

600V N-SJ ENHANCEMENT MODE MOSFET

MAIN CHARACTERISTICS

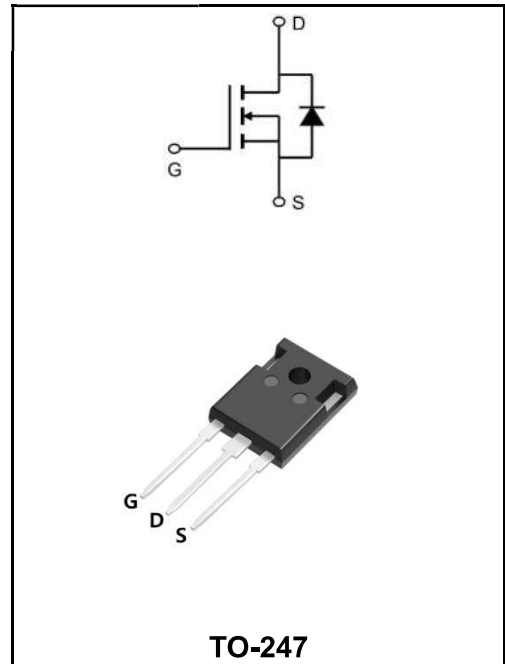
I_D	40A
V_{DSS}	600V
R_{DS(on)-typ(@V_{GS}=10V)}	< 0.096Ω(Type:0.085 Ω)

Features

- ◆Low RDS(on) & FOM
- ◆Extremely low switching loss
- ◆Excellent stability and uniformity
- ◆Easy to drive

Application

- ◆Lighting
- ◆Server power supply
- ◆Telecom
- ◆Solar invertor



Product Specification Classification

Part Number	Package	Marking	Pack
YFWJ40N60AP	TO-247	YFW J40N60AP XXXXX	600PCS/Tube

Maximum Ratings at T_c=25°C unless otherwise specified

Characteristics	Symbols	Value	Units
Drain-Source Voltage	V_{DS}	600	V
Gate –Source Voltage	V_{GS}	±30	V
Continuous Drain Current ¹⁾ T _C =25°C	I_D	40	A
Continuous Drain Current ¹⁾ T _C =100°C	I_D	25	A
Pulsed Drain Current ²⁾ T _C =25°C	ID, pulse	120	A
Continuous diode forward current ²⁾ , T _C =25 °C	I_S	40	A
Diode pulse current ²⁾ , T _C =25 °C	IS, pulse	120	A
Power dissipation ³⁾ , for TO247, T _C =25 °C	P_D	261	W
Single pulse avalanche energy ⁴⁾	E_{AS}	793.6	mJ
MOSFET dv/dt ruggedness, V _{DS} =0...480 V	dv/dt	50	V/ns
Reverse diode dv/dt, V _{DS} =0...480 V, I _{SD} ≤I _D	dv/dt	15	V/ns
Operation and storage temperature	T_J, T_{STG}	-55 to 150	°C
Thermal Resistance, Junction-to-case	R_{θJC}	0.48	°C/W
Thermal Resistance, Junction –to–ambient	R_{θJA}	62	°C/W

