

**500V N-Channel Enhancement Mode Power MOSFET**

**MAIN CHARACTERISTICS**

<b>I<sub>D</sub></b>	5A
<b>V<sub>DS</sub></b>	500V
<b>R<sub>DS(on)-typ(@V<sub>GS</sub>=10V)</sub></b>	< 1.6Ω (Type: 1.3Ω)

**FEATURES**

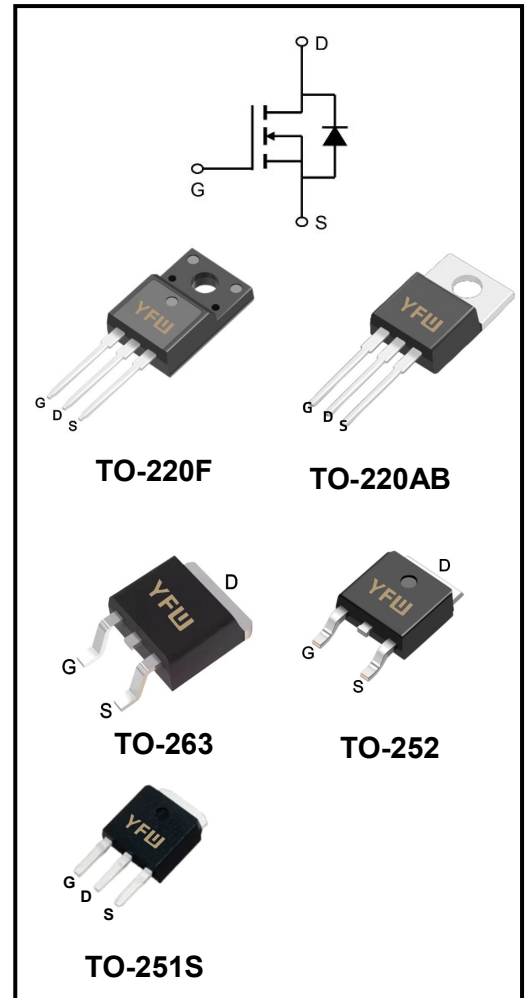
- ◆Fast Switching
- ◆Low ON Resistance
- ◆Low Gate Charge
- ◆100% Single Pulse avalanche energy Test

**APPLICATION**

- ◆Power switch circuit of adaptor and charger.

**MECHANICAL DATA**

- ◆Case: TO-220F/AF TO-220AB/AT TO-263/AS TO-252/AD TO-251S/AMJ
- ◆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
		TO-220AB/TO-263	TO-220F	TO-251S/TO-252	
Drain-Source Voltage	<b>V<sub>DS</sub></b>	500			<b>V</b>
Gate-Source Voltage	<b>V<sub>GS</sub></b>	±30			<b>V</b>
Continue Drain Current	<b>I<sub>D</sub></b>	5			<b>A</b>
Pulsed Drain Current (Note1)	<b>I<sub>DM</sub></b>	20			<b>A</b>
Power Dissipation	<b>P<sub>D</sub></b>	75	30	75	<b>W</b>
Single Pulse Avalanche Energy(Note1)	<b>E<sub>AR</sub></b>	200			<b>mJ</b>
Operating Temperature Range	<b>T<sub>J</sub></b>	150			<b>°C</b>
Storage Temperature Range	<b>T<sub>STG</sub></b>	-55 to +150			<b>°C</b>
Thermal Resistance, Junction to Case	<b>R<sub>θJC</sub></b>	1.67	4.17	1.67	<b>°C/W</b>
Thermal Resistance, Junction to Ambient	<b>R<sub>θJA</sub></b>	62.5	100	62.5	<b>°C/W</b>

