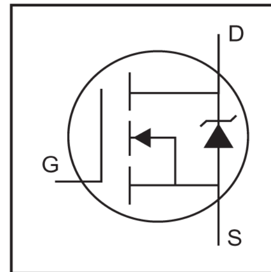
International
IOR Rectifier

PD - 95062A

IRLR2705PbF
IRLU2705PbF

HEXFET® Power MOSFET

- Logic-Level Gate Drive
- Ultra Low On-Resistance
- Surface Mount (IRLR2705)
- Straight Lead (IRLU2705)
- Advanced Process Technology
- Fast Switching
- Fully Avalanche Rated
- Lead-Free



V_{DSS} = 55V

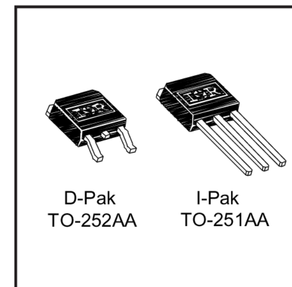
$R_{DS(on)}$ = 0.040Ω

I_D = 28A⑤

Description

Fifth Generation HEXFETs from International Rectifier utilize advanced processing techniques to achieve the lowest possible 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 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

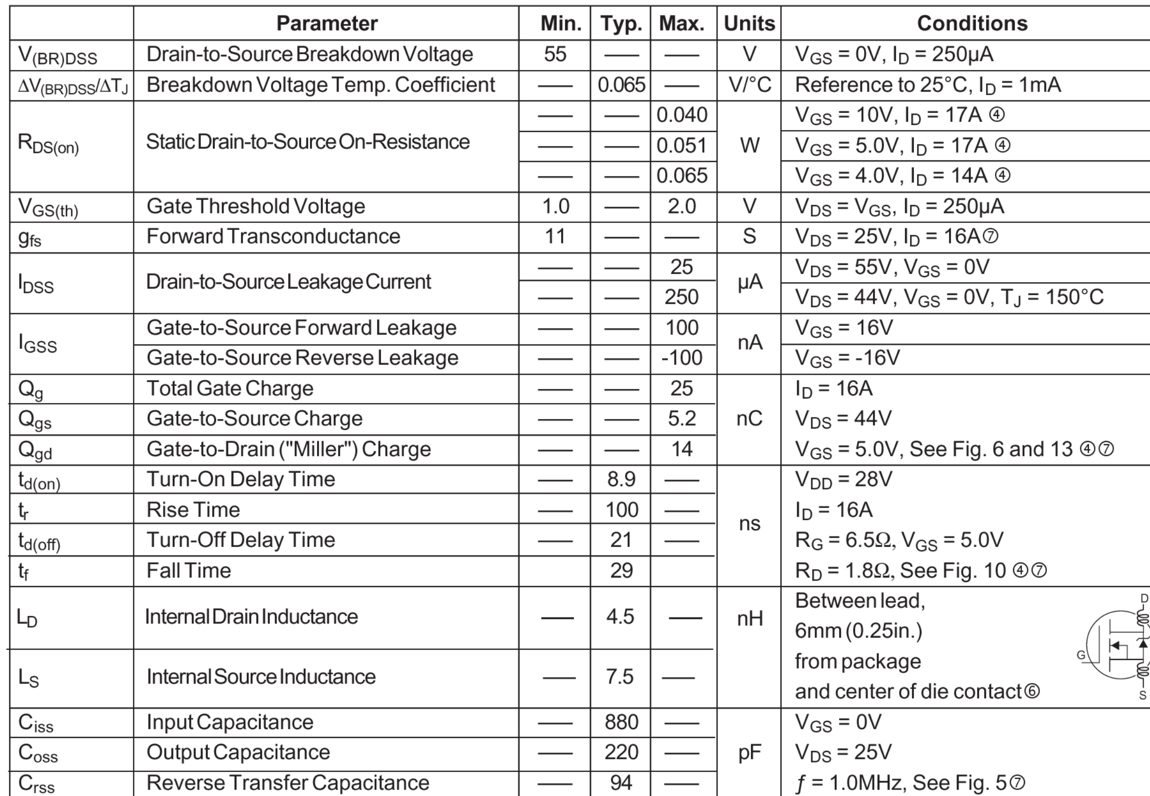
	Parameter	Max.	Units
I_D @ T_C = 25°C	Continuous Drain Current, V_{GS} @ 10V	28	A
I_D @ T_C = 100°C	Continuous Drain Current, V_{GS} @ 10V	20	
I_{DM}	Pulsed Drain Current ①	110	
P_D @T_C = 25°C	Power Dissipation	68	W
	Linear Derating Factor	0.45	W/°C
V_{GS}	Gate-to-Source Voltage	± 16	V
E_{AS}	Single Pulse Avalanche Energy②	110	mJ
I_{AR}	Avalanche Current①	16	A
E_{AR}	Repetitive Avalanche Energy①	6.8	mJ
dv/dt	Peak Diode Recovery dv/dt ③	5.0	V/ns
T_J T_{STG}	Operating Junction and Storage Temperature Range	-55 to + 175	°C
	Soldering Temperature, for 10 seconds	300 (1.6mm from case)	

