

**40V N-Channel Enhancement Mode MOSFET**

**MAIN CHARACTERISTICS**

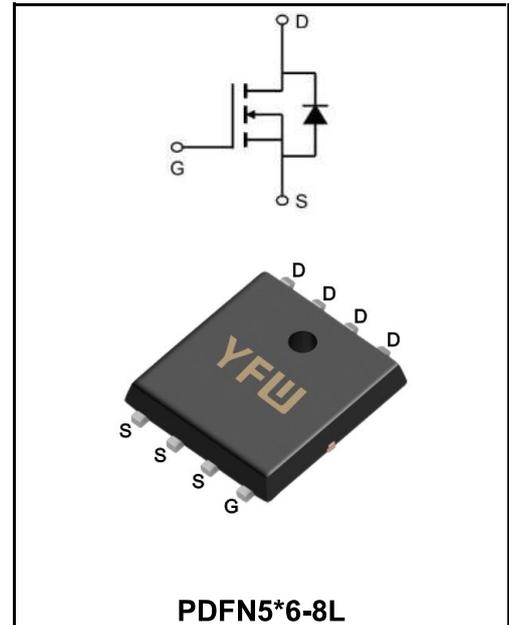
<b>I<sub>D</sub></b>	60A
<b>V<sub>DS</sub></b>	40V
<b>R<sub>DS(ON)-typ(@V<sub>GS</sub>=10V)</sub></b>	<5.5mΩ(Typ:4.5mΩ)

**DESCRIPTION**

The YFWG60N04NF uses advanced SGT technology to provide excellent R<sub>DS(ON)</sub>, low gate charge and operation with gate voltages as low as 4.5V. This device is suitable for use as a Battery protection or in other Switching application.

**APPLICATION**

- ◆ **YFW-SGT technology**
- ◆ PWM application
- ◆ Load switch
- ◆ Power management



**Maximum Ratings at T<sub>c</sub>=25°C unless otherwise specified**

Characteristics	Symbols	Value	Units
Drain-to-Source Voltage	<b>V<sub>DS</sub></b>	40	<b>V</b>
Gate-to-Source Voltage	<b>V<sub>GS</sub></b>	±20	<b>V</b>
Continuous Drain Current	<b>I<sub>D</sub></b>	T <sub>C</sub> = 25°C	60
		T <sub>C</sub> = 100°C	36
Pulsed Drain Current <sup>(1)</sup>	<b>I<sub>DM</sub></b>	240	<b>A</b>
Single Pulsed Avalanche Energy <sup>(2)</sup>	<b>E<sub>AS</sub></b>	56	<b>mJ</b>
Power Dissipation	<b>P<sub>D</sub></b>	37	<b>W</b>
Thermal Resistance, Junction to Case	<b>R<sub>θJC</sub></b>	3.3	<b>°C/W</b>
Junction & Storage Temperature Range	<b>T<sub>J</sub>, T<sub>STG</sub></b>	-55 to 150	<b>°C</b>

