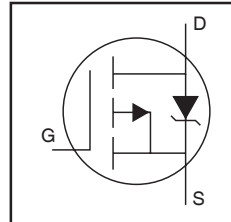


IRF4905SPbF
IRF4905LPbF

Features

- Advanced Process Technology
- Ultra Low On-Resistance
- 150°C Operating Temperature
- Fast Switching
- Repetitive Avalanche Allowed up to Tjmax
- Some Parameters Are Different from IRF4905S
- Lead-Free

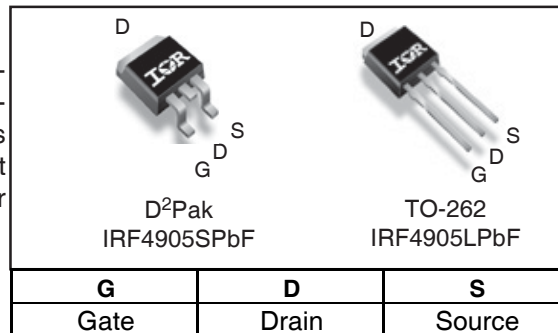
HEXFET® Power MOSFET



$V_{DSS} = -55V$
$R_{DS(on)} = 20m\Omega$
$I_D = -42A$

Description

Features of this design are a 150°C junction operating temperature, fast switching speed and improved repetitive avalanche rating. These features combine to make this design an extremely efficient and reliable device for use in a wide variety of other applications.



Absolute Maximum Ratings

	Parameter	Max.	Units
$I_D @ T_C = 25^\circ C$	Continuous Drain Current, $V_{GS} @ 10V$ (Silicon Limited)	-70	A
$I_D @ T_C = 100^\circ C$	Continuous Drain Current, $V_{GS} @ 10V$ (Silicon Limited)	-44	
$I_D @ T_C = 25^\circ C$	Continuous Drain Current, $V_{GS} @ 10V$ (Package Limited)	-42	
I_{DM}	Pulsed Drain Current ①	-280	
$P_D @ T_C = 25^\circ C$	Power Dissipation	170	W
	Linear Derating Factor	1.3	W/°C
V_{GS}	Gate-to-Source Voltage	± 20	V
E_{AS} (Thermally limited)	Single Pulse Avalanche Energy ②	140	mJ
E_{AS} (Tested)	Single Pulse Avalanche Energy Tested Value ③	790	
I_{AR}	Avalanche Current ④	See Fig.12a, 12b, 15, 16	A
E_{AR}	Repetitive Avalanche Energy ⑤		mJ
T_J	Operating Junction and	-55 to + 150	°C
T_{STG}	Storage Temperature Range		
	Soldering Temperature, for 10 seconds	300 (1.6mm from case)	
	Mounting Torque, 6-32 or M3 screw ⑦	10 lbf•in (1.1N•m)	

Thermal Resistance

	Parameter	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-Case ⑧	—	0.75	
$R_{\theta JA}$	Junction-to-Ambient (PCB Mount, steady state) ⑦ ⑧	—	40	

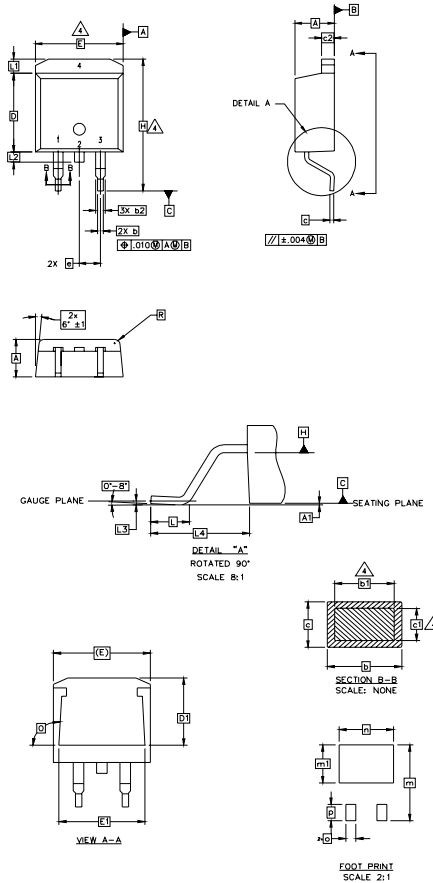
Electrical Characteristics @ $T_J = 25^\circ\text{C}$ (unless otherwise specified)

