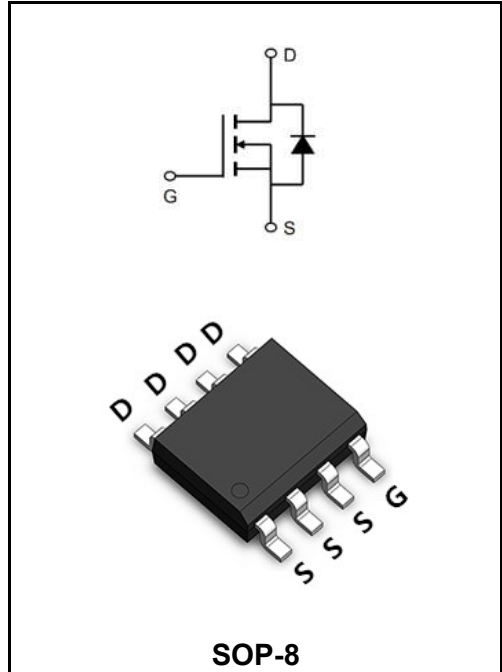


**40V N-CHANNEL ENHANCEMENT MODE MOSFET**

**MAIN CHARACTERISTICS**

$I_D$	15A
$V_{DSS}$	40V
$R_{DS(on)-typ}(@V_{GS}=10V)$	< 13mΩ (Type: 10.5 mΩ)



**Application**

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

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

Characteristics	Symbols	Value	Units
Drain-Source Voltage	$V_{DS}$	40	V
Gate - Source Voltage	$V_{GS}$	±20	V
Continuous Drain Current, $V_{GS} @ 10V^1 @ T_A=25^\circ C$	$I_D$	15	A
Continuous Drain Current, $V_{GS} @ 10V^1 @ T_A=70^\circ C$	$I_D$	8	A
Pulsed Drain Current <sup>2</sup>	$I_{DM}$	34	A
Single Pulse Avalanche Energy <sup>3</sup>	$E_{AS}$	31	mJ
Avalanche Current	$I_{AS}$	25	A
Total Power Dissipation <sup>4</sup> @TA=25°C	$P_D$	1.5	W
Storage Temperature Range	$T_{STG}$	-55 to +150	°C
Operating Junction Temperature Range	$T_J$	-55 to +150	°C
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	85	°C/W
Thermal Resistance Junction-Case	$R_{\theta JC}$	30	°C/W

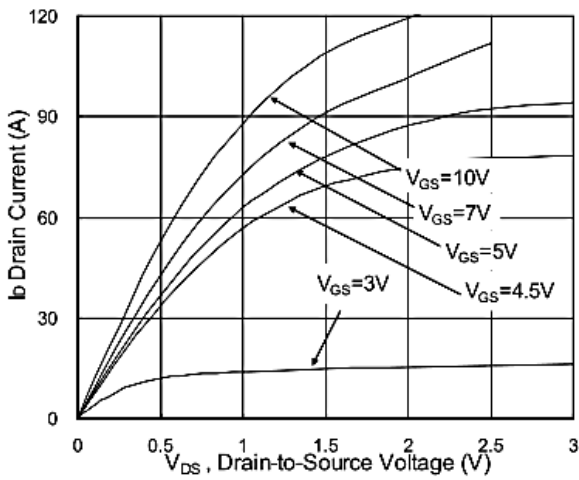
**Maximum Ratings at Tc=25°C unless otherwise specified**

