

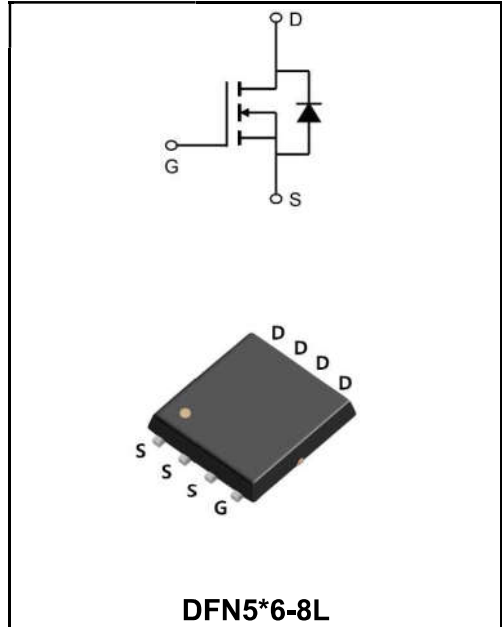
**40V N-CHANNEL ENHANCEMENT MODE MOSFET**

**MAIN CHARACTERISTICS**

<b>I<sub>D</sub></b>	180A
<b>V<sub>DSS</sub></b>	40V
<b>R<sub>DS(on)-typ(@V<sub>GS</sub>=10V)</sub></b>	< 1.8mΩ ( <b>Type:1.3 mΩ</b> )

**Features**

- ◆ Low RDS(on) & FOM
- ◆ Extremely low switching loss
- ◆ Excellent stability and uniformity
- ◆ Fast switching and soft recovery
- ◆ Invertors
- ◆ Synchronous-rectification applications
- ◆ **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
YFW180N04NF	DFN5*6-8L	YFW 180N04NF 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 <sup>1)</sup>	<b>I<sub>D</sub></b>	180	<b>A</b>
Pulsed Drain Current <sup>2)</sup>	<b>I<sub>D, pulse</sub></b>	390	<b>A</b>
Power Dissipation <sup>3)</sup>	<b>P<sub>D</sub></b>	140	<b>W</b>
Single Pulse Avalanche Energy <sup>4)</sup>	<b>E<sub>AS</sub></b>	200	<b>mJ</b>
Operation and storage temperature	<b>T<sub>J</sub>, T<sub>STG</sub></b>	-55 to +150	<b>°C</b>
Thermal Resistance Junction-Case	<b>R<sub>θJC</sub></b>	0.89	<b>°C/W</b>
Thermal Resistance Junction-ambient <sup>5)</sup>	<b>R<sub>θJA</sub></b>	62	<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
Gate -Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	$V_{GS(th)}$	1.0	*	2.5	V
Drain-source on-state resistance	$V_{GS}=10V, I_D=55A$	$R_{DS(on)}$	-	1.3	1.8	mΩ
	$V_{GS}=4.5V, I_D=55A$		-	2.0	3.0	
Gate -Source Leakage Current	$V_{GS}=20V$	$I_{GSS}$	-	*	100	nA
	$V_{GS}=-20V$		-	-	-100	
Drain -Source Leakage Current	$V_{DS}=40V, V_{GS}=0V$	$I_{DSS}$	-	-	1	μA
Input Capacitance	$V_{DS}=20V$ $V_{GS}=0V$ $f=100MHz$	$C_{iss}$	-	6587.4	-	pF
Output Capacitance		$C_{oss}$	-	2537.3	-	
Reverse Transfer Capacitance		$C_{rss}$	-	178.8	-	
Turn-on delay time	$V_{GS}=10V$ $V_{DD}=20V$ $R_G=2\Omega$ $I_D=20A$	$t_{d(on)}$	-	26.6	-	ns
Rise Time		$T_r$	-	9.3	-	
Turn-Off Delay Time		$t_{d(OFF)}$	-	96	-	
Fall Time		$t_f$	-	39.3	-	
Total Gate Charge	$I_D=20A$ $V_{DS}=20V$ $V_{GS}=10V$	$Q_g$	-	96.8	-	nC
Gate-Source Charge		$Q_{gs}$	-	14.5	-	
Gate-Drain Charge		$Q_{gd}$	-	18.4	-	
Gate plateau voltage		$V_{plateau}$	-	2.7	-	
Diode forward current	$V_{GS}<V_{th}$	$I_S$	-	-	130	A
Pulsed source current		$I_{SP}$	-	-	390	
Diode Forward Voltage	$V_{GS}=0V, I_S=20A$	$V_{SD}$	-	-	1.3	V
Reverse recovery time	$I_S=20A, di/dt=100A/\mu s$	$t_{rr}$	-	205	-	ns
Reverse recovery charge		$Q_{rr}$	-	557.4	-	nC
Peak reverse recovery current		$I_{rrm}$	-	4.3	-	A