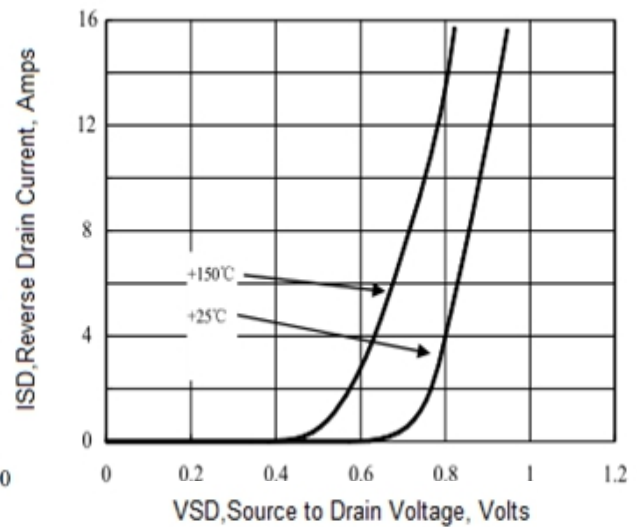
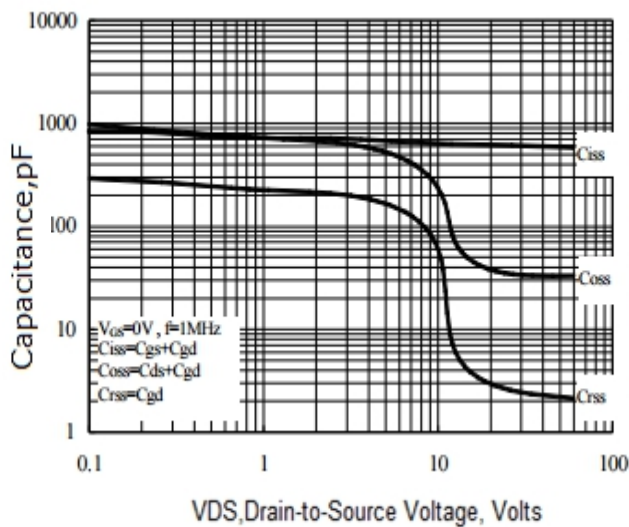
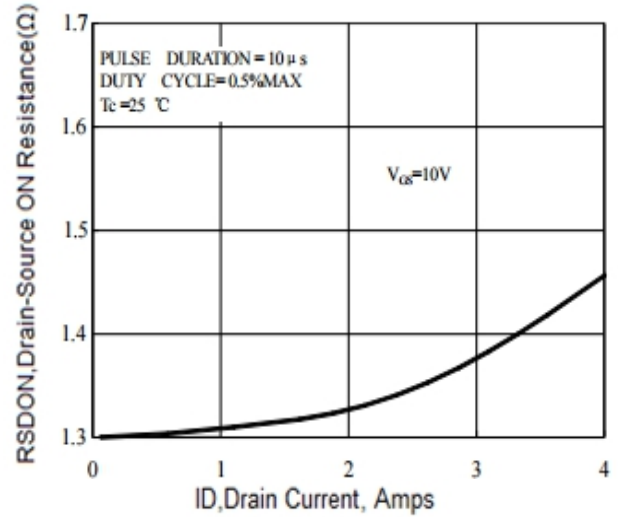
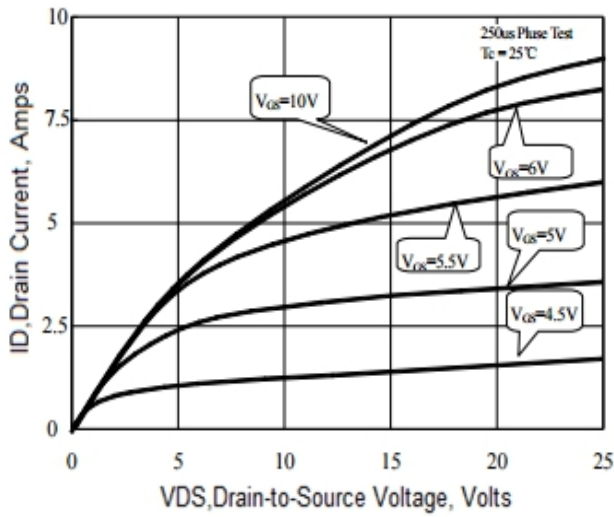
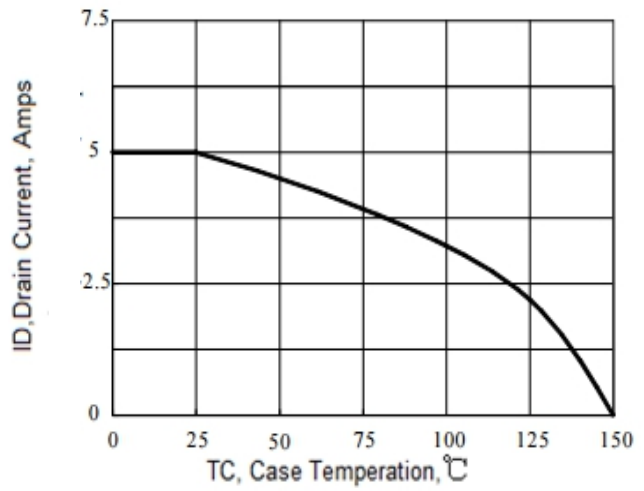
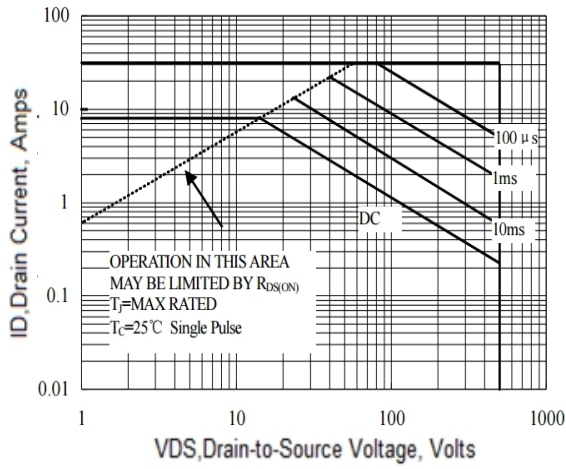
Note1: Pulse test: 300 μs pulse width, 2 % duty cycle

