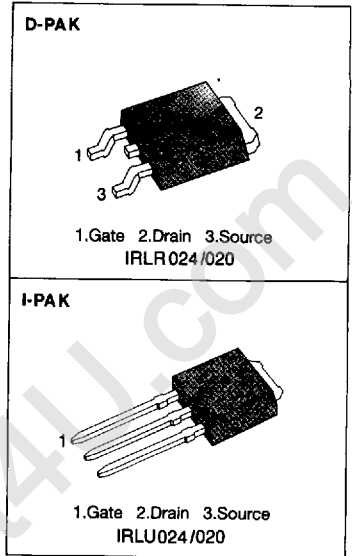


FEATURES

- Lower $R_{DS(on)}$
- Excellent voltage stability
- Fast switching speeds
- Rugged polysilicon gate cell structure
- Lower input capacitance
- Extended safe operating area
- Improved high temperature reliability
- D-PAK/I-PAK

PRODUCT SUMMARY

Part Number	V_{DS}	$R_{DS(on)}$	$I_{D(on)}$
IRLR024/U024	60V	0.15Ω	14A
IRLR020/U020	50V	0.15Ω	14A



MAXIMUM RATINGS

Characteristic	Symbol	IRLR024 IRLU024	IRLR020 IRLU020	Units
Drain-Source Voltage (1)	V_{DS}	60	50	Vdc
Drain-Gate Voltage ($R_{GS}=1.0M\Omega$) (1)	V_{DGR}	60	50	Vdc
Gate-Source Voltage	V_{GS}	± 15		Vdc
Continuous Drain Current $T_C=25^\circ C$	I_D	14.0		Adc
Continuous Drain Current $T_C=100^\circ C$	I_D	8.7		Adc
Drain Current—Pulsed (3)	I_{DM}	52		Adc
Total Power Dissipation @ $T_C=25^\circ C$	P_D	42		Watts W/°C
Derate above 25°C		0.33		
Operating and Storage Junction Temperature Range	T_J, T_{STG}	-55 to +150		°C
Maximum Lead Temp. for Soldering Purposes, 1/8" from case for 5 seconds	T_L	300		°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

ELECTRICAL CHARACTERISTICS (Tc=25°C unless otherwise specified)

Symbol	Characteristic	Min	Typ	Max	Units	Test Conditions
BV _{DSS}	Drain-Source Breakdown Voltage					
	IRLR024/U024	1.0	-	-	V	V _{GS} =0V, I _D =250μA
	IRLR020/U020	-	-	-	V	
V _{GS(th)}	Gate Threshold Voltage	1.0	-	2.0	V	V _{DS} =V _{GS} , I _D =1mA
I _{GSS}	Gate-Source Leakage Forward	-	-	100	nA	V _{GS} =15V
I _{GSS}	Gate-Source Leakage Reverse	-	-	-100	nA	V _{GS} =-15V
I _{DSS}	Zero Gate Voltage	-	-	250	μA	V _{DS} =Max. Rating, V _{GS} =0V
	Drain Current	-	-	1000	μA	V _{DS} =0.8 Max. Rating, V _{GS} =0V, Tc=125°C
R _{DS(on)}	Static Drain-Source On Resistance(2)	-	-	0.15	Ω	V _{GS} =5.0V, I _D =7A
g _{fs}	Forward Transconductance (2)	2.0	-	-	Ω	V _{DS} ≥15V, I _D =7A
C _{iss}	Input Capacitance	-	750	-	pF	V _{GS} =0V, V _{DS} =25V, f=1.0MHz
C _{oss}	Output Capacitance	-	250	-	pF	
C _{rss}	Reverse Transfer Capacitance	-	120	-	pF	
t _{d(on)}	Turn-On Delay Time	-	-	30	ns	V _{DD} =0.5 BV _{DSS} , I _D =14A, Z _o =24Ω (MOSFET switching times are essentially independent of operating temperature)
t _r	Rise Time	-	-	90	ns	
t _{d(off)}	Turn-Off Delay Time	-	-	40	ns	
t _f	Fall Time	-	-	30	ns	
Q _g	Total Gate Charge (Gate-Source Plus Gate-Drain)	-	-	38	nC	V _{GS} =5V, I _D =14A, V _{DS} =0.8 Max. Rating (Gate charge is essentially independent of operating temperature)
Q _{gs}	Gate-Source Charge	-	25	-	nC	
Q _{gd}	Gate-Drain Charge	-	5.0	-	nC	

