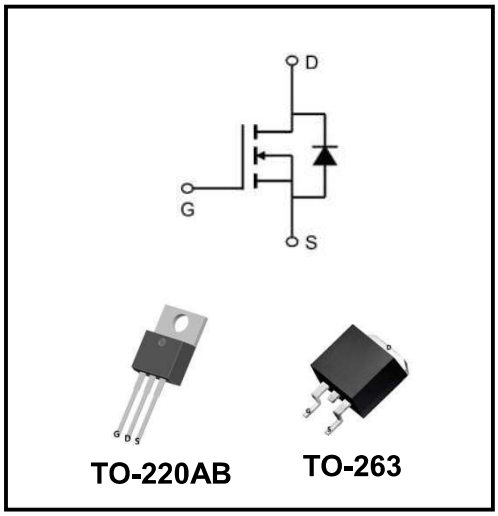
650V N-SJ ENHANCEMENT MODE MOSFET

MAIN CHARACTERISTICS

I_D	20A
V_{DSS}	650V
R_{DSON}-typ(@V_{GS}=10V)	< 0.2Ω(Type:0.16Ω)



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
YFWJ20N65AT	TO-220AB	YFW J20N65AT XXXXX	1000PCS/Box
YFWJ20N65AS	TO-263	YFW J20N65AS XXXXX	800PCS/Tape

Maximum Ratings at Tc=25°C unless otherwise specified

Characteristics	Symbols	Value	Units
Drain-Source Voltage	V_{DS}	650	V
Gate - Source Voltage	V_{GS}	±30	V
Continuous Drain Current [1] T_C=25℃	I_D	20	A
Continuous Drain Current [1] T_C=100℃		12.5	A
Pulsed Drain Current[2] T_C=25℃	$I_{DM\ (pluse)}$	60	A
Power Dissipation3) T_C=25℃	P_D	151	W
Single Pulse Avalanche Energy[5]	E_{AS}	600	mJ
Single pulsed avalanche current[5]	I_{AS}	10.9	A
Repetitive Avalanche energy	E_{AR}	0.8	mJ
Repetitive Avalanche current	I_{AR}	10.9	A
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
Operating and Storage Temperature	T_J ,T_{STG}	-55 to 150	°C
Thermal Resistance， Junction-to-Case	$R_{\theta JC}$	0.82	°C/W
Thermal Resistance, Junction –to-ambient[4]	$R_{\theta JA}$	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=250uA	BV_{DSS}	650	-	-	V
	V_{GS}=0V, I_D=250uA, T_j= 150℃		700	774		
Gate Threshold Voltage	V_{DS}= V_{GS}, I_D=250μA	$V_{GS(th)}$	2.0	-	4	V
Drain-Source On-State Resistance	V_{GS}=10V, I_D=10A	$R_{DS(ON)}$	-	0.16	0.2	Ω
	V_{GS}=10V, I_D=10A, T_j= 150℃		-	0.42	-	
Gate Source Leakage Current	V_{GS}=30V	I_{GSS}	-	-	100	nA
	V_{GS}=-30V		-	-	-100	
Drain-source leakage current	V_{DS}=650V , V_{GS}=0V	I_{DSS}	-	-	1	μA
Input Capacitance	V_{DS}=50V V_{GS}=0V f=1MHz	C_{iss}	-	1433	-	pF
Output Capacitance		C_{oss}	-	925	-	
Reverse Transfer Capacitance		C_{rss}	-	3.9	-	
Turn-on delay time	V_{DS}=520V I_D=20A R_G=25Ω V_{GS}=10V	$t_{d(on)}$	-	40.1	-	ns
Rise Time		T_r	-	49.8	-	
Turn-Off Delay Time		$t_{d(OFF)}$	-	57.3	-	
Fall Time		t_f	-	63.7	-	
Total Gate Charge	V_{DS}=520V I_D=20A V_{GS}=10V	Q_g	-	24.8	-	nC
Gate-Source Charge		Q_{gs}	-	7.2	-	
Gate-Drain Charge		Q_{gd}	-	8.2	-	
Gate plateau voltage		$V_{plateau}$	-	5.6	-	V
Diode forward current	V_{GS}<Vth	I_S	-	-	20	A
Pulsed source current		I_{SP}	-	-	60	
Diode forward voltage	V_{GS}=0V , I_S=20A	V_{SD}	-	-	1.4	V
Reverse Recovery Time	I_S=20A, V_R=400V dI_{SD}/dt=100A/μs,	t_{rr}	-	380	-	ns
Reverse Recovery Charge		Q_{rr}	-	5.3	-	nC
Peak reverse recovery current		I_{rrm}	-	25.7	-	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) 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.
5) VDD=150 V, RG=25 Ω, L=10.8 mH, starting Tj=25 °C.