	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(BR)DSS}$	Drain-to-Source Breakdown Voltage	-55	—	—	V	$V_{GS} = 0V, I_D = -250\mu A$
$\Delta V_{(BR)DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient	—	-0.054	—	V/ $^\circ\text{C}$	Reference to 25°C , $I_D = -1\text{mA}$
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	—	—	20	m Ω	$V_{GS} = -10V, I_D = -42A$ ③
$V_{GS(th)}$	Gate Threshold Voltage	-2.0	—	-4.0	V	$V_{DS} = V_{GS}, I_D = -250\mu A$
gfs	Forward Transconductance	19	—	—	S	$V_{DS} = -25V, I_D = -42A$
I_{DSS}	Drain-to-Source Leakage Current	—	—	-25	μA	$V_{DS} = -55V, V_{GS} = 0V$
		—	—	-200		$V_{DS} = -44V, V_{GS} = 0V, T_J = 125^\circ\text{C}$
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	—	120	180	nC	$I_D = -42A$
Q_{gs}	Gate-to-Source Charge	—	32	—		$V_{DS} = -44V$
Q_{gd}	Gate-to-Drain ("Miller") Charge	—	53	—		$V_{GS} = -10V$ ③
$t_{d(on)}$	Turn-On Delay Time	—	20	—	ns	$V_{DD} = -28V$
t_r	Rise Time	—	99	—		$I_D = -42A$
$t_{d(off)}$	Turn-Off Delay Time	—	51	—		$R_G = 2.6\ \Omega$
t_f	Fall Time	—	64	—		$V_{GS} = -10V$ ③
L_S	Internal Source Inductance	—	7.5	—	nH	Between lead, and center of die contact
C_{iss}	Input Capacitance	—	3500	—	pF	$V_{GS} = 0V$
C_{oss}	Output Capacitance	—	1250	—		$V_{DS} = -25V$
C_{rss}	Reverse Transfer Capacitance	—	450	—		$f = 1.0\text{MHz}$
C_{oss}	Output Capacitance	—	4620	—		$V_{GS} = 0V, V_{DS} = -1.0V, f = 1.0\text{MHz}$
C_{oss}	Output Capacitance	—	940	—		$V_{GS} = 0V, V_{DS} = -44V, f = 1.0\text{MHz}$
$C_{oss\ eff.}$	Effective Output Capacitance	—	1530	—		$V_{GS} = 0V, V_{DS} = 0V\ \text{to}\ -44V$ ④

Source-Drain Ratings and Characteristics

	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current (Body Diode)	—	—	-42	A	MOSFET symbol showing the integral reverse p-n junction diode.
I_{SM}	Pulsed Source Current (Body Diode) ①	—	—	-280		
V_{SD}	Diode Forward Voltage	—	—	-1.3	V	$T_J = 25^\circ\text{C}, I_S = -42A, V_{GS} = 0V$ ③
t_{rr}	Reverse Recovery Time	—	61	92	ns	$T_J = 25^\circ\text{C}, I_F = -42A, V_{DD} = -28V$
Q_{rr}	Reverse Recovery Charge	—	150	220	nC	$di/dt = -100A/\mu s$ ③
t_{on}	Forward Turn-On Time	Intrinsic turn-on time is negligible (turn-on is dominated by L_S+L_D)				

D²Pak Package Outline (Dimensions are shown in millimeters (inches))



NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M-1994
2. DIMENSIONS ARE SHOWN IN MILLIMETERS [INCHES].
3. DIMENSION D & E DO NOT INCLUDE MOLD FLASH. MOLD FLASH SHALL NOT EXCEED 0.127 [.005"] PER SIDE. THESE DIMENSIONS ARE MEASURED AT THE OUTMOST EXTREMES OF THE PLASTIC BODY.
4. DIMENSION b1 AND c1 APPLY TO BASE METAL ONLY.
5. CONTROLLING DIMENSION: INCH.