Thermal Resistance

	Parameter	Typ.	Max.	Units
$R_{θJC}$	Junction-to-Case	——	2.2	°C/W
$R_{θJA}$	Case-to-Ambient (PCB mount)**	——	50	
$R_{θJA}$	Junction-to-Ambient	——	110	

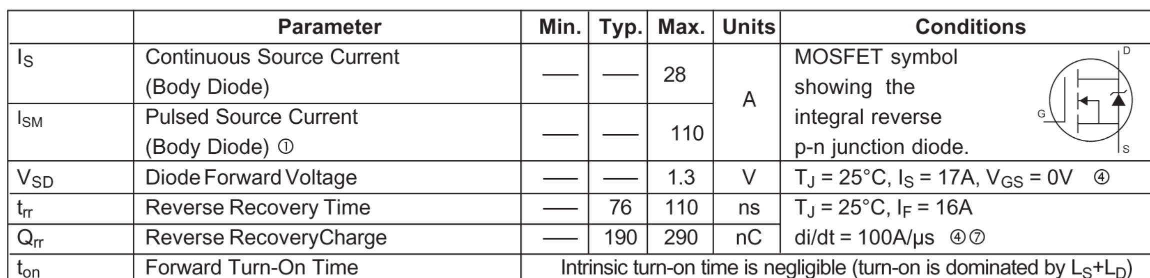
** When mounted on 1" square PCB (FR-4 or G-10 Material) .
For recommended footprint and soldering techniques refer to application note #AN-994

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
$\Delta V_{(BR)DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient	—	0.065	—	V/°C	Reference to 25°C, I_D = 1mA
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	—	—	0.040	W	V_{GS} = 10V, I_D = 17A ④
		—	—	0.051		V_{GS} = 5.0V, I_D = 17A ④
		—	—	0.065		V_{GS} = 4.0V, I_D = 14A ④
$V_{GS(th)}$	Gate Threshold Voltage	1.0	—	2.0	V	V_{DS} = V_{GS}, I_D = 250µA
g_{fs}	Forward Transconductance	11	—	—	S	V_{DS} = 25V, I_D = 16A⑦
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} = 16V
	Gate-to-Source Reverse Leakage	—	—	-100		V_{GS} = -16V
Q_g	Total Gate Charge	—	—	25	nC	I_D = 16A
Q_{gs}	Gate-to-Source Charge	—	—	5.2		V_{DS} = 44V
Q_{gd}	Gate-to-Drain ("Miller") Charge	—	—	14		V_{GS} = 5.0V, See Fig. 6 and 13 ④⑦
$t_{d(on)}$	Turn-On Delay Time	—	8.9	—	ns	V_{DD} = 28V
t_r	Rise Time	—	100	—		I_D = 16A
$t_{d(off)}$	Turn-Off Delay Time	—	21	—		R_G = 6.5Ω, V_{GS} = 5.0V
t_f	Fall Time		29			R_D = 1.8Ω, See Fig. 10 ④⑦
L_D	Internal Drain Inductance	—	4.5	—	nH	Between lead, 6mm (0.25in.) from package and center of die contact⑥
L_S	Internal Source Inductance	—	7.5	—		
C_{iss}	Input Capacitance	—	880	—	pF	V_{GS} = 0V
C_{oss}	Output Capacitance	—	220	—		V_{DS} = 25V
C_{rss}	Reverse Transfer Capacitance	—	94	—		f = 1.0MHz, See Fig. 5⑦

