

650V N-channel Super Junction MOSFET

MAIN CHARACTERISTICS

I_D	4A
V_{DSS}	650V
R_{DS(on)-typ}(@V_{GS}=10V)	<1000mΩ(Type:800mΩ)

FEATURES

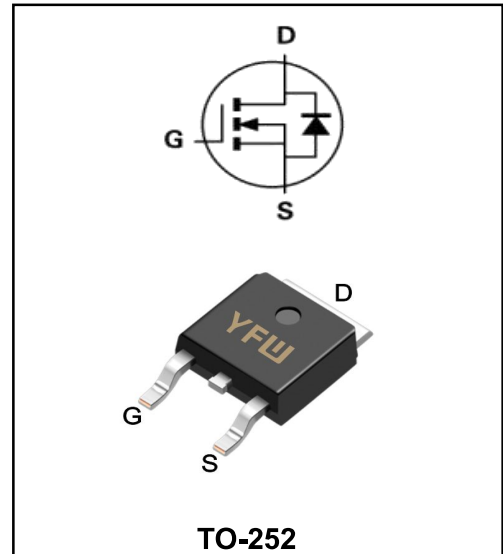
Adopt advanced trench technology to provide excellent R_{dson}, low gate charge and operation with gate voltages as low as 4.5V. This device is suitable for use as a Battery protection or in other Switching application.

APPLICATIONS

- Solar inverters
- LCD/LED/PDP TV
- Telecom/Server Power supplies
- AC-DC Power Supply

MECHANICAL DATA

- Case: Molded plastic
- 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 Tc=25°C unless otherwise specified

Characteristics	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	650	V
Gate-Source Voltage	V_{GS}	± 30	V
Continue Drain Current	I_D	4	A
Pulsed Drain Current (Note1)	I_{DM}	20	A
Power Dissipation	P_D	56	W
Single Pulse Avalanche Energy (Note1)	E_{AS}	27	mJ
Operating Temperature Range	T_J	150	°C
Storage Temperature Range	T_{STG}	-55 to +150	°C
Thermal Resistance, Junction to Case	$R_{\theta JC}$	2.2	°C/W
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	55	°C/W

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

Electrical Characteristics at Tc=25°C unless otherwise specified

Characteristics	Test Condition	Symbol	Min	Typ	Max	Unit
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 Leakage Current	$V_{GS} = \pm 30V, V_{DS} = 0V$	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	$V_{GS} = 10V, I_D = 2A$	$R_{DS(on)}$	-	800	1000	m Ω
Gate Resistance	$V_{GS} = 0V, f = 1.0MHz$	R_g	-	8.5	-	Ω
Input Capacitance	$V_{DS} = 100V, V_{GS} = 0V, f = 1MHz$	C_{iss}	-	295	-	pF
Output Capacitance		C_{oss}	-	15	-	pF
Reverse Transfer Capacitance		C_{rss}	-	0.5	-	pF
Turn-on Delay Time(Note2)	$V_{DD} = 400V, I_D = 2A, V_{GS} = 10V, R_G = 25\Omega$	$t_{d(ON)}$	-	9.5	-	ns
Rise Time(Note2)		t_r	-	22	-	ns
Turn-Off Delay Time(Note2)		$t_{d(OFF)}$	-	35	-	ns
Fall Time(Note2)		t_f	-	25	-	ns
Total Gate Charge(Note2)	$V_{DS} = 520V, V_{GS} = 10V, I_D = 2A$	Q_G	-	9.2	-	nC
Gate to Source Charge(Note2)		Q_{GS}	-	2.1	-	nC
Gate to Drain Charge(Note2)		Q_{GD}	-	4	-	nC

Source-Drain Diode Characteristics at Ta=25°C unless otherwise specified

Characteristics	Test Condition	Symbol	Min.	Typ.	Max.	Unit
Maximun Body-Diode Continuous Current		I_S	-	-	4	A
Maximun Body-Diode Pulsed Current(Note2)		I_{SM}	-	-	20	A
Drain-Source Diode Forward Voltage	$V_{GS} = 0V, I_S = 1A, T_J = 25^\circ C$	V_{SD}	-	-	1.2	V

