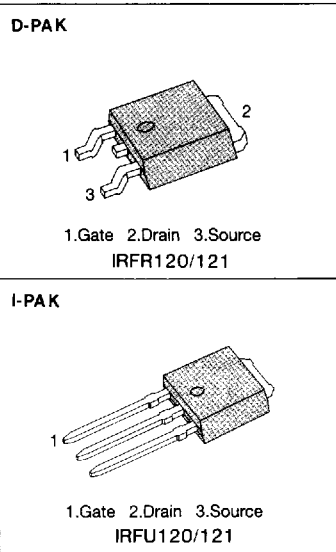


**FEATURES**

- Lower  $R_{DS(ON)}$
- Improved inductive ruggedness
- Fast switching times
- Rugged polysilicon gate cell structure
- Lower input capacitance
- Extended safe operating area
- Improved high temperature reliability

**PRODUCT SUMMARY**

Part Number	$V_{DS}$	$R_{DS(on)}$	$I_D$
IRFR120/U120	100V	0.27 $\Omega$	8.4A
IRFR121/U121	80V	0.27 $\Omega$	8.4A



**MAXIMUM RATINGS**

Characteristic	Symbol	IRFR120/U120	IRFR121/U121	Unit
Drain-Source Voltage (1)	$V_{DS}$	100	80	Vdc
Drain-Gate Voltage ( $R_{GS}=1.0M\Omega$ )(1)	$V_{DGR}$	100	80	Vdc
Gate-Source Voltage	$V_{GS}$		$\pm 20$	Vdc
Continuous Drain Current $T_C=25^\circ C$	$I_D$	8.4		Adc
Continuous Drain Current $T_C=100^\circ C$	$I_D$	5.9		Adc
Drain Current—Pulsed (3)	$I_{DM}$	34		Adc
Gate Current—Pulsed	$I_{GM}$		$\pm 1.5$	Adc
Single Pulsed Avalanche Energy (4)	$E_{AS}$	30		mJ
Avalanche Current	$I_{AS}$	8.4		A
Total Power Dissipation @ $T_C=25^\circ C$ Derate above $25^\circ C$	$P_D$	42 0.33		Watts W/ $^\circ C$
Operating and Storage Junction Temperature Range	$T_J, T_{stg}$		-55 to +150	$^\circ C$
Maximum Lead Temp. for Soldering Purposes, 1/8" from case for 5 seconds	$T_L$	300		$^\circ C$

- Notes:** (1)  $T_J=25^\circ C$  to  $150^\circ C$   
 (2) Pulse test: Pulse width $\leq 300\mu s$ , Duty Cycle $\leq 2\%$   
 (3) Repetitive rating: Pulse width limited by max. junction temperature  
 (4)  $L=0.64mH$ ,  $V_{dd}=25V$ ,  $R_G=25\Omega$ , Starting  $T_J=25^\circ C$

