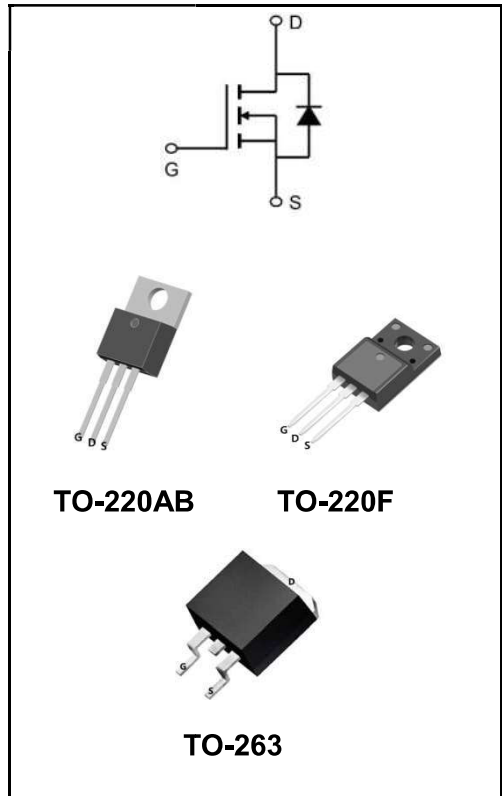


40V N-CHANNEL ENHANCEMENT MODE MOSFET

MAIN CHARACTERISTICS

I_D	160A
V_{DSS}	40V
R_{DS(on)-typ(@V_{GS}=10V)}	< 3.0mΩ (Type:1.9 mΩ)



Application

- ◆ Battery protection
- ◆ Load switch
- ◆ Uninterruptible power supply

Product Specification Classification

Part Number	Package	Marking	Pack
YFW160N04AT	TO-220AB	YFW 160N04AT XXXXX	1000PCS/box
YFW160N04AF	TO-220F	YFW 160N04AF XXXXX	1000PCS/box
YFW160N04AS	TO-263	YFW 160N04AS XXXXX	800PCS/Reel

Maximum Ratings at T_c=25°C unless otherwise specified

Characteristics	Symbols	Value	Units
Drain-Source Voltage	V _{DS}	40	V
Gate - Source Voltage	V _{GS}	±20	V
Continuous Drain Current, V _{GS} @ 10V ^{1,6} @T _C =25°C	I _D	160	A
Continuous Drain Current, V _{GS} @ 10V ^{1,6} @T _C =100°C	I _D	142	A
Pulsed Drain Current ²	I _{DM}	400	A
Single Pulse Avalanche Energy ³	E _{AS}	400	mJ
Avalanche Current	I _{AS}	40	A
Total Power Dissipation ⁴ @T _C =25°C	P _D	178	W
Storage Temperature Range	T _{STG}	-55 to +150	°C
Operating Junction Temperature Range	T _J	-55 to +150	°C
Thermal Resistance Junction-ambient ¹	R _{θJA}	50	°C/W
Thermal Resistance Junction-Case ¹	R _{θJC}	0.7	°C/W

Maximum Ratings at Tc=25°C unless otherwise specified

Characteristics	Test Condition	Symbols	Min	Typ	Max	Units
Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	BV_{DSS}	40	-	-	V
Static Drain-Source On-Resistance ²	$V_{GS}=10V, I_D=20A$	$R_{DS(ON)}$	-	1.9	3.0	mΩ
	$V_{GS}=4.5V, I_D=20A$		-	2.3	3.5	
Gate -Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	$V_{GS(th)}$	1.2	1.6	2.2	V
Drain -Source Leakage Current	$V_{DS}=32V, V_{GS}=0V, T_J=25^\circ C$	I_{DSS}	-	-	1	μA
	$V_{DS}=32V, V_{GS}=0V, T_J=55^\circ C$		-	-	5	
Gate-Source Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$	I_{GSS}	-	-	±100	nA
Forward Transconductance	$V_{DS}=5V, I_D=20A$	g_{FS}	-	53	-	S
Gate Resistance	$V_{DS}=0V, V_{GS}=0V, f=1MHz$	R_g	-	1.0	-	Ω
Total Gate Charge(4.5V)	$V_{DS}=15V$ $V_{GS}=10V$ $I_D=20A$	Q_g	-	45	-	nC
Gate-Source Charge		Q_{GS}	-	12	-	
Gate-Drain Charge		Q_{gd}	-	18.5	-	
Turn-on delay time	$V_{DD}=15V$ $V_{GS}=10V$ $R_G=3.3\Omega$ $I_D=20A$	$t_{d(on)}$	-	18.5	-	ns
Rise Time		T_r	-	9	-	
Turn-Off Delay Time		$t_{d(OFF)}$	-	58.5	-	
Fall Time		t_f	-	32	-	
Input Capacitance	$V_{DS}=20V$ $V_{GS}=0V$ $f=1.0MHz$	C_{iss}	-	3972	-	pF
Output Capacitance		C_{oss}	-	1119	-	
Reverse Transfer Capacitance		C_{rss}	-	82	-	
Continuous Source Current ^{1,6}	$V_G=V_D=0V, \text{Force Current}$	I_S	-	-	150	A
Diode Forward Voltage ²	$V_{GS}=0V, I_S=1A, T_J=25^\circ C$	V_{SD}	-	-	1.2	V