Characteristics	Test Condition	Symbols	Min	Typ	Max	Units
Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	$BV_{DSS}$	40	44	-	V
BVDSS Temperature Coefficient	Reference to 25°C, $I_D=1mA$	$\Delta BV_{DSS}/\Delta T_J$	-	0.034	-	V/°C
Static Drain-Source On-Resistance <sup>2</sup>	$V_{GS}=10V, I_D=8A$	$R_{DS(ON)}$	-	10.5	13	mΩ
	$V_{GS}=4.5V, I_D=6A$		-	11.5	17	
Gate -Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	$V_{GS(th)}$	1.0	1.6	2.5	V
VGS(th) Temperature Coefficient		$\Delta V_{GS(th)}$	-	-5.64	-	mV/°C
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	$V_{DS}=5V, I_D=8A$	$g_{FS}$	-	36	-	S
Gate Resistance	$V_{DS}=0V, V_{GS}=0V, f=1MHz$	$R_g$	-	2.1	-	Ω
Total Gate Charge(4.5V)	$V_{DS}=20V$ $V_{GS}=4.5V$ $I_D=8A$	$Q_g$	-	10.7	-	nC
Gate-Source Charge		$Q_{gs}$	-	3.3	-	
Gate-Drain Charge		$Q_{gd}$	-	4.2	-	
Turn-on delay time	$V_{DD}=12V$ $V_{GS}=10V$ $R_G=3.3$ $I_D=6A$	$t_{d(on)}$	-	8.6	-	ns
Rise Time		$T_r$	-	3.4	-	
Turn-Off Delay Time		$t_{d(OFF)}$	-	24.8	-	
Fall Time		$t_f$	-	2.2	-	
Input Capacitance	$V_{DS}=15V$ $V_{GS}=0V$ $f=1.0MHz$	$C_{iss}$	-	1314	-	pF
Output Capacitance		$C_{oss}$	-	120	-	
Reverse Transfer Capacitance		$C_{rss}$	-	88	-	
Continuous Source Current <sup>1,5</sup>	$V_G=V_D=0V, \text{Force Current}$	$I_S$	-	-	8.5	A
Pulsed Source Current <sup>2,5</sup>		$I_{SM}$	-	-	34	A
Diode Forward Voltage <sup>2</sup>	$V_{GS}=0V, I_S=1A, T_J=25^\circ C$	$V_{SD}$	-	-	1.2	V

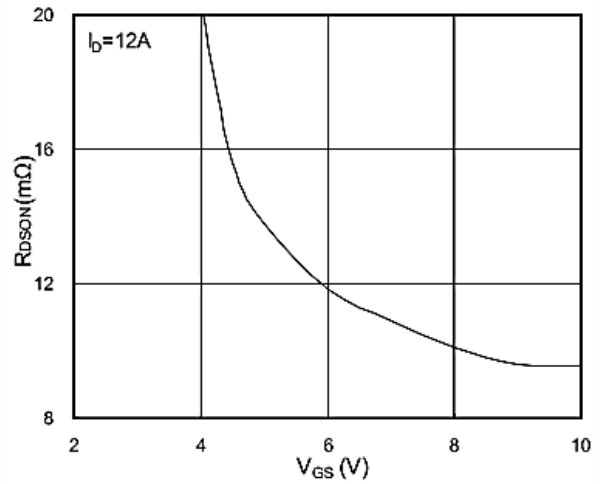
Note :

- 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  $\leq 300\mu s$  , duty cycle  $\leq 2\%$
- 3、 The EAS data shows Max. rating . The test condition is  $V_{DD}=32V, V_{GS}=10V, L=0.1Mh, I_{AS}=22A$
- 4、 The power dissipation is limited by 175°C junction temperature
- 5、 The data is theoretically the same as ID and IDM , in real applications , should be limited by total power dissipation.

