

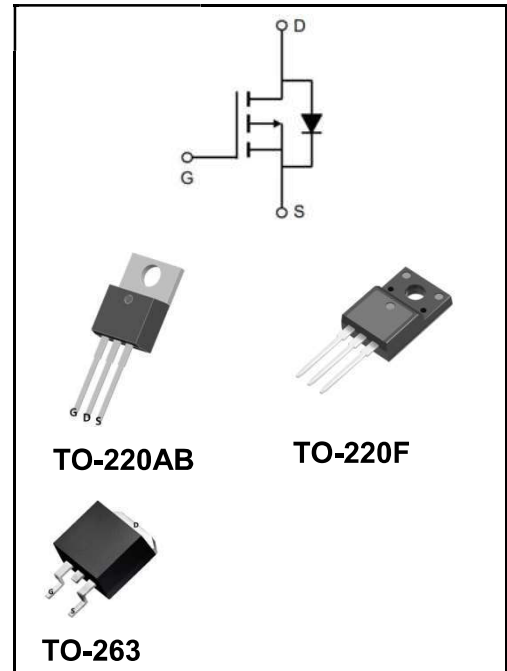
-200V P-CHANNEL ENHANCEMENT MODE MOSFET

MAIN CHARACTERISTICS

I_D	-13A
V_{DSS}	-200V
R_{DS(on)-typ(@V_{GS}=-10V)}	< 0.42Ω(Type:0.34 Ω)

Application

- ◆Power amplifier
- ◆motor drive




Product Specification Classification

Part Number	Package	Marking	Pack
YFW13P20AT	TO-220AB	YFW 13P20AT XXXXX	1000PCS/Box
YFW13P20AF	TO-220F	YFW 13P20AF XXXXX	1000PCS/Box
YFW13P20AS	TO-263	YFW 13P20AS XXXXX	800PCS/Reel

Maximum Ratings at T_c=25°C unless otherwise specified

Characteristics	Symbols	Value	Units
Drain-Source Voltage	V_{DS}	-200	V
Gate - Source Voltage	V_{GS}	± 20	V
Continuous Drain Current T _C =25°C	I_D	-13	A
Continuous Drain Current T _C =100°C		-7.2	A
Pulsed Drain Current ^a	I_{DM}	-52	A
Single Pulse Avalanche Energy ^b	E_{AS}	750	mJ
Repetitive Avalanche Current ^a	I_{AR}	-11	A
Repetitive Avalanche Energy ^a	E_{AR}	13	mJ
Maximum Power Dissipation T _C = 25 °C	P_D	125	W
Peak Diode Recovery dV/dt ^c	dV/dt	-5.0	V/ns
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 to +150	°C
Maximum Junction-to-Ambient	R_{thJA}	62	°C/W
Case-to-Sink, Flat, Greased Surface	R_{thCS}	0.50	°C/W
Maximum Junction-to-Case (Drain)	R_{thJC}	1.0	°C/W

