

650V N-channel Super Junction MOSFET

MAIN CHARACTERISTICS

I_D	11A
V_{DS}	650V
$R_{DS(on)-typ}(@V_{GS}=10V)$	$<390m\Omega$ (Typ: 340mΩ)

FEATURES

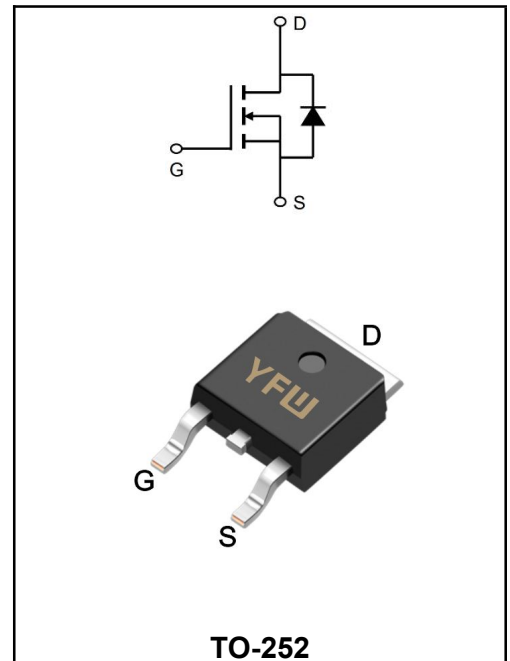
- ♦ Ultra low $R_{DS(on)}$
- ♦ Ultra low gate charge
- ♦ 100% UIS tested

APPLICATION

- ♦ Switch Mode Power Supply(SMPS)
- ♦ Uninterruptible Power Supply(UPS)
- ♦ Power Factor Correction(PFC)

MECHANICAL DATA

- ♦ Case: TO-252/AD
- ♦ Mounting Position: Any
- ♦ Molded Plastic: UL Flammability Classification Rating 94V-0
- ♦ Lead free in compliance with EU RoHS 2011/65/EU directive
- ♦ Solder bath temperature 275°C maximum, 10s per JESD 22-B106



Maximum Ratings at $T_c=25^\circ\text{C}$ unless otherwise specified

Characteristics	Symbols	Value	Units
Drain-Source Voltage	V_{DS}	650	V
Gate - Source Voltage	V_{GS}	± 30	V
Continuous Drain Current	I_D	11	A
Pulsed Drain Current(note1)	I_{DM}	44	A
Power Dissipation	P_D	30	W
Single Pulse Avalanche Energy(note1)	E_{AS}	270	mJ
Operating Temperature Range	T_J	-50 to +150	$^\circ\text{C}$
Storage Temperature Range	T_{STG}	-50 to +150	$^\circ\text{C}$
Thermal Resistance, Junction-to-case	$R_{\theta JC}$	4.2	$^\circ\text{C/W}$
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	62	$^\circ\text{C/W}$

Note1: Pulse test: 300 μs pulse width, 2 % duty cycle

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}	650	-	-	V
Drain-Source Leakage Current	$V_{DS}=650V, V_{GS}=0V$	I_{DSS}	-	-	1	μA
Gate-Source Leakage	$V_{GS}=\pm 30V, V_{DS}=0V$	I_{GSS}	-	-	± 100	nA
Gate- Source Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	$V_{GS(th)}$	2.5	-	4.5	V
Drain-Source On State Resistance	$V_{GS}=10V, I_D=5.5A$	$R_{DS(ON)}$	-	340	390	m Ω
Input Capacitance	$V_{DS}=100V$ $V_{GS}=0V$ $f=250KHz$	C_{iss}	-	900	-	pF
Output Capacitance		C_{oss}	-	37.4	-	
Reverse Transfer Capacitance		C_{rss}	-	0.46	-	
Turn-on delay time(note2)	$V_{DD}=400V$ $I_D=5.5A$ $V_{GS}=10V$ $R_G=10\Omega$	$t_{d(on)}$	-	46.8	-	nS
Rise Time(note2)		T_r	-	10.6	-	
Turn-Off Delay Time(note2)		$t_{d(OFF)}$	-	40.2	-	
Fall Time(note2)		t_f	-	7	-	
Total Gate Charge(note2)	$V_{DS}=520V$ $I_D=5.5A$ $V_{GS}=10V$	Q_g	-	4.6	-	nC
Gate-Source Charge(note2)		Q_{gs}	-	8.5	-	
Gate-Drain Charge(note2)		Q_{gd}	-	20.6	-	
Maximun Body-Diode Continuous Current		I_S	-	-	11	A
Maximun Body-Diode Pulsed Current(Note2)		I_{SM}	-	-	44	A
Drain-Source Diode Forward Voltage	$V_{GS}=0V, I_S=5.5A, T_J=25^\circ C$	V_{SD}	-	-	1.2	V
Body Diode Reverse Recovery Time	$V_R=400V, I_F=5.5A,$ $dI/dt=100A/\mu s$	t_{rr}	-	240	-	nS
Body Diode Reverse Recovery Charge		Q_{rr}	-	1962	-	μC