Maximum Ratings at Tc=25°C unless otherwise specified

Characteristics	Test Condition	Symbols	Min	Typ	Max	Units
Drain Source Breakdown Voltage	$V_{GS}=0V, I_D=1mA$	BV_{DSS}	600	-	-	V
	$V_{GS}=0V, I_D=1mA, T_J=150\text{ }^\circ\text{C}$		650	-	-	
Gate -Threshold Voltage	$V_{DS}=V_{GS}, I_D=1mA$	$V_{GS(th)}$	3.0	-	4.0	V
Drain-to-Source On-Resistance	$V_{GS}=10V, I_D=20A$	$R_{DS(on)}$	-	0.085	0.096	Ω
	$V_{GS}=10V, I_D=20A, T_J=150\text{ }^\circ\text{C}$		-	0.20	-	
Gate-source leakage current	$V_{GS}=30V$	I_{GSS}	-	-	100	nA
	$V_{GS}=-30V$		-	-	-100	
Drain-source leakage current	$V_{DS}=600V, V_{GS}=0V$	I_{DSS}	-	-	1	μA
Gate Resistance	Open drain f=1MHz	R_G	-	7.4	-	Ω
Input Capacitance	$V_{DS}=50V$ $V_{GS}=0V$ f=100KHz	C_{iss}	-	3190.3	-	pF
Output Capacitance		C_{oss}	-	280.1	-	
Reverse Transfer Capacitance		C_{rss}	-	1.69	-	
Turn-on delay time	$V_{GS}=10V$ $V_{DS}=400V$ $R_G=2\text{ }\Omega$ $I_D=20A$	$t_{d(on)}$	-	36.8	-	ns
Rise Time		T_r	-	34.7	-	
Turn-Off Delay Time		$t_{d(OFF)}$	-	104.7	-	
Fall Time		t_f	-	7.7	-	
Total Gate Charge	$I_D=20A$ $V_{DS}=400V$ $V_{GS}=10V$	Q_g	-	56.6	-	nC
Gate to Source Charge		Q_{gs}	-	16.2	-	
Gate to Drain Charge		Q_{gd}	-	16.6	-	
Gate plateau voltage		$V_{plateau}$	-	5.5	-	
Diode Forward Voltage	$I_S=120A, V_{GS}=0V$	V_{SD}	-	-	1.1	V
Reverse Recovery Time	$I_S=20A, V_R=400V$ dI/dt=100A/ μs	t_{rr}	-	506	-	ns
Reverse Recovery Charge		Q_{rr}	-	4.2	-	nC

