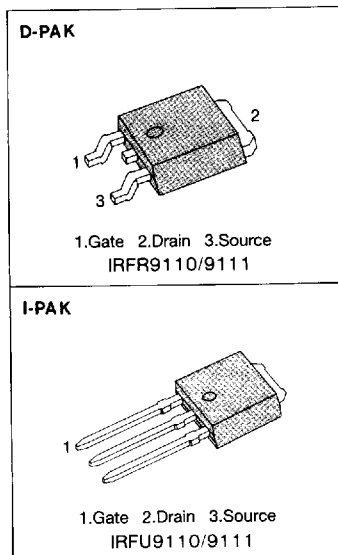


FEATURES

- 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
IRFR9110/U9110	-100V	1.2 Ω	-3.2A
IRFR9111/U9111	-80V	1.2 Ω	-3.2A



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MAXIMUM RATINGS

Characteristic	Symbol	IRFR9110/U9110	IRFR9111/U9111	Unit
Drain-Source Voltage (1)	V_{DSS}	-100	-80	Vdc
Drain-Gate Voltage ($R_{GS}=1.0M\Omega$)(1)	V_{DGR}	-100	-80	Vdc
Gate-Source Voltage	V_{GS}		± 20	Vdc
Continuous Drain Current $T_C=25^\circ C$	I_D	-3.2		Adc
Continuous Drain Current $T_C=100^\circ C$	I_D	-2.0		Adc
Drain Current—Pulsed (3)	I_{DM}	-13		Adc
Gate Current—Pulsed	I_{GM}		± 1.5	Adc
Single Pulsed Avalanche Energy (4)	E_{AS}		190	mJ
Avalanche Current	I_{AS}	-3.2		A
Total Power Dissipation @ $T_C=25^\circ C$ Derate above $25^\circ C$	P_D		25 0.20	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) $L=29mH$, $V_{dd}=-25V$, $R_g=25\Omega$, Starting $T_J=25^\circ C$

ELECTRICAL CHARACTERISTICS ($T_C=25^\circ\text{C}$ unless otherwise specified)

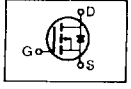
Symbol	Characteristic	Min	Typ	Max	Units	Test Conditions
BV _{DSS}	Drain-Source Breakdown Voltage					
	IRFR9110/IRFU9110	-100	-	-	V	V _{GS} =0V, I _D =-250 μ A
	IRFR9111/IRFU9111	-80	-	-	V	
V _{GS(th)}	Gate Threshold Voltage	2.0	-	4.0	V	V _{DS} =V _{GS} , I _D =-250 μ A
I _{GSS}	Gate-Source Leakage Forward	-	-	100	nA	V _{GS} =-20V
I _{GSS}	Gate-Source Leakage Reverse	-	-	-100	nA	V _{GS} =20V
I _{DSS}	Zero Gate Voltage Drain Current	-	-	-250	μ A	V _{DS} =-Max. Rating, V _{GS} =0V
		-	-	-1000	μ A	V _{DS} =-0.8 Max. Rating, V _{GS} =0V, T _C =125 $^\circ$ C
R _{DS(on)}	Static Drain-Source On Resistance (2)	-	-	1.2	Ω	V _{GS} =10V, I _D =-1.6A
g _{fs}	Forward Transconductance (2)	0.7	-	-	S	V _{DS} \geq -50V, I _D =-1.6A
C _{iss}	Input Capacitance	-	250	-	pF	V _{GS} =0V, V _{DS} =-25V, f=1.0MHz
C _{oss}	Output Capacitance	-	92	-	pF	
C _{rss}	Reverse Transfer Capacitance	-	51	-	pF	
t _{d(on)}	Turn-On Delay Time	-	7.9	12	ns	V _{DD} =-0.5 BV _{DSS} , I _D =-3.2A, Z _O =24 Ω (MOSFET switching times are essentially independent of operating temperature)
t _r	Rise Time	-	33	50	ns	
t _{d(off)}	Turn-Off Delay Time	-	8.3	12	ns	
t _f	Fall Time	-	14	21	ns	
Q _g	Total Gate Charge (Gate-Source Plus Gate-Drain)	-	-	19.0	nC	
Q _{gs}	Gate-Source Charge	-	4.1	-	nC	V _{GS} =-10V, I _D =-3.2A, V _{DS} =-0.8 Max. Rating (Gate charge is essentially independent of operating temperature)
Q _{gd}	Gate-Drain ("Miller") Charge	-	9.6	-	nC	