Note2:Pulse test: 300 μs pulse width, 2 % duty cycle

Ratings and Characteristic Curves

Fig 1: Output Characteristics

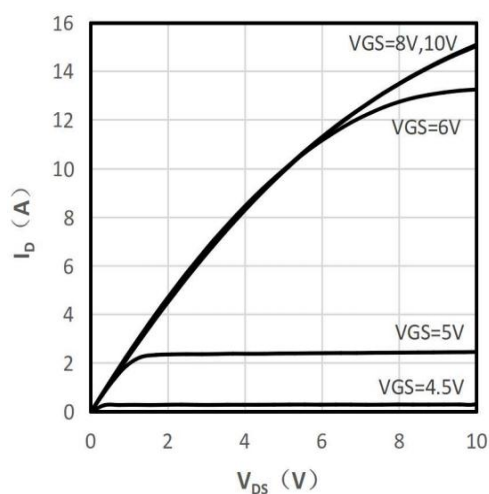


Fig 2: Transfer Characteristics

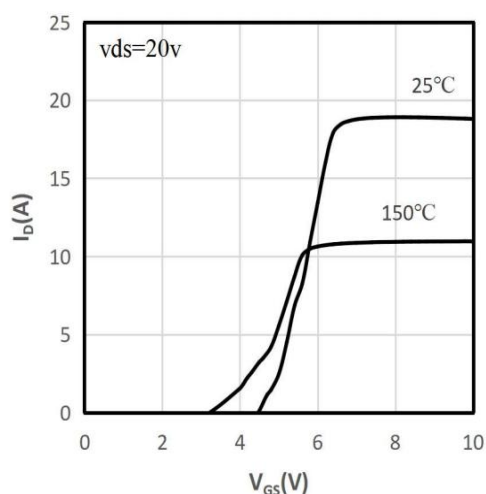


Fig 3: $R_{DS(on)}$ vs Drain Current and Gate Voltage

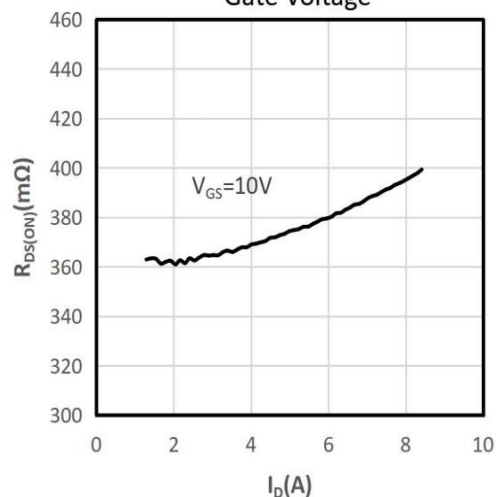


Fig 4: $R_{DS(on)}$ vs. Temperature

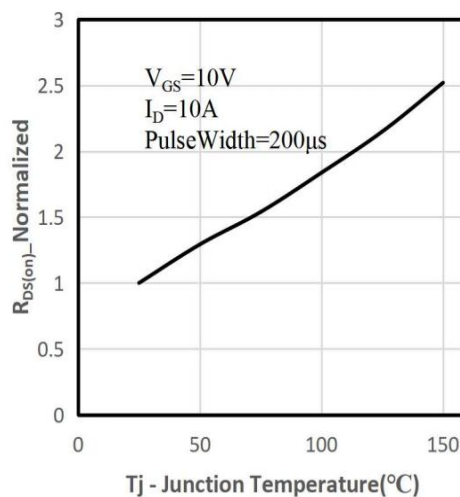


Fig 5: Breakdown Voltage vs. Temperature

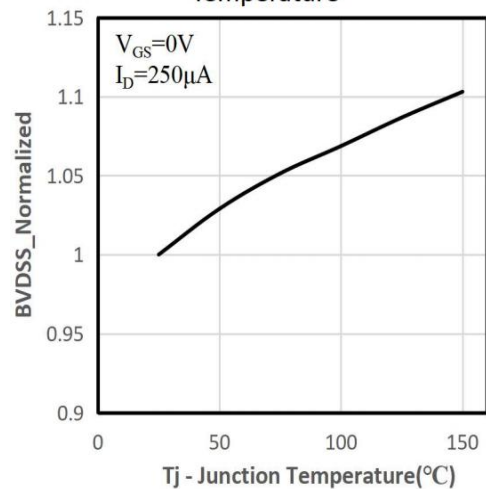
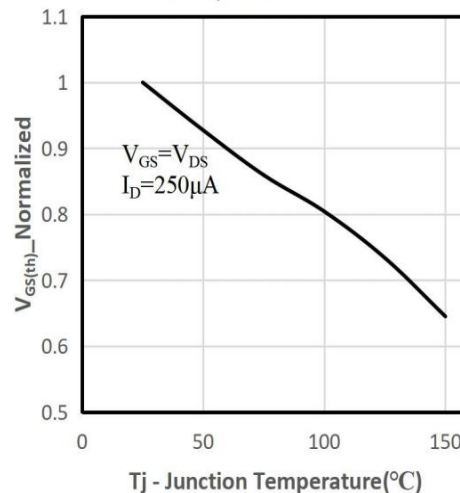


