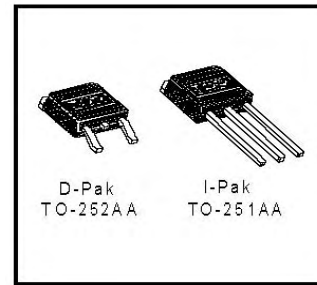
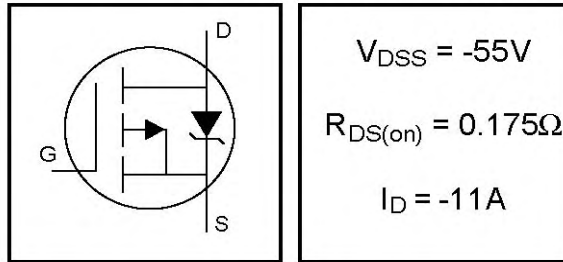


- Ultra Low On-Resistance
- P-Channel
- Surface Mount (IRFR9024N)
- Straight Lead (IRFU9024N)
- Advanced Process Technology
- Fast Switching
- Fully Avalanche Rated
- Lead-Free

HEXFET® Power MOSFET



Description

Fifth Generation HEXFETs from International Rectifier utilize advanced processing techniques to achieve extremely low on-resistance per silicon area. This benefit, combined with the fast switching speed and ruggedized device design that HEXFET Power MOSFETs are well known for, provides the designer with an extremely efficient and reliable device for use in a wide variety of applications.

The D-Pak is designed for surface mounting using vapor phase, infrared, or wave soldering techniques. The straight lead version (IRFU series) is for through-hole mounting applications. Power dissipation levels up to 1.5 watts are possible in typical surface mount applications.

Absolute Maximum Ratings

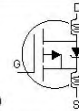
	Parameter	Max.	Units
$I_D @ T_C = 25^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ -10\text{V}$	-11	A
$I_D @ T_C = 100^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ -10\text{V}$	-8	
I_{DM}	Pulsed Drain Current ①	-44	
$P_D @ T_C = 25^\circ\text{C}$	Power Dissipation	38	W
	Linear Derating Factor	0.30	W/°C
V_{GS}	Gate-to-Source Voltage	± 20	V
E_{AS}	Single Pulse Avalanche Energy ②	62	mJ
I_{AR}	Avalanche Current ①	-6.6	A
E_{AR}	Repetitive Avalanche Energy ①	3.8	mJ
dv/dt	Peak Diode Recovery dv/dt ③	-10	V/ns
T_J	Operating Junction and Storage Temperature Range	-55 to + 150	°C
T_{STG}			
	Soldering Temperature, for 10 seconds	300 (1.6mm from case)	

Thermal Resistance

	Parameter	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-Case	---	3.3	°C/W
$R_{\theta JA}$	Junction-to-Ambient (PCB mount)**	---	50	
$R_{\theta JA}$	Junction-to-Ambient	---	110	

Electrical Characteristics @ T_J = 25°C (unless otherwise specified)

	Parameter	Min.	Typ.	Max.	Units	Conditions
V _{(BR)DSS}	Drain-to-Source Breakdown Voltage	-55	—	—	V	V _{GS} = 0V, I _D = -250μA
ΔV _{(BR)DSS/ΔT_J}	Breakdown Voltage Temp. Coefficient	—	-0.05	—	V/°C	Reference to 25°C, I _D = -1mA
R _{DS(on)}	Static Drain-to-Source On-Resistance	—	—	0.175	Ω	V _{GS} = -10V, I _D = -6.6A ④
V _{GS(th)}	Gate Threshold Voltage	-2.0	—	-4.0	V	V _{DS} = V _{GS} , I _D = -250μA
g _{fs}	Forward Transconductance	2.5	—	—	S	V _{DS} = -25V, I _D = -7.2A⑥
I _{DSS}	Drain-to-Source Leakage Current	—	—	-25	μA	V _{DS} = -55V, V _{GS} = 0V
		—	—	-250		V _{DS} = -44V, V _{GS} = 0V, T _J = 150°C
I _{GSS}	Gate-to-Source Forward Leakage	—	—	100	nA	V _{GS} = 20V
	Gate-to-Source Reverse Leakage	—	—	-100		V _{GS} = -20V
Q _g	Total Gate Charge	—	—	19	nC	I _D = -7.2A
Q _{gs}	Gate-to-Source Charge	—	—	5.1		V _{DS} = -44V
Q _{gd}	Gate-to-Drain ("Miller") Charge	—	—	10		V _{GS} = -10V, See Fig. 6 and 13 ④⑥
t _{d(on)}	Turn-On Delay Time	—	13	—	ns	V _{DD} = -28V
t _r	Rise Time	—	55	—		I _D = -7.2A
t _{d(off)}	Turn-Off Delay Time	—	23	—		R _G = 24Ω
t _f	Fall Time	—	37	—		R _D = 3.7Ω, See Fig. 10 ④⑥
L _D	Internal Drain Inductance	—	4.5	—	nH	Between lead, 6mm (0.25in.) from package and center of die contact⑤
L _S	Internal Source Inductance	—	7.5	—		
C _{iss}	Input Capacitance	—	350	—	pF	V _{GS} = 0V
C _{oss}	Output Capacitance	—	170	—		V _{DS} = -25V
C _{rss}	Reverse Transfer Capacitance	—	92	—		f = 1.0MHz, See Fig. 5⑥