Source-Drain Ratings and Characteristics



	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current (Body Diode)	—	—	28	A	MOSFET symbol showing the integral reverse p-n junction diode.
I_{SM}	Pulsed Source Current (Body Diode) ①	—	—	110		
V_{SD}	Diode Forward Voltage	—	—	1.3	V	T_J = 25°C, I_S = 17A, V_{GS} = 0V ④
t_{rr}	Reverse Recovery Time	—	76	110	ns	T_J = 25°C, I_F = 16A
Q_{rr}	Reverse RecoveryCharge	—	190	290	nC	di/dt = 100A/µs ④⑦
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 V_{DD} = 25V, starting T_J = 25°C, L = 610µH R_G = 25Ω, I_{AS} = 16A. (See Figure 12)

③ $I_{SD} \leq$ 16A, di/dt $\leq$ 270A/µs, $V_{DD} \leq V_{(BR)DSS}$, $T_J \leq$ 175°C

④ Pulse width $\leq$ 300µs; duty cycle $\leq$ 2%.

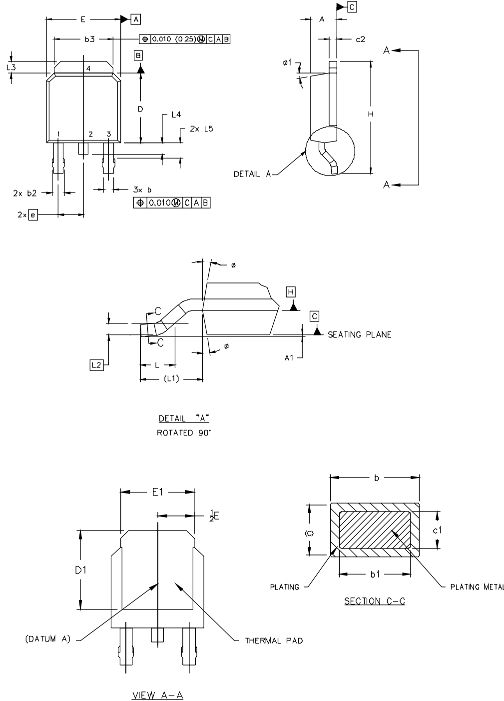
⑤ Caculated continuous current based on maximum allowable junction temperature; Package limitation current = 20A.

⑥ This is applied for I-PAK, L_S of D-PAK is measured between lead and center of die contact.

⑦ Uses IRLZ34N data and test conditions.

D-Pak (TO-252AA) Package Outline

Dimensions are shown in millimeters (inches)



NOTES:

1.0 DIMENSIONING AND TOLERANCING PER ASME Y14.5 M– 1994.
2.0 DIMENSIONS ARE SHOWN IN INCHES [MILLIMETERS].
3.0 LEAD DIMENSION UNCONTROLLED IN L5
4.0 DIMENSION D1 AND E1 ESTABLISH A MINIMUM MOUNTING SURFACE FOR THERMAL PAD.
5.0 SECTION C–C DIMENSIONS APPLY TO THE FLAT SECTION OF THE LEAD BETWEEN .005 [0.127] AND .010 [0.2540 FROM THE LEAD TIP.
6.0 DIMENSION D & E DO NOT INCLUDE MOLD FLASH. MOLD FLASH SHALL NOT EXCEED .005" (0.127) PER SIDE. THESE DIMENSIONS ARE MEASURED AT THE OUTERMOST EXTREMES OF THE PLASTIC BODY.
7.0 OUTLINE CONFORMS TO JEDEC OUTLINE TO–252AA.