Note

 1 VDD=100 V, RG=50 Ω , L=60 mH, starting Tj=25 °C.

 2 The value of R θ JA 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

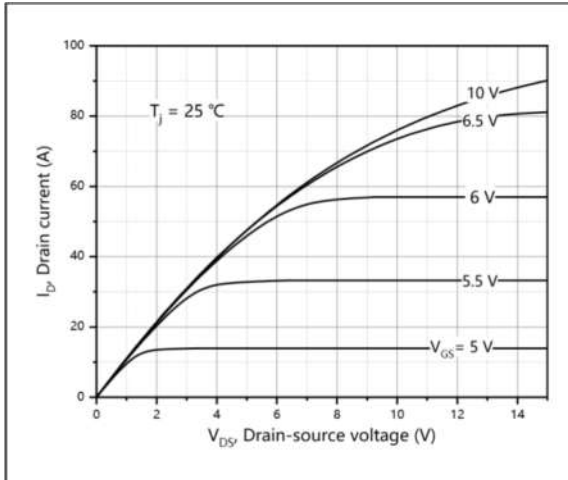


Figure 1, Typ. output characteristics

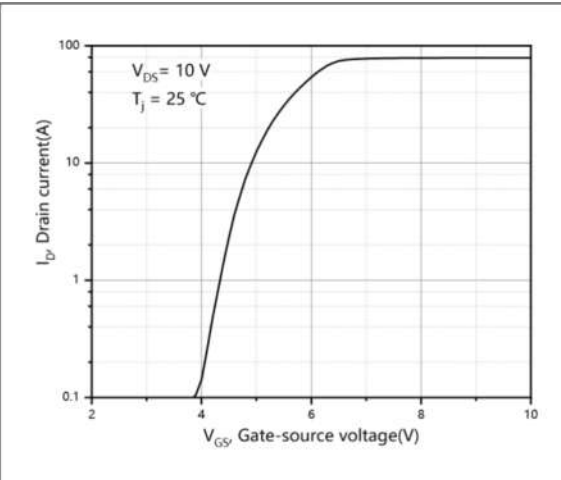


Figure 2, Typ. transfer characteristics

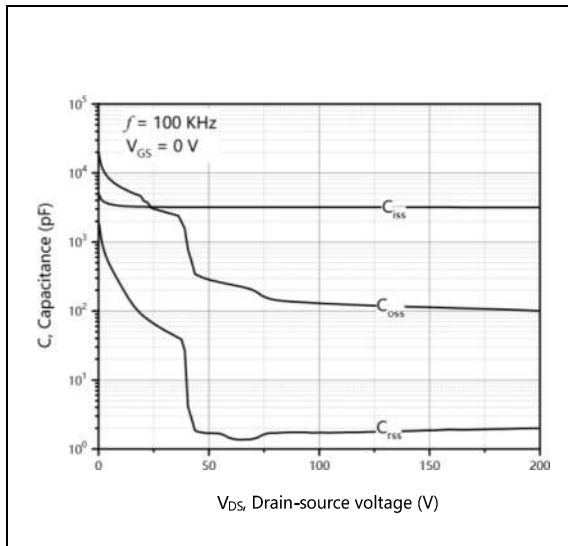


Figure 3, Typ. capacitances

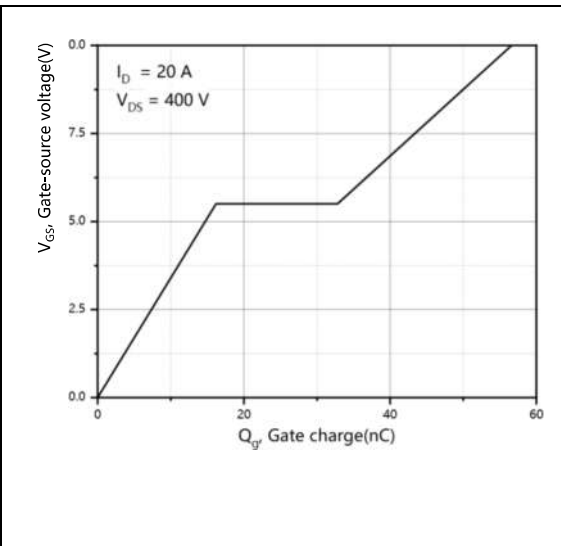


Figure 4, Typ. gate charge

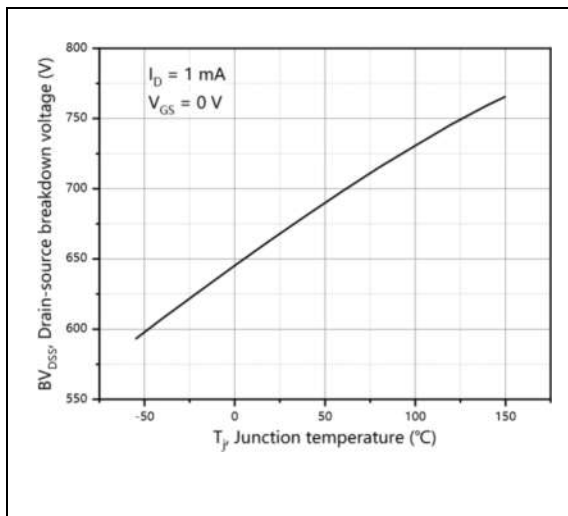


Figure 5, Drain-source breakdown voltage

