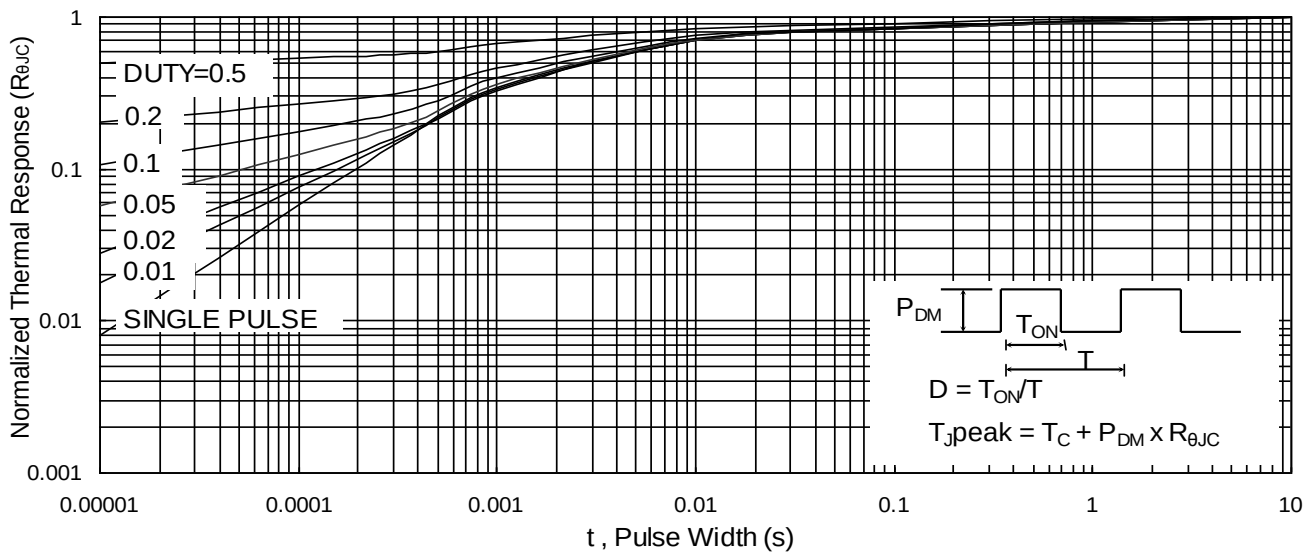


Fig.9 Normalized Maximum Transient Thermal Impedance

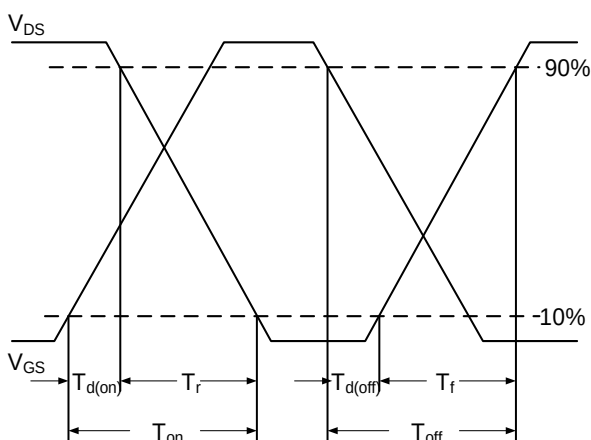


Fig.10 Switching Time Waveform

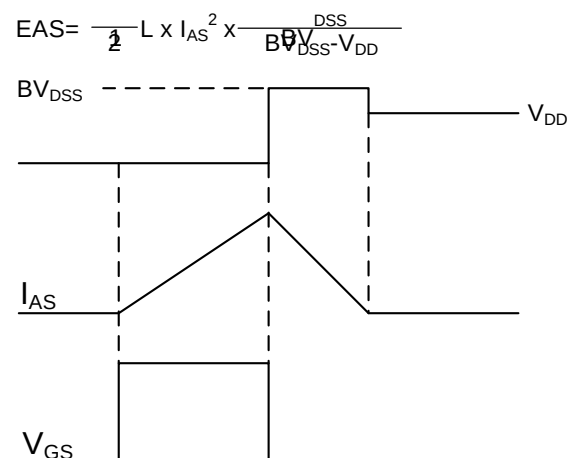
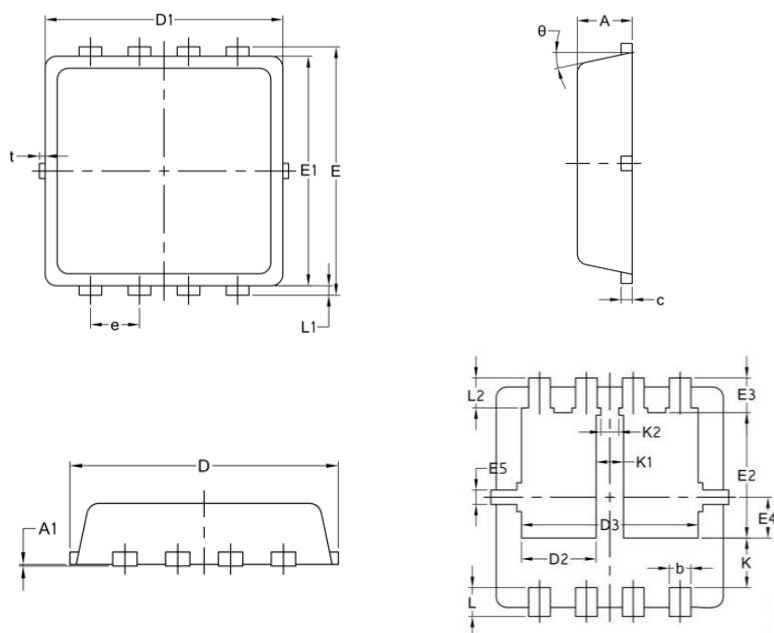


Fig.11 Unclamped Inductive Switching Waveform

DFN3*3-8L



Symbol	Common		
	Mm		
	Min	Nom	Max
A	0.70	0.75	0.85
A1	/	/	0.05
b	0.25	0.30	0.39
c	0.14	0.152	0.20
D	3.20	3.30	3.45
D1	3.05	3.15	3.25
D2	0.84	1.04	1.24
D3	2.30	2.45	2.60
E	3.20	3.30	3.40
E1	2.95	3.05	3.15
E2	1.60	1.74	1.90
E3	0.28	0.48	0.65
E4	0.37	0.57	0.77
E5	0.10	0.20	0.30
e	0.60	0.65	0.70
K	0.50	0.69	0.80
K1	0.30	0.38	0.53
K2	0.15	0.25	0.35
L	0.30	0.40	0.50
L1	0.06	0.125	0.20
L2	0.27	0.42	0.57
t	0	0.075	0.13
Φ	10°	12°	14°