- Note
- 1) Calculated continuous current based on maximum allowable junction temperature.
  - 2) Repetitive rating; pulse width limited by max. junction temperature.
  - 3) Pd is based on max. junction temperature, using junction-case thermal resistance.
  - 4) VDD=30 V, RG=50 Ω, L=0.3 mH, starting Tj=25 °C.
  - 5) The value of RθJA is measured with the device mounted on 1 in 2 FR-4 board with 2oz. Copper, in a still air environment with Ta=25 °C.

Ratings and Characteristic Curves

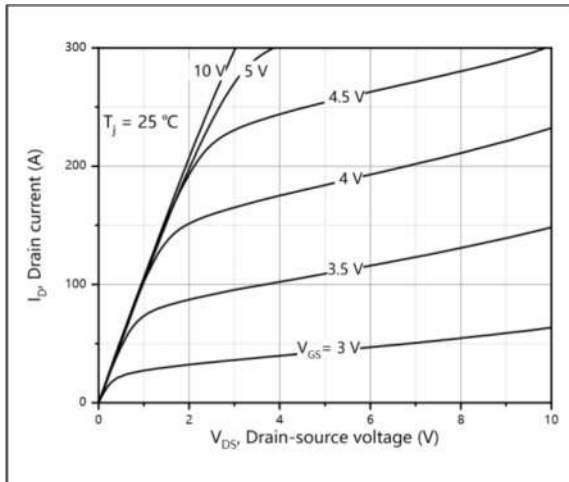


Figure 1, Typ. output characteristics

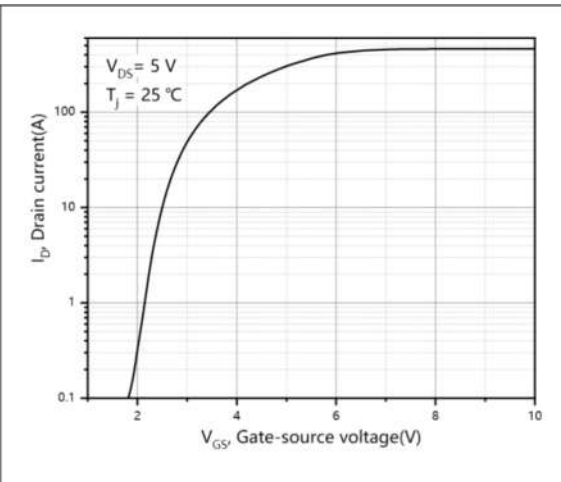


Figure 2, Typ. transfer characteristics

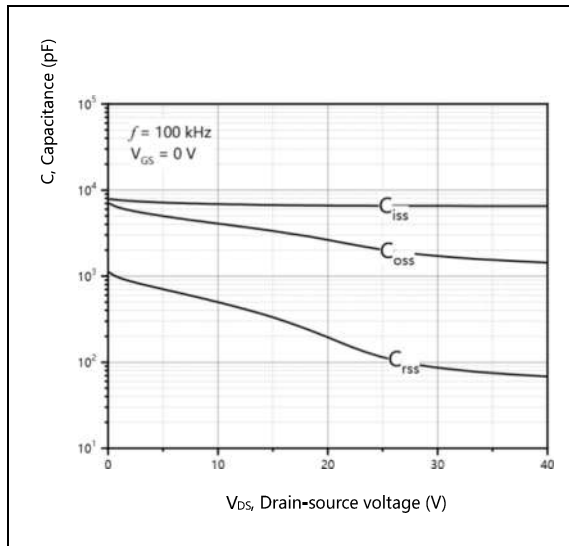


Figure 3, Typ. capacitances

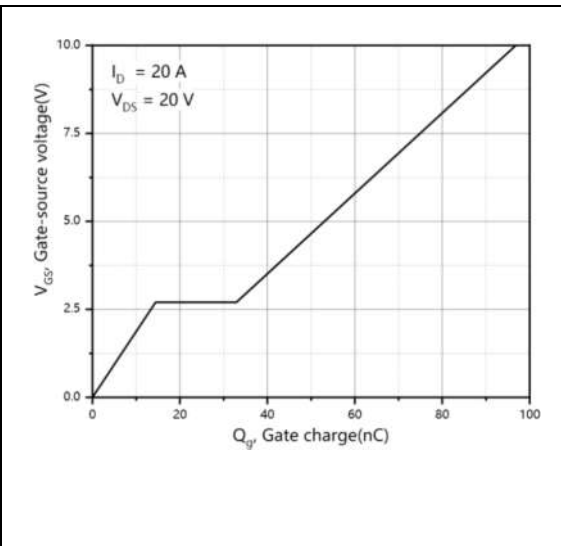


Figure 4, Typ. gate charge

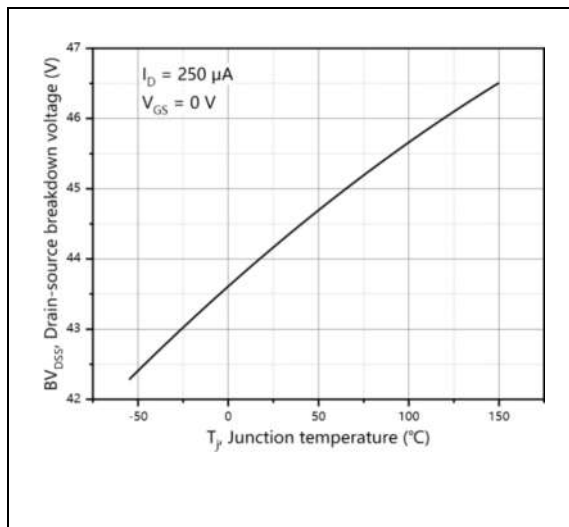


Figure 5, Drain-source breakdown voltage