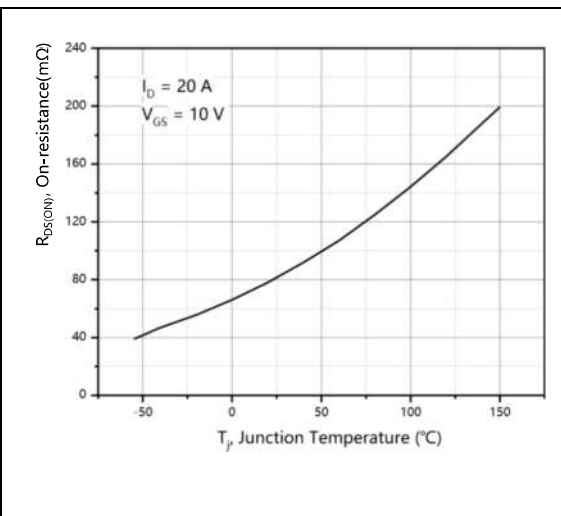


Figure 6, Drain-source on-state resistance

Ratings and Characteristic Curves

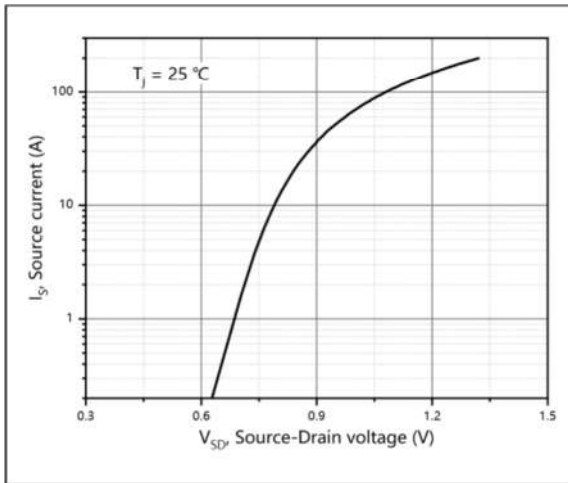


Figure 7, Forward characteristic of body diode

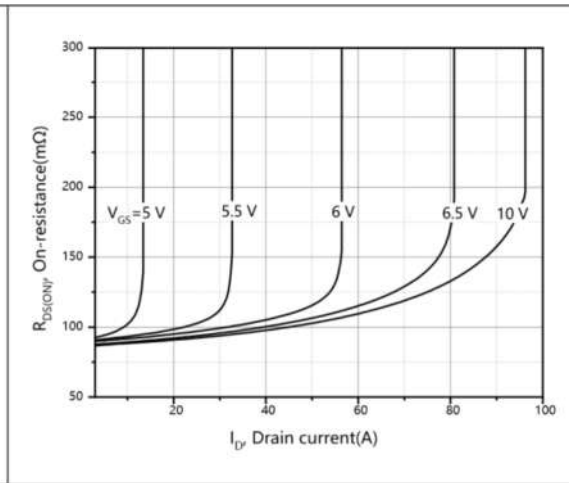


Figure 8, Drain-source on-state resistance

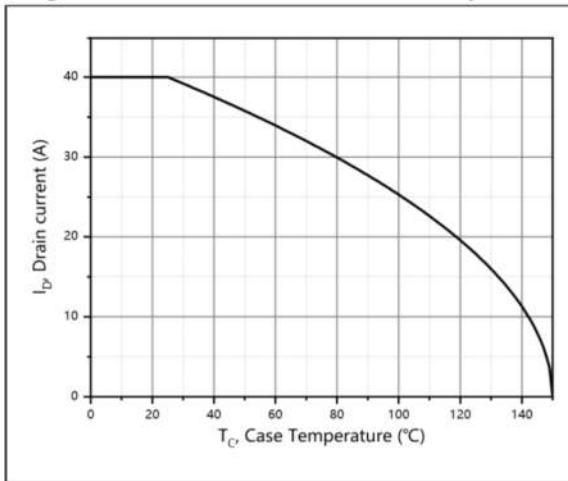


Figure 9, Drain current

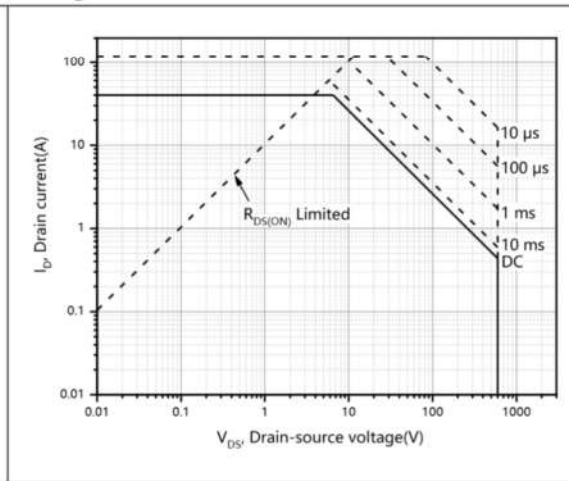


Figure 10, Safe operation area for TO247/TO263/TO220 $T_C=25\text{ }^\circ\text{C}$