Maximum Ratings at Tc=25°C unless otherwise specified

Characteristics	Test Condition	Symbols	Min	Typ	Max	Units
Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=-250\mu A$	V_{DS}	-200	-	-	V
V_{DS} Temperature Coefficient	Reference to 25°C, $I_D=-1mA$	$\Delta V_{DS}/T_J$	-	-0.2	-	V/°C
Gate-Source Threshold Voltage	$V_{DS}=V_{GS}, I_D=-250\mu A$	$V_{GS(th)}$	-2.0	-	-4.0	V
Gate-Source Leakage	$V_{GS}=\pm 20V$	I_{GSS}	-	-	± 100	nA
Zero Gate Voltage Drain Current	$V_{DS}=-200V, V_{GS}=0V$	I_{DSS}	-	-	-100	μA
	$V_{DS}=-160V, V_{GS}=0V, T_J=125^\circ C$		-	-	-500	
Drain-Source On-State Resistance	$V_{GS}=-10V, I_D=-5.5 A^b$	$R_{DS(ON)}$	-	0.34	0.42	Ω
Forward Transconductance	$V_{DS}=-50V, I_D=-6.6A^b$	g_{fs}	4.1	-	-	S
Input Capacitance	$V_{GS}=0V$ $V_{DS}=-25V$ $f=1MHz$ MHz, see fig. 5	C_{iss}	-	1200	-	μF
Output Capacitance		C_{oss}	-	370	-	
Reverse Transfer Capacitance		C_{rss}	-	81	-	
Total Gate Charge	$V_{GS}=-10V$ $I_D = -11 A,$ $V_{DS} = -160 V,$ see fig. 6 and 13^b	Q_g	-	-	44	nC
Gate-Source Charge		Q_{gs}	-	-	7.1	
Gate-Drain Charge		Q_{gd}	-	-	27	
Turn-on delay time	$V_{DD}=-100V$ $I_D=-11A$ $R_G=9.1\Omega$ $R_D=8.6\Omega$ see fig. 10 ^b	$t_{d(on)}$	-	14	-	ns
Rise Time		T_r	-	43	-	
Turn-Off Delay Time		$t_{d(OFF)}$	-	39	-	
Fall Time		t_f	-	38	-	
Gate Input Resistance	$f = 1 MHz, \text{open drain}$	R_g	0.3	-	1.7	Ω
Continuous Source-Drain Diode Current	Between lead, 6 mm (0.25") from package and center of die contact 	I_S	-	-	-11	A
Pulsed Diode Forward Current ^a		I_{SM}	-	-	-44	A
Body Diode Voltage	$T_J = 25^\circ C, I_S = -11 A,$ $V_{GS} = 0 V^b$	V_{SD}	-	-	-5	V
Body Diode Reverse Recovery Time	$T_J = 25^\circ C, I_F = -11 A,$ $di/dt = 100 A/\mu s^b$	t_{rr}	-	250	300	ns
Body Diode Reverse Recovery Charge		Q_{rr}	-	2.9	3.6	μC
Forward Turn-On Time	Intrinsic turn-on time is negligible (turn-on is dominated by LS and LD)	t_{on}	-	-	-	-

Notes

- a. Repetitive rating; pulse width limited by maximum junction temperature (see fig. 11).
b. Pulse width $\leq 300 \mu s$; duty cycle ≤ 2

