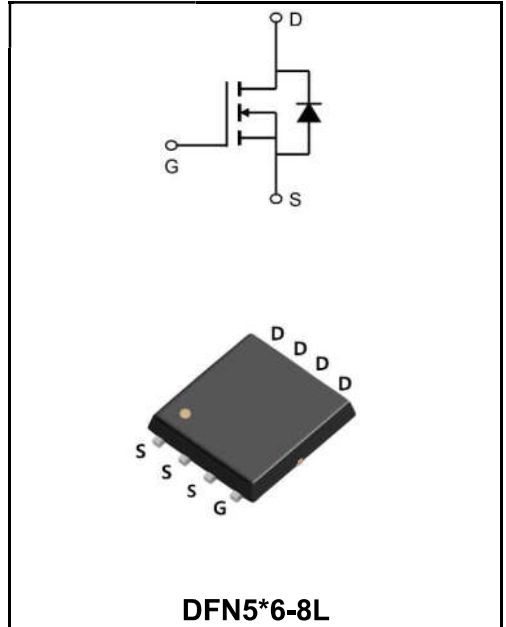


**40V N-CHANNEL ENHANCEMENT MODE MOSFET**

**MAIN CHARACTERISTICS**

<b>I<sub>D</sub></b>	120A
<b>V<sub>DSS</sub></b>	40V
<b>R<sub>DS(on)-typ(@V<sub>GS</sub>=10V)</sub></b>	< 1.8mΩ ( <b>Type:1.4 mΩ</b> )



**Features**

- ◆ Low RDS(on) & FOM
- ◆ Extremely low switching loss
- ◆ Excellent stability and uniformity or Invertors
- ◆ **YFW-SGT technology**

**Application**

- ◆ Consumer electronic power supply
- ◆ Motor control
- ◆ Synchronous-rectification
- ◆ Isolated DC
- ◆ Synchronous-rectification applications

**Product Specification Classification**

Part Number	Package	Marking	Pack
YFWG120N04NF	DFN5*6-8L	YFW 120N04NF XXXXX	5000PCS/Tape

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

Characteristics	Symbols	Value	Units
Drain-Source Voltage	<b>V<sub>DS</sub></b>	40	<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>1,6</sup> @T <sub>C</sub> =25°C	<b>I<sub>D</sub></b>	120	<b>A</b>
Continuous Drain Current, V <sub>GS</sub> @ 10V <sup>1,6</sup> @T <sub>C</sub> =100°C	<b>I<sub>D</sub></b>	82	<b>A</b>
Pulsed Drain Current <sup>2</sup>	<b>I<sub>DM</sub></b>	400	<b>A</b>
Single Pulse Avalanche Energy <sup>3</sup>	<b>E<sub>AS</sub></b>	400	<b>mJ</b>
Avalanche Current	<b>I<sub>AS</sub></b>	40	<b>A</b>
Power Dissipation <sup>4</sup> @T <sub>C</sub> =25°C	<b>P<sub>D</sub></b>	125	<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>	50	<b>°C/W</b>
Thermal Resistance Junction-Case <sup>1</sup>	<b>R<sub>θJC</sub></b>	1	<b>°C/W</b>