**Electrical Characteristics at Tc=25°C unless otherwise specified**

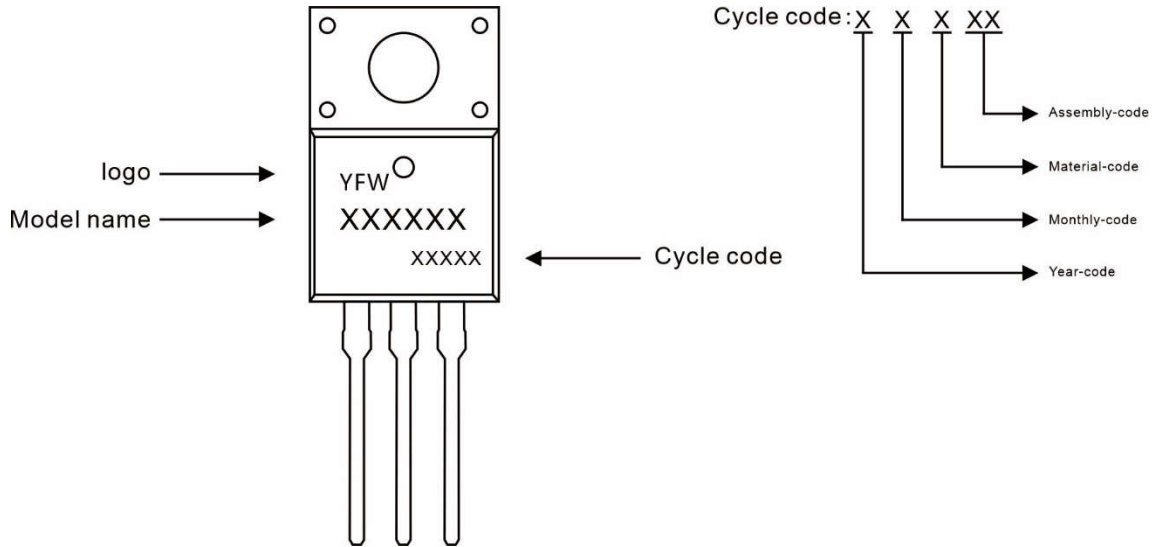
Characteristics	Test Condition	Symbol	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	$V_{GS} = 0\text{ V}, I_D = 250\ \mu\text{A}$	<b><math>BV_{DSS}</math></b>	500	-	-	<b>V</b>
Drain-Source Leakage Current	$V_{DS} = 500\text{ V}, V_{GS} = 0\text{ V}$	<b><math>I_{DSS}</math></b>	-	-	1	<b><math>\mu\text{A}</math></b>
Gate Leakage Current	$V_{GS} = \pm 30\text{ V}, V_{DS} = 0\text{ V}$	<b><math>I_{GSS}</math></b>	-	-	$\pm 100$	<b>nA</b>
Gate-Source Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\ \mu\text{A}$	<b><math>V_{GS(th)}</math></b>	2	-	4	<b>V</b>
Drain-Source On-State Resistance	$V_{GS} = 10\text{ V}, I_D = 2.5\text{ A}$	<b><math>R_{DS(ON)}</math></b>	-	1.3	1.6	<b><math>\Omega</math></b>
Forward Transconductance	$V_{DS} = 15\text{ V}, I_D = 2.5\text{ A}$	<b><math>g_{fs}</math></b>	-	4	-	<b>S</b>
Input Capacitance	$V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V},$ $f = 1\text{ MHz}$	<b><math>C_{iss}</math></b>	-	545	-	<b>pF</b>
Output Capacitance		<b><math>C_{oss}</math></b>	-	63	-	
Reverse Transfer Capacitance		<b><math>C_{rss}</math></b>	-	5.5	-	
Turn-on Delay Time(Note2)	$I_D = 5\text{ A}, V_{DD} = 250\text{ V},$ $R_G = 10\ \Omega$	<b><math>t_{d(on)}</math></b>	-	9	-	<b>ns</b>
Rise Time(Note2)		<b><math>T_r</math></b>	-	11	-	
Turn-Off Delay Time(Note2)		<b><math>t_{d(OFF)}</math></b>	-	29	-	
Fall Time(Note2)		<b><math>t_f</math></b>	-	16	-	
Total Gate Charge(Note2)	$I_D = 5\text{ A}, V_{DD} = 400\text{ V},$ $V_{GS} = 10\text{ V}$	<b><math>Q_g</math></b>	-	14.5	-	<b>nC</b>
Gate to Source Charge(Note2)		<b><math>Q_{gs}</math></b>	-	3.5	-	
Gate to Drain Charge(Note2)		<b><math>Q_{gd}</math></b>	-	7	-	
Maximun Body-Diode Continuous Current		<b><math>I_S</math></b>	-	-	5	<b>A</b>
Maximun Body-Diode Pulsed Current(Note2)		<b><math>I_{SM}</math></b>	-	-	20	<b>A</b>
Drain-Source Diode Forward Voltage	$I_{SD} = 5\text{ A}$	<b><math>V_{SD}</math></b>	-	-	1.4	<b>V</b>
Reverse Recovery Time(Note2)	$I_{SD} = 5\text{ A}, V_{GS} = 0\text{ V},$ $dI_F / dt = 100\text{ A}/\mu\text{s}$	<b><math>t_{rr}</math></b>	-	391	-	<b>ns</b>
Reverse Recovery Charge(Note2)		<b><math>Q_{rr}</math></b>	-	1.7	-	<b><math>\mu\text{C}</math></b>

