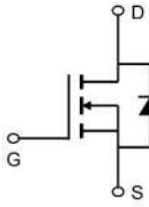
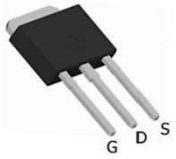
650V N-SJ ENHANCEMENT MODE MOSFET

MAIN CHARACTERISTICS

I_D	4A
V_{DSS}	650V
R_{DSON}-typ(@V_{GS}=10V)	< 1100mΩ(Type:950mΩ)





TO-251 TO-252

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
YFWJ4N65AD	TO-252	YFW J4N65AD XXXXX	2500PCS/Tape
YFWJ4N65AMJ	TO-251	YFW J4N65AMJ XXXXX	4000PCS/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 at T_C=25℃	$I_{D(DC)}$	4	A
Continuous Drain Current at T_C=100℃		2.5	A
Pulsed Drain Current(Note1)	$I_{DM\ (pluse)}$	16	A
Power Dissipation T_C=25℃	P_D	41	W
Single Pulse Avalanche Energy (Note2)	E_{AS}	27	mJ
Avalanche current(Note 1)	I_{AR}	0.7	A
Repetitive Avalanche energy tAR limited by Tjmax (Note 1)	E_{AR}	0.1	mJ
Drain Source voltage slope, V_{DS} ≤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 Junction and Storage Temperature Range	T_J ,T_{STG}	-55 to 150	°C
Thermal Resistance， Junction-to-Case （Maximum）	$R_{\theta JC}$	3.0	°C/W
Thermal Resistance, Junction –to-ambient（Maximum）	$R_{\theta JA}$	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
Zero Gate Voltage Drain Current	V_{DS}=650V , V_{GS}=0V , T_C= 25℃	I_{DSS}	-	-	1	μA
	V_{DS}=650V , V_{GS}=0V ,T_C= 125℃		-	-	50	
Gate to Body Leakage Current	V_{GS}=±20V	I_{GSS}	-	-	±100	nA
Gate Threshold Voltage	V_{DS}= V_{GS}, I_D=250μA	$V_{GS(th)}$	3	-	4	V
Drain-Source On-State Resistance	V_{GS}=10V, I_D=2A	$R_{DS(ON)}$	-	950	1100	mΩ
Input Capacitance	V_{DS}=50V V_{GS}=0V f=1MHz	C_{iss}	-	304	-	pF
Output Capacitance		C_{oss}	-	18	-	
Reverse Transfer Capacitance		C_{rss}	-	0.6	-	
Total Gate Charge	V_{DS}=480V I_D=4A V_{GS}=10V	Q_g	-	8.8	1.2	nC
Gate-Source Charge		Q_{gs}	-	2.3	-	
Gate-Drain Charge		Q_{gd}	-	4	-	
Turn-on delay time	V_{DD}=380V I_D=2.5A R_G=5Ω V_{GS}=10V	$t_{d(on)}$	-	8	-	ns
Turn-on Rise Time		T_r	-	4	-	
Turn-Off Delay Time		$t_{d(OFF)}$	-	52	70	
Turn-on Fall Time		t_f	-	9	18	
Source-drain current(Body Diode)	T_C= 25℃	I_{SD}	-	-	4	A
Pulsed Source-drain current(Body Diode)		I_{SDM}	-	-	16	A
Forward On Voltage	V_{GS}=0V , I_{SD}=4A , T_J= 25℃	V_{SD}	-	0.9	1.2	V
Reverse Recovery Time	I_F=2A, dI_{SD}/dt=100A/μs, T_J= 25℃	t_{rr}	-	200	-	ns
Reverse Recovery Charge		Q_{rr}	-	0.6	-	nC
Peak reverse recovery current		I_{rrm}	-	6	-	A

