

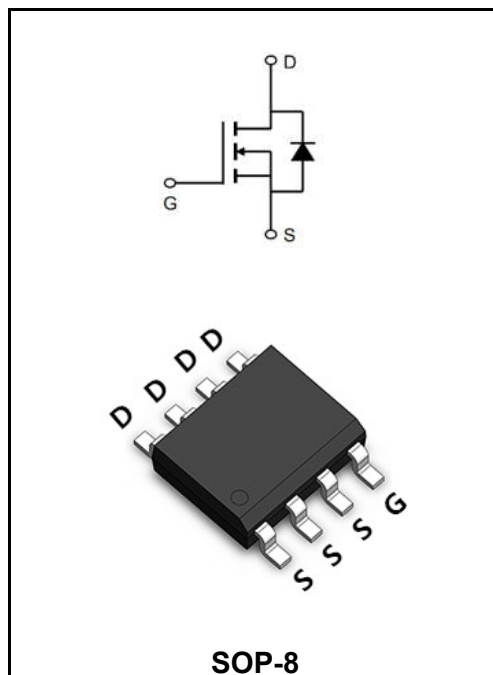
30V N-Channel Enhancement Mode MOSFET

MAIN CHARACTERISTICS

I_D	20A
V_{DS}	30V
$R_{DS(on)-typ}(@V_{GS}=10V)$	$<4.0m\Omega$ (Typ:3.0m Ω)
$R_{DS(on)-typ}(@V_{GS}=4.5V)$	$<7.0m\Omega$ (Typ:5.0m Ω)

DESCRIPTION

The YFW20N03S uses advanced trench technology to provide excellent $R_{DS(on)}$, 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 ($T_C=25^{\circ}C$ unless otherwise noted)

Parameter		Symbol	Value	Units
Drain-to-Source Voltage		V_{DS}	30	V
Gate-to-Source Voltage		V_{GS}	± 20	V
Continuous Drain Current	$T_C = 25^{\circ}C$	I_D	20	A
	$T_C = 100^{\circ}C$		13.2	
Pulsed Drain Current ⁽¹⁾		I_{DM}	88	A
Single Pulsed Avalanche Energy ⁽²⁾		E_{AS}	121	mJ
Power Dissipation	$T_C = 25^{\circ}C$	P_D	3.8	W
Thermal Resistance, Junction to Ambient ⁽³⁾		$R_{\theta JA}$	33	$^{\circ}C/W$
Junction & Storage Temperature Range		T_J, T_{STG}	-55 to 150	$^{\circ}C$

Electrical Characteristics (T_J=25 °C, unless otherwise noted)

Parameter	Conditions	Symbol	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	I _D = 250μA, V _{GS} = 0V	BV_{DSS}	30	-	-	V
Zero Gate Voltage Drain Current	V _{DS} = 30V, V _{GS} = 0V	I_{DSS}	-	-	1.0	μA
Gate-Body Leakage Current	V _{DS} = 0V, V _{GS} = ±20V	I_{GSS}	-	-	±100	nA
Gate Threshold Voltage	V _{DS} = V _{GS} , I _D = 250μA	V_{GS(th)}	1.0	1.7	2.5	V
Static Drain-Source ON-Resistance ⁽⁴⁾	V _{GS} = 10V, I _D = 20A	R_{DS(ON)}	-	3.0	4.0	mΩ
	V _{GS} = 4.5V, I _D = 10A		-	5.0	7.0	mΩ
Input Capacitance	V _{GS} = 0V V _{DS} = 15V f = 1MHz	C_{iss}	-	3089	-	pF
Output Capacitance		C_{oss}	-	372	-	
Reverse Transfer Capacitance		C_{rss}	-	302	-	
Total Gate Charge	V _{GS} = 0 to 10V V _{DS} = 15V I _D = 30A	Q_g	-	58	-	nC
Gate Source Charge		Q_{gs}	-	12	-	
Gate Drain("Miller") Charge		Q_{gd}	-	13	-	
Turn-On DelayTime	V _{GS} = 10V V _{DD} = 15V I _D = 30A R _{GEN} = 3Ω	t_{d(on)}	-	11	-	ns
Turn-On Rise Time		T_r	-	29	-	
Turn-Off DelayTime		t_{d(OFF)}	-	47	-	
Turn-Off Fall Time		t_f	-	18	-	
Maximum Continuous Drain to Source Diode Forward Current		I_S	-	-	20	A
Maximum Pulsed Drain to Source Diode Forward Current		I_{SM}	-	-	88	A
Drain to Source Diode Forward Voltage	V _{GS} = 0V, I _S = 20A	V_{SD}	-	-	1.2	V
Body Diode Reverse Recovery Time	I _F = 20A, di/dt = 100A/us	trr	-	16	-	ns
Body Diode Reverse Recovery Charge		Qrr	-	7	-	nC

Notes:

- 1.Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature.
- 2.E_{AS} condition: Starting T_J=25°C, V_{DD}=15V, V_G=10V, R_G=25ohm, L=0.5mH, I_{AS}=22A
- 3.R_{θJA} is measured with the device mounted on a 1inch² pad of 2oz copper FR4 PCB
- 4.Pulse Test: Pulse Width≤300μs, Duty Cycle≤0.5%.