**Note2:Pulse test: 300  $\mu\text{s}$  pulse width, 2 % duty cycle**

Ratings and Characteristic Curves



**Marking Diagram**



**Ordering information**

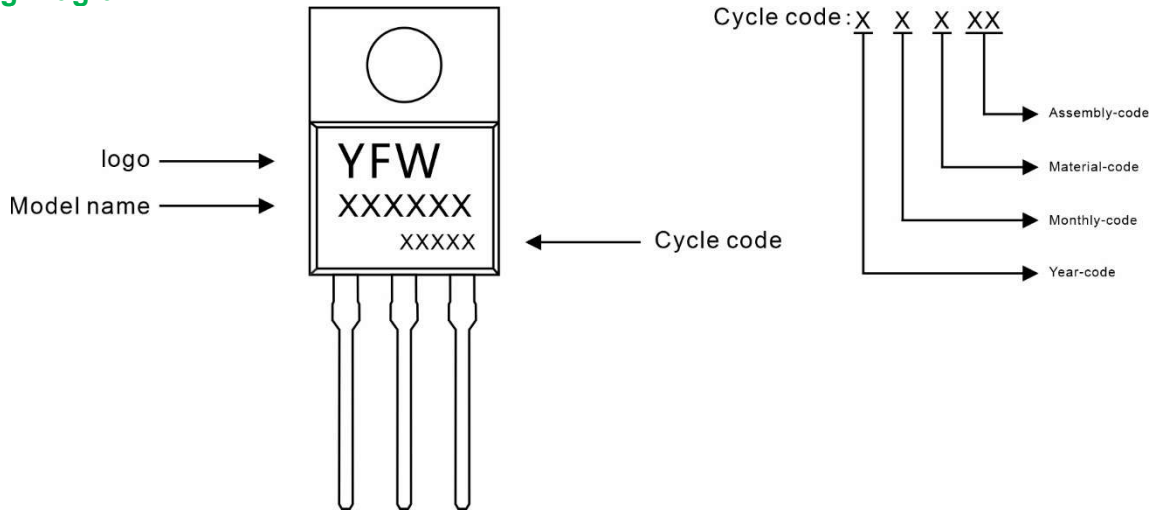
Model name	Package	Unit Weight	Base Quantity	Packing Quantity
YFW5N50AF	TO-220F	0.06oz(1.74g)	50pcs/tube	1000PCS/Box 5000PCS/Carton

