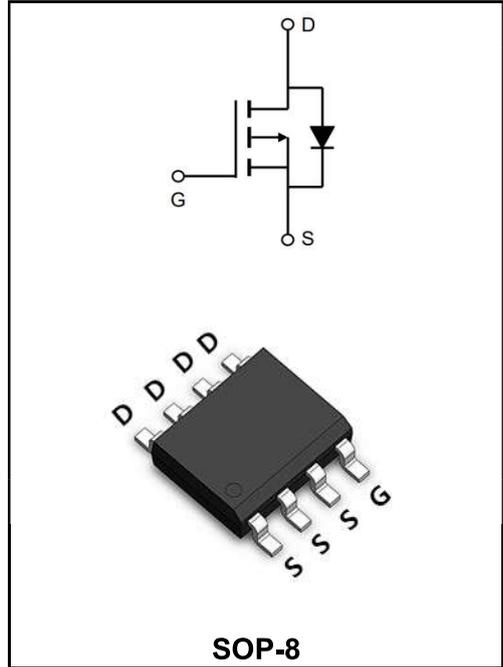


**-40V P-Channel Enhancement Mode MOSFET**

**MAIN CHARACTERISTICS**

<b>I<sub>D</sub></b>	-6A
<b>V<sub>DS</sub></b>	-40V
<b>R<sub>DS(on)-typ(@V<sub>GS</sub>=-10V)</sub></b>	<55mΩ(Typ:39mΩ)
<b>R<sub>DS(on)-typ(@V<sub>GS</sub>=-4.5V)</sub></b>	<78mΩ(Typ:56mΩ)



**DESCRIPTION**

The YFW6P04S uses advanced trench technology to provide excellent RDS(ON), 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**

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

**Absolute Maximum Ratings (T<sub>c</sub>=25°C unless otherwise noted)**

Parameter		Symbol	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	T <sub>A</sub> = 25°C	<b>I<sub>D</sub></b>	-6	<b>A</b>
	T <sub>A</sub> = 100°C		-3.6	<b>A</b>
Pulsed Drain Current note1		<b>I<sub>DM</sub></b>	22	<b>A</b>
Single Pulsed Avalanche Energy note2		<b>E<sub>AS</sub></b>	17.6	<b>mJ</b>
Power Dissipation	T <sub>A</sub> = 25°C	<b>P<sub>D</sub></b>	2.6	<b>W</b>
Thermal Resistance, Junction to Ambient		<b>R<sub>θJA</sub></b>	48	<b>°C/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>