Ratings and Characteristic Curves

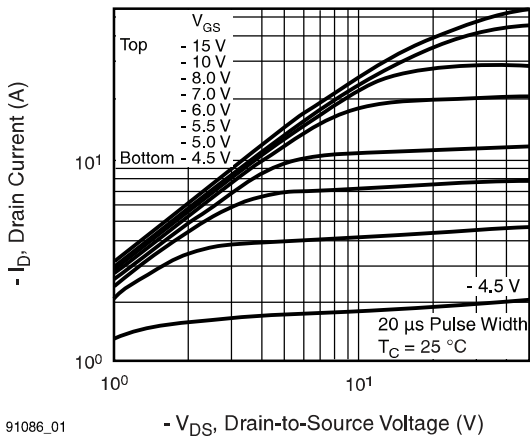


Fig. 1 - Typical Output Characteristics, $T_C = 25\text{ }^\circ\text{C}$

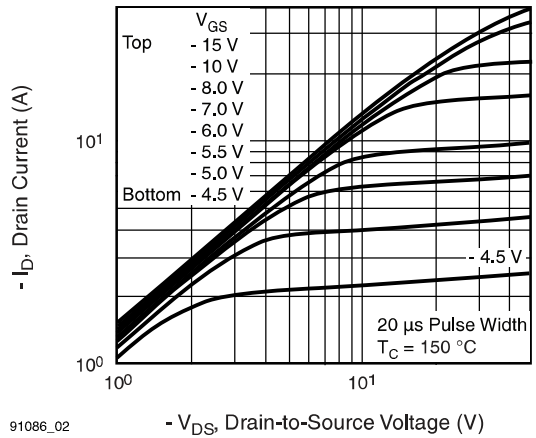


Fig. 2 - Typical Output Characteristics, $T_C = 150\text{ }^\circ\text{C}$

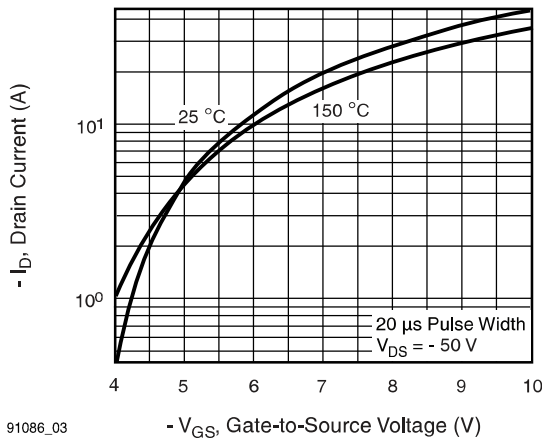


Fig. 3 - Typical Transfer Characteristics

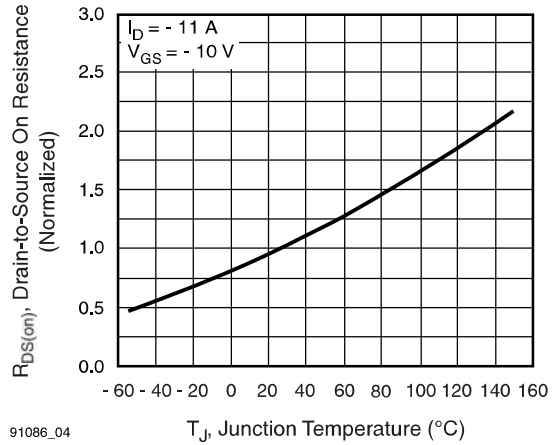


Fig. 4 - Normalized On-Resistance vs. Temperature

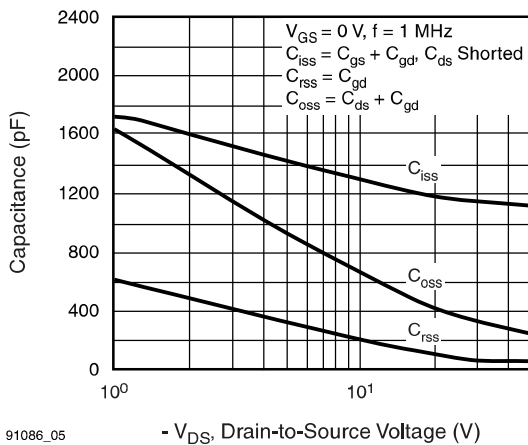


Fig. 5 - Typical Capacitance vs. Drain-to-Source Voltage

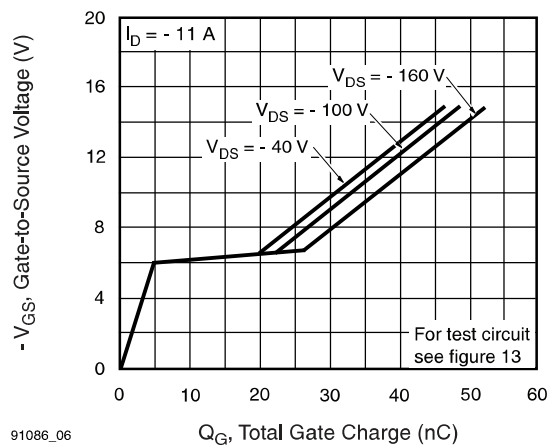
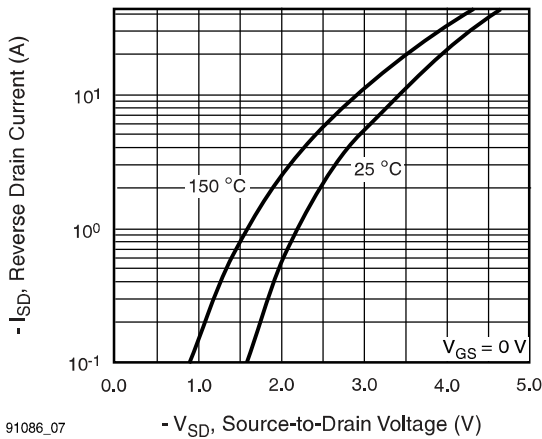


