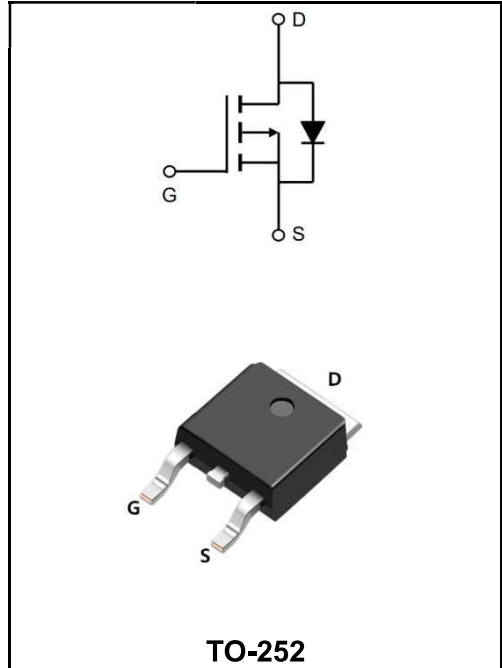


**-200V P-CHANNEL ENHANCEMENT MODE MOSFET**

**MAIN CHARACTERISTICS**

<b>I<sub>D</sub></b>	-13A
<b>V<sub>DSS</sub></b>	-200V
<b>R<sub>DS(on)-typ(@V<sub>GS</sub>=-10V)</sub></b>	< 0.42Ω( <b>Type:0.34 Ω</b> )



**Application**

- ◆Power amplifier
- ◆motor drive




**Product Specification Classification**

Part Number	Package	Marking	Pack
YFW13P20AD	TO-252	YFW 13P20AD XXXXX	2500PCS/Tape

**Maximum Ratings at T<sub>c</sub>=25°C unless otherwise specified**

Characteristics	Symbols	Value	Units
Drain-Source Voltage	<b>V<sub>DS</sub></b>	-200	<b>V</b>
Gate - Source Voltage	<b>V<sub>GS</sub></b>	±20	<b>V</b>
Continuous Drain Current T <sub>C</sub> =25°C	<b>I<sub>D</sub></b>	-13	<b>A</b>
Continuous Drain Current T <sub>C</sub> =100°C		-7.2	<b>A</b>
Pulsed Drain Current <sup>a</sup>	<b>I<sub>DM</sub></b>	-52	<b>A</b>
Single Pulse Avalanche Energy <sup>b</sup>	<b>E<sub>AS</sub></b>	750	<b>mJ</b>
Repetitive Avalanche Current <sup>a</sup>	<b>I<sub>AR</sub></b>	-11	<b>A</b>
Repetitive Avalanche Energy <sup>a</sup>	<b>E<sub>AR</sub></b>	13	<b>mJ</b>
Maximum Power Dissipation T <sub>C</sub> = 25 °C	<b>P<sub>D</sub></b>	125	<b>W</b>
Peak Diode Recovery dV/dt <sup>c</sup>	<b>dV/dt</b>	-5.0	<b>V/ns</b>
Operating Junction and Storage Temperature Range	<b>T<sub>J</sub>, T<sub>STG</sub></b>	-55 to +150	<b>°C</b>
Maximum Junction-to-Ambient	<b>R<sub>thJA</sub></b>	62	<b>°C/W</b>
Case-to-Sink, Flat, Greased Surface	<b>R<sub>thCS</sub></b>	0.50	<b>°C/W</b>
Maximum Junction-to-Case (Drain)	<b>R<sub>thJC</sub></b>	1.0	<b>°C/W</b>