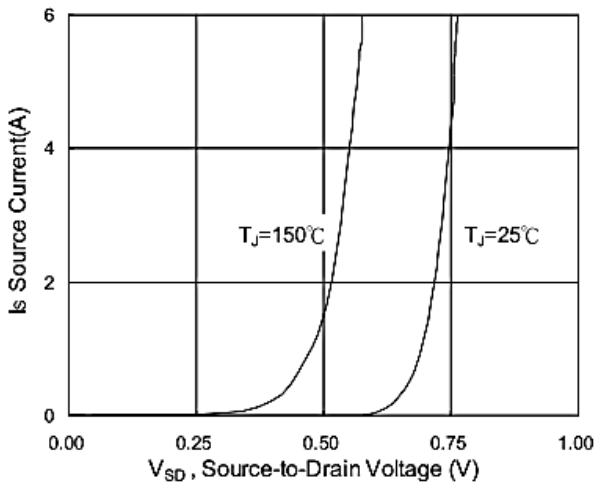
**Typical Characteristics**



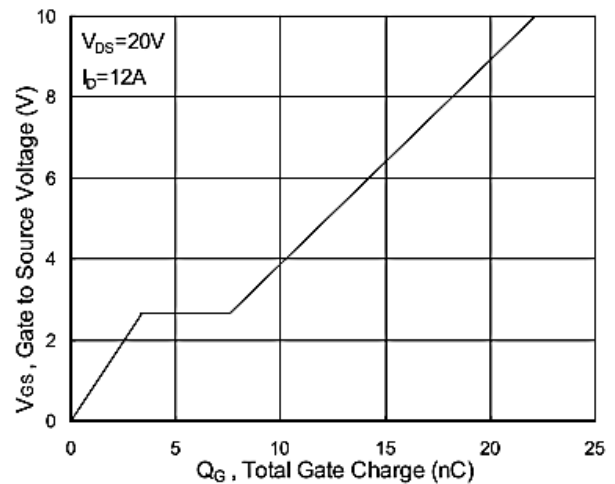
**Fig.1 Typical Output Characteristics**



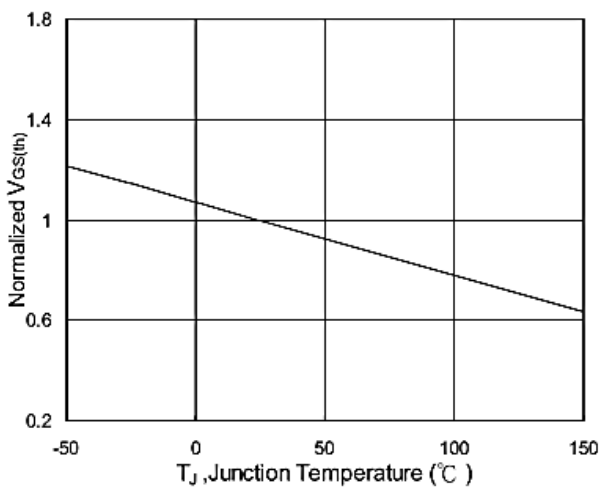
**Fig.2 On-Resistance vs. G-S Voltage**



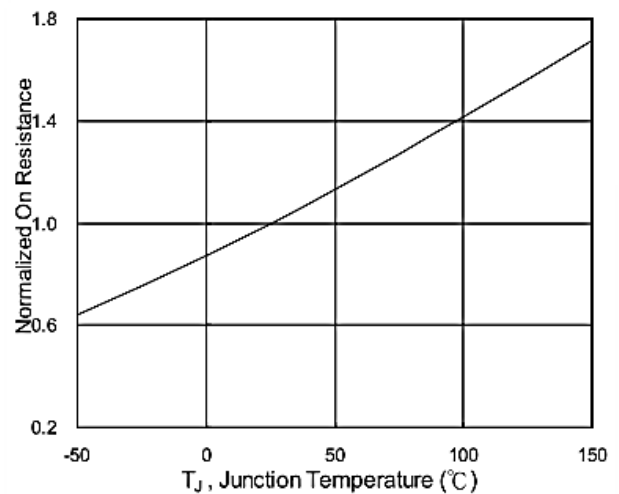
**Fig.3 Forward Characteristics of Reverse**