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

Characteristics	Test Condition	Symbol	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	$V_{GS} = 0\text{ V}, I_D = 250\ \mu\text{A}$	$BV_{DSS}$	40	-	-	<b>V</b>
Drain-Source Leakage Current	$V_{DS} = 40\text{ V}, V_{GS} = 0\text{ V}$	$I_{DSS}$	-	-	1.0	<b><math>\mu\text{A}</math></b>
Gate Leakage Current	$V_{GS} = \pm 20\text{ V}, V_{DS} = 0\text{ V}$	$I_{GSS}$	-	-	$\pm 100$	<b>nA</b>
Gate-Source Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\ \mu\text{A}$	$V_{GS(th)}$	1.0	1.6	2.5	<b>V</b>
Drain-Source On-State Resistance <sup>(3)</sup>	$V_{GS} = 10\text{ V}, I_D = 20\text{ A}$	$R_{DS(ON)}$	-	4.5	5.5	<b>m<math>\Omega</math></b>
	$V_{GS} = 4.5\text{ V}, I_D = 20\text{ A}$		-	6.8	8.5	
Input Capacitance	$V_{GS} = 0\text{ V}$ $V_{DS} = 20\text{ V}$ $f = 1\text{ MHz}$	$C_{iss}$	-	950	-	<b>pF</b>
Output Capacitance		$C_{oss}$	-	597	-	
Reverse Transfer Capacitance		$C_{rss}$	-	28	-	
Turn-on Delay Time	$V_{GS} = 10\text{ V}$ $V_{DD} = 20\text{ V}$ $I_D = 20\text{ A}$ $R_{GEN} = 3\ \Omega$	$t_{d(ON)}$	-	6.5	-	<b>ns</b>
Rise Time		$T_r$	-	2.7	-	
Turn-Off Delay Time		$t_{d(OFF)}$	-	26	-	
Fall Time		$t_f$	-	3.6	-	
Total Gate Charge	$V_{GS} = 0\text{ to }10\text{ V}$ $V_{DS} = 20\text{ V}$ $I_D = 20\text{ A}$	$Q_g$	-	17	-	<b>nC</b>
Gate to Source Charge		$Q_{gs}$	-	4.5	-	
Gate to Drain Charge		$Q_{gd}$	-	2	-	
Maximum Continuous Drain to Source Diode Forward Current		$I_S$	-	-	60	<b>A</b>
Maximum Pulsed Drain to Source Diode Forward Current		$I_{SM}$	-	-	240	<b>A</b>
Drain-Source Diode Forward Voltage	$V_{GS} = 0\text{ V}, I_S = 20\text{ A}$	$V_{SD}$	-	-	1.2	<b>V</b>
Reverse Recovery Time	$I_F = 20\text{ A}, di/dt = 100\text{ A}/\mu\text{s}$	$t_{rr}$	-	40	-	<b>ns</b>
Reverse Recovery Charge		$Q_{rr}$	-	22	-	<b>nC</b>

**Notes:**

- 1.Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature.
- 2.EAs condition: Starting  $T_J = 25^\circ\text{C}$ ,  $V_{DD} = 20\text{ V}$ ,  $V_G = 10\text{ V}$ ,  $R_G = 25\ \Omega$ ,  $L = 0.5\text{ mH}$ ,  $I_{AS} = 15\text{ A}$
- 3.Pulse Test: Pulse Width  $\leq 300\ \mu\text{s}$ , Duty Cycle  $\leq 0.5\%$ .