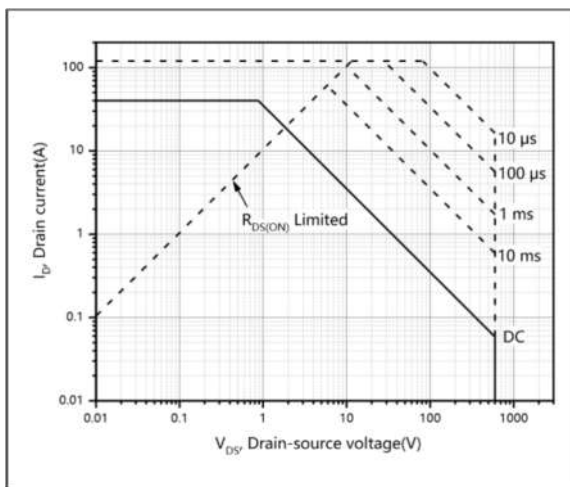


Figure 11, Safe operation area for TO220F

$T_C=25\text{ }^\circ\text{C}$

Test circuits and waveforms

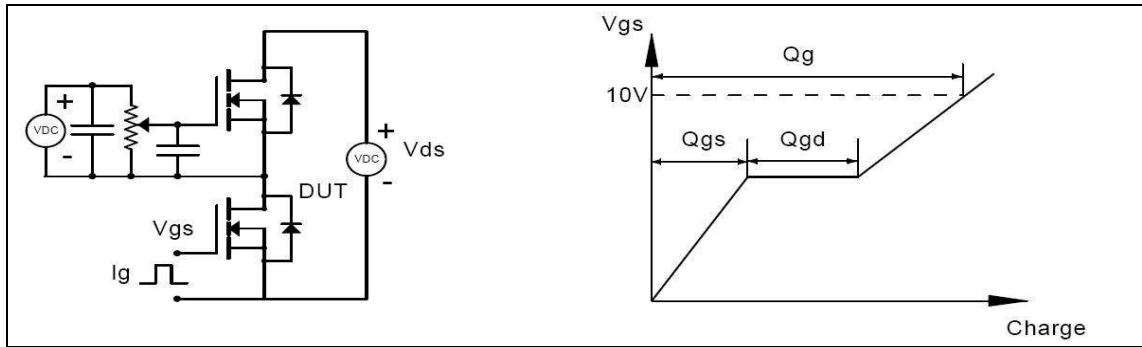


Figure 1, Gate charge test circuit & waveform

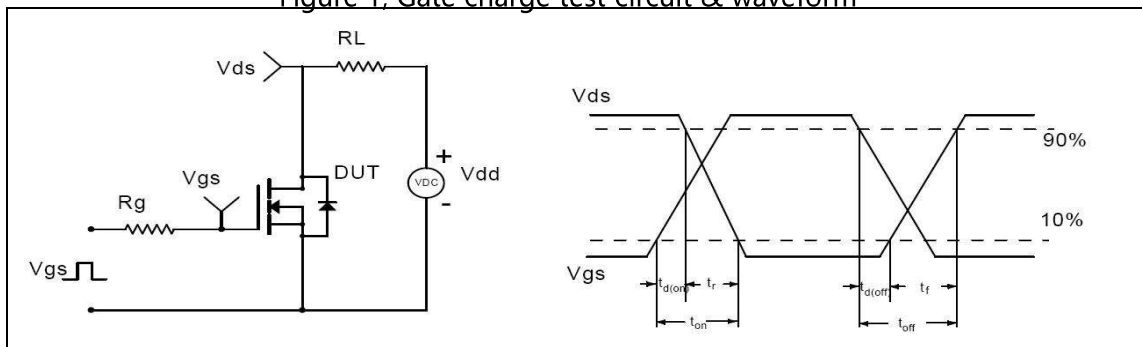


Figure 2, Switching time test circuit & waveforms

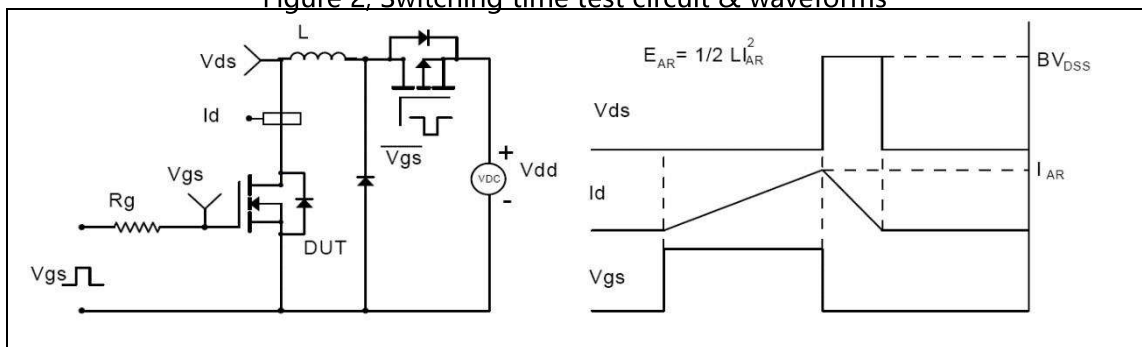