Ratings and Characteristic Curves

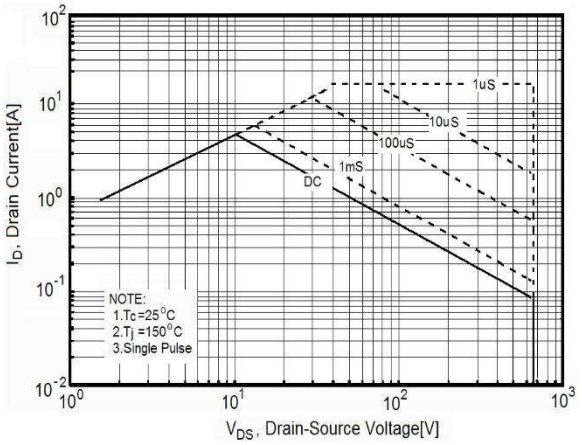


Figure1. Safe operating area

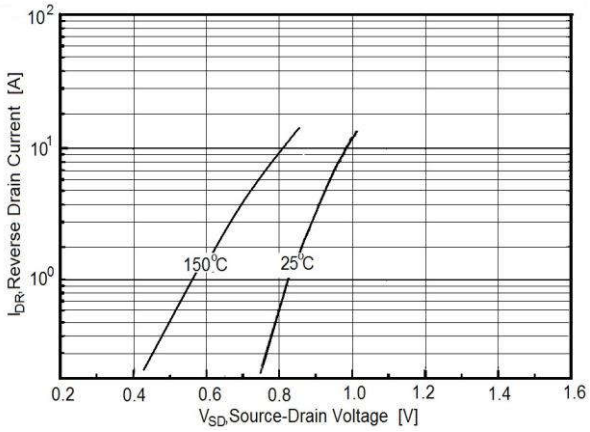


Figure2. Source-Drain Diode Forward Voltage

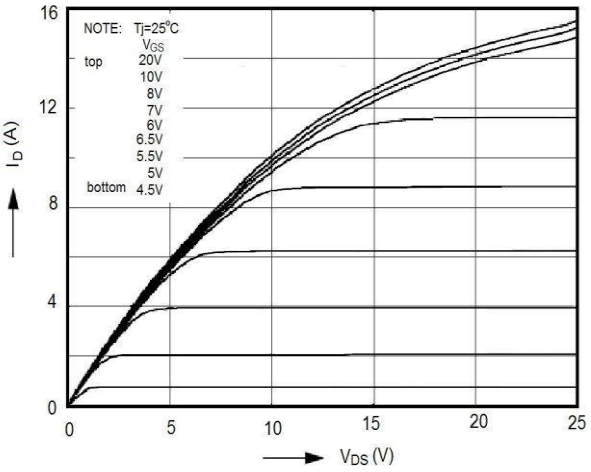


Figure3. Output characteristics

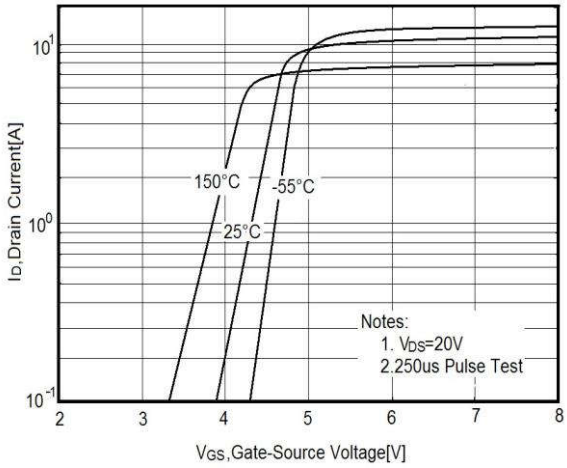


Figure4. Transfer characteristics

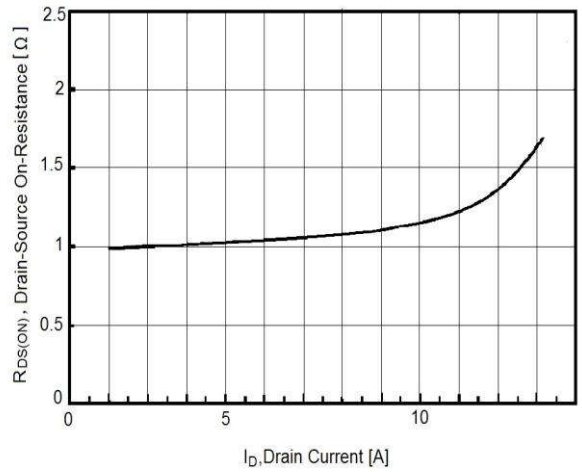


Figure5. Static drain-source on resistance