Fig 6: Threshold voltage vs. Temperature



Ratings and Characteristic Curves

Fig 7: Body-Diode Characteristics

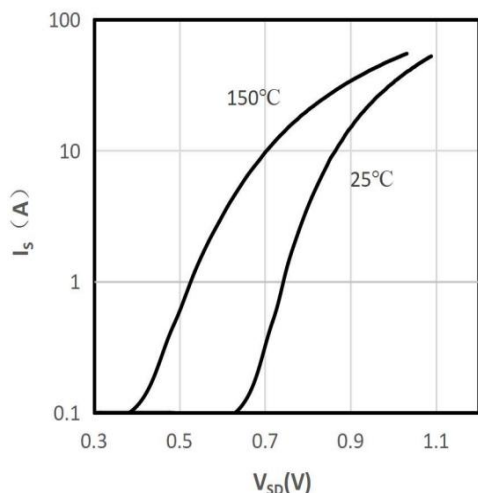


Fig 8: Capacitance Characteristics

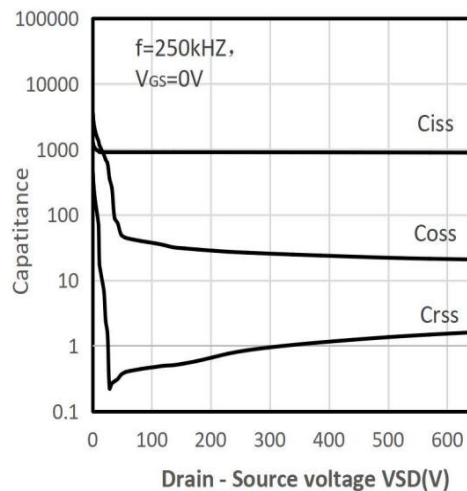


Fig 9: Gate Quantity of electric charge vs. Gate Voltage

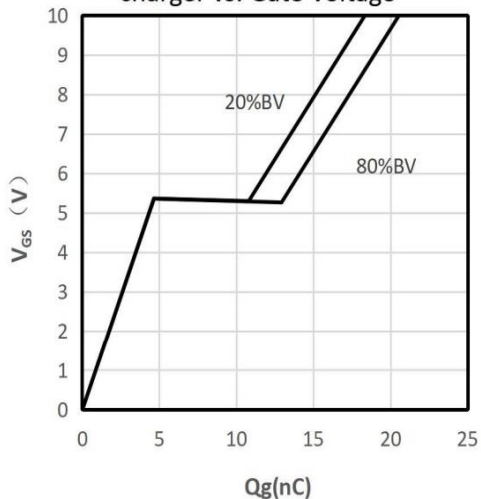


Fig 10: Drain Current Derating

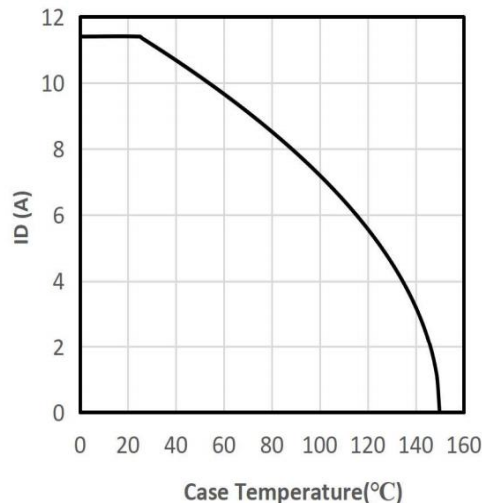


Fig 11: Power Dissipation vs. Temperature

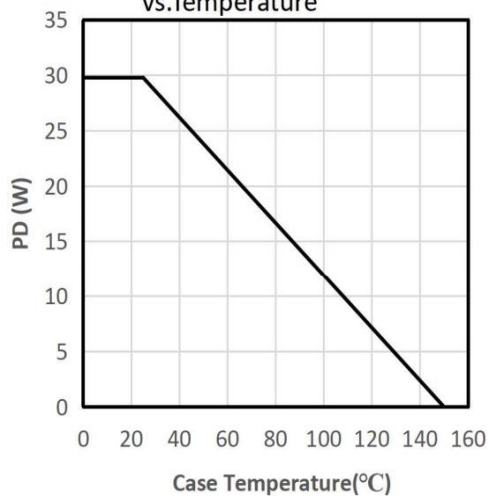
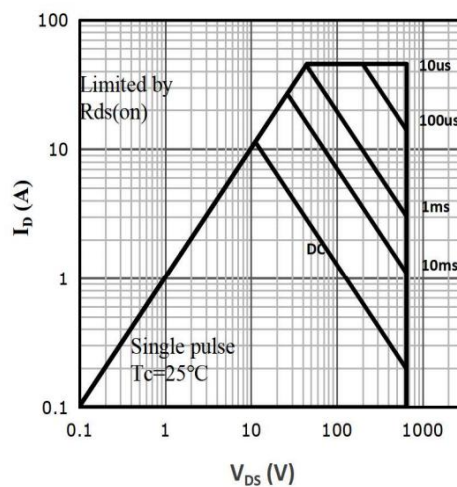
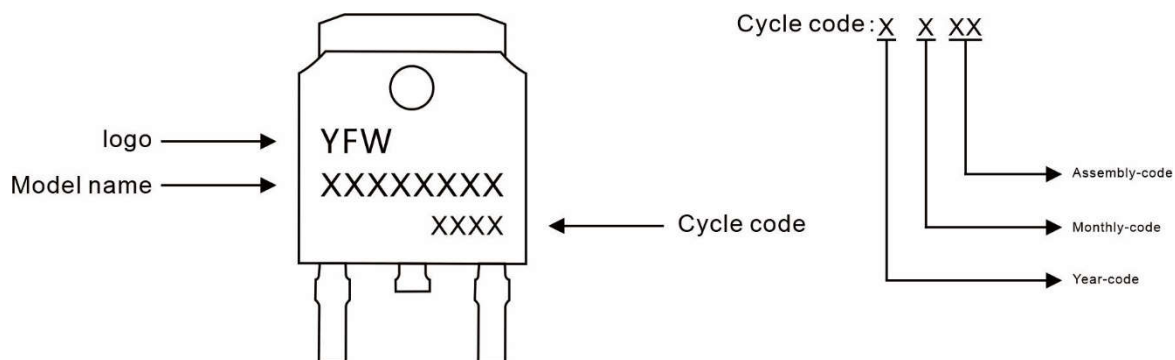


Fig 12: Safe Operating Area



Marking Diagram



Ordering information

Model name	Package	Unit Weight	Base Quantity	Packing Quantity
YFW65R380AD	TO-252	0.011oz(0.32g)	2500pcs/reel	5000pcs/box 25000pcs/Carton

Package Dimensions

TO-252

Dim	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	2.20	2.50	0.087	0.098
A1	0.00	0.12	0.000	0.005
A2	2.20	2.40	0.087	0.094
B	1.20	1.60	0.047	0.063
b	0.50	0.70	0.020	0.028
b1	0.70	0.90	0.028	0.035
c	0.40	0.60	0.016	0.024
c1	0.40	0.60	0.016	0.024
D	6.35	6.65	0.250	0.262
D1	5.20	5.40	0.205	0.213
E	5.40	5.70	0.213	0.224
e	2.20	2.40	0.087	0.094
e1	4.40	4.80	0.173	0.189
L	10.00	11.00	0.393	0.433
L1	2.70	3.10	0.106	0.122
L2	1.40	1.80	0.055	0.071
L3	0.90	1.50	0.035	0.059

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