**Maximum Ratings at Tc=25°C unless otherwise specified**

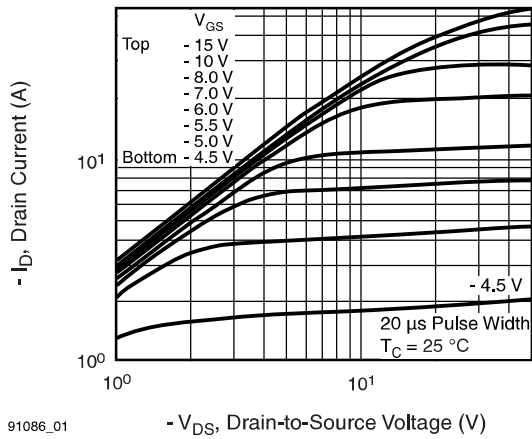
Characteristics	Test Condition	Symbols	Min	Typ	Max	Units
Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=-250\mu A$	$V_{DS}$	-200	-	-	V
$V_{DS}$ Temperature Coefficient	Reference to 25°C, $I_D=-1mA$	$\Delta V_{DS}/T_J$	-	-0.2	-	V/°C
Gate-Source Threshold Voltage	$V_{DS}=V_{GS}, I_D=-250\mu A$	$V_{GS(th)}$	-2.0	-	-4.0	V
Gate-Source Leakage	$V_{GS}=\pm 20V$	$I_{GSS}$	-	-	$\pm 100$	nA
Zero Gate Voltage Drain Current	$V_{DS}=-200V, V_{GS}=0V$	$I_{DSS}$	-	-	-100	$\mu A$
	$V_{DS}=-160V, V_{GS}=0V, T_J=125^\circ C$		-	-	-500	
Drain-Source On-State Resistance	$V_{GS}=-10V, I_D=-5.5 A^b$	$R_{DS(ON)}$	-	0.34	0.42	$\Omega$
Forward Transconductance	$V_{DS}=-50V, I_D=-6.6A^b$	$g_{fs}$	4.1	-	-	S
Input Capacitance	$V_{GS}=0V$ $V_{DS}=-25V$ $f=1.0$ MHz, see fig. 5	$C_{iss}$	-	1200	-	$\mu F$
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 <sup>b</sup>	$t_{d(on)}$	-	14	-	ns
Rise Time		$T_r$	-	43	-	
Turn-Off Delay Time		$t_{d(OFF)}$	-	39	-	
Fall Time		$t_f$	-	38	-	
Gate Input Resistance	$f = 1 \text{ MHz, open drain}$	$R_g$	0.3	-	1.7	$\Omega$
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 <sup>a</sup>		$I_{SM}$	-	-	-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	$\mu C$
Forward Turn-On Time	Intrinsic turn-on time is negligible (turn-on is dominated by LS and LD)	$t_{on}$	-	-	-	-

**Notes**

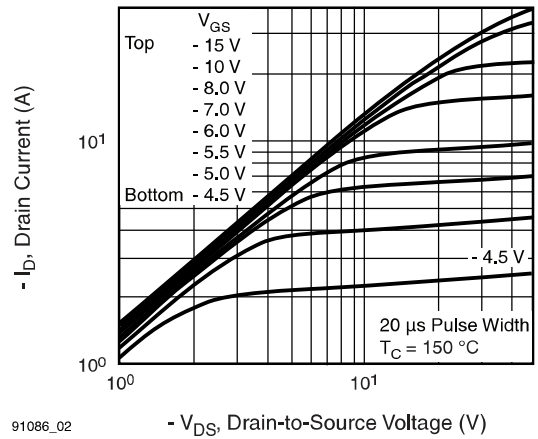
a. Repetitive rating; pulse width limited by maximum junction temperature (see fig. 11).