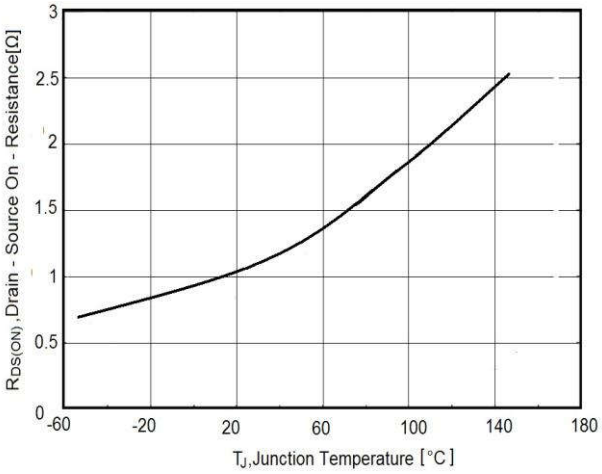


Figure6. RDS(ON) vs Junction Temperature

Ratings and Characteristic Curves

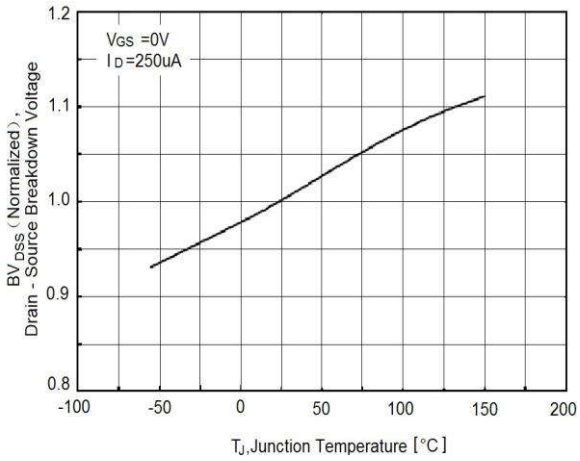


Figure7. BV_{DSS} vs Junction Temperature

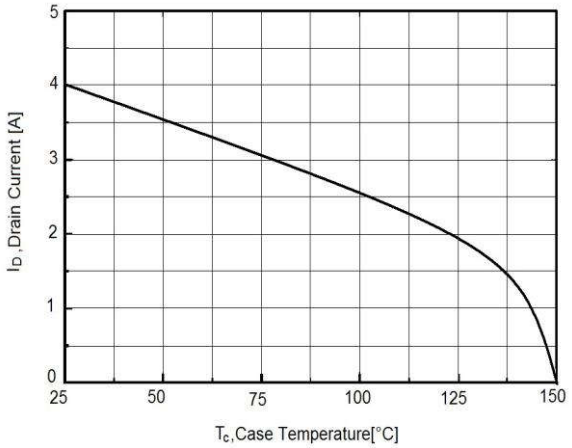


Figure8. Maximum I_D vs Junction Temperature

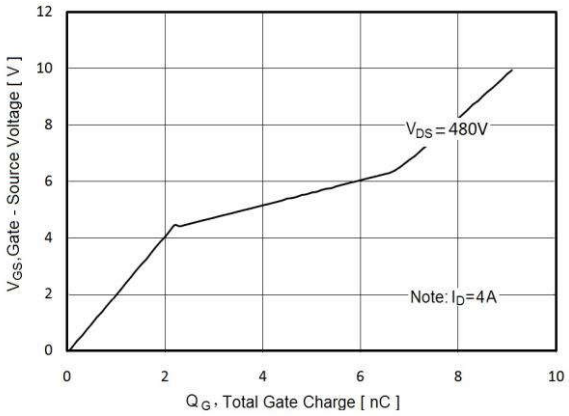


Figure9. Gate charge waveforms

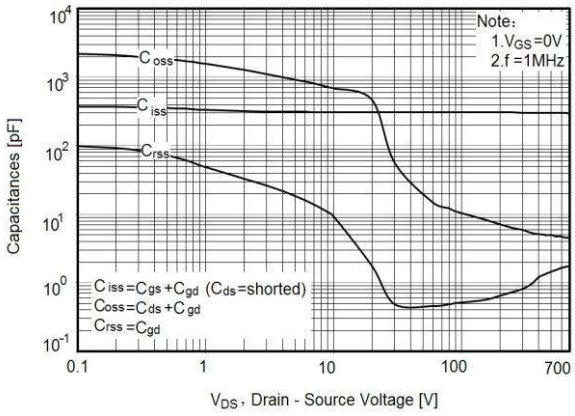