**ELECTRICAL CHARACTERISTICS** (T<sub>C</sub>=25°C unless otherwise specified)

Symbol	Characteristic	Min	Typ	Max	Units	Test Conditions
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage					
	IRFR120/U120	100	-	-	V	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA
	IRFR121/U121	80	-	-	V	
V <sub>GS(th)</sub>	Gate Threshold Voltage	2.0	-	4.0	V	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA
I <sub>GSS</sub>	Gate-Source Leakage Forward	-	-	100	nA	V <sub>GS</sub> =20V
I <sub>GSS</sub>	Gate-Source Leakage Reverse	-	-	-100	nA	V <sub>GS</sub> =-20V
I <sub>DSS</sub>	Zero Gate Voltage	-	-	250	μA	V <sub>DS</sub> =Max. Rating, V <sub>GS</sub> =0V
	Drain Current	-	-	1000	μA	V <sub>DS</sub> =0.8 Max. Rating, V <sub>GS</sub> =0V, T <sub>C</sub> =125°C
R <sub>DS(on)</sub>	Static Drain-Source On Resistance(2)	-	-	0.27	Ω	V <sub>GS</sub> =10V, I <sub>D</sub> =4.2A
g <sub>fs</sub>	Forward Transconductance (2)	2.8	3.3	-	Ω	V <sub>DS</sub> ≥50V, I <sub>D</sub> =4.2A
C <sub>iss</sub>	Input Capacitance	-	416	-	pF	V <sub>GS</sub> =0V, V <sub>DS</sub> =25V, f=1.0MHz
C <sub>oss</sub>	Output Capacitance	-	111	-	pF	
C <sub>rss</sub>	Reverse Transfer Capacitance	-	43	-	pF	
t <sub>d(on)</sub>	Turn-On Delay Time	-	8.8	13	ns	V <sub>DD</sub> =0.5 BV <sub>DSS</sub> , I <sub>D</sub> =8.4A, Z <sub>0</sub> =18 Ω (MOSFET switching times are essentially independent of operating temperature)
t <sub>r</sub>	Rise Time	-	30	45	ns	
t <sub>d(off)</sub>	Turn-Off Delay Time	-	19	29	ns	
t <sub>f</sub>	Fall Time	-	20	30	ns	
Q <sub>g</sub>	Total Gate Charge (Gate-Source Plus Gate-Drain)	-	-	22	nC	
Q <sub>gs</sub>	Gate-Source Charge	-	4.6	-	nC	V <sub>GS</sub> =10V, I <sub>D</sub> =8.4A, V <sub>DS</sub> =0.8 Max. Rating (Gate charge is essentially independent of operating temperature)
Q <sub>gd</sub>	Gate-Drain ("Miller") Charge	-	9.1	-	nC	

**THERMAL RESISTANCE**

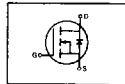
Symbol	Characteristics		All	Units	Remark
R <sub>thJC</sub>	Junction-to-Case	MAX	3.0	K/W	
R <sub>thCS</sub>	Case-to-Sink	TYP	1.7	K/W	Mounting surface flat, smooth and greased
R <sub>thJA</sub>	Junction-to-Ambient	MAX	110	K/W	Free Air Operation

Notes : (1) T<sub>J</sub>=25°C to 150°C

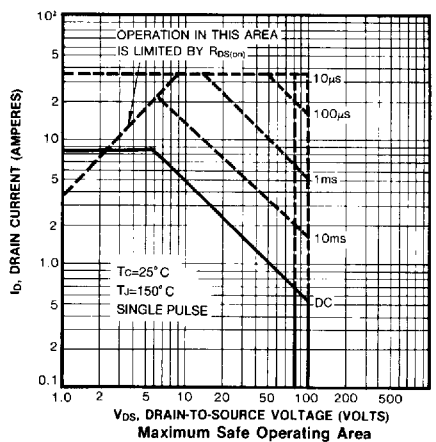
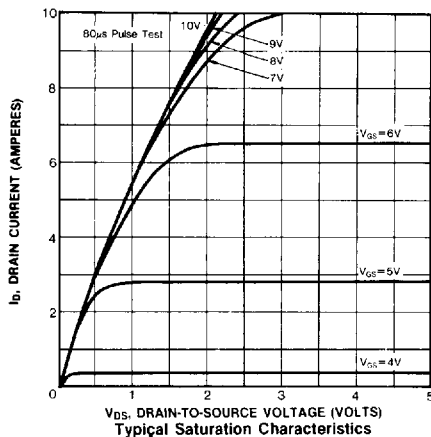
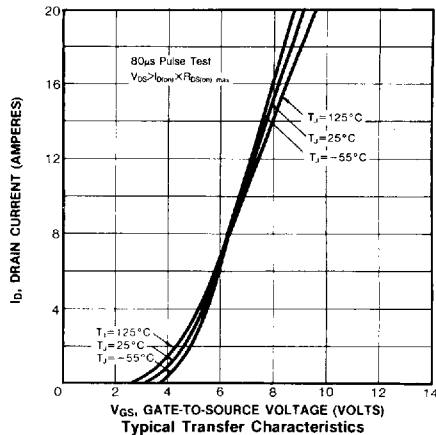
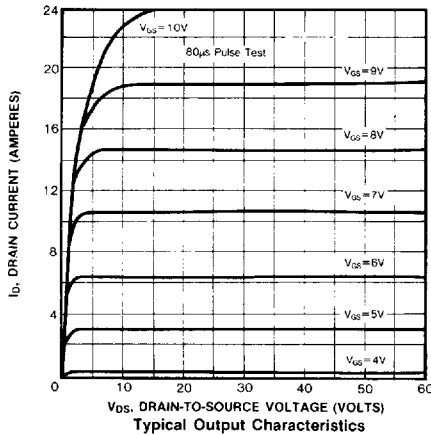
(2) Pulse test : Pulse width ≤ 300μs, Duty Cycle ≤ 2%