 b. Pulse width  $\leq 300 \mu s$ ; duty cycle  $\leq 2\%$

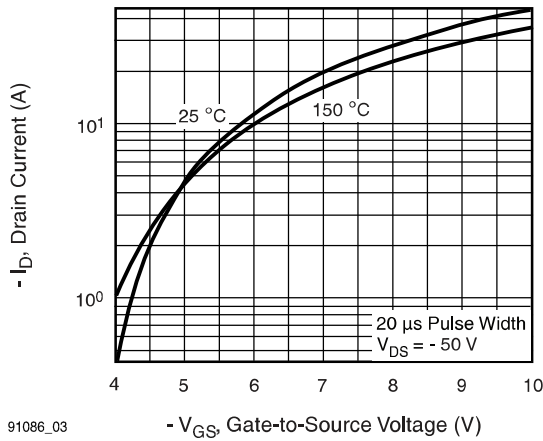
**Ratings and Characteristic Curves**



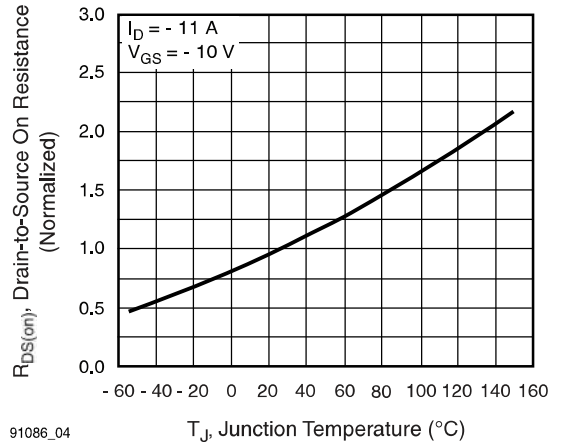
**Fig. 1 - Typical Output Characteristics,  $T_C = 25\text{ }^\circ\text{C}$**



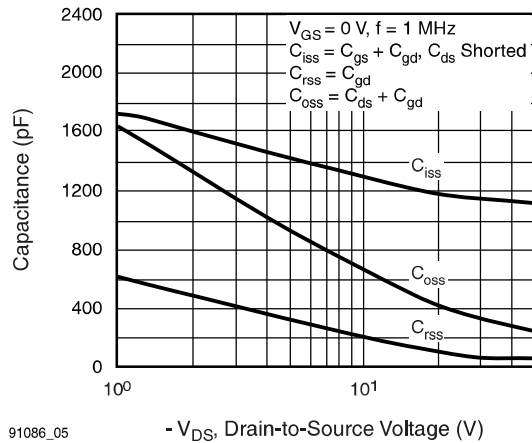
**Fig. 2 - Typical Output Characteristics,  $T_C = 150\text{ }^\circ\text{C}$**



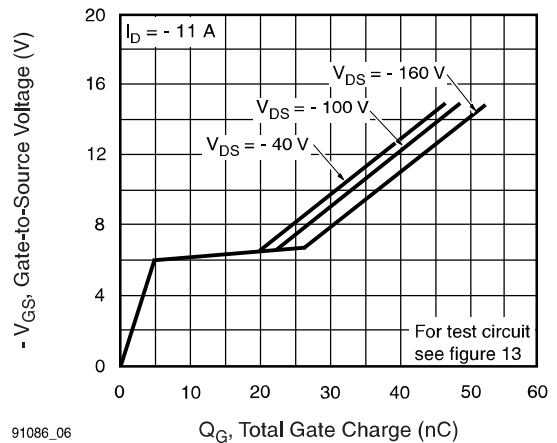
**Fig. 3 - Typical Transfer Characteristics**



**Fig. 4 - Normalized On-Resistance vs. Temperature**

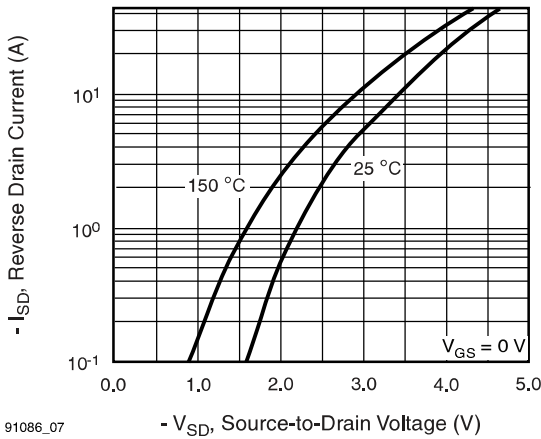


**Fig. 5 - Typical Capacitance vs. Drain-to-Source Voltage**



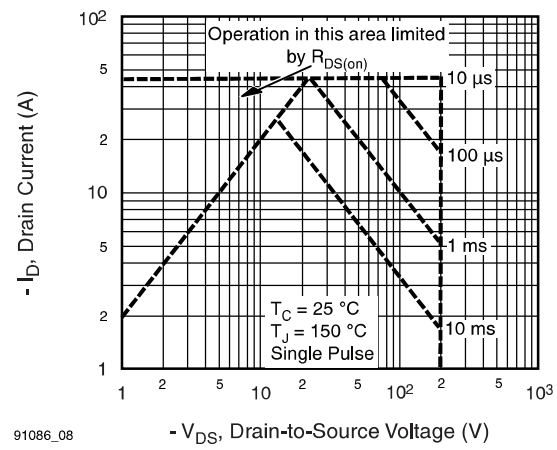
**Fig. 6 - Typical Gate Charge vs. Drain-to-Source Voltage**