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

RATINGS AND CHARACTERISTIC CURVES

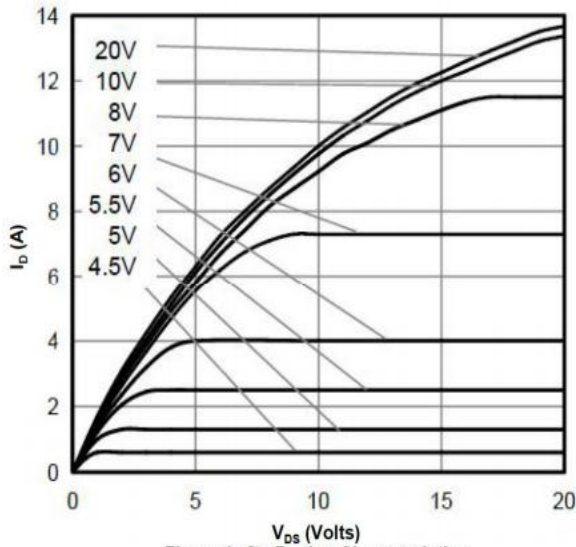


Figure 1: On-Region Characteristics

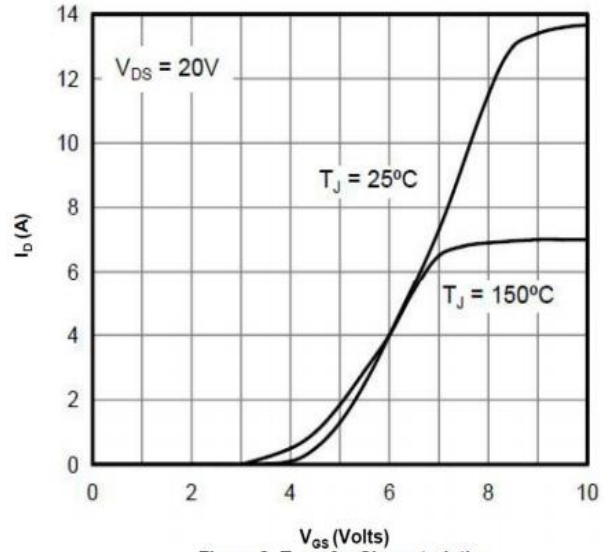


Figure 2: Transfer Characteristics

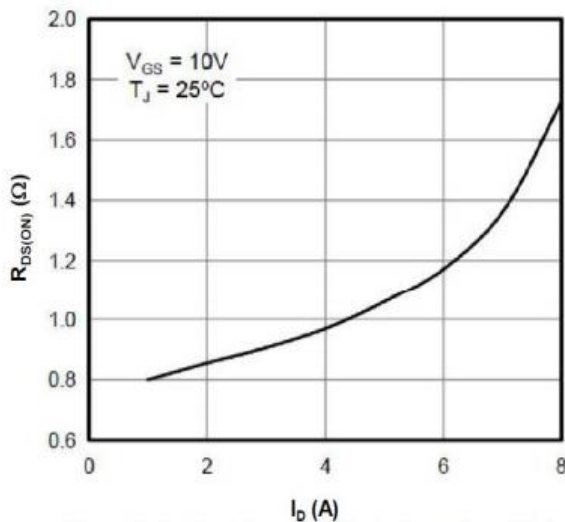


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

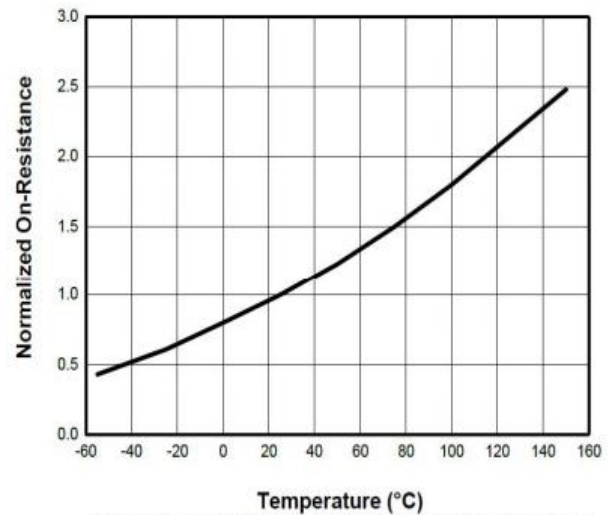


Figure 4: On-Resistance vs. Junction Temperature