**Electrical Characteristics (T<sub>J</sub>=25°C, unless otherwise noted)**

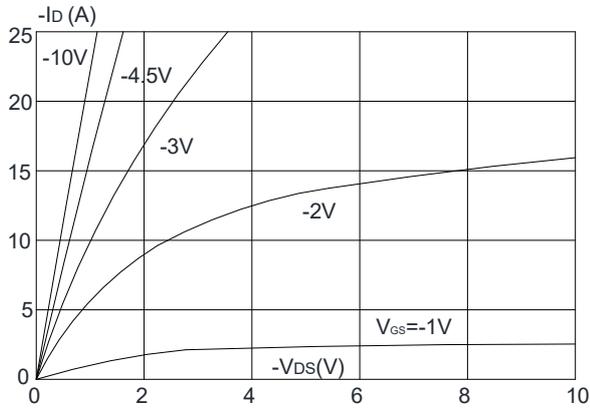
Parameter	Conditions	Symbol	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> = -250μA	<b>BV<sub>DSS</sub></b>	-40	-	-	<b>V</b>
Zero Gate Voltage Drain Current	V <sub>DS</sub> = -40V, V <sub>GS</sub> =0V	<b>I<sub>DSS</sub></b>	-	-	-1	<b>μA</b>
Gate to Body Leakage Current	V <sub>DS</sub> =0V, V <sub>GS</sub> = ±20V	<b>I<sub>GSS</sub></b>	-	-	±100	<b>nA</b>
Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> = -250μA	<b>V<sub>GS(th)</sub></b>	-1.0	-1.6	-2.5	<b>V</b>
Static Drain-Source on-Resistance <small>Note3</small>	V <sub>GS</sub> = -10V, I <sub>D</sub> = -5A	<b>R<sub>DS(on)</sub></b>	-	39	55	<b>mΩ</b>
	V <sub>GS</sub> = -4.5V, I <sub>D</sub> = -4A		-	56	78	
Input Capacitance	V <sub>DS</sub> = -20V V <sub>GS</sub> =0V f=1.0MHz	<b>C<sub>iss</sub></b>	-	869	-	<b>pF</b>
Output Capacitance		<b>C<sub>oss</sub></b>	-	94	-	<b>pF</b>
Reverse Transfer Capacitance		<b>C<sub>rss</sub></b>	-	69	-	<b>pF</b>
Total Gate Charge		<b>Q<sub>G</sub></b>	-	17.3	-	<b>nC</b>
Gate-Source Charge	V <sub>DS</sub> = -20V I <sub>D</sub> = -4A V <sub>GS</sub> = -10V	<b>Q<sub>GS</sub></b>	-	3.2	-	<b>nC</b>
Gate-Drain("Miller") Charge		<b>Q<sub>GD</sub></b>	-	4.3	-	<b>nC</b>
Turn-on Delay Time		<b>t<sub>d(ON)</sub></b>	-	10.3	-	<b>ns</b>
Turn-on Rise Time	V <sub>DS</sub> = -20V I <sub>D</sub> = -4A, V <sub>GS</sub> = -10V R <sub>GEN</sub> =3Ω	<b>t<sub>r</sub></b>	-	4.3	-	<b>ns</b>
Turn-off Delay Time		<b>t<sub>d(OFF)</sub></b>	-	39	-	<b>ns</b>
Turn-off Fall Time		<b>t<sub>f</sub></b>	-	46.5	-	<b>ns</b>
Maximum Continuous Drain to Source Diode Forward Current		<b>I<sub>S</sub></b>	-	-	-6	<b>A</b>
Maximum Pulsed Drain to Source Diode Forward Current	<b>I<sub>SM</sub></b>	-	-	-22	<b>A</b>	
Drain to Source Diode Forward Voltage	V <sub>GS</sub> =0V, I <sub>S</sub> = -6A	<b>V<sub>SD</sub></b>	-	-0.8	-1.2	<b>V</b>
Reverse Recovery Time	V <sub>GS</sub> =0V, I <sub>S</sub> = -6A, di/dt=100A/μs	<b>trr</b>	-	17	-	<b>ns</b>
Reverse Recovery Charge		<b>Qrr</b>	-	11.5	-	<b>nC</b>

**Notes:**

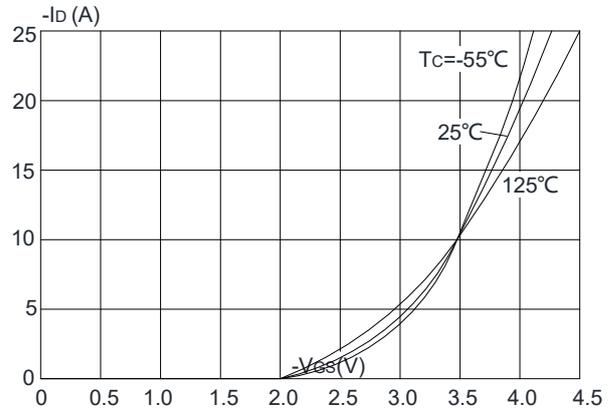
1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature
2. EAS condition : T<sub>J</sub>=25°C, V<sub>DD</sub>=-20V, V<sub>G</sub>= -10V, L=0.5mH, R<sub>g</sub>=25Ω, I<sub>AS</sub>=-8.4A
3. Pulse Test: Pulse Width≤300μs, Duty Cycle≤2%

Typical Characteristics

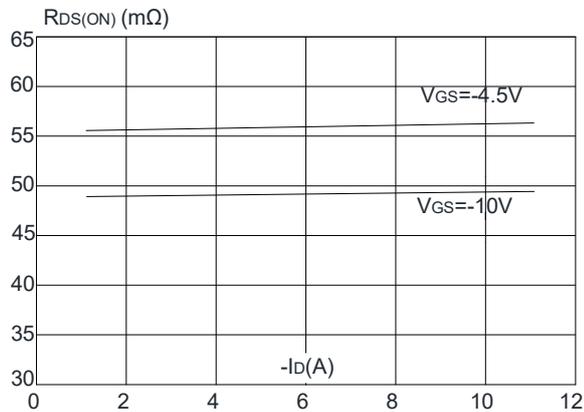
**Figure 1: Output Characteristics**



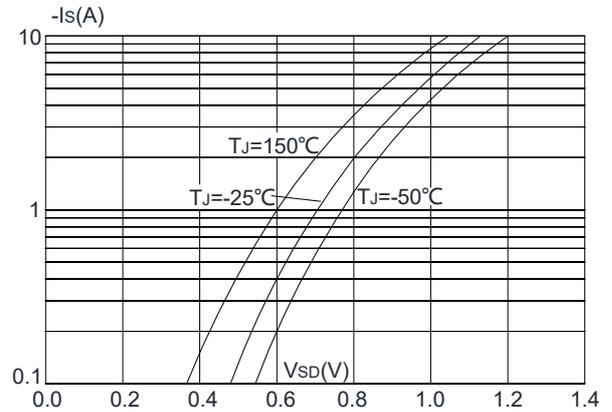
**Figure 2: Typical Transfer Characteristics**