(3) Repetitive rating : Pulse width limited by max. junction temperature

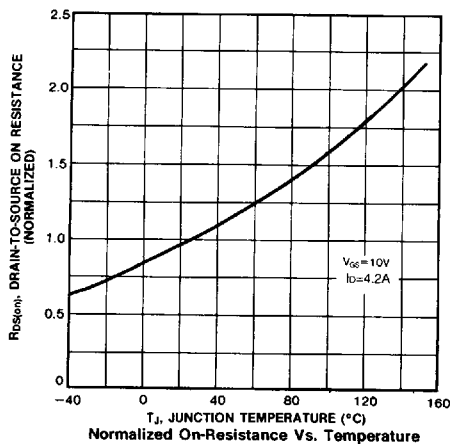
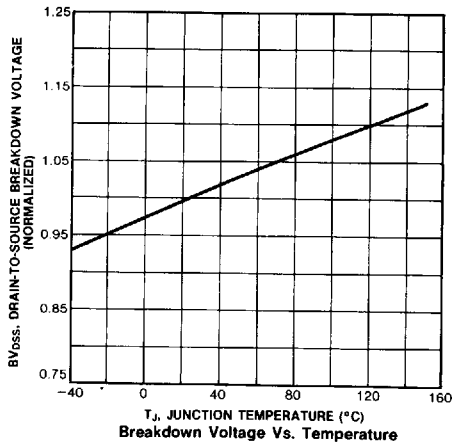
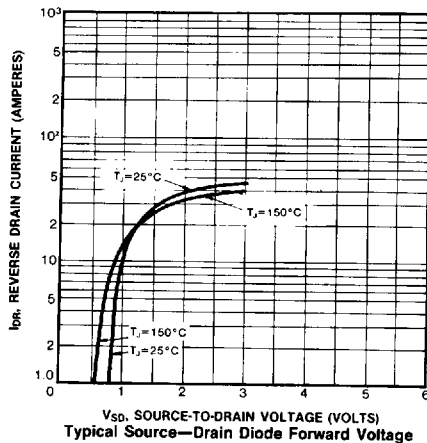
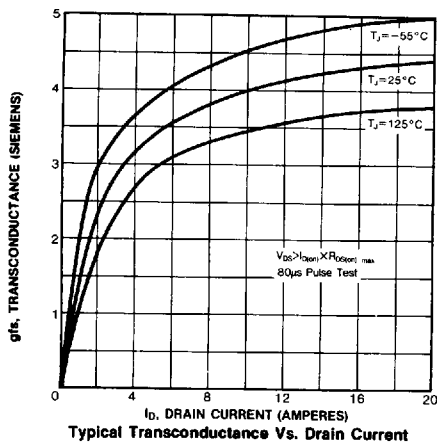
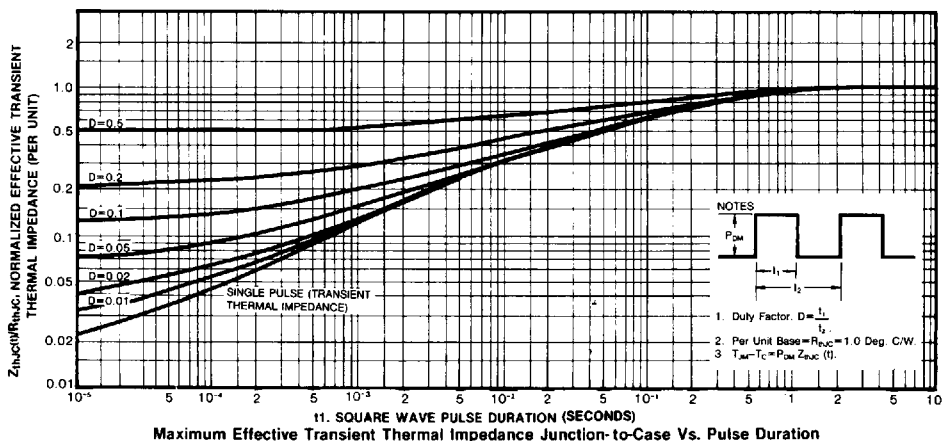
**SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS**