THERMAL RESISTANCE

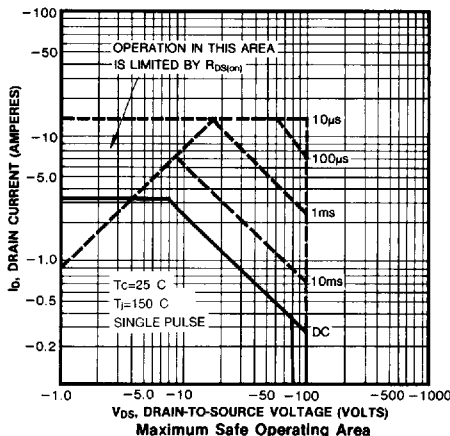
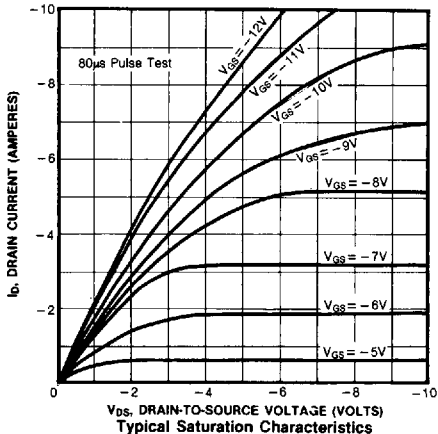
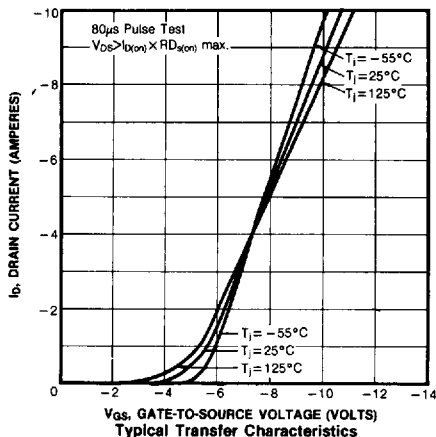
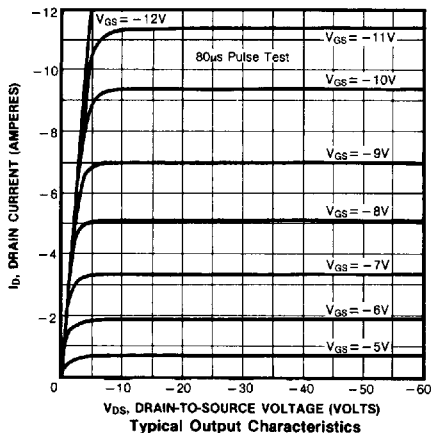
Symbol	Characteristics		All	Units	Remark
R _{thJC}	Junction-to-Case	MAX	5.0	K/W	
R _{thCS}	Case-to-Sink	TYP	1.7	K/W	Mounting surface flat, smooth and greased
R _{thJA}	Junction-to-Ambient	MAX	110	K/W	Free Air Operation

- Notes : (1) T_J=25 $^\circ$ C to 150 $^\circ$ C
 (2) Pulse test : Pulse width \leq 300 μ s, Duty Cycle \leq 2%
 (3) Repetitive rating : Pulse width limited by max. junction temperature