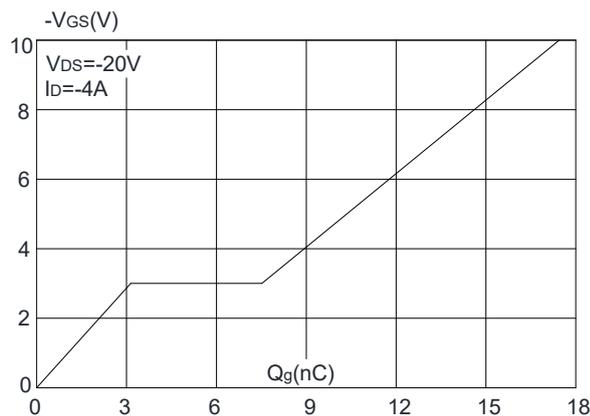
**Figure 3: On-resistance vs. Drain Current**



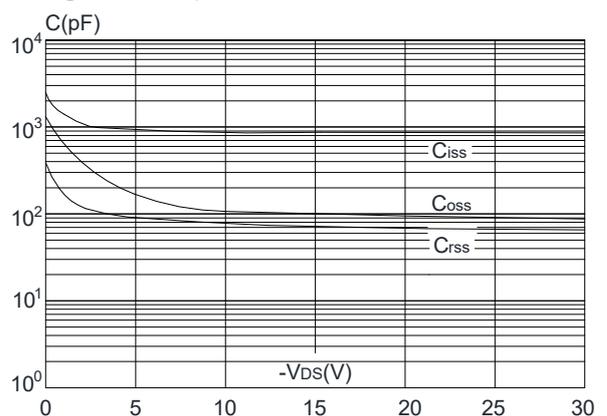
**Figure 4: Body Diode Characteristics**



**Figure 5: Gate Charge Characteristics**

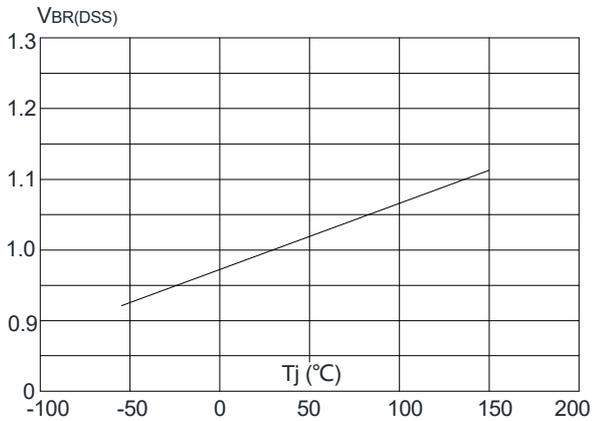


**Figure 6: Capacitance Characteristics**

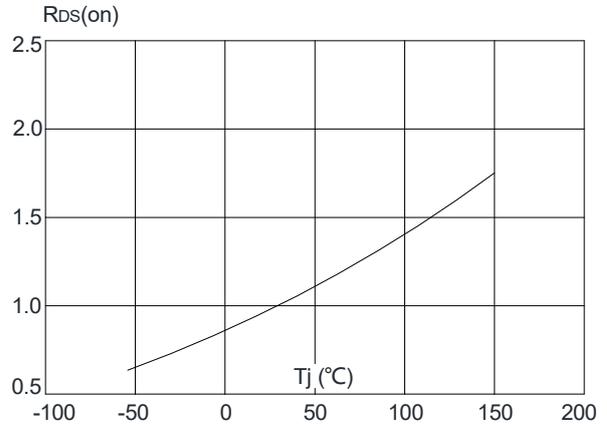


**Typical Characteristics**

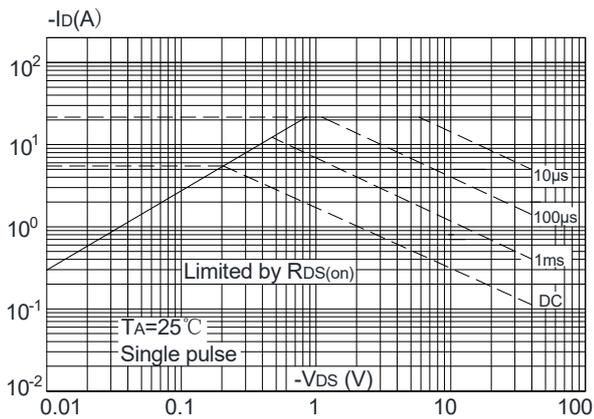
**Figure 7: Normalized Breakdown Voltage vs. Junction Temperature**