Ratings and Characteristic Curves

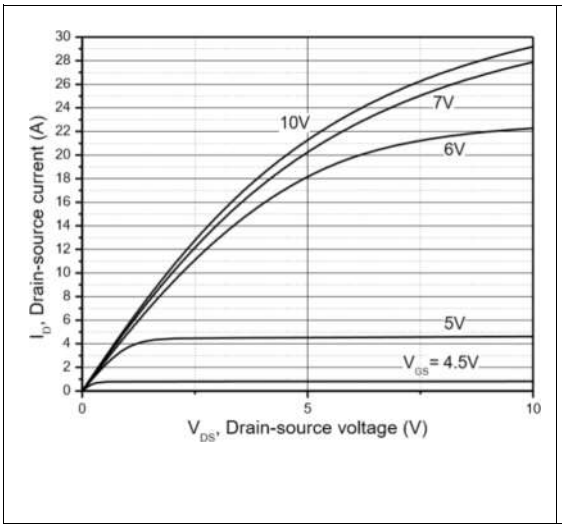


Figure 1, Typ. output characteristics

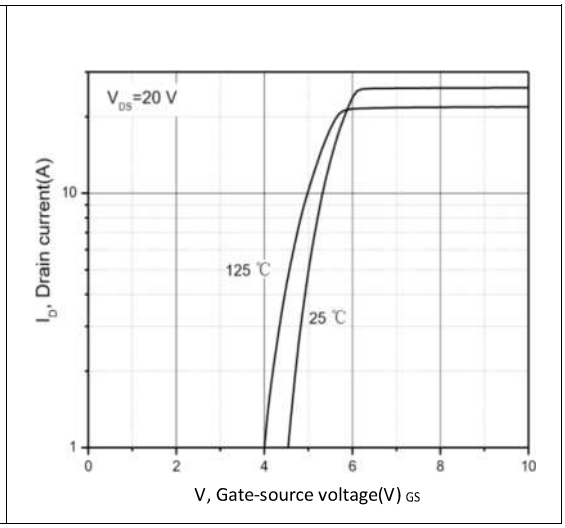


Figure 2, Typ. transfer characteristics

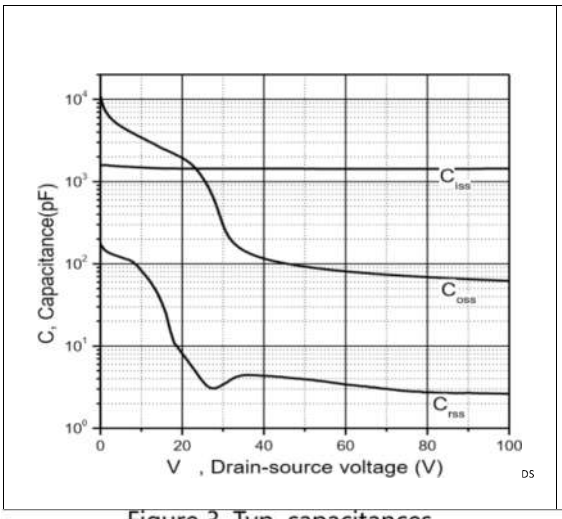


Figure 3, Typ. capacitances

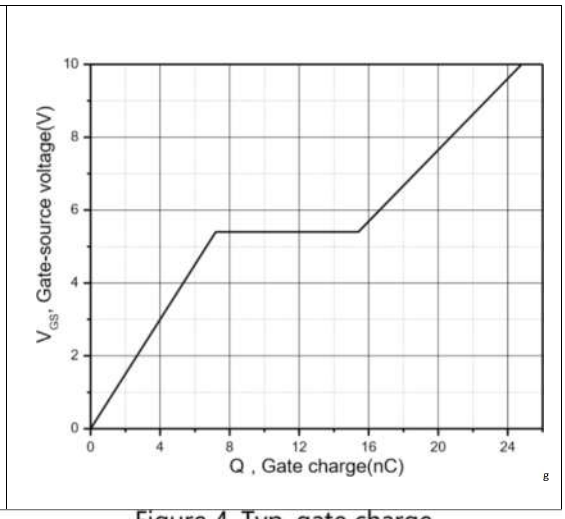


Figure 4, Typ. gate charge

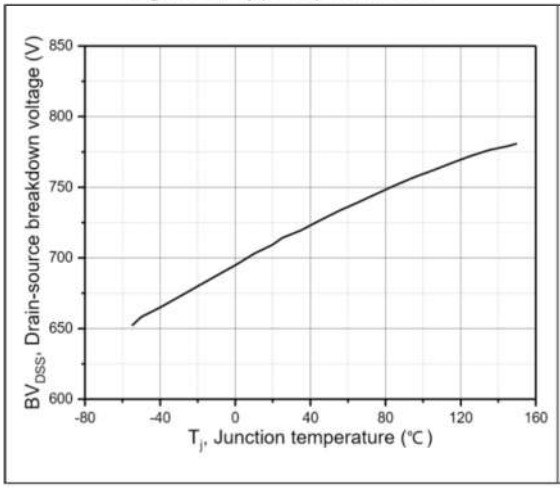