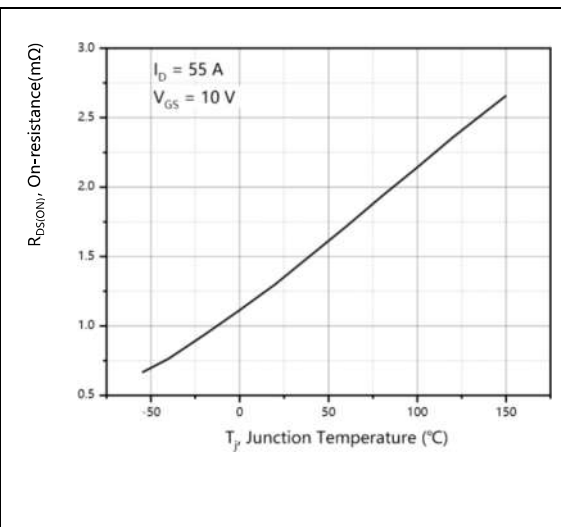


Figure 6, Drain-source on-state resistance

Ratings and Characteristic Curves

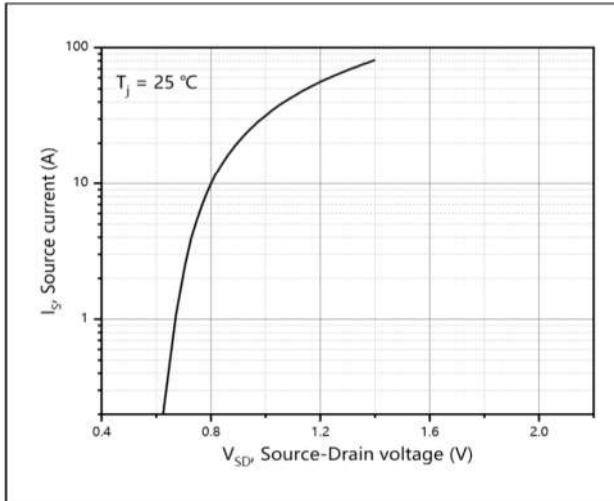


Figure 7, Forward characteristic of body diode

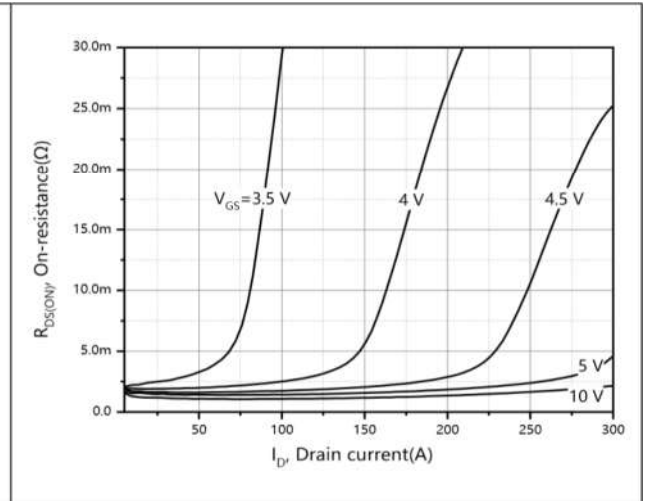


Figure 8, Drain-source on-state resistance

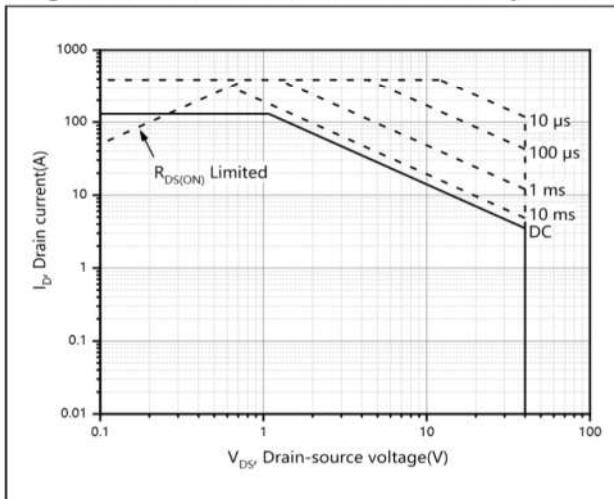


Figure 9, Safe operation area  $T_C=25\text{ °C}$

Ratings and Characteristic Curves

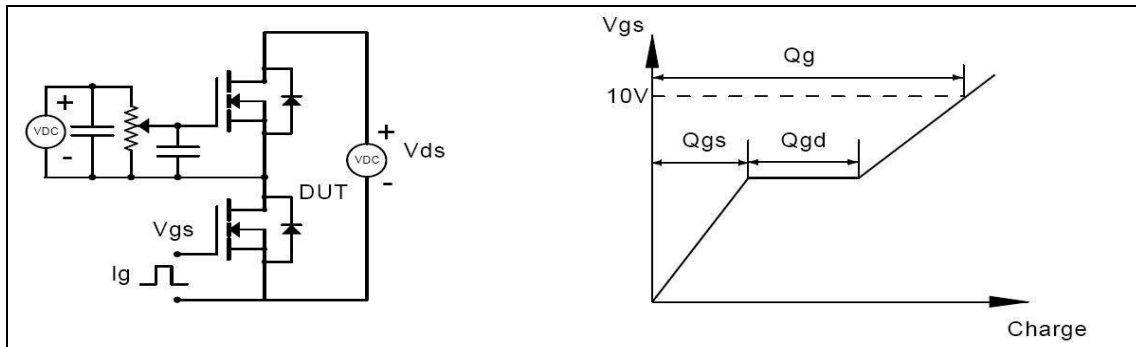