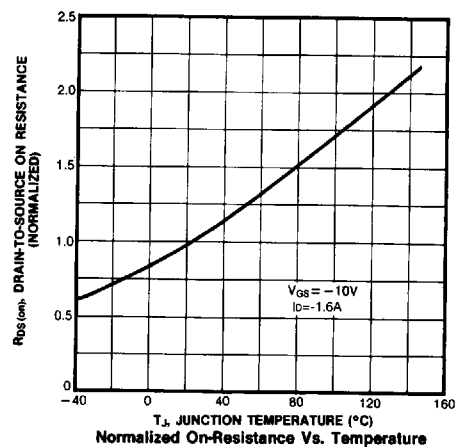
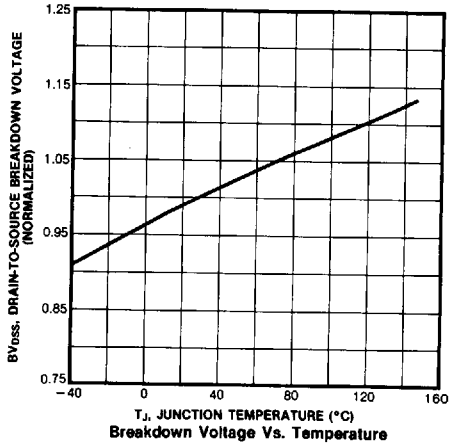
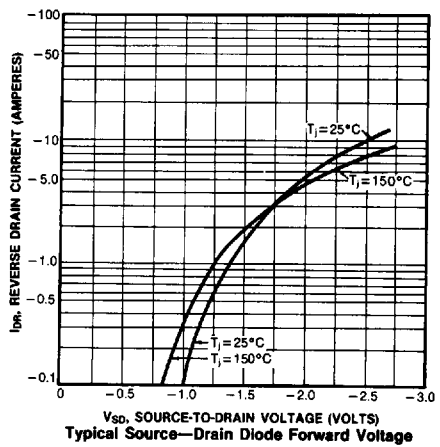
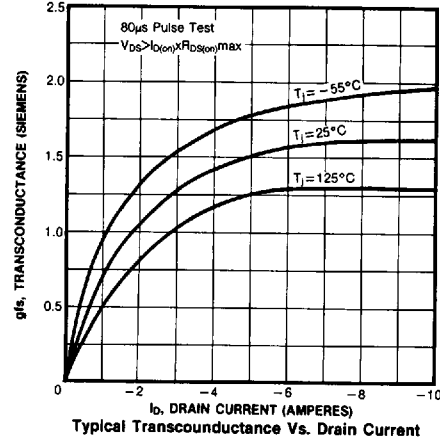
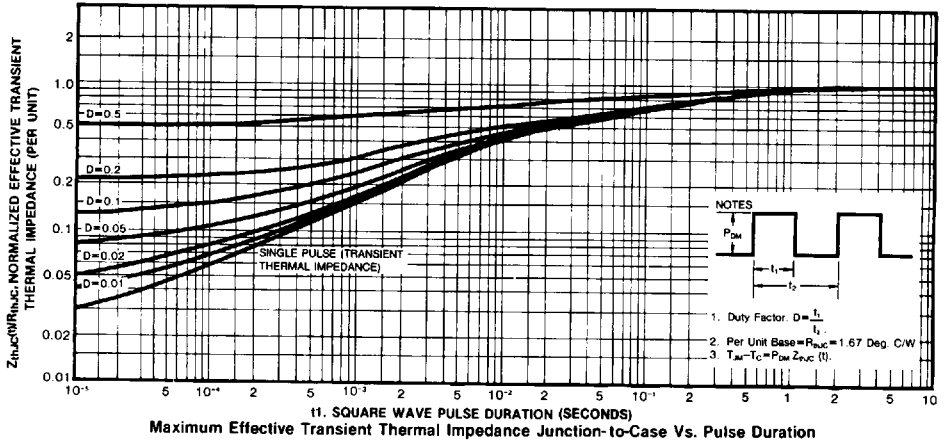
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