Figure 3, Unclamped inductive switching (UIS) test circuit & waveforms

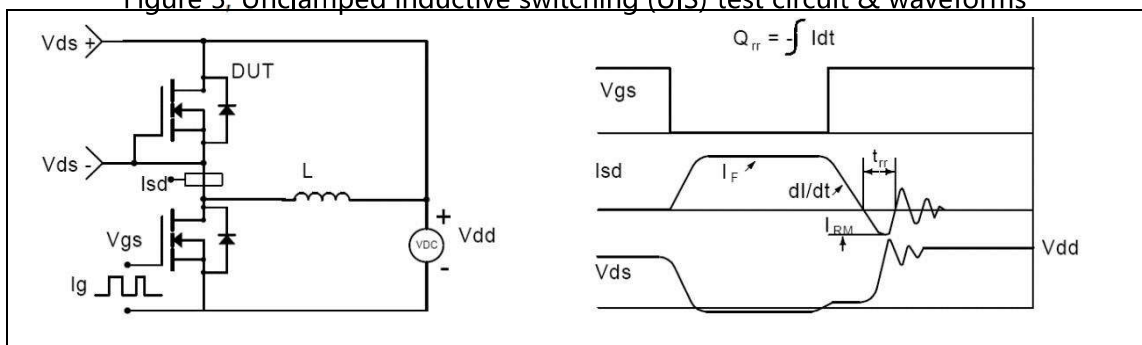
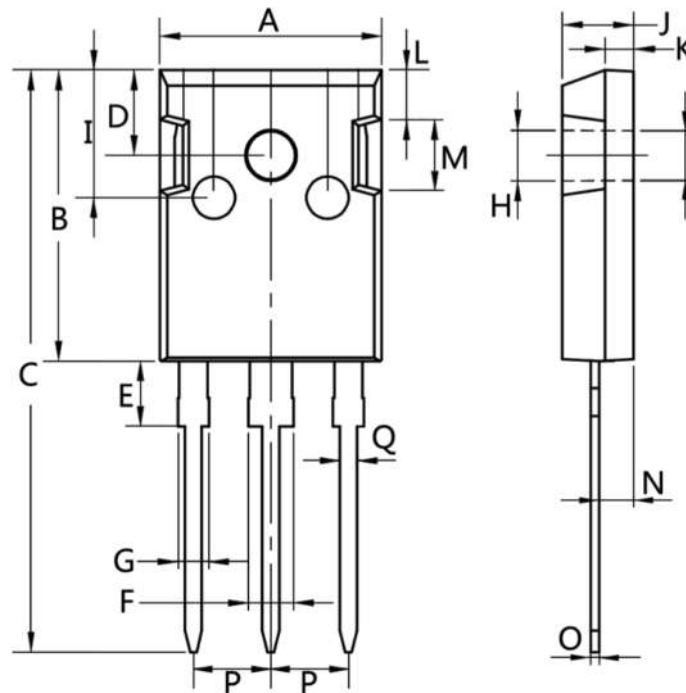


Figure 4, Diode reverse recovery test circuit & waveforms

TO-247



Dim.	Min.	Max.
A	15.0	16.0
B	20.0	21.0
C	41.0	42.0
D	5.0	6.0
E	4.0	5.0
F	2.5	3.5
G	1.75	2.5
H	3.0	3.5
I	8.0	10.0
J	4.9	5.1
K	1.9	2.1
L	3.5	4.0
M	4.75	5.25
N	2.0	3.0
O	0.55	0.75
P	Typ 5.08	
Q	1.2	1.3