SYMBOL	DIMENSIONS				NOTES
	MILLIMETERS		INCHES		
	MIN.	MAX.	MIN.	MAX.	
A	4.06	4.83	.160	.190	4
A1	0.00	0.254	.000	.010	
b	0.51	0.99	.020	.039	4
b1	0.51	0.89	.020	.035	
b2	1.14	1.78	.045	.070	3
c	0.38	0.74	.015	.029	
c1	0.38	0.58	.015	.023	3
c2	1.14	1.65	.045	.065	
D	8.51	9.65	.335	.380	3
D1	6.86		.270		
E	9.65	10.67	.380	.420	3
E1	6.22		.245		
e	2.54 BSC		.100 BSC		
H	14.61	15.88	.575	.625	4
L	1.78	2.79	.070	.110	
L1		1.65		.065	4
L2	1.27	1.78	.050	.070	
L3	0.25 BSC		.010 BSC		
L4	4.78	5.28	.188	.208	4
m	17.78		.700		
m1	8.89		.350		4
n	11.43		.450		
o	2.08		.082		4
p	3.81		.150		
R	0.51	0.71	.020	.028	4
θ	90°	93°	90°	93°	

LEAD ASSIGNMENTS

HEXFET

- 1.- GATE
- 2, 4.- DRAIN
- 3.- SOURCE

IGBTs, CoPACK

- 1.- GATE
- 2, 4.- COLLECTOR
- 3.- EMITTER

DIODES

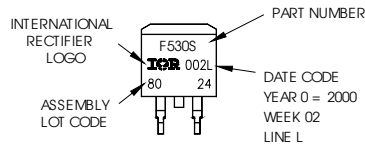
- 1.- ANODE *
- 2, 4.- CATHODE
- 3.- ANODE

* PART DEPENDENT.

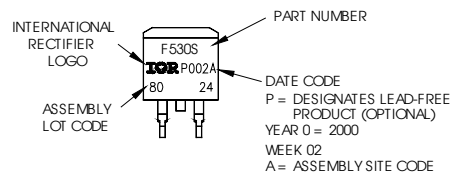
D²Pak Part Marking Information

EXAMPLE: THIS IS AN IRF530S WITH
LOT CODE 8024
ASSEMBLED ON WW 02, 2000
IN THE ASSEMBLY LINE "L"

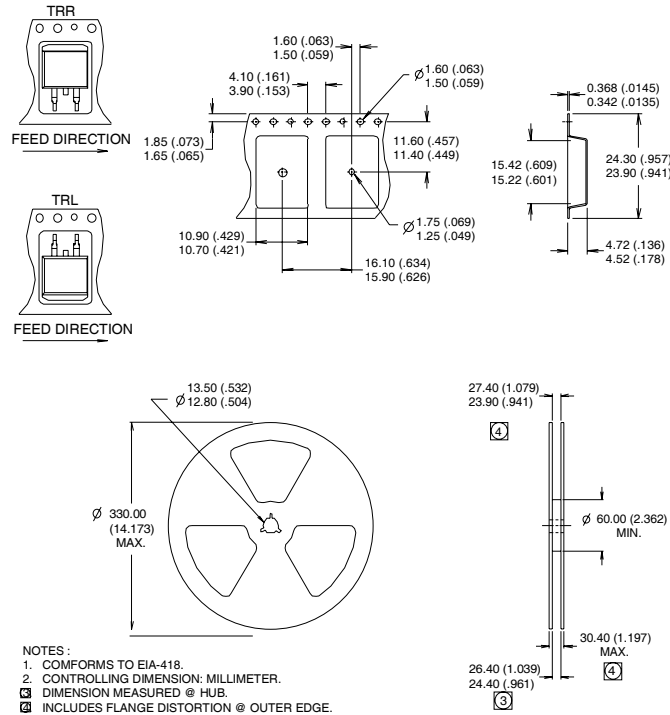
Note: "P" in assembly line position indicates "Lead-Free"



OR



D²Pak Tape & Reel Information



Notes:

- ① Repetitive rating; pulse width limited by max. junction temperature. (See fig. 11).
- ② Limited by T_{Jmax} , starting $T_J = 25^\circ\text{C}$, $L = 0.16\text{mH}$, $R_G = 25\Omega$, $I_{AS} = -42\text{A}$, $V_{GS} = -10\text{V}$. Part not recommended for use above this value.
- ③ Pulse width $\leq 1.0\text{ms}$; duty cycle $\leq 2\%$.
- ④ C_{OSS} eff. is a fixed capacitance that gives the same charging time as C_{OSS} while V_{DS} is rising from 0 to 80% V_{DSS} .
- ⑤ Limited by T_{Jmax} , see Fig.12a, 12b, 15, 16 for typical repetitive avalanche performance.
- ⑥ This value determined from sample failure population. 100% tested to this value in production.
- ⑦ This is applied to D²Pak, when mounted on 1" square PCB (FR-4 or G-10 Material). For recommended footprint and soldering techniques refer to application note #AN-994.
- ⑧ R_{θ} is measured at T_J approximately 90°C

Data and specifications subject to change without notice.
 This product has been designed and qualified for the Industrial market.