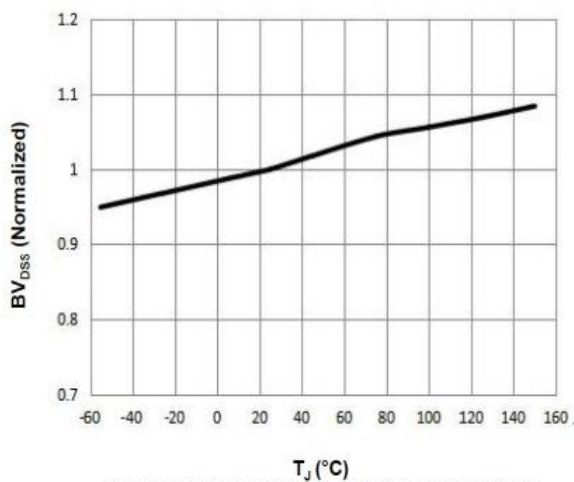


Figure 5: Break Down vs. Junction Temperature

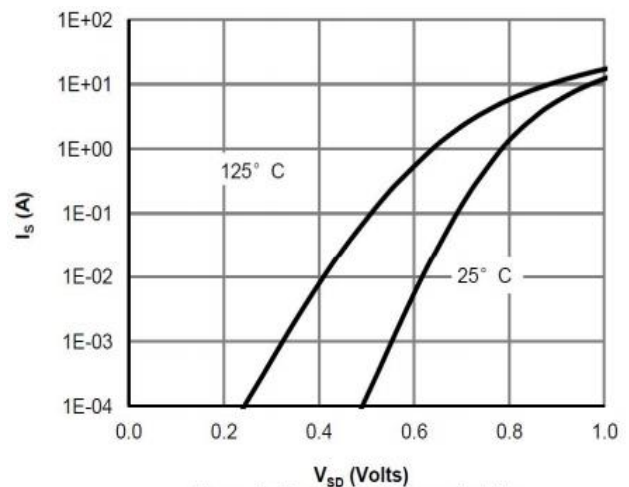


Figure 6: Body-Diode Characteristics

RATINGS AND CHARACTERISTIC CURVES

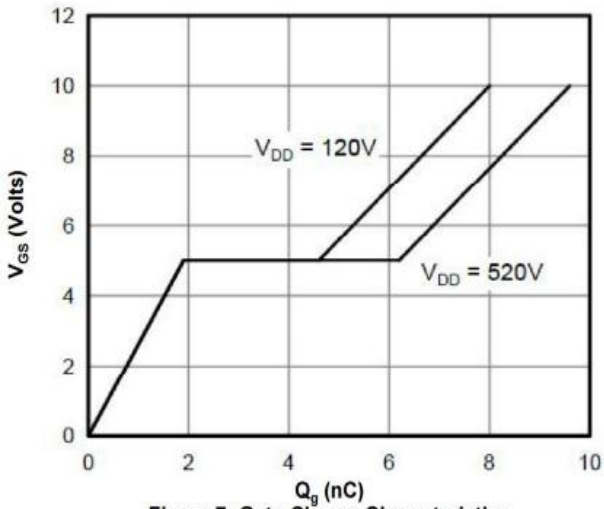


Figure 7: Gate-Charge Characteristics

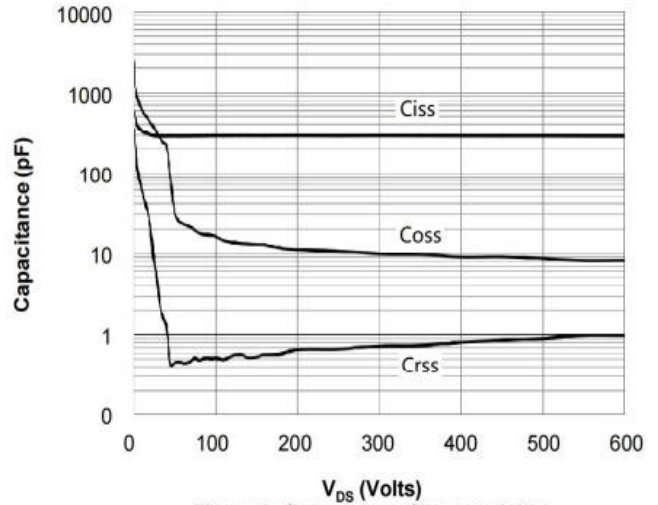


Figure 8: Capacitance Characteristics

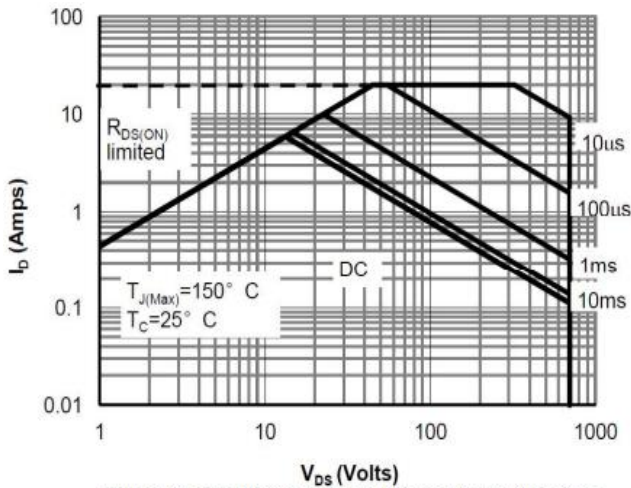