Note :

- 1、 The data tested by surface mounted on a 1 inch 2 FR-4 board with 2OZ copper.
- 2、 The data tested by pulsed , pulse width $\cong 300\mu s$, duty cycle $\cong 2\%$
- 3、 The EAS data shows Max. rating . The test condition is $V_{DD}=25V, V_{GS}=10V, L=0.5mH, I_{AS}=40A$
- 4、 The power dissipation is limited by 150°C junction temperature
- 5、 The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation.
- 6、 Package limitation current is 180A

Ratings and Characteristic Curves

Typical Characteristics

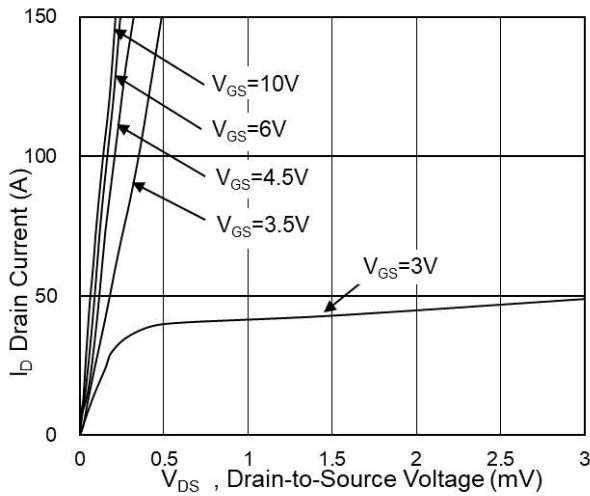


Fig.1 Typical Output Characteristics