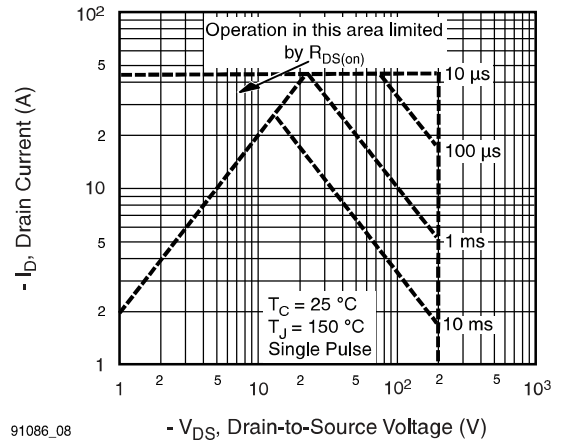
Fig. 6 - Typical Gate Charge vs. Drain-to-Source Voltage

Ratings and Characteristic Curves



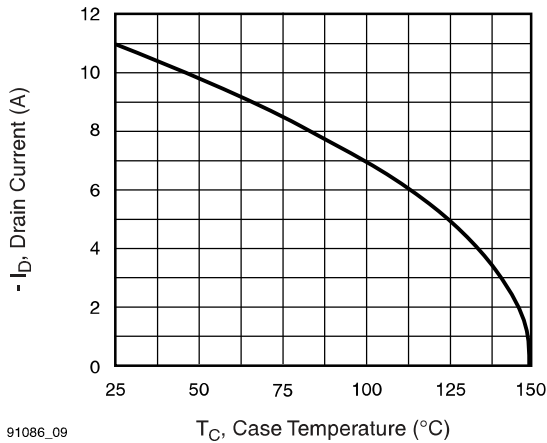
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Fig. 7 - Typical Source-Drain Diode Forward Voltage



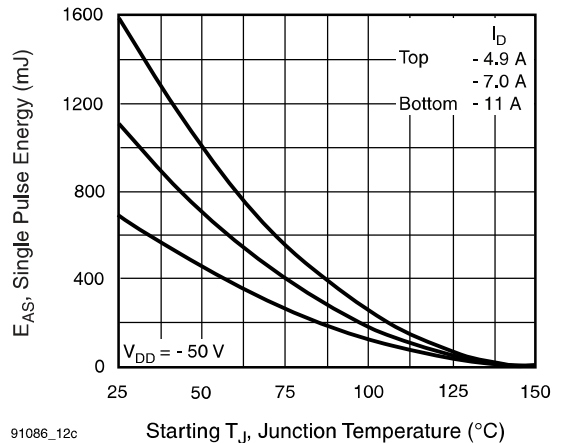
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Fig. 8 - Maximum Safe Operating Area



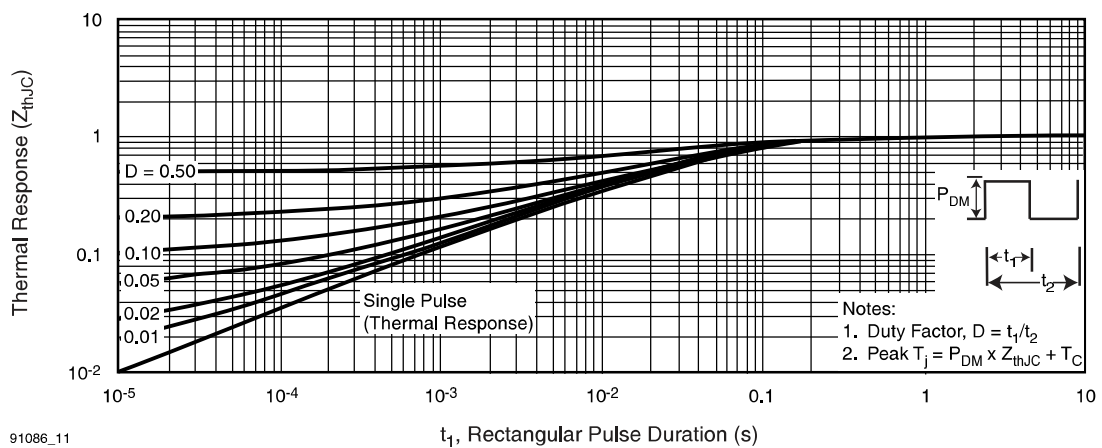
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Fig. 9 - Maximum Drain Current vs. Case Temperature



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Fig. 10 - Maximum Avalanche Energy vs. Drain Current



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Fig. 11 - Maximum Effective Transient Thermal Impedance, Junction-to-Case

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		