THERMAL RESISTANCE

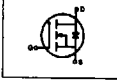
Symbol	Characteristics		All	Units	Remark
R _{thJC}	Junction-to-Case	MAX	3.0	K/W	
R _{thCS}	Case-to-Sink	TYP	1.7	K/W	Mounting surface flat, smooth and greased
R _{thJA}	Junction-to-Ambient	MAX	110	K/W	Free Air Operation

Notes : (1) T_J=25°C to 150°C

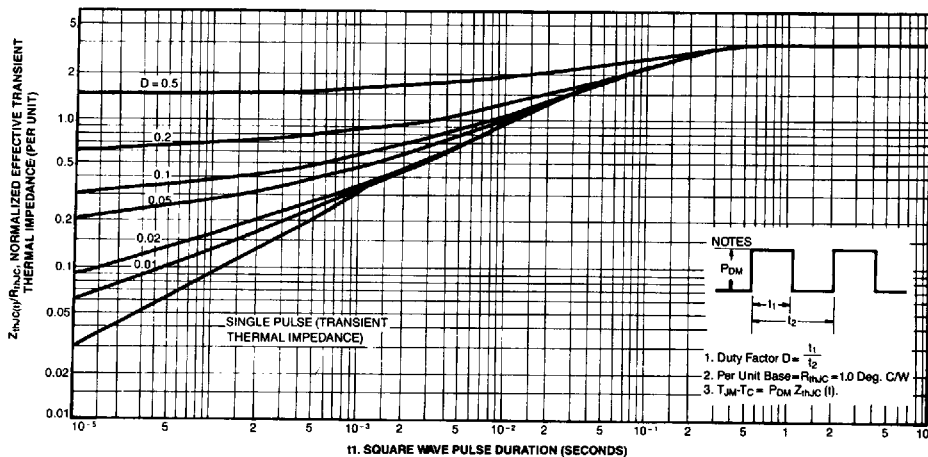
(2) Pulse test : Pulse width ≤ 300μs, Duty Cycle ≤ 2%

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

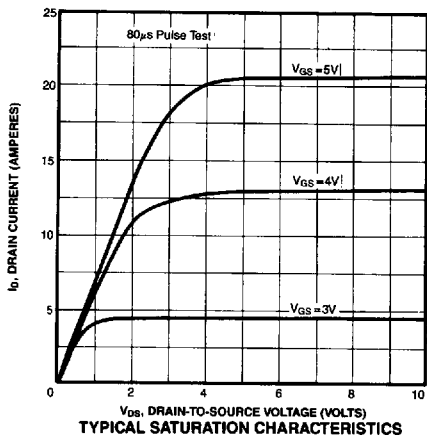
SOURCE-DRAIN DIODE RATING AND CHARACTERISTICS

Symbol	Characteristic	Min	Typ	Max	Units	Test Condition
I_S	Continuous Source Current (Body Diode)	—	—	14	A	Modified MOSFET showing the symbol integral reverse P-N junction rectifier 
I_{SM}	Pulse Source Current (Body Diode) (3)	—	—	52	A	
V_{SD}	Diode Forward Voltage (2)	—	—	1.4	V	$T_J=25^\circ\text{C}$, $I_S=14\text{A}$, $V_{GS}=0\text{V}$
t_{rr}	Reverse Recovery Time	—	—	300	ns	$T_J=25^\circ\text{C}$, $I_F=14\text{A}$, $dI_F/dt=100\text{A}/\mu\text{s}$

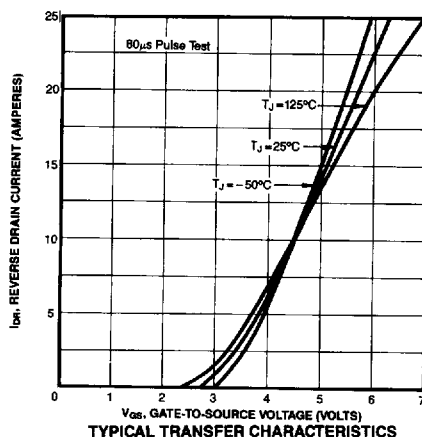
- Notes: (1) $T_J=25^\circ\text{C}$ to 150°C
 (2) Pulse test: Pulse width $\leq 300\mu\text{s}$, Duty Cycle $\leq 2\%$
 (3) Repetitive rating: Pulse width limited by max. junction temperature