Typical Performance Characteristics

Figure 1: Output Characteristics

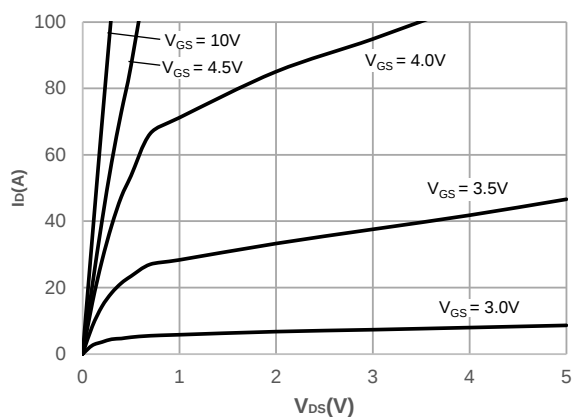


Figure 2: Typical Transfer Characteristics

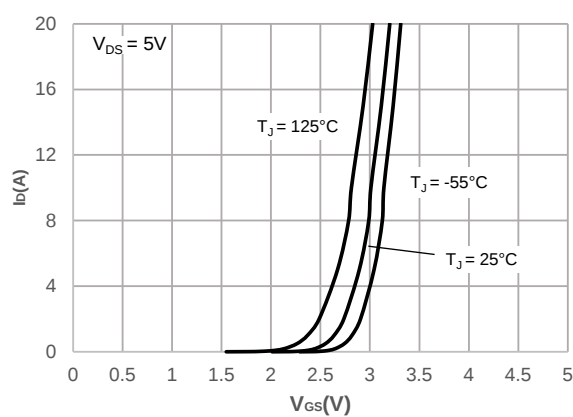


Figure 3: On-resistance vs. Drain Current

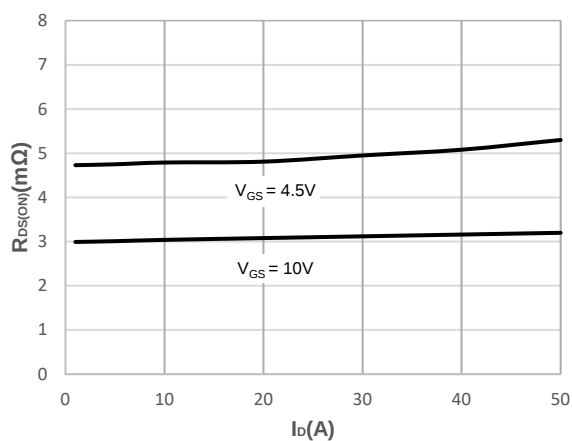


Figure 4: Body Diode Characteristics

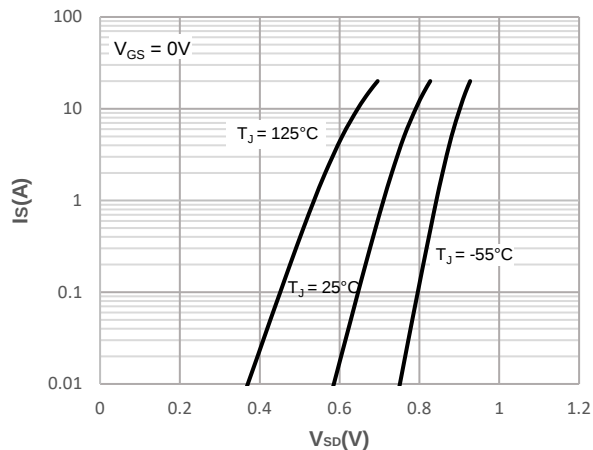


Figure 5: Gate Charge Characteristics

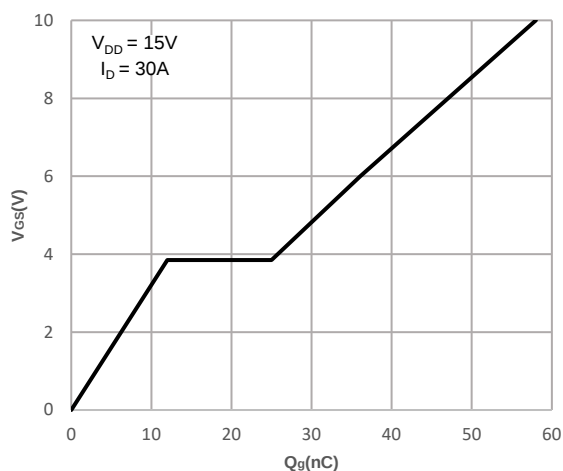
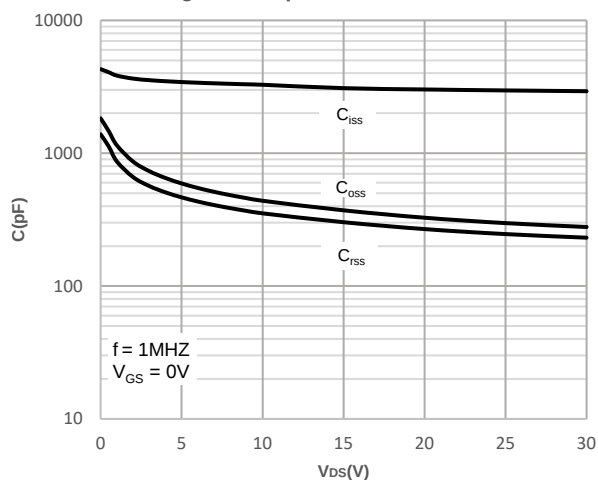