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

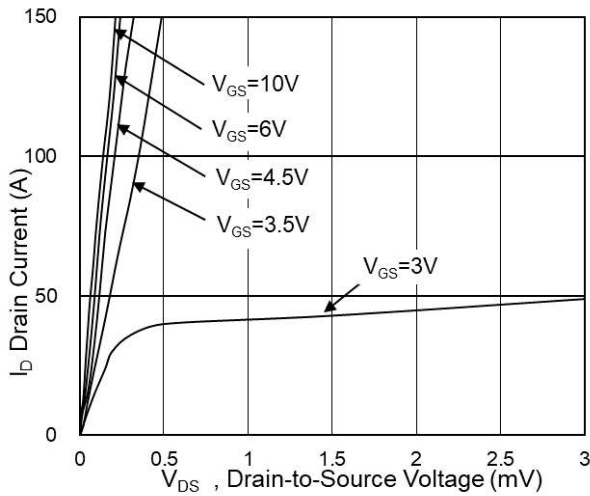
Characteristics	Test Condition	Symbols	Min	Typ	Max	Units
Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	$BV_{DSS}$	40	-	-	V
Static Drain-Source On-Resistance <sup>2</sup>	$V_{GS}=10V, I_D=20A$	$R_{DS(on)}$	-	1.4	1.8	mΩ
	$V_{GS}=4.5V, I_D=20A$		-	2.0	2.6	
Gate -Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	$V_{GS(th)}$	1.2	1.6	2.2	V
Drain -Source Leakage Current	$V_{DS}=32V, V_{GS}=0V, T_J=25^\circ C$	$I_{DSS}$	-	-	1	μA
	$V_{DS}=32V, V_{GS}=0V, T_J=55^\circ C$		-	-	5	
Gate-Source Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$	$I_{GSS}$	-	-	±100	nA
Forward Transconductance	$V_{DS}=5V, I_D=20A$	$g_{FS}$	-	53	-	S
Gate Resistance	$V_{DS}=0V, V_{GS}=0V, f=1MHz$	$R_g$	-	1.0	-	Ω
Total Gate Charge(4.5V)	$V_{DS}=15V$ $V_{GS}=10V$ $I_D=20A$	$Q_g$	-	45	-	nC
Gate-Source Charge		$Q_{GS}$	-	12	-	
Gate-Drain Charge		$Q_{gd}$	-	18.5	-	
Turn-on delay time	$V_{DD}=15V$ $V_{GS}=10V$ $R_G=3.3$ $I_D=20A$	$t_{d(on)}$	-	18.5	-	ns
Rise Time		$T_r$	-	9	-	
Turn-Off Delay Time		$t_{d(OFF)}$	-	58.5	-	
Fall Time		$t_f$	-	32	-	
Input Capacitance	$V_{DS}=20V$ $V_{GS}=0V$ $f=1.0MHz$	$C_{iss}$	-	3972	-	pF
Output Capacitance		$C_{oss}$	-	1119	-	
Reverse Transfer Capacitance		$C_{rss}$	-	82	-	
Continuous Source Current <sup>1,6</sup>	$V_G=V_D=0V, \text{Force Current}$	$I_S$	-	-	100	A
Diode Forward Voltage <sup>2</sup>	$V_{GS}=0V, I_S=1A, T_J=25^\circ C$	$V_{SD}$	-	-	1.2	V

Note :

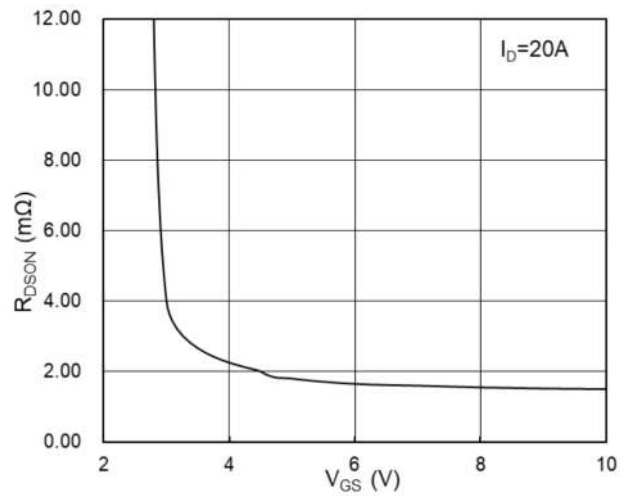
- 1.The data tested by surface mounted on a 1 inch<sup>2</sup> FR-4 board with 2OZ copper.
- 2 .The data tested by pulsed , pulse width  $\cong 300\mu s$  , duty cycle  $\cong 2\%$
- 3.The EAS data shows Max. rating . The test condition is  $V_{DD}=25V, V_{GS}=10V, L=0.5mH, I_{AS}=40A$
- 4.The power 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**