Source-Drain Ratings and Characteristics

	Parameter	Min.	Typ.	Max.	Units	Conditions
I _S	Continuous Source Current (Body Diode)	—	—	-11	A	MOSFET symbol showing the integral reverse p-n junction diode.
I _{SM}	Pulsed Source Current (Body Diode) ①	—	—	-44		
V _{SD}	Diode Forward Voltage	—	—	-1.6	V	T _J = 25°C, I _S = -7.2A, V _{GS} = 0V ④
t _{rr}	Reverse Recovery Time	—	47	71	ns	T _J = 25°C, I _F = -7.2A
Q _{rr}	Reverse Recovery Charge	—	84	130	nC	di/dt = 100A/μs ④⑥
t _{on}	Forward Turn-On Time	Intrinsic turn-on time is negligible (turn-on is dominated by L _S +L _D)				

Notes:

- ① Repetitive rating; pulse width limited by max. junction temperature. (See fig. 11)
- ② Starting T_J = 25°C, L = 2.8mH
R_G = 25Ω, I_{AS} = -6.6A. (See Figure 12)
- ③ I_{SD} ≤ -6.6A, di/dt ≤ 240A/μs, V_{DD} ≤ V_{(BR)DSS}, T_J ≤ 150°C
- ④ Pulse width ≤ 300μs; duty cycle ≤ 2%.
- ⑤ This is applied for I-PAK, L_S of D-PAK is measured between lead and center of die contact
- ⑥ Uses IRF9Z24N data and test conditions.

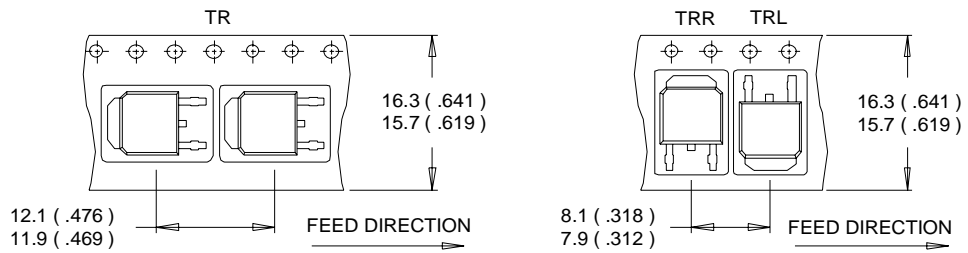
** When mounted on 1" square PCB (FR-4 or G-10 Material) .
For recommended footprint and soldering techniques refer to application note #AN-994

IRFR/U9024NPbF

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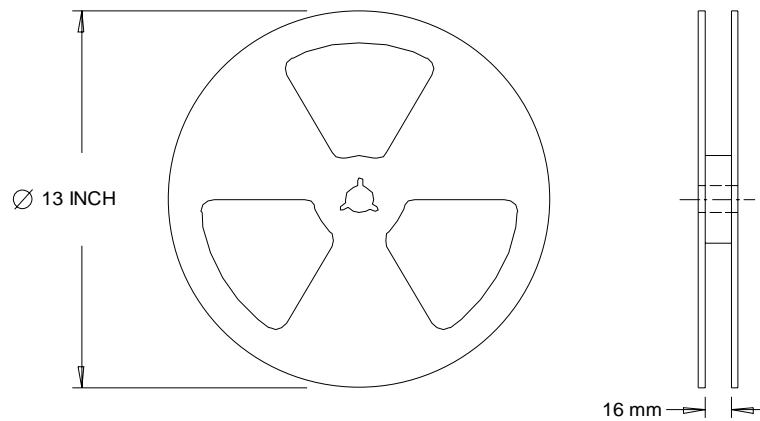
D-Pak (TO-252AA) Tape & Reel Information

Dimensions are shown in millimeters (inches)



NOTES :

1. CONTROLLING DIMENSION : MILLIMETER.
2. ALL DIMENSIONS ARE SHOWN IN MILLIMETERS (INCHES).
3. OUTLINE CONFORMS TO EIA-481 & EIA-541.



NOTES :

1. OUTLINE CONFORMS TO EIA-481.

Data and specifications subject to change without notice.

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