Typical Characteristics

Figure 1: Output Characteristics

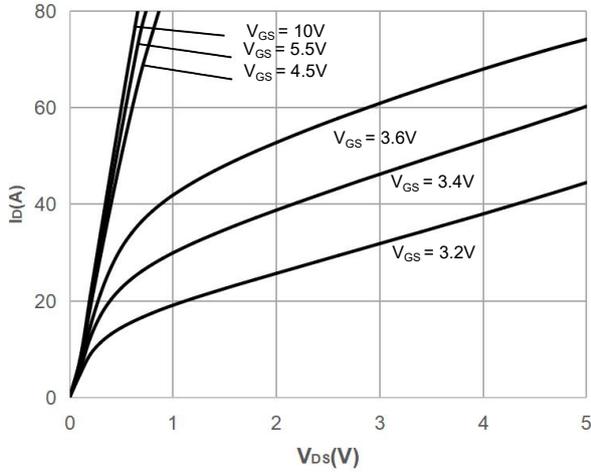


Figure 2: Typical Transfer Characteristics

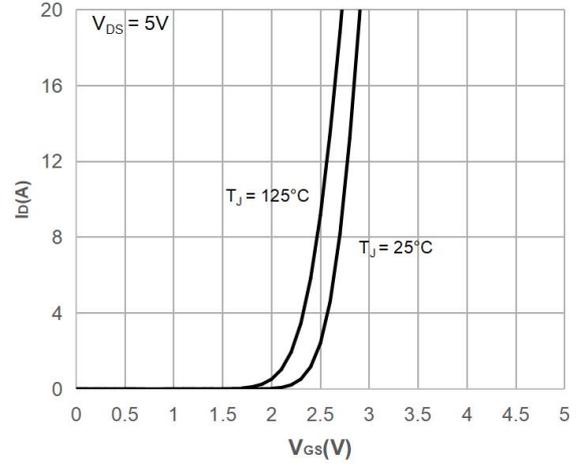


Figure 3: On-resistance vs. Drain Current

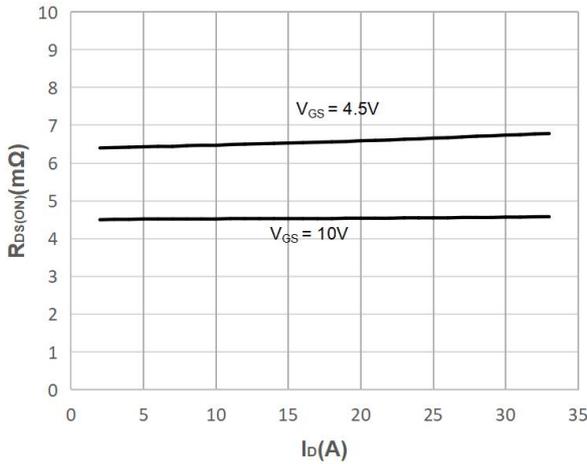


Figure 4: Body Diode Characteristics

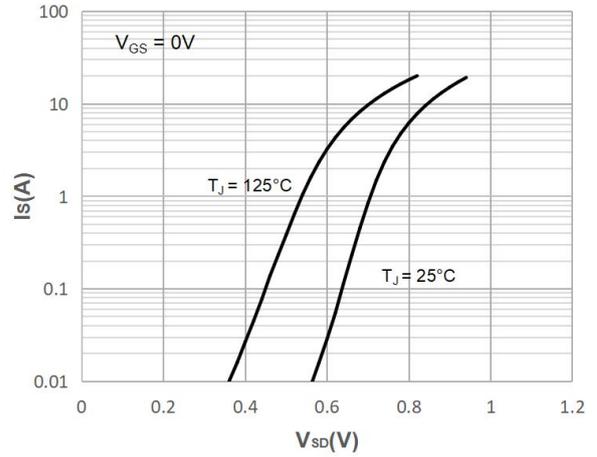


Figure 5: Gate Charge Characteristics

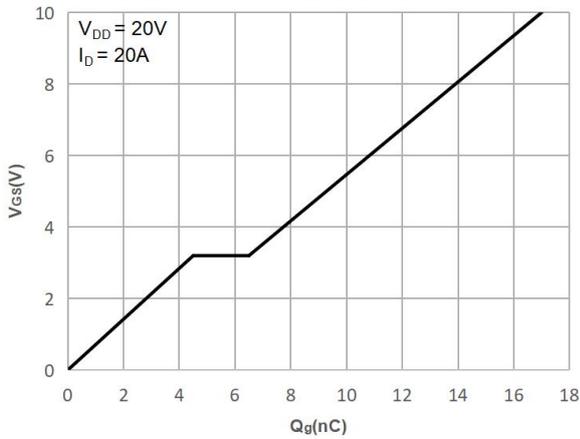
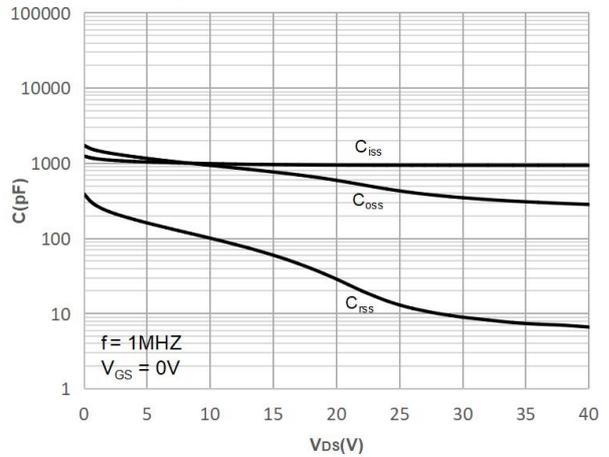
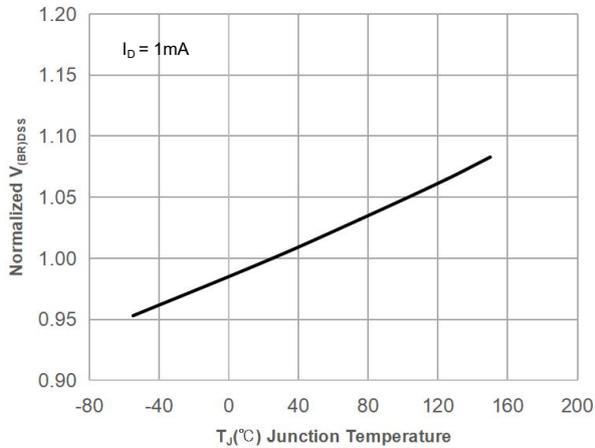