Figure 6: Capacitance Characteristics



Typical Performance Characteristics

Figure 7: Normalized Breakdown voltage vs. Junction Temperature

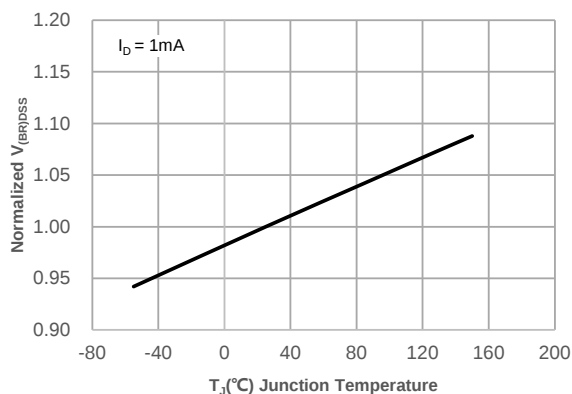


Figure 8: Normalized on Resistance vs. Junction Temperature

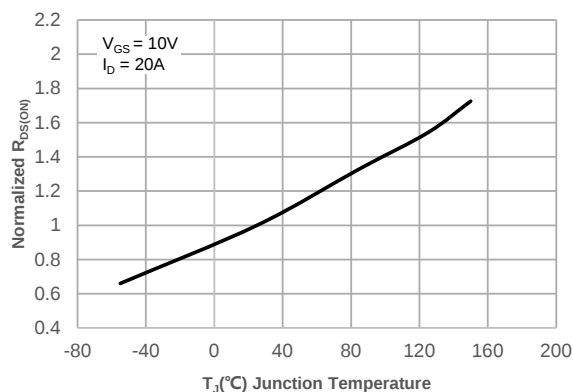


Figure 9: Maximum Safe Operating Area

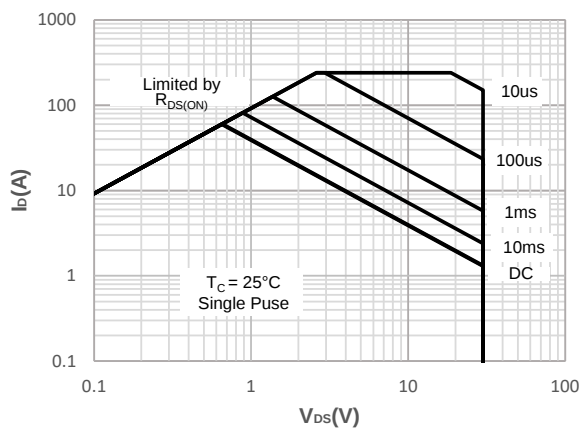


Figure 10: Maximum Continuous Driain Current vs. Case Temperature

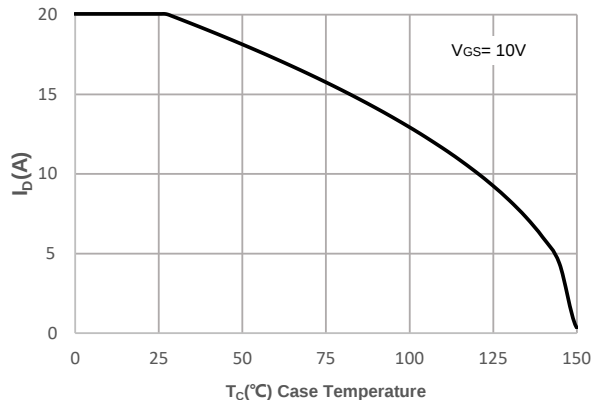