Figure 9 : Maximum Forward Biased Safe Operating Area

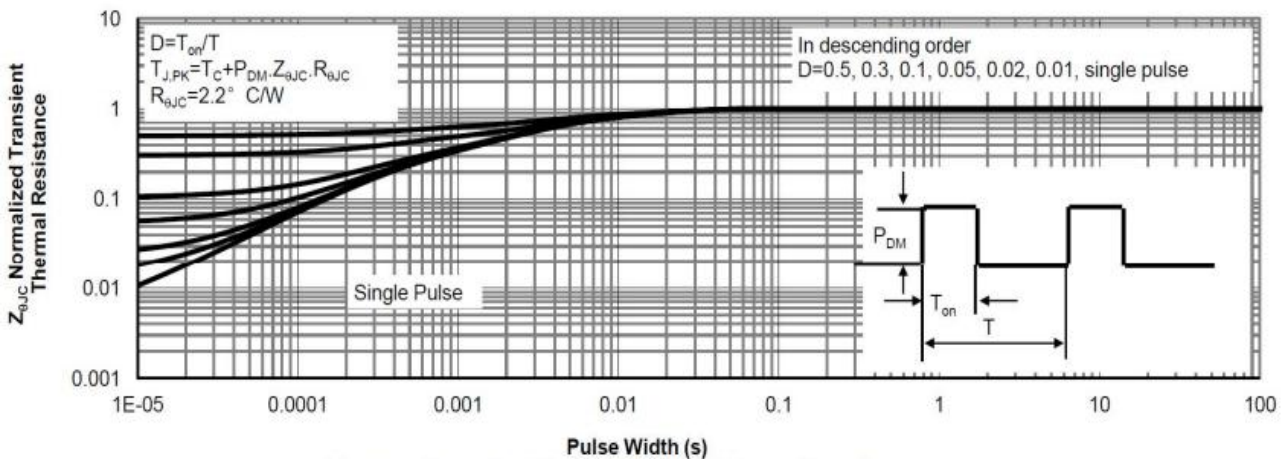
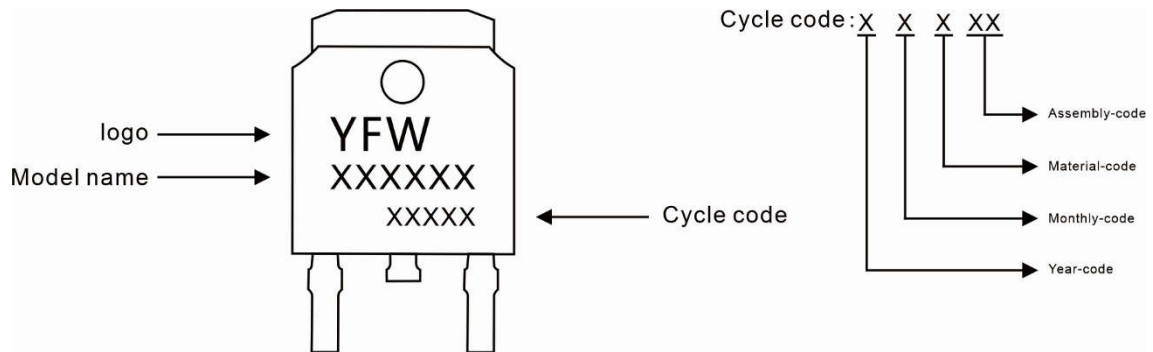


Figure 10: Normalized Maximum Transient Thermal Impedance

Marking Diagram



Ordering information

Model name	Package	Unit Weight	Base Quantity	Packing Quantity
YFW65R1K0AD	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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