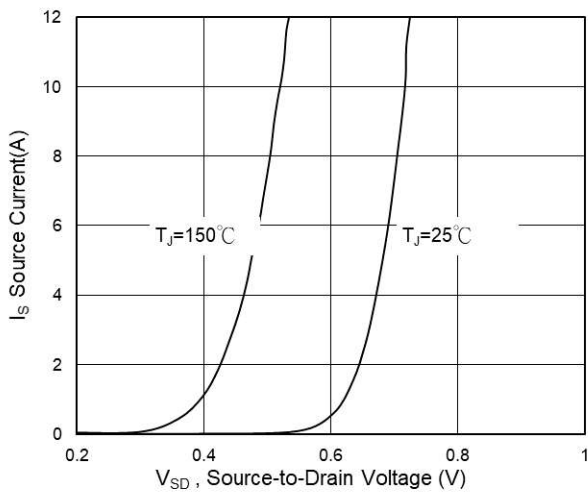
**Typical Characteristics**



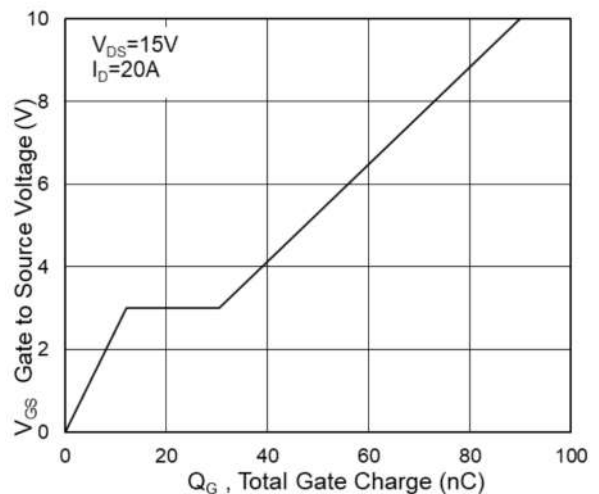
**Fig.1 Typical Output Characteristics**



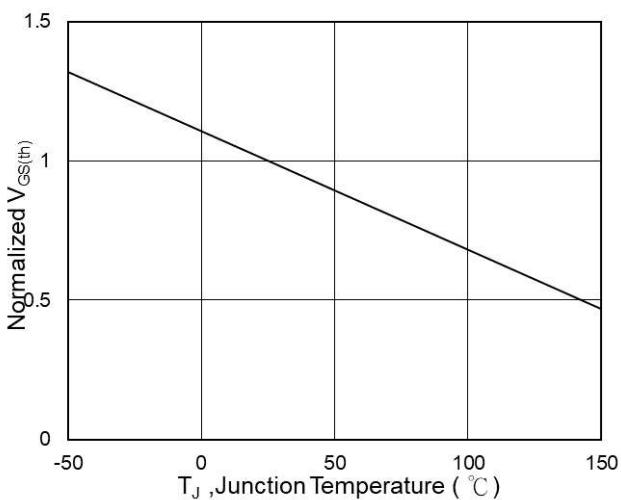
**Fig.2 On-Resistance vs G-S Voltage**



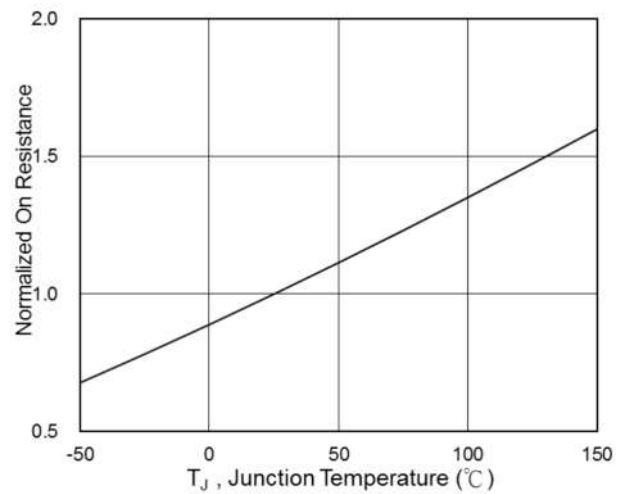
**Fig.3 Source Drain Forward Characteristics**