Figure 1, Gate charge test circuit & waveform

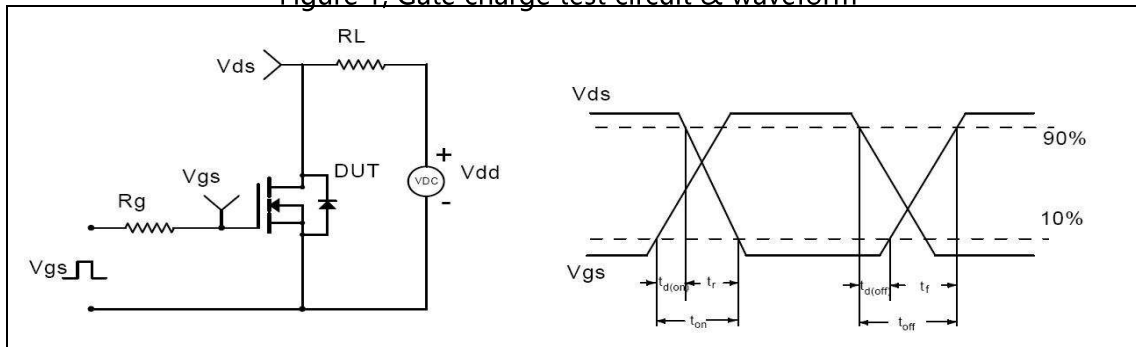


Figure 2, Switching time test circuit & waveforms

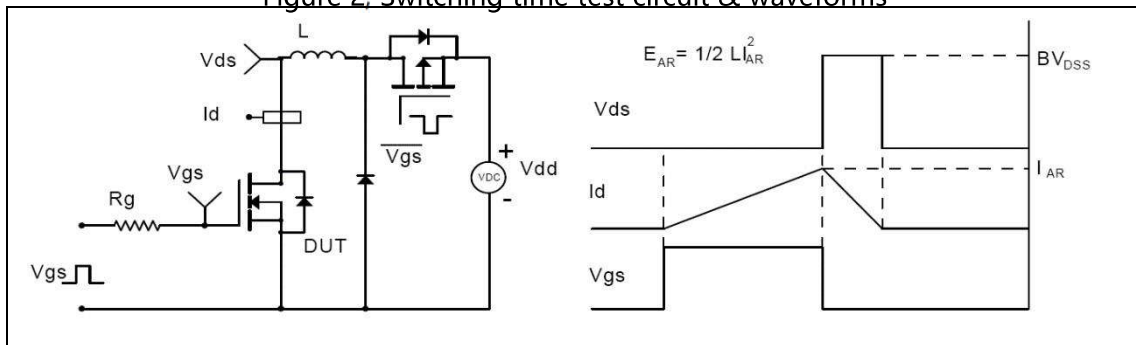


Figure 3, Unclamped inductive switching (UIS) test circuit & waveforms

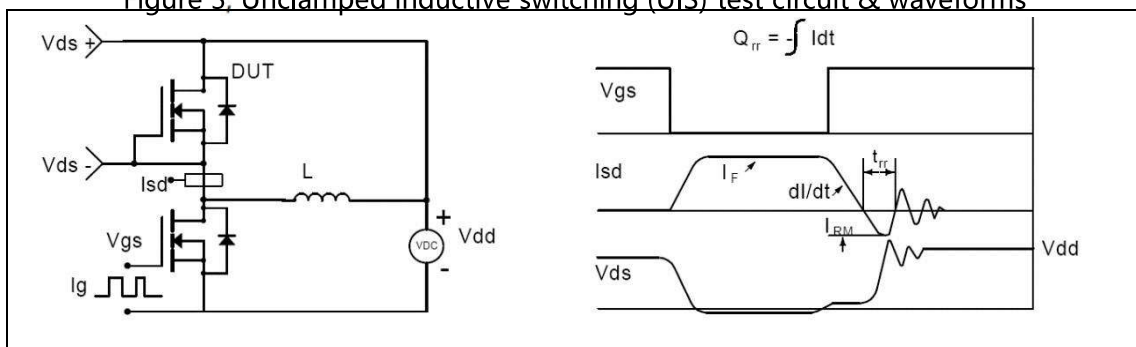
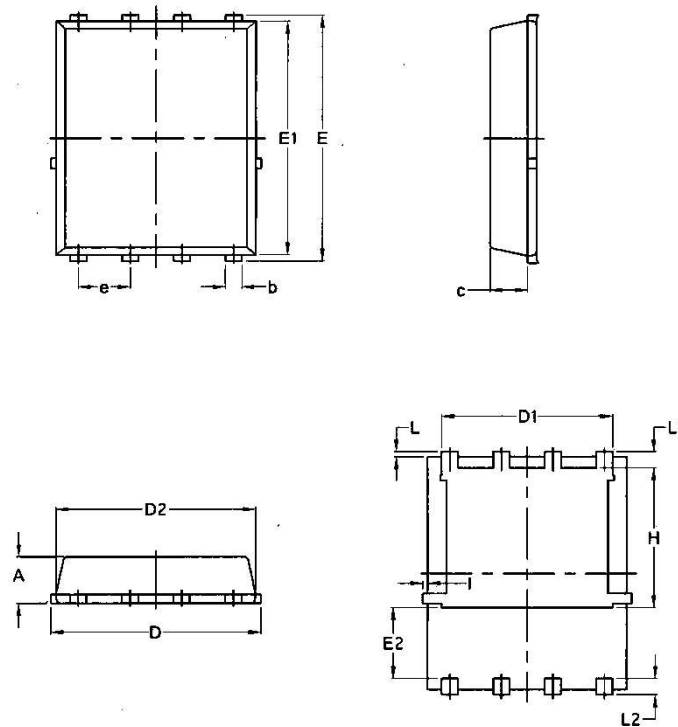


Figure 4, Diode reverse recovery test circuit & waveforms

**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