SYMBOL	DIMENSIONS				NOTES
	MILLIMETERS		INCHES		
	MIN.	MAX.	MIN.	MAX.	
A	2.18	2.39	.086	.094	
A1		0 13		005	
b	0.64	0.89	.025	.035	5
b1	0.64	0.79	.025	0.031	5
b2	0.76	1.14	.030	.045	
b3	4.95	5.46	.195	.215	
c	0.46	0.61	.018	.024	5
c1	0.41	0.56	.016	.022	5
c2	.046	0.89	.018	.035	5
D	5.97	6.22	.235	.245	6
D1	5.21	–	205	–	4
E	6.35	6.73	.250	.265	6
E1	4 32	–	.170		4
e	2.29		.090 BSC		
H	9.40	10.41	.370	.410	
L	1.40	1.78	.055	.070	
L1	2.74 REF.		.108 REF.		
L2	0.051 BSC		.020 BSC		
L3	0.89	1.27	.035	.050	
L4		1.02		040	
L5	1.14	1.52	.045	.060	3
ø	0°	10°	0°	10°	
ø1	0°	15°	0°	15°	

LEAD ASSIGNMENTS

HEXFET

1.– GATE
2.– DRAIN
3.– SOURCE
4.– DRAIN

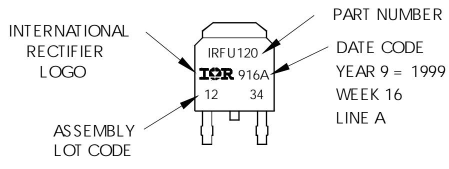
IGBTs, CoPACK

1.– GATE
2.– COLLECTOR
3.– EMITTER
4.– COLLECTOR

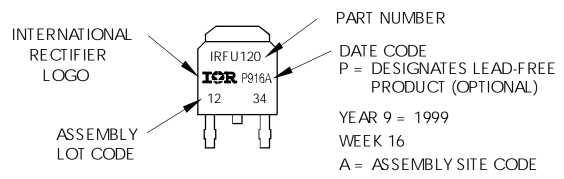
D-Pak (TO-252AA) Part Marking Information

EXAMPLE: THIS IS AN IRFR120
WITH ASSEMBLY
LOT CODE 1234
ASSEMBLED ON WW 16, 1999
IN THE ASSEMBLY LINE "A"

Note: "P" in assembly line position indicates "Lead-Free"

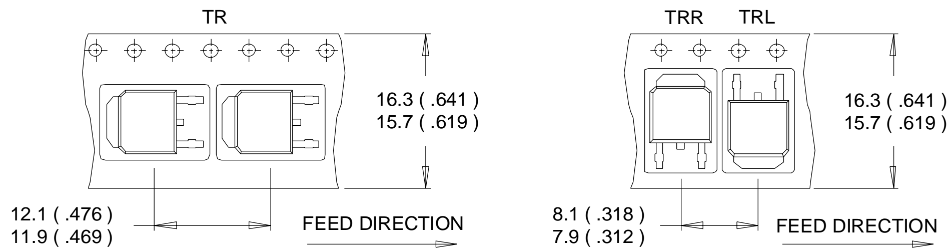


OR

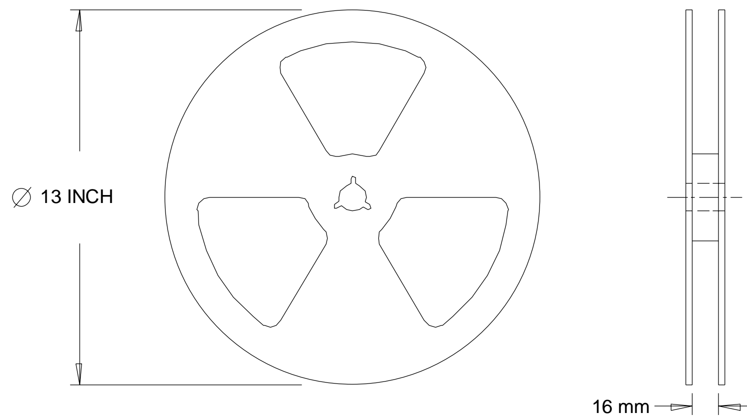


D-Pak (TO-252AA) Tape & Reel Information

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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