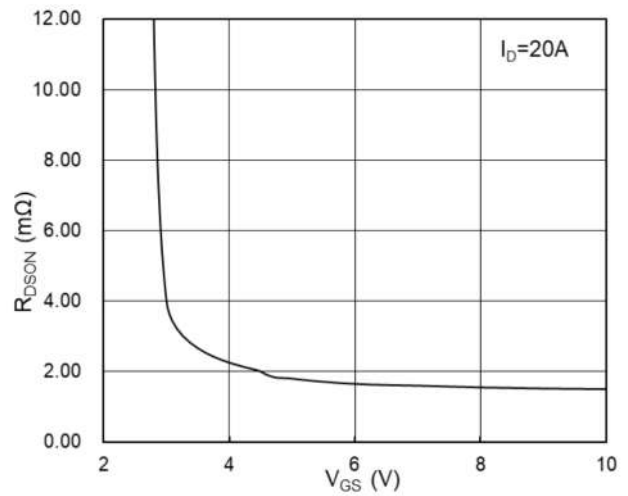


Fig.2 On-Resistance vs G-S Voltage

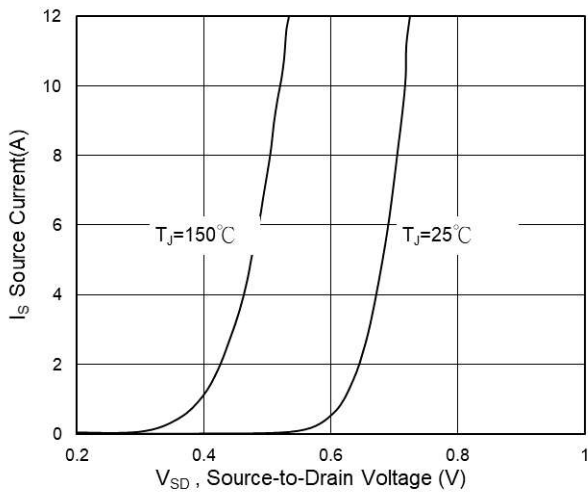


Fig.3 Source Drain Forward Characteristics

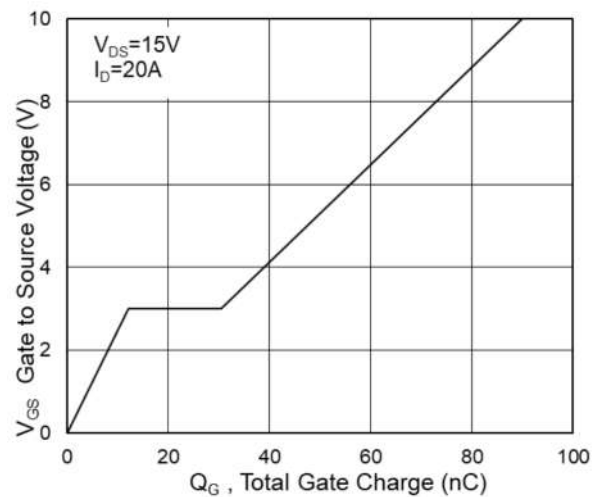


Fig.4 Gate-Charge Characteristics

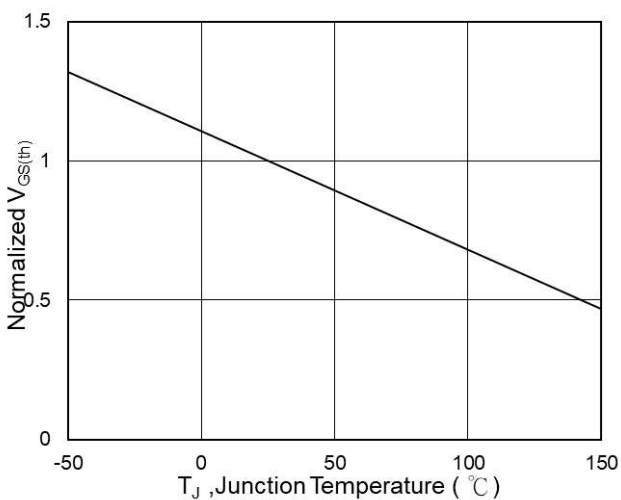


Fig.5 Normalized $V_{GS(th)}$ vs T_J

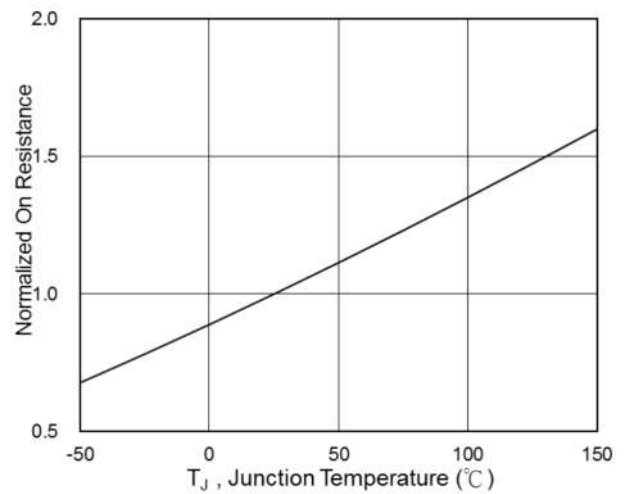


Fig.6 Normalized $R_{DS(on)}$ vs T_J

Ratings and Characteristic Curves

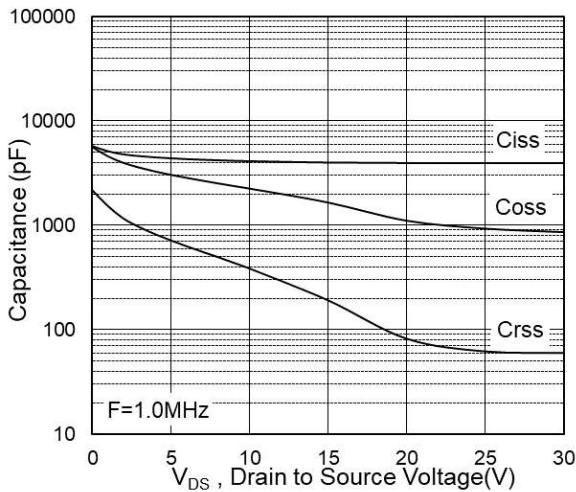


Fig.7 Capacitance

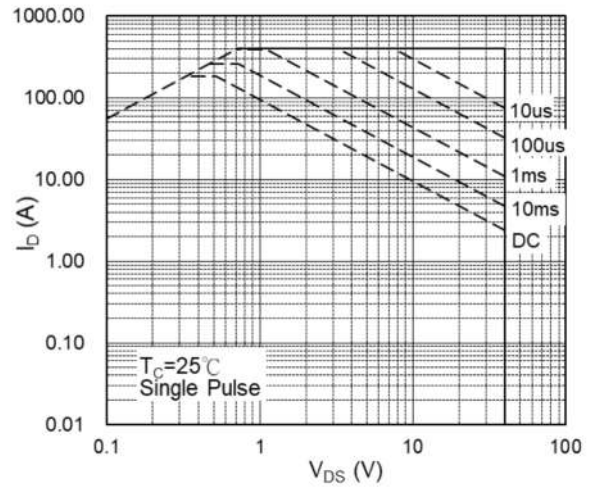


Fig.8 Safe Operating Area

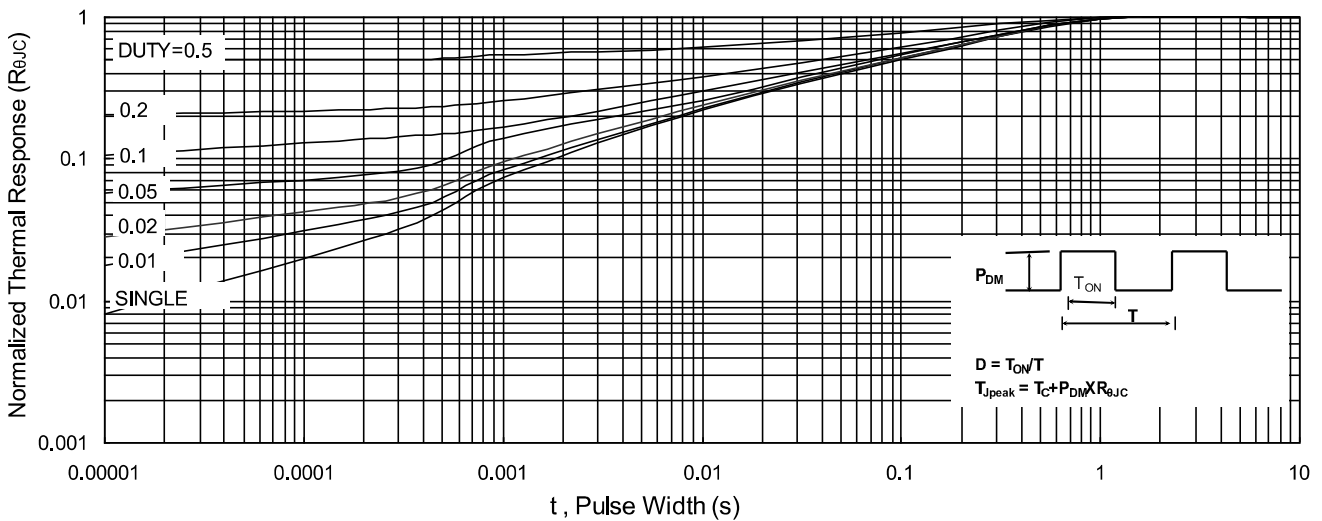