**Ratings and Characteristic Curves**



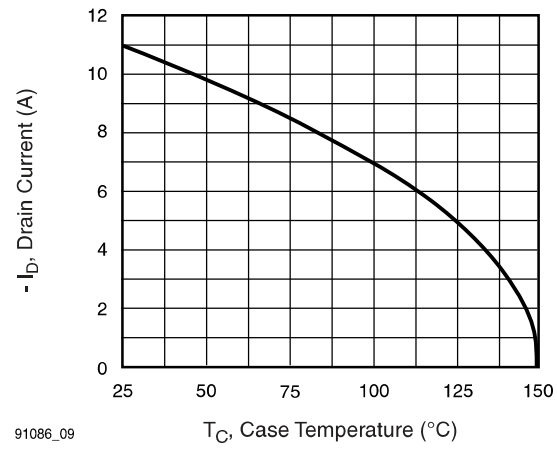
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**Fig. 7 - Typical Source-Drain Diode Forward Voltage**



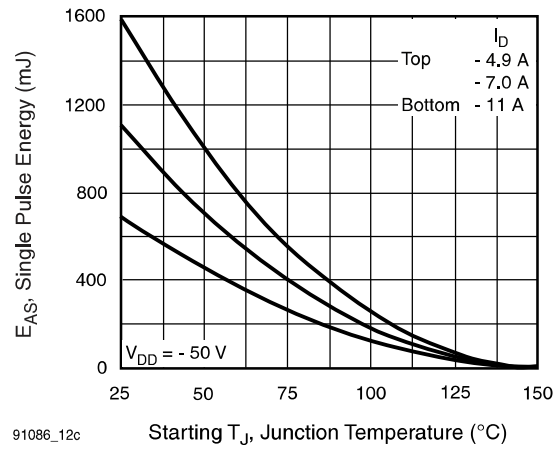
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**Fig. 8 - Maximum Safe Operating Area**



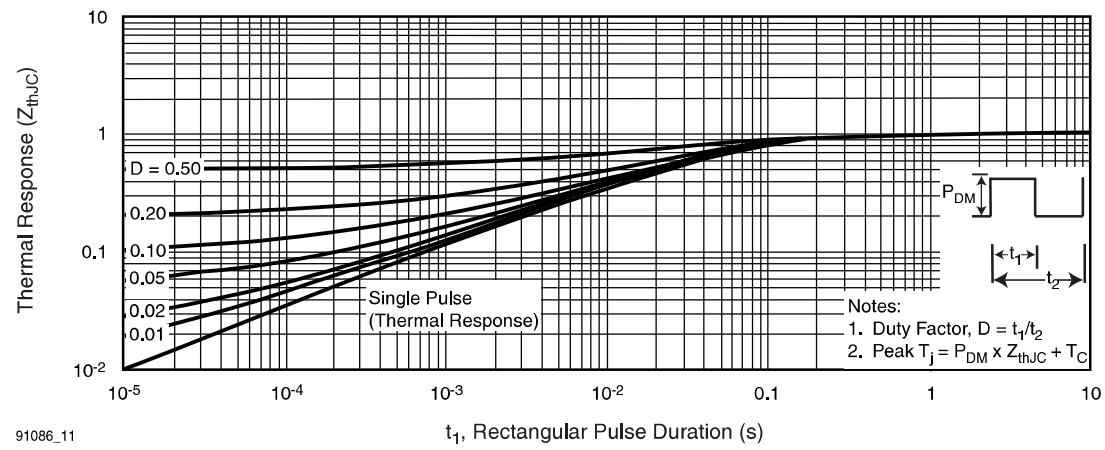
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**Fig. 9 - Maximum Drain Current vs. Case Temperature**



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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-252

Dim.	Min.	Typ.	Max.
A	2.10	-	2.50
A2	0	-	0.10
B	0.66	-	0.86
B2	5.18	-	5.48
C	0.40	-	0.60
C2	0.44	-	0.58
D	5.90	-	6.30
D1	5.30REF		
E	6.40	-	6.80
E1	4.63	-	-
G	4.47	-	4.67
H	9.50	-	10.70
L	1.09	-	1.21
L2	1.35	-	1.65
V1	-	7°	-
V2	0°	-	6°
All Dimensions in millimeter			