Figure10. Capacitance

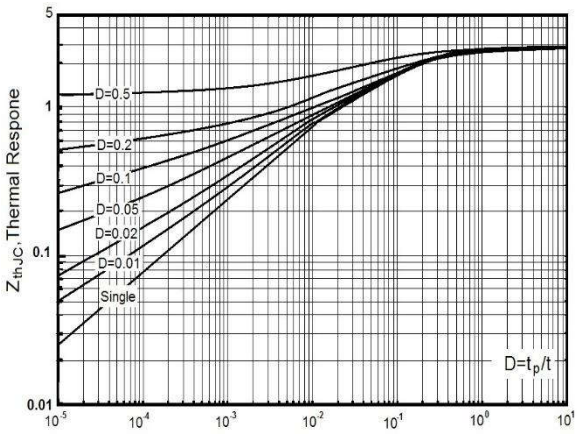


Figure11. Transient Thermal Impedance

Ratings and Characteristic Curves

Test circuits and waveforms

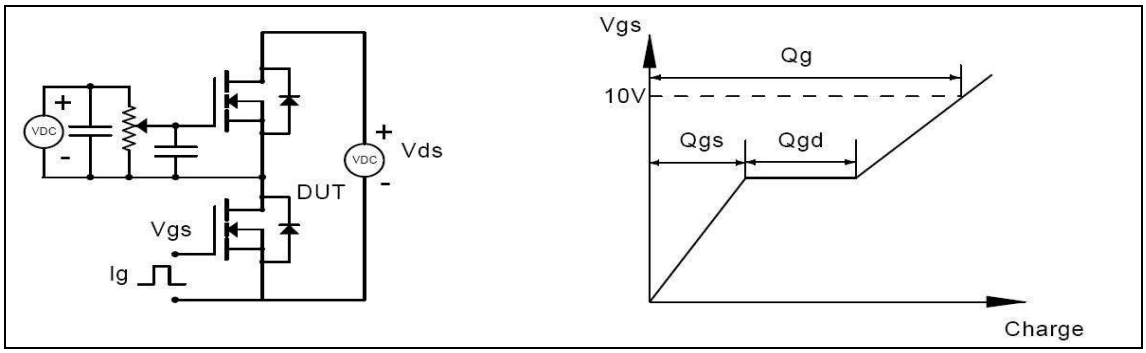


Figure 1, Gate charge test circuit & waveform

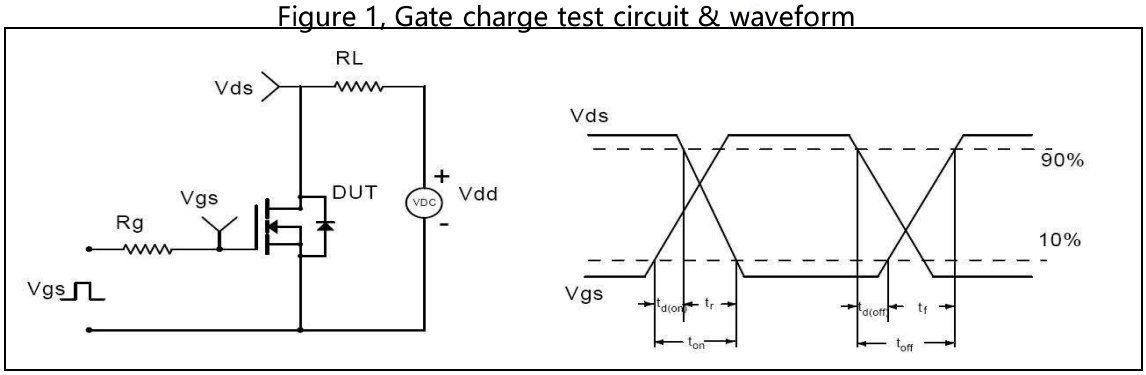


Figure 2, Switching time test circuit & waveforms

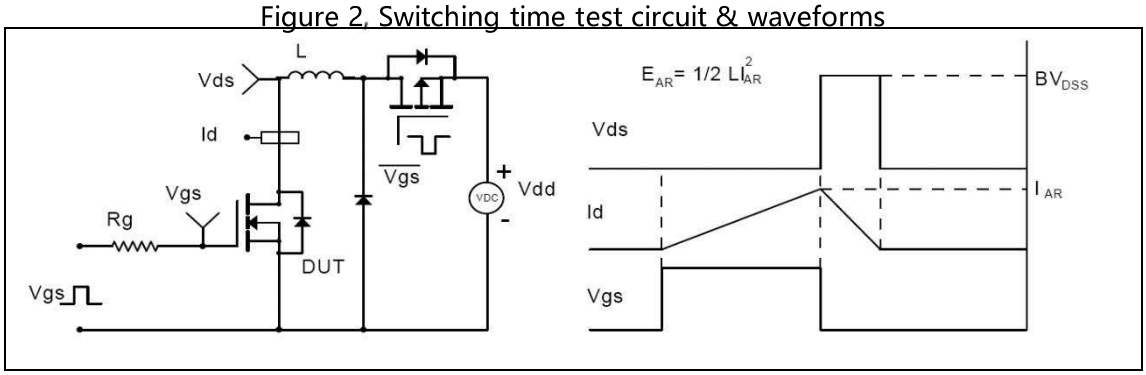