**Package Dimensions**

**TO-220F**

Symbol	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	4.50	4.90	0.177	0.193
A1	2.34	2.74	0.092	0.108
A2	2.66	2.86	0.105	0.113
b	0.75	0.85	0.030	0.033
b1	1.24	1.44	0.049	0.057
c	0.40	0.60	0.016	0.024
D	10.00	10.32	0.394	0.406
E	15.75	16.05	0.620	0.632
e	2.44	2.64	0.096	0.104
e1	4.88	5.28	0.192	0.208
F	3.10	3.5	0.122	0.138
L	13.50	13.90	0.531	0.547
L1	2.90	3.30	0.114	0.130
Φ	3.10	3.30	0.122	0.130

**Marking Diagram**



**Ordering information**

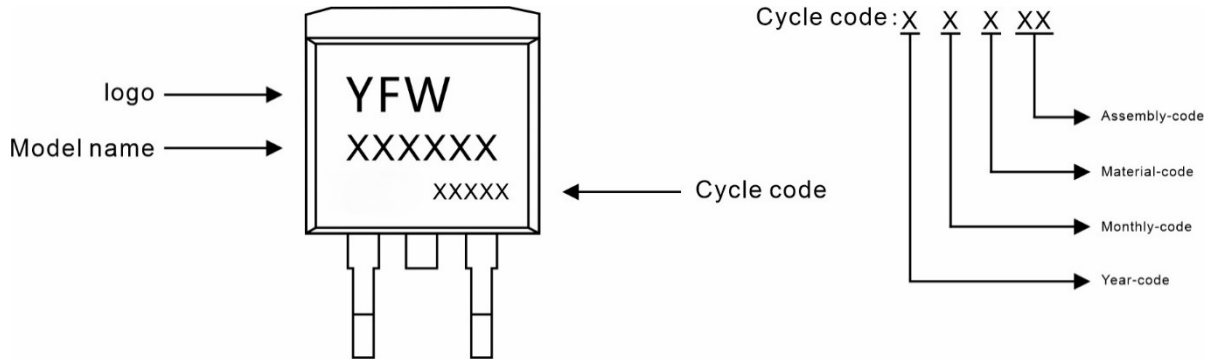
Model name	Package	Unit Weight	Base Quantity	Packing Quantity
YFW5N50AT	TO-220AB	0.07oz(1.96g)	50pcs/tube	1000PCS/Box 5000PCS/Carton

**Package Dimensions**

**TO-220AB**

Symbol	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	4.30	4.70	0.169	0.185
A1	2.52	2.82	0.099	0.111
b	0.71	0.91	0.028	0.036
b1	1.17	1.37	0.046	0.054
c	0.30	0.50	0.012	0.020
c1	1.17	1.37	0.046	0.054
D	9.90	10.20	0.390	0.402
E	8.50	8.90	0.335	0.350
E1	12.00	12.50	0.472	0.492
e	2.44	2.64	0.096	0.104
e1	4.88	5.28	0.192	0.208
F	2.60	2.80	0.102	0.110
L	13.20	13.80	0.520	0.543
L1	3.80	4.20	0.150	0.165
Φ	3.60	3.96	0.142	0.156