Figure 6: Capacitance Characteristics

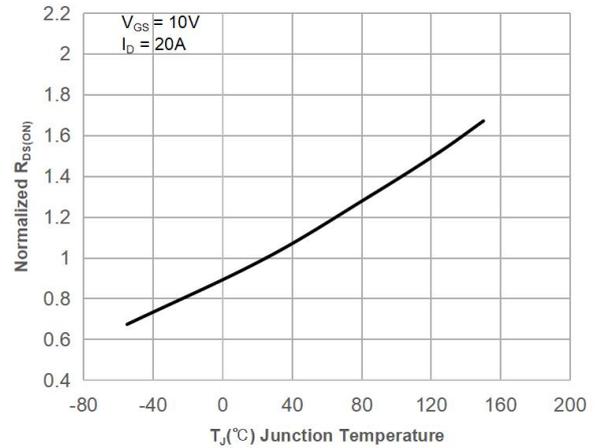


**Typical Characteristics**

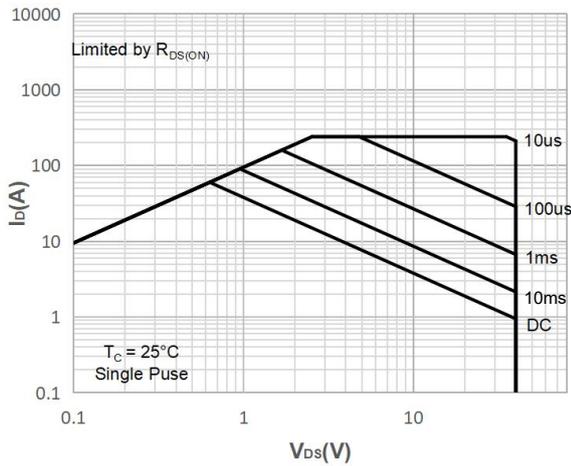
**Figure 7: Normalized Breakdown voltage vs. Junction Temperature**



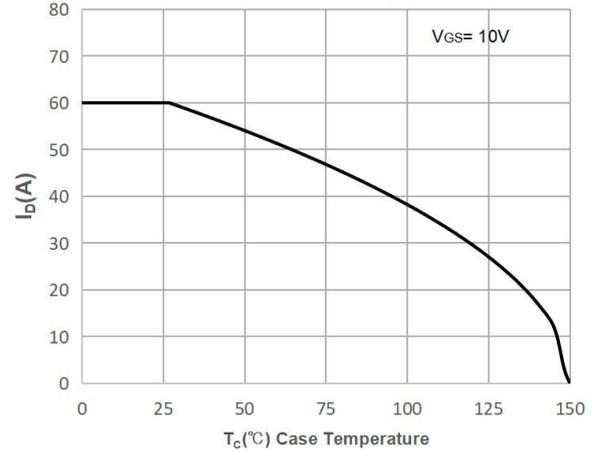
**Figure 8: Normalized on Resistance vs. Junction Temperature**