Figure 3, Unclamped inductive switching (UIS) test circuit & waveforms

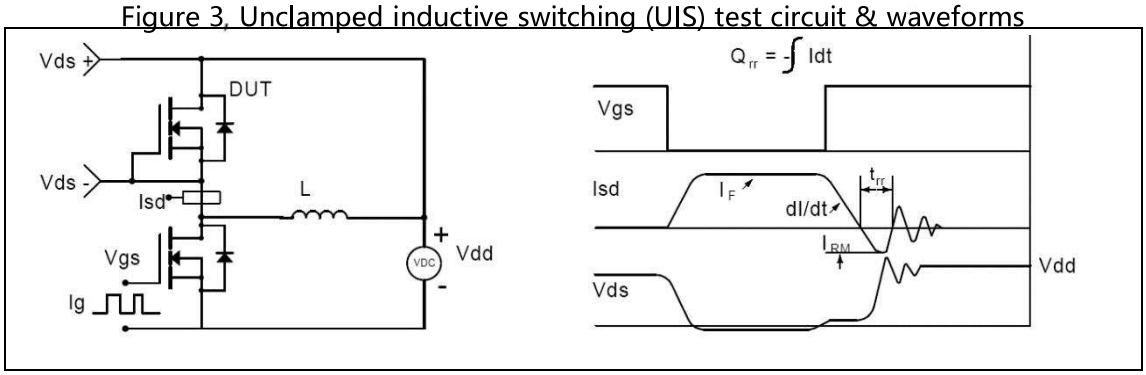


Figure 4, Diode reverse recovery test circuit & waveforms

Package Outline Dimensions Millimeters

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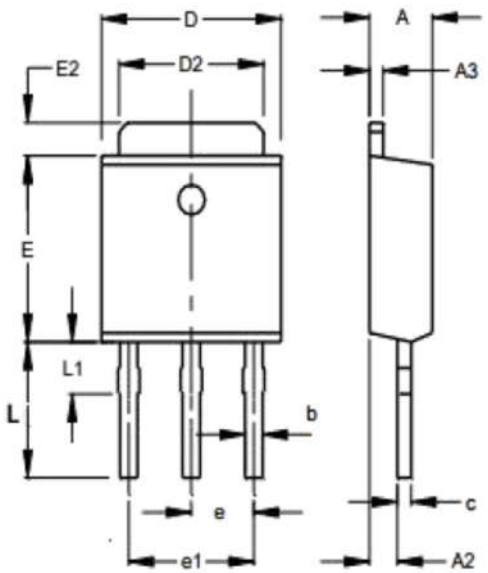

Dim.	Min.	Max.
A	2.2	2.4
A2	0.95	1.15
A3	0.45	0.65
b	0.65	0.85
c	0.45	0.55
D	6.45	6.75
D2	5.2	5.4
E	5.8	6
E2	0.95	1.25
e	Typ 2.3	