Figure 11: Normalized Maximum Transient Thermal Impedance

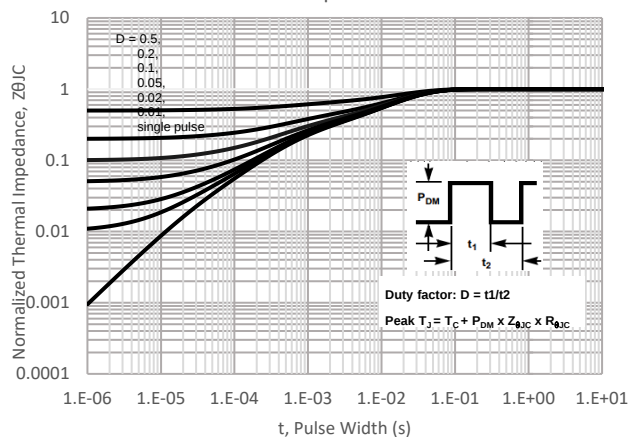
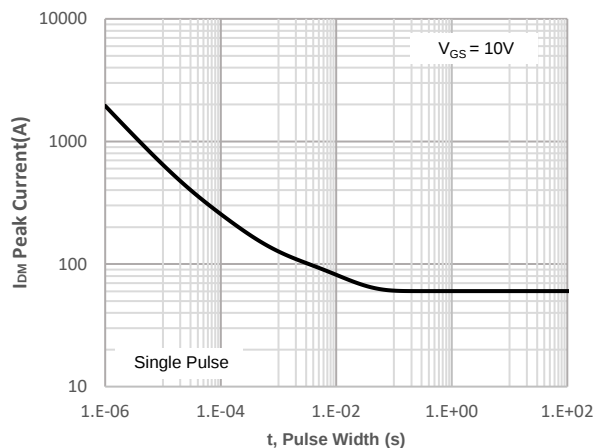
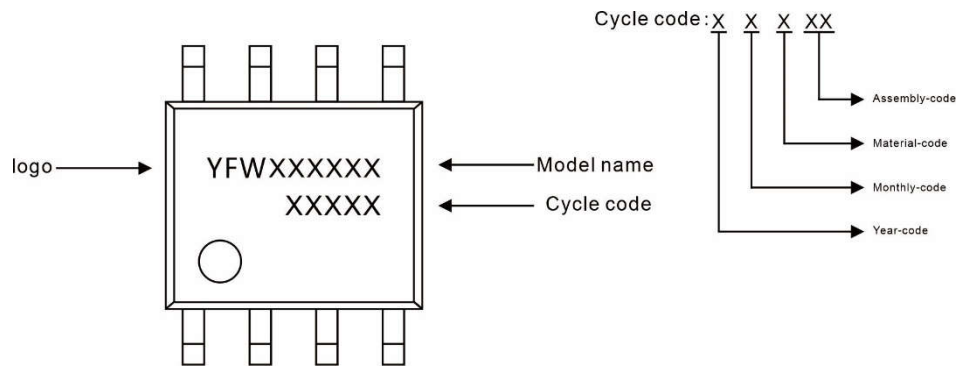


Figure 12: Peak Current Capacity



Marking Diagram



Ordering information

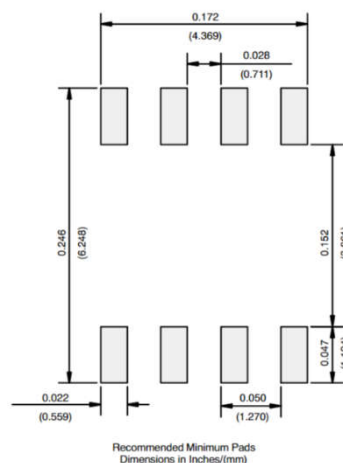
Package	Packing Description	Packing Quantity
SOP-8	Tape/Reel, 13" reel	3000PCS/Reel 30000PCS/Carton

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



Disclaimer

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