Figure 5, Drain-source breakdown voltage

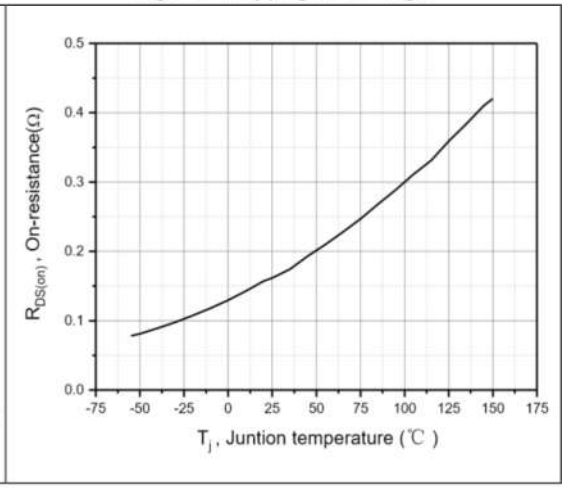


Figure 6, Drain-source on-state resistance

Ratings and Characteristic Curves

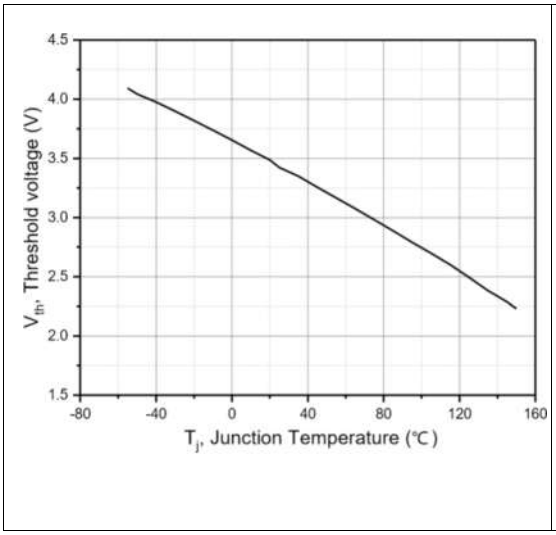


Figure 7, Threshold voltage

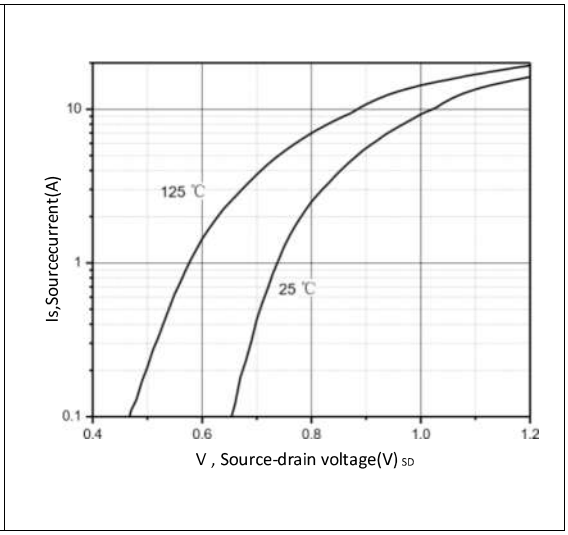


Figure 8, Forward characteristic of body diode

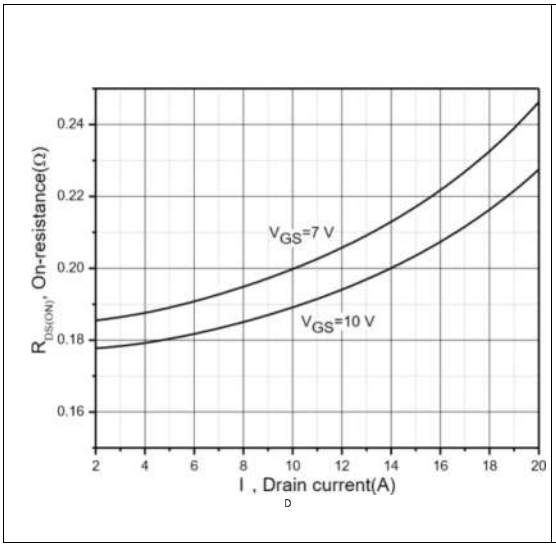


Figure 9, Drain-source on-state resistance