Fig.9 Normalized Maximum Transient Thermal Impedance

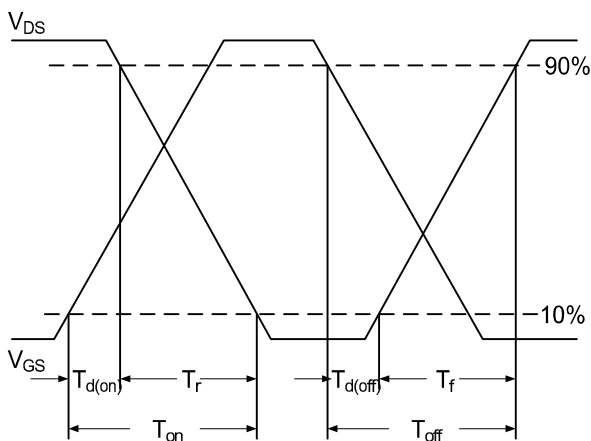


Fig.10 Switching Time Waveform

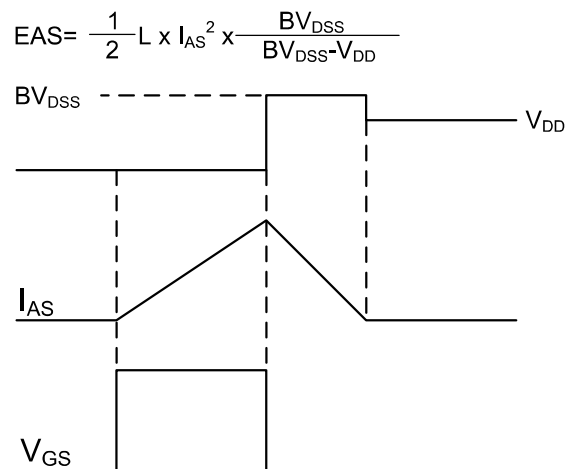


Fig.11 Unclamped Inductive Switching Waveform

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-220F

	Dim.	Min.	Max.
	A	9.95	10.25
	B	2.95	3.25
	C	1.25	1.45
	D	12.95	13.25
	E	0.50	0.65
	F	3.1	3.3
	G	1.30	1.45
	H	Typ 2.54	
	I	Typ 5.08	
	J	4.60	4.75
	K	2.50	2.65
	L	6.35	6.55
	M	15.4	16.0
	N	2.75	3.05
	O	0.48	0.52
P	0.76	0.84	
All Dimensions in millimeter			

Package Outline Dimensions Millimeters

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			