**Fig.4 Gate-Charge Characteristics**

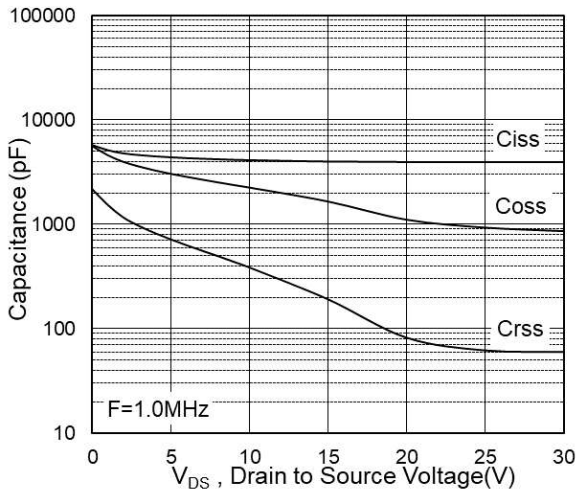


**Fig.5 Normalized V<sub>GS(th)</sub> vs T<sub>J</sub>**

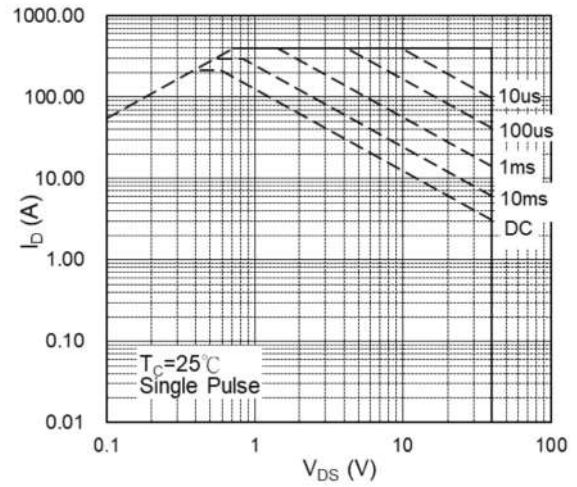


**Fig.6 Normalized R<sub>DS(on)</sub> vs T<sub>J</sub>**

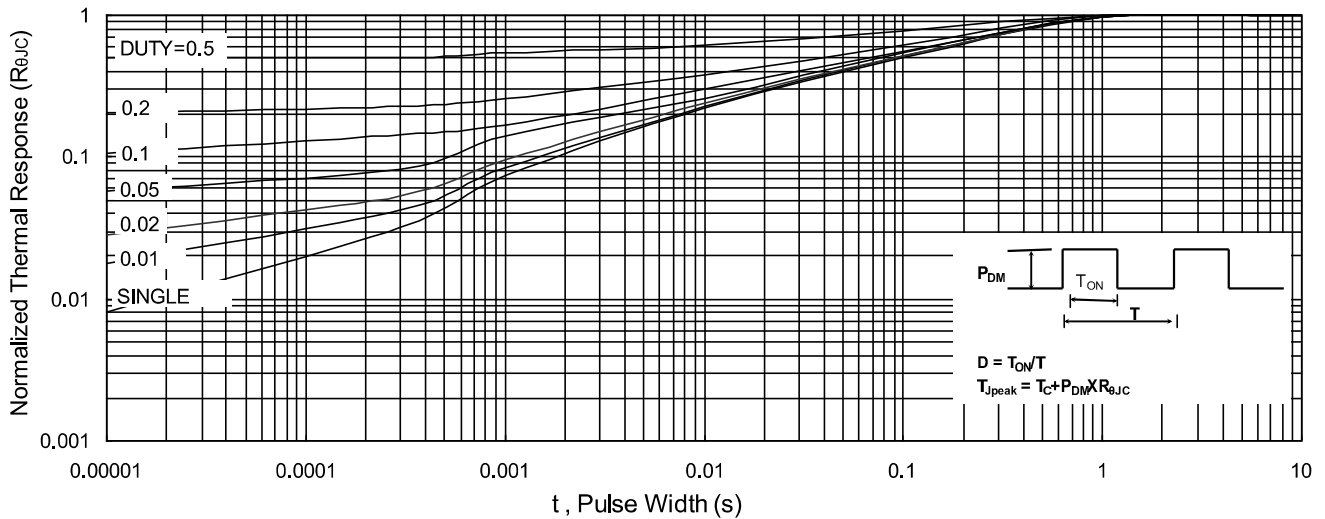
**Ratings and Characteristic Curves**



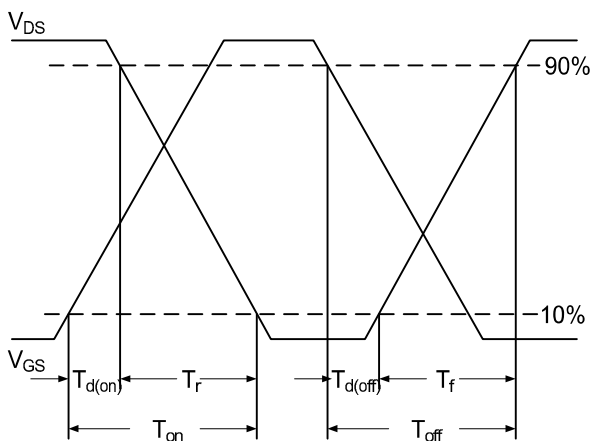
**Fig.7 Capacitance**



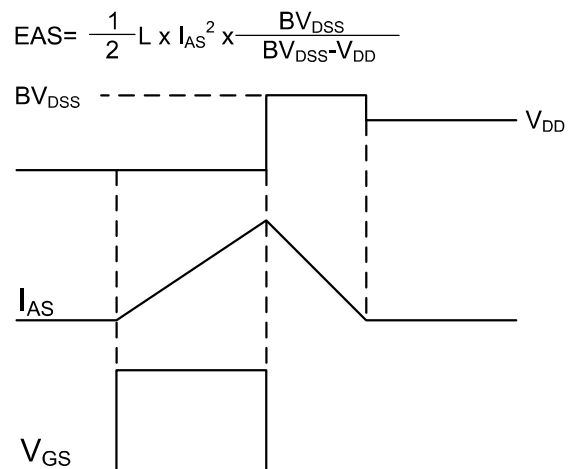
**Fig.8 Safe Operating Area**



**Fig.9 Normalized Maximum Transient Thermal Impedance**

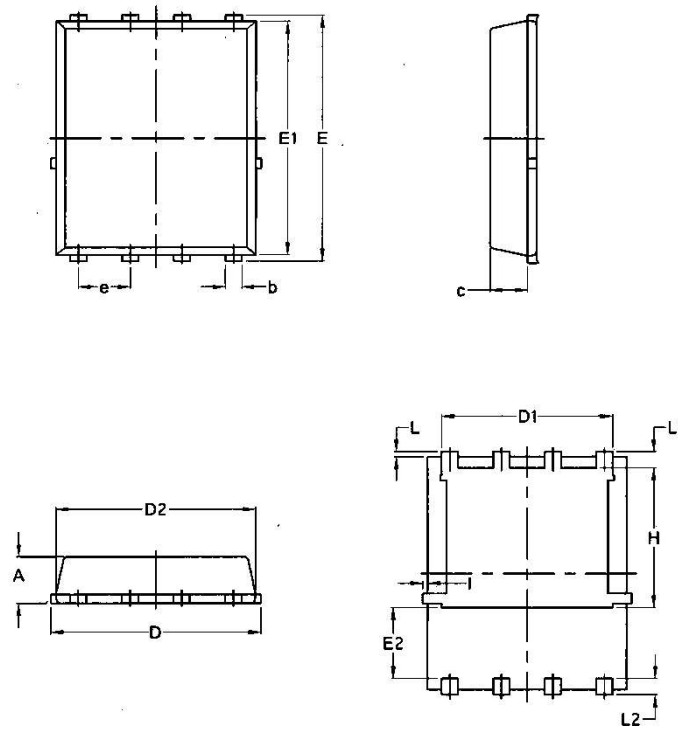


**Fig.10 Switching Time Waveform**



**Fig.11 Unclamped Inductive Switching Waveform**

**DFN5\*6-8L**



Symbol	Common			
	mm		Inch	
	Min	Max	Min	Max
A	1.03	1.17	0.0406	0.0461
b	0.34	0.48	0.0134	0.0189
c	0.824	0.0970	0.0324	0.082
D	4.80	5.40	0.1890	0.2126
D1	4.11	4.31	0.1618	0.1697
D2	4.80	5.00	0.1890	0.1969
E	5.95	6.15	0.2343	0.2421
E1	5.65	5.85	0.2224	0.2303
E2	1.60	/	0.0630	/
e	1.27 BSC		0.05 BSC	
L	0.05	0.25	0.0020	0.0098
L1	0.38	0.50	0.0150	0.0197
L2	0.38	0.50	0.0150	0.0197
H	3.30	3.50	0.1299	0.1378
I	/	0.18	/	0.0070