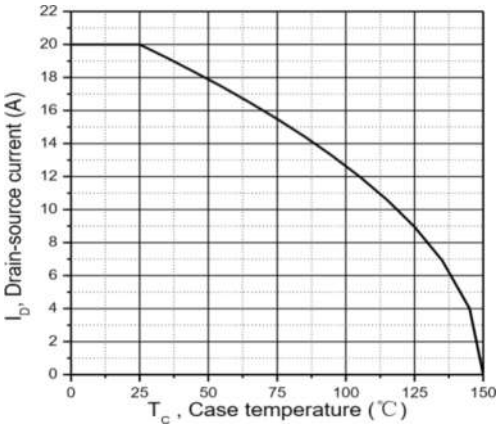


Figure 10, Drain current

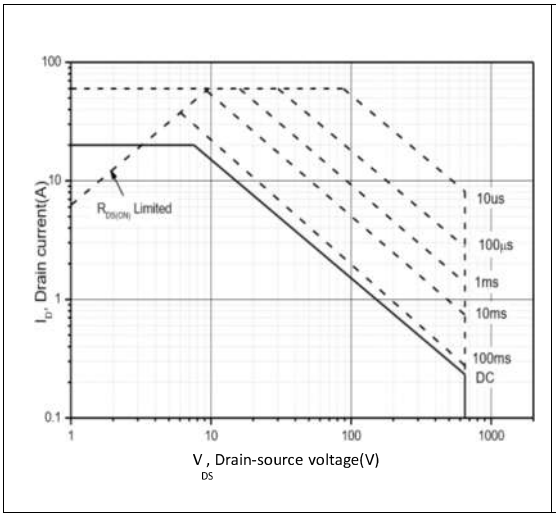


Figure 11, Safe operation area for

Test circuits and waveforms

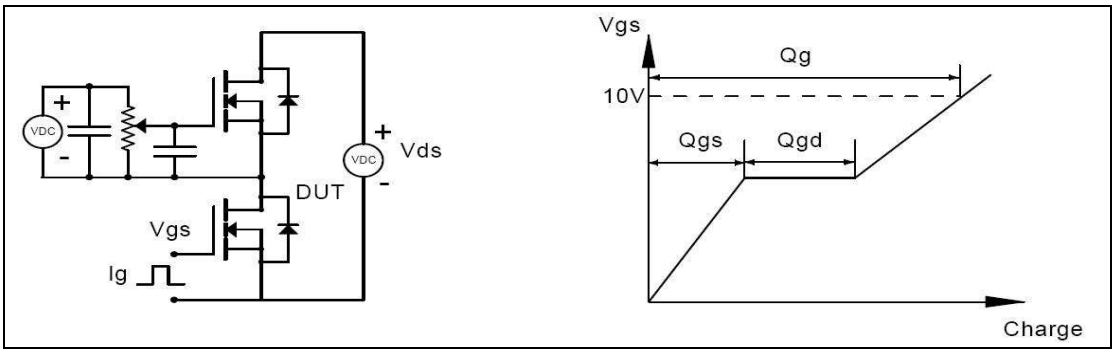


Figure 1, Gate charge test circuit & waveform

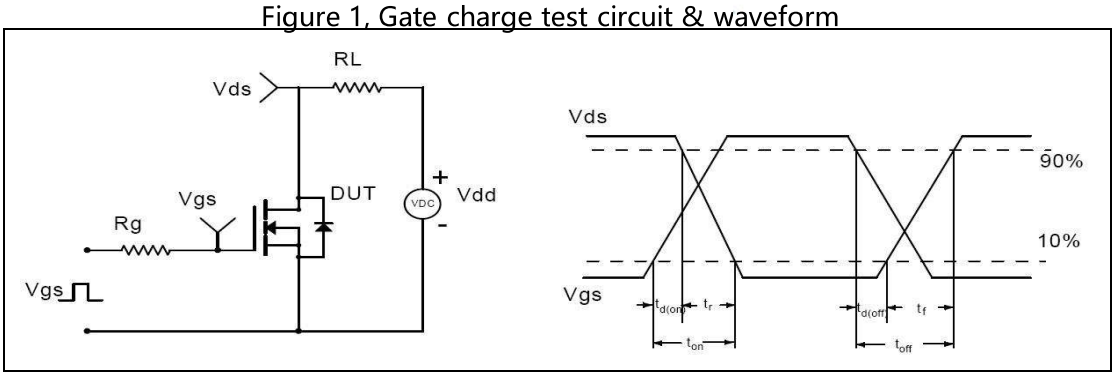


Figure 2, Switching time test circuit & waveforms