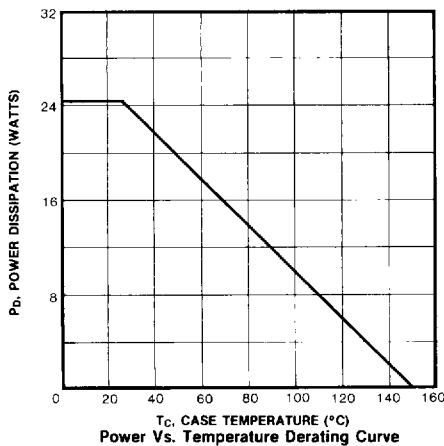
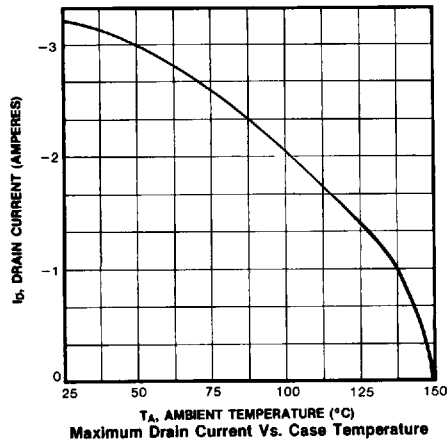
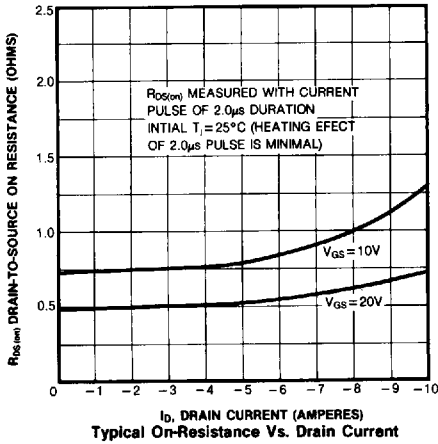
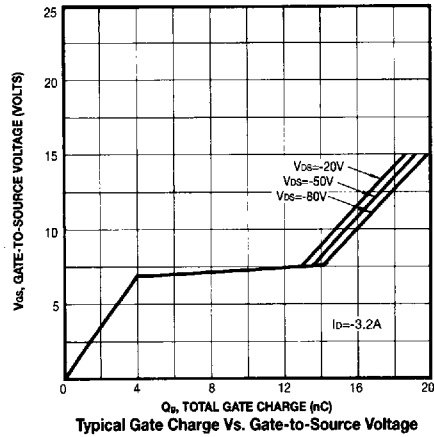
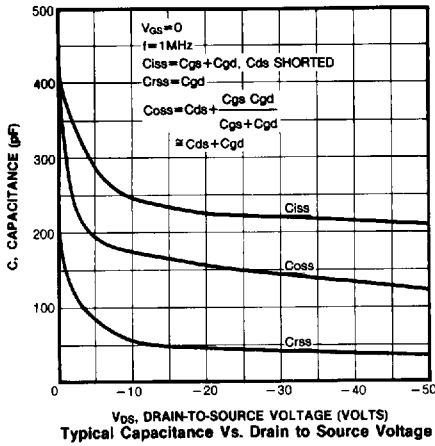
Symbol	Characteristic	Min	Typ	Max	Units	Test Conditions
I_S	Continuous Source Current (Body Diode)	-	-	-3.2	A	Modified MOSFET symbol showing the integral reverse P-N junction rectifier 
I_{SM}	Pulse Source Current (Body Diode) (3)	-	-	-12.8	A	
V_{SD}	Diode Forward Voltage	-	-	-5.5	V	$T_J=25^\circ\text{C}$, $I_S=-3.2\text{A}$, $V_{GS}=0\text{V}$
t_{rr}	Reverse Recovery Time	-	86	180	ns	$T_J=25^\circ\text{C}$, $I_F=-3.2\text{A}$, $dI_F/dt=100\text{A}/\mu\text{S}$

- Notes : (1) $T_J=25^\circ\text{C}$ to 150°C
 (2) Pulse test : Pulse width $\leq 300\mu\text{s}$, Duty Cycle $\leq 2\%$
 (3) Repetitive rating : Pulse width limited by max. junction temperature



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