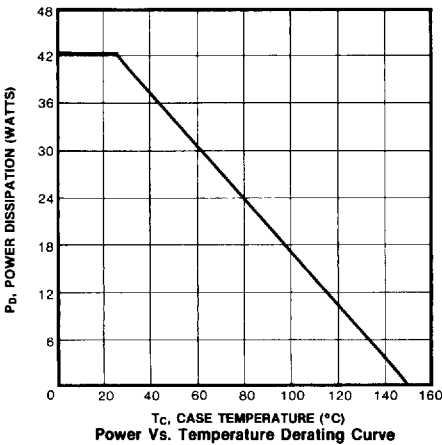
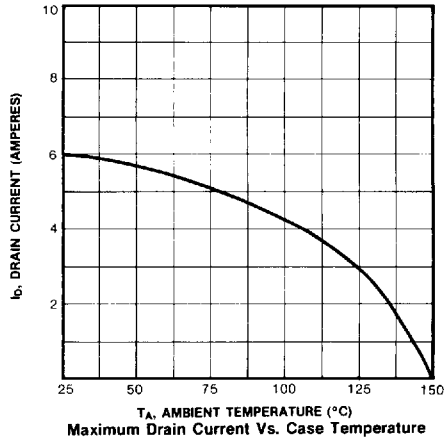
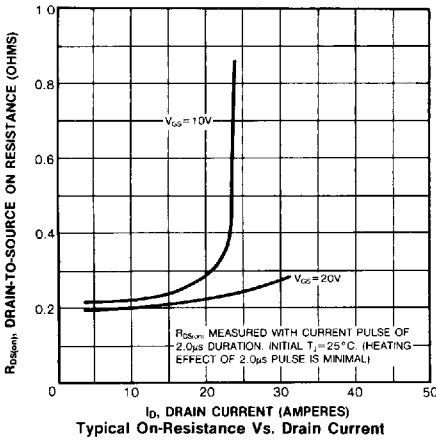
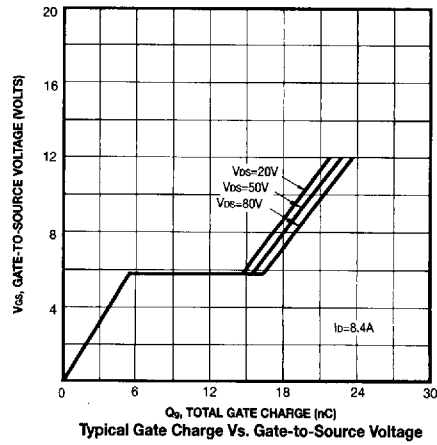
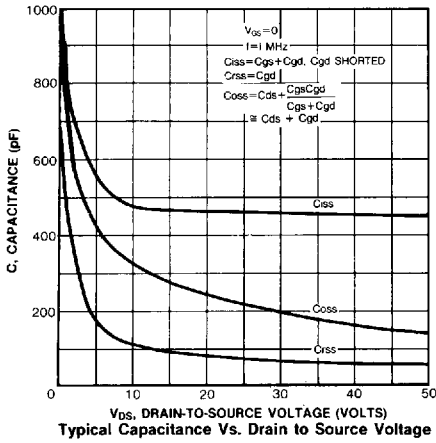
Symbol	Characteristic	Min	Typ	Max	Units	Test Conditions
Is	Continuous Source Current (Body Diode)	-	-	8.4	A	Modified MOSFET symbol showing the integral reverse P-N junction rectifier 
ISM	Pulse Source Current (Body Diode) (3)	-	-	34	A	
VSD	Diode Forward Voltage	-	-	2.5	V	T <sub>J</sub> =25°C, I <sub>S</sub> =8.4A, V <sub>GS</sub> =0V
t <sub>rr</sub>	Reverse Recovery Time	-	110	240	ns	T <sub>J</sub> =150°C, I <sub>F</sub> =8.4A, dI <sub>F</sub> /dt=100A/μS

- Notes: (1) T<sub>J</sub>=25°C to 150°C  
 (2) Pulse test : Pulse width ≤ 300μs, Duty Cycle ≤ 2%  
 (3) Repetitive rating : Pulse width limited by max. junction temperature



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