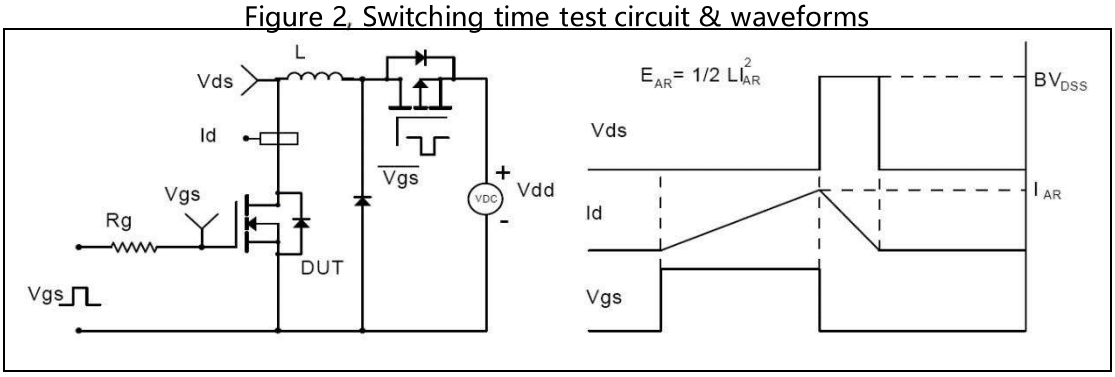


Figure 3, Unclamped inductive switching (UIS) test circuit & waveforms

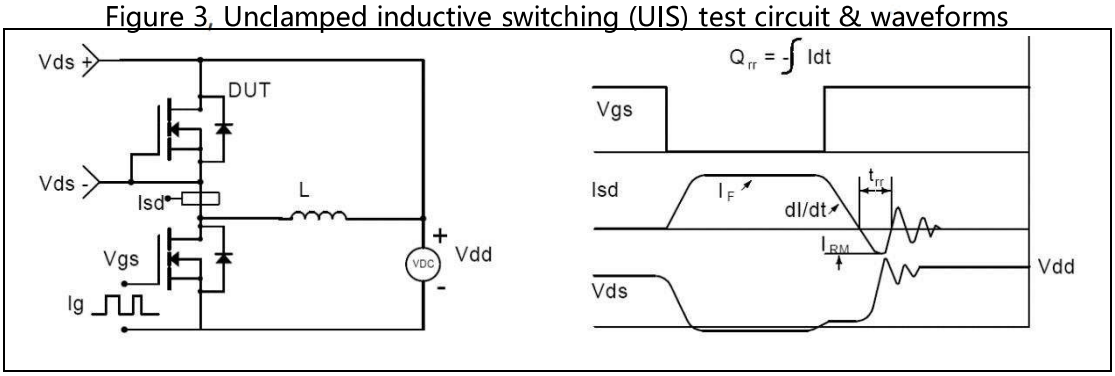
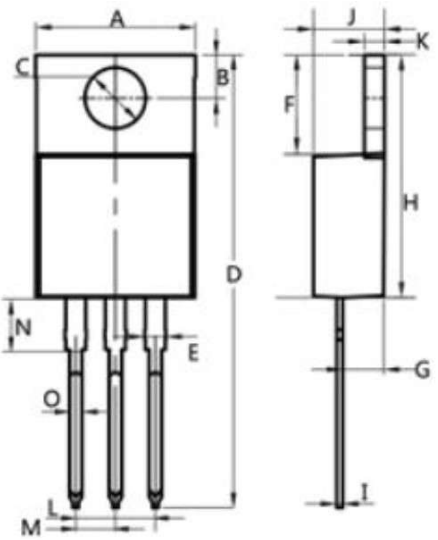


Figure 4, Diode reverse recovery test circuit & waveforms

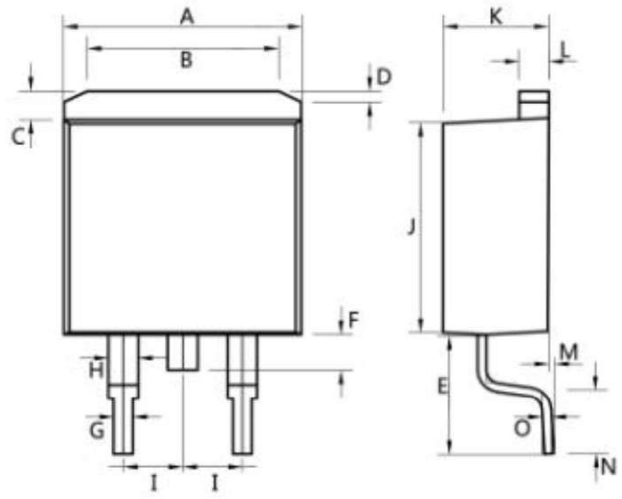
Package Outline Dimensions Millimeters

TO-220AB



Dim.	Min.	Max.
A	10.15	10.35
B	2.65	2.95
C	3.70	3.90
D	28.5	29.5
E	1.30	1.45
F	6.35	6.55
G	2.9	3.3
H	15.0	16.0
I	0.38	0.42
J	4.45	4.55
K	1.25	1.35
L	Typ 5.08	
M	Typ 2.54	
N	3.1	3.3
O	0.76	0.84
All Dimensions in millimeter		

TO-263



Dim.	Min.	Max.
A	10.1	10.2
B	7.4	7.6
C	1.3	1.5
D	0.55	0.75
E	5.0	6.0
F	1.4	1.6
G	0.78	0.86
H	1.2	1.3
I	Typ2.54	
J	8.4	8.6
K	4.45	4.55
L	1.25	1.35
M	0.02	0.1
N	2.4	2.8
O	0.36	0.40
All Dimensions in millimeter		