Marking Diagram



Ordering information

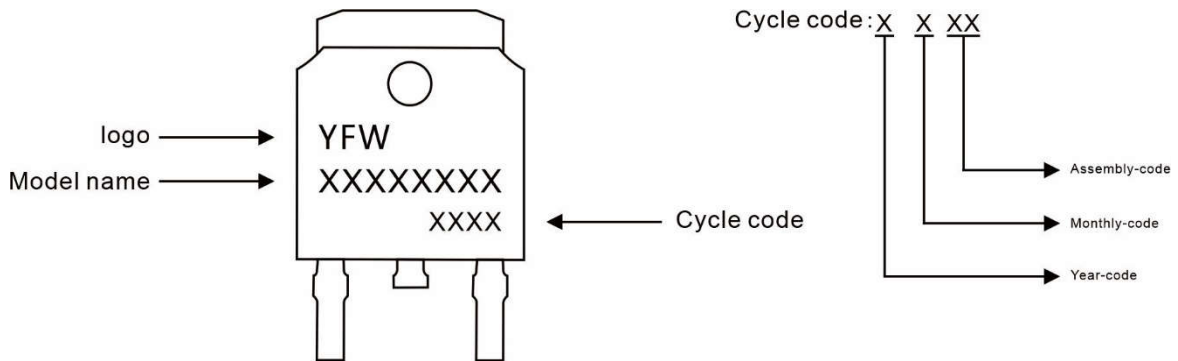
Model name	Package	Unit Weight	Base Quantity	Packing Quantity
YFW5N50AS	TO-263	0.04oz(1.16g)	800pcs/reel	1600pcs/box 8000pcs/Carton

Package Dimensions

TO-263

Dim	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	4.30	4.70	0.169	0.185
A1	0.00	0.15	0.000	0.006
A2	4.30	4.55	0.169	0.179
B	1.10	1.50	0.043	0.059
b	0.70	0.90	0.028	0.035
b1	1.20	1.50	0.047	0.059
c	0.30	0.60	0.012	0.024
c1	1.17	1.37	0.046	0.054
D	9.90	10.20	0.390	0.402
E	8.50	8.90	0.335	0.350
e	2.44	2.64	0.096	0.104
e1	4.88	5.28	0.192	0.208
L	15.00	15.30	0.591	0.602
L1	5.20	5.40	0.205	0.213
L2	2.40	2.60	0.094	0.102
L3	1.60	1.80	0.063	0.071

Marking Diagram



Ordering information

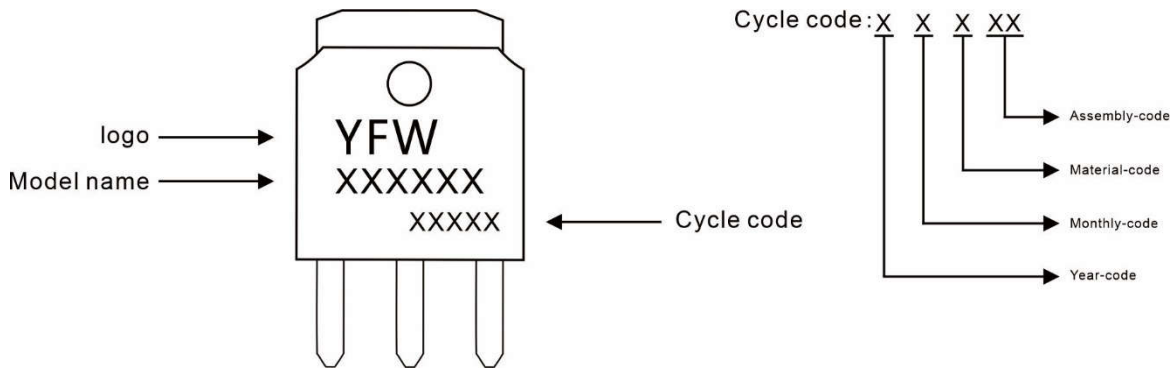
Model name	Package	Unit Weight	Base Quantity	Packing Quantity
YFW5N50AD	TO-252	0.011oz(0.32g)	2500pcs/reel	5000pcs/box 25000pcs/Carton

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

**Marking Diagram**



**Ordering information**

Model name	Package	Unit Weight	Base Quantity	Packing Quantity
YFW5N50AMJ	TO-251S	0.011oz(0.32g)	80pcs/tube	4000pcs/box 24000pcs/Carton

**Package Dimensions**

**TO-251S**

Dim	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	2.1	2.5	0.083	0.098
A1	6.3	6.9	0.248	0.271
A2	0.9	1.1	0.035	0.043
A3	TYP0.5		TYP0.019	
b	0.6	0.8	0.024	0.031
c	0.4	0.5	0.015	0.020
D	5.3	5.5	0.209	0.217
D2	3.65	4.05	0.144	0.159
E	5.8	6.4	0.228	0.252
E2	0.9	1.4	0.035	0.055
e	TYP2.29		TYP0.090	
e1	TYP4.58		TYP0.180	
L	3.7	4.3	0.146	0.169

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