**Fig.4 Gate-Charge Characteristics**

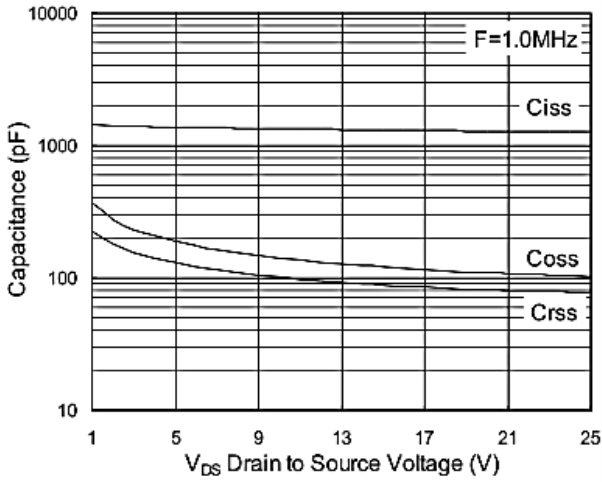


**Fig.5  $V_{GS(th)}$  vs.  $T_J$**

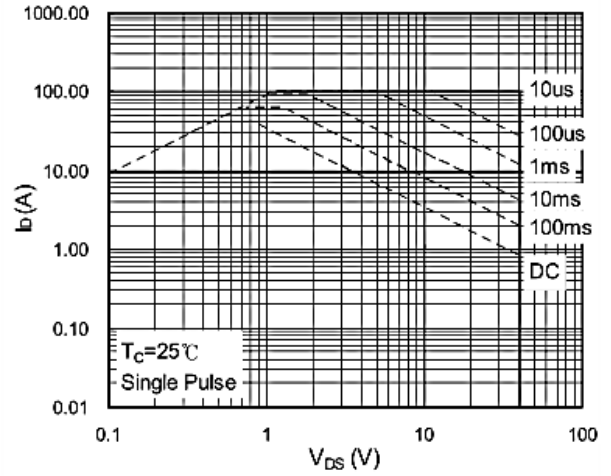


**Fig.6 Normalized  $R_{DS(on)}$  vs.  $T_J$**

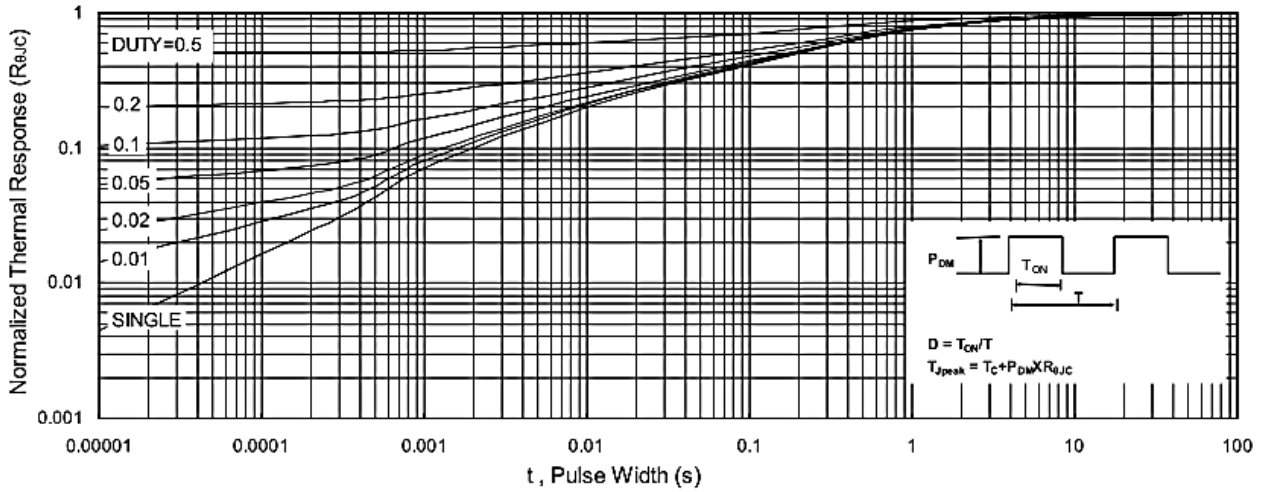
**Ratings and Characteristic Curves**



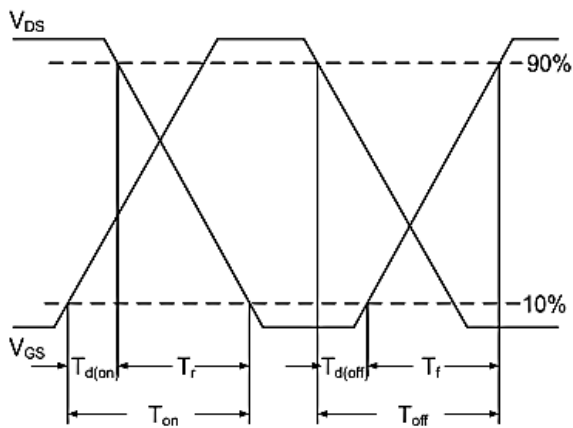
**Fig.7 Capacitance**



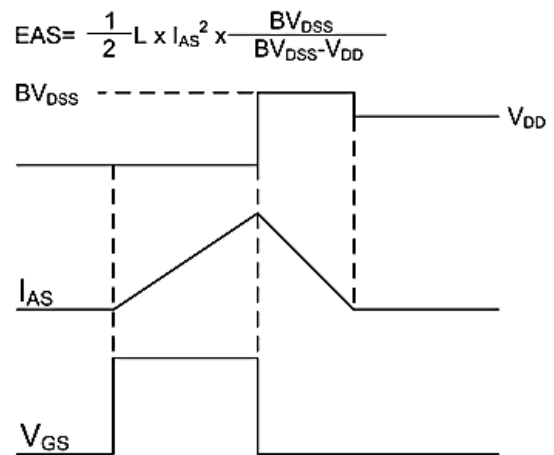
**Fig.8 Safe Operating Area**



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

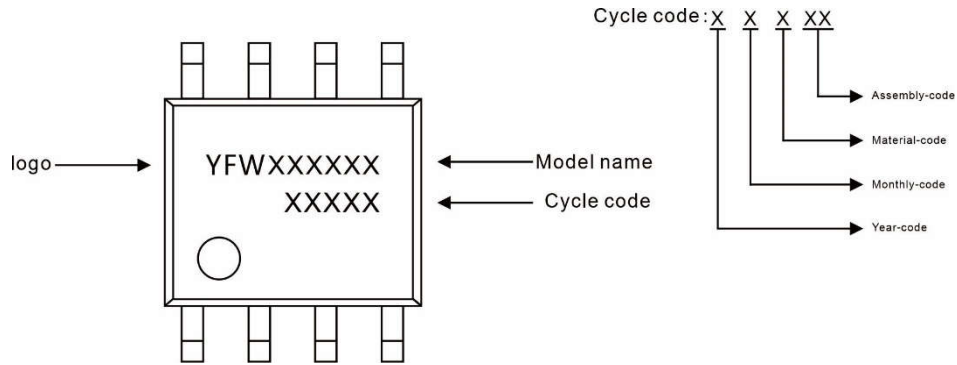


**Fig.10 Switching Time Waveform**



**Fig.11 Unclamped Inductive Switching Waveform**

**Marking Diagram**



**Ordering information**

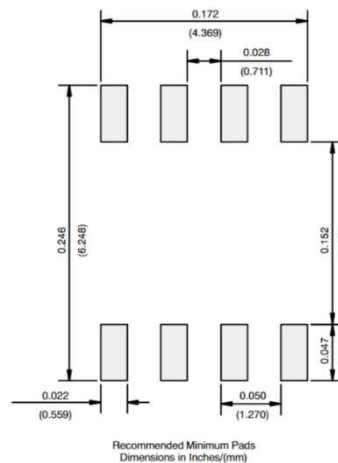
Package	Packing Description	Packing Quantity
SOP-8	Tape/Reel, 13" reel	3000PCS/Reel 30000PCS/Carton

**Package Dimensions**

**SOP-8**

Dim	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	1.35	1.75	0.053	0.069
A1	0.10	0.25	0.004	0.010
A2	1.35	1.50	0.053	0.059
b	0.35	0.55	0.014	0.022
c	0.15	0.25	0.006	0.010
D	4.80	5.00	0.189	0.197
D1	3.10	3.50	0.122	0.138
E	5.80	6.20	0.228	0.244
E1	3.80	4.00	0.150	0.157
E2	2.20	2.60	0.087	0.102
e	1.27 (BSC)		0.050 (BSC)	
L	0.40	1.27	0.016	0.050
θ	0°	8°	0°	8°

**The recommended mounting pad size**



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