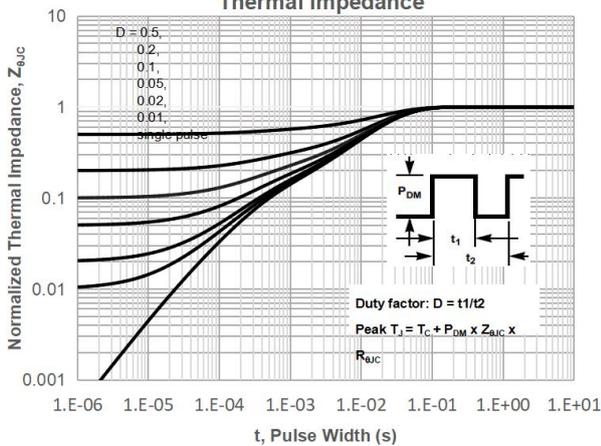
**Figure 9: Maximum Safe Operating Area**



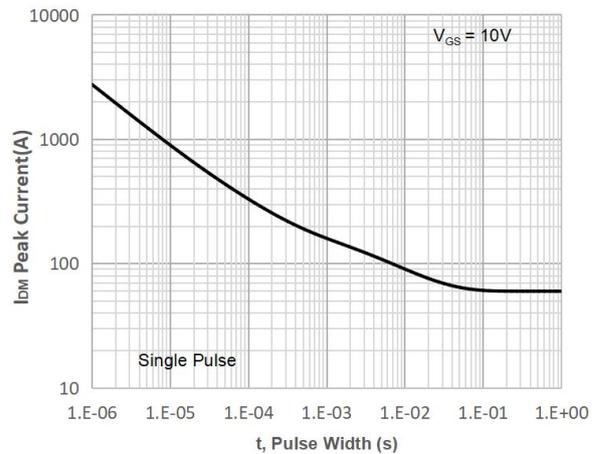
**Figure 10: Maximum Continuous Driant Current vs. Case Temperature**



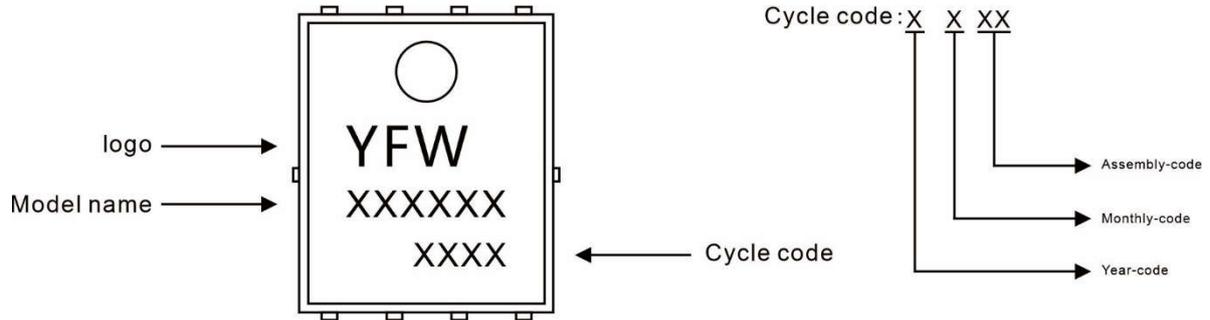
**Figure 11: Normalized Maximum Transient Thermal Impedance**



**Figure 12: Peak Current Capacity**



**Marking Diagram**



**Ordering information**

Model name	Package	Unit Weight	Base Quantity	Packing Quantity
YFWG60N04NF	PDFN5*6-8L	0.0032oz(0.093g)	5000pcs/reel	10000pcs/box 50000pcs/Carton

**Package Dimensions**

PDFN5\*6-8L

Dim	Millimeter		mil	
	Min.	Max.	Min.	Max.
A	0.9	1.2	35	45
A2	0.204	0.304	8	12
b	0.4ref.		16ref.	
b1	0.2	0.4	8	16
D	5.0	5.3	197	209
D1	4.84	5.24	191	206
E	5.95	6.35	234	250
E1	3.275	3.675	129	145
E2	5.69	6.09	224	232
e	1.27typ.		50typ.	
K	1.29typ.		51typ.	
L	0.585	0.785	23	27
L1	0.7typ.		28typ.	

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