e1	Typ 4.6	
L	4	4.2
L1	1.2	1.5

All Dimensions in millimeter

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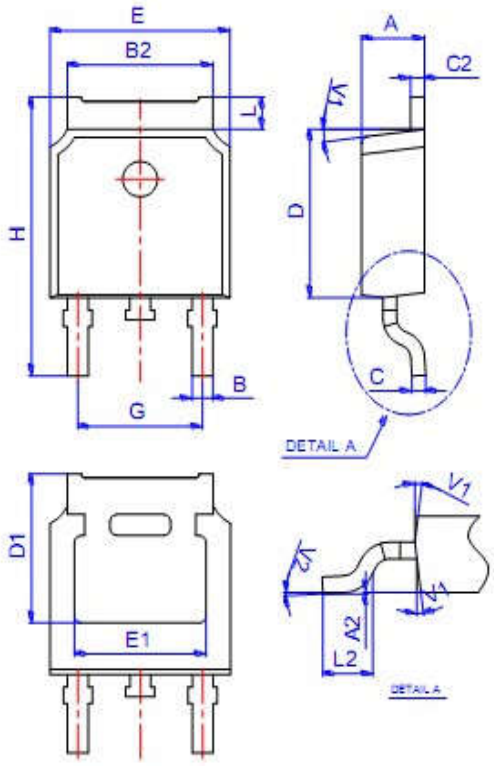

Dim.	Min.	Typ.	Max.
A	2.10	-	2.50
A2	0	-	0.10
B	0.66	-	0.86
B2	5.18	-	5.48
C	0.40	-	0.60
C2	0.44	-	0.58
D	5.90	-	6.30
D1	5.30REF		
E	6.40	-	6.80
E1	4.63	-	-
G	4.47	-	4.67
H	9.50	-	10.70
L	1.09	-	1.21
L2	1.35	-	1.65
V1	-	7°	-
V2	0°	-	6°

All Dimensions in millimeter