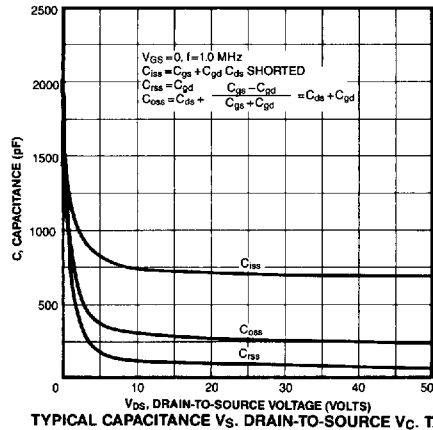
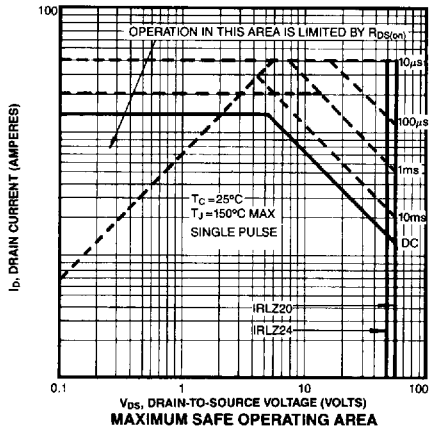
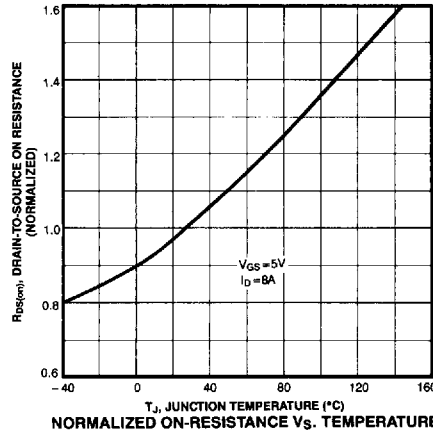
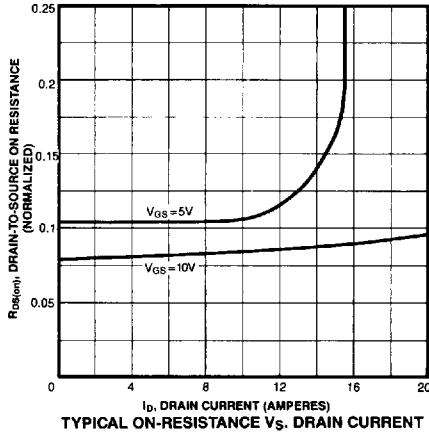
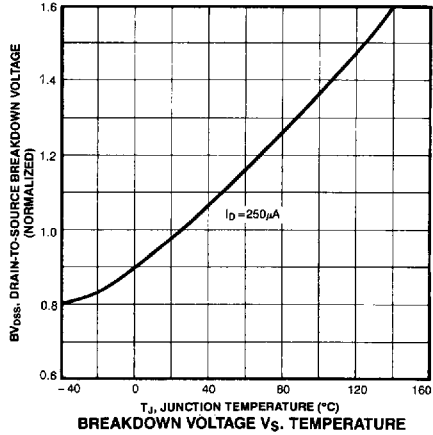
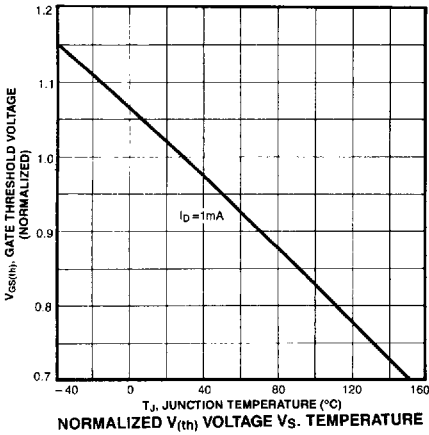
11. SQUARE WAVE PULSE DURATION (SECONDS)
 MAXIMUM EFFECTIVE TRANSIENT THERMAL IMPEDANCE JUNCTION-TO-CASE V_{GS} PULSE DURATION



TYPICAL SATURATION CHARACTERISTICS



TYPICAL TRANSFER CHARACTERISTICS



4