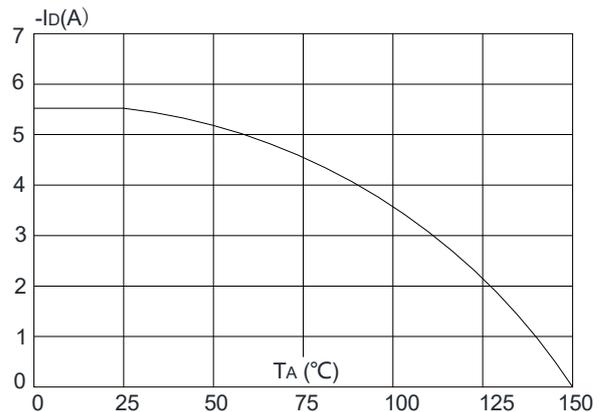
**Figure 8: Normalized on Resistance vs. Junction Temperature**



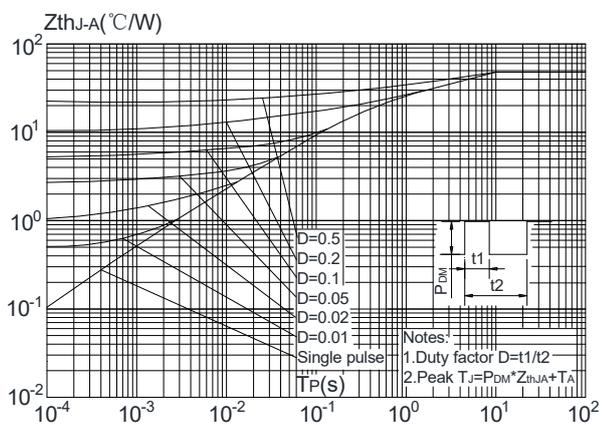
**Figure 9: Maximum Safe Operating Area**



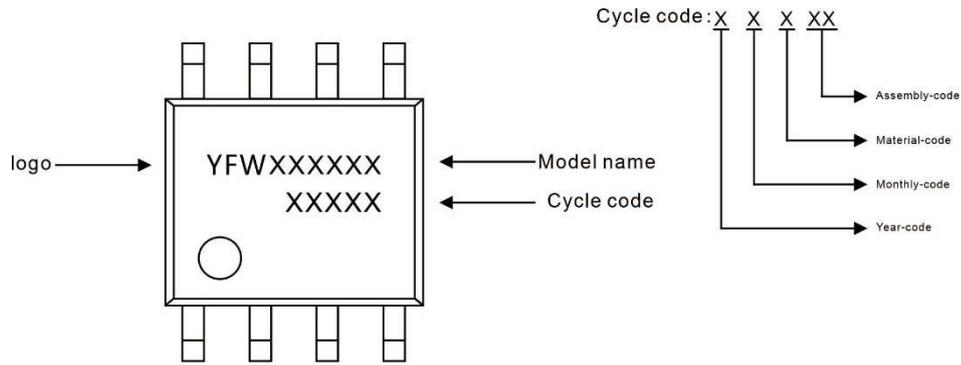
**Figure 10: Maximum Continuous Drain Current vs. Ambient Temperature**



**Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Ambient**



**Marking Diagram**



**Ordering information**

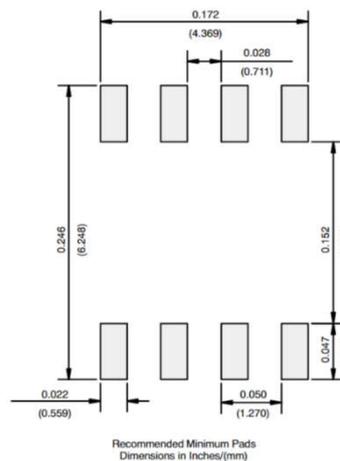
Package	Packing Description	Packing Quantity
SOP-8	Tape/Reel, 13" reel	3000PCS/Reel 30000PCS/Carton

**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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