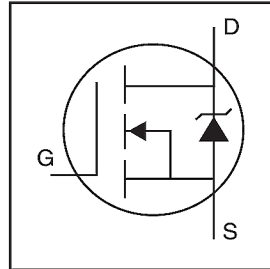


# IRF3710S

# IRF3710L

HEXFET® Power MOSFET

- Advanced Process Technology
- Ultra Low On-Resistance
- Dynamic dv/dt Rating
- 175°C Operating Temperature
- Fast Switching
- Fully Avalanche Rated

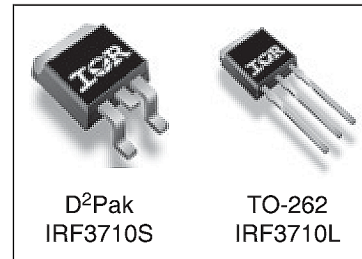


$V_{DSS} = 100V$
$R_{DS(on)} = 23m\Omega$
$I_D = 57A$

## Description

Advanced HEXFET® Power MOSFETs 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<sup>2</sup>Pak is a surface mount power package capable of accommodating die sizes up to HEX-4. It provides the highest power capability and the lowest possible on-resistance in any existing surface mount package. The D<sup>2</sup>Pak is suitable for high current applications because of its low internal connection resistance and can dissipate up to 2.0W in a typical surface mount application. The through-hole version (IRF3710L) is available for low-profile applications.



D<sup>2</sup>Pak  
IRF3710S

TO-262  
IRF3710L

## Absolute Maximum Ratings

	Parameter	Max.	Units
$I_D @ T_C = 25^\circ C$	Continuous Drain Current, $V_{GS} @ 10V$ ⑦	57	A
$I_D @ T_C = 100^\circ C$	Continuous Drain Current, $V_{GS} @ 10V$ ⑦	40	
$I_{DM}$	Pulsed Drain Current ① ⑦	180	
$P_D @ T_C = 25^\circ C$	Power Dissipation	200	W
	Linear Derating Factor	1.3	W/°C
$V_{GS}$	Gate-to-Source Voltage	$\pm 20$	V
$I_{AR}$	Avalanche Current ①	28	A
$E_{AR}$	Repetitive Avalanche Energy ①	20	mJ
dv/dt	Peak Diode Recovery dv/dt ③ ⑦	5.8	V/ns
$T_J$	Operating Junction and	-55 to + 175	°C
$T_{STG}$	Storage Temperature Range		
	Soldering Temperature, for 10 seconds		

## Thermal Resistance

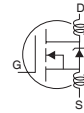
	Parameter	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-Case	—	0.75	°C/W
$R_{\theta JA}$	Junction-to-Ambient (PCB Mounted, steady-state)**	—	40	

# IRF3710S/IRF3710L

International  
**IR** Rectifier

## 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	100	—	—	V	$V_{GS} = 0V, I_D = 250\mu A$
$\Delta V_{(BR)DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient	—	0.13	—	V/°C	Reference to $25^\circ\text{C}$ , $I_D = 1\text{mA}$ ⑦
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	—	—	23	mΩ	$V_{GS} = 10V, I_D = 28A$ ④
$V_{GS(th)}$	Gate Threshold Voltage	2.0	—	4.0	V	$V_{DS} = V_{GS}, I_D = 250\mu A$
$g_{fs}$	Forward Transconductance	32	—	—	S	$V_{DS} = 25V, I_D = 28A$ ⑦
$I_{DSS}$	Drain-to-Source Leakage Current	—	—	25	μA	$V_{DS} = 100V, V_{GS} = 0V$
		—	—	250		$V_{DS} = 80V, V_{GS} = 0V, T_J = 150^\circ\text{C}$
$I_{GSS}$	Gate-to-Source Forward Leakage	—	—	100	nA	$V_{GS} = 20V$
	Gate-to-Source Reverse Leakage	—	—	-100		$V_{GS} = -20V$
$Q_g$	Total Gate Charge	—	—	130	nC	$I_D = 28A$
$Q_{gs}$	Gate-to-Source Charge	—	—	26		$V_{DS} = 80V$
$Q_{gd}$	Gate-to-Drain ("Miller") Charge	—	—	43		$V_{GS} = 10V$ , See Fig. 6 and 13⑦
$t_{d(on)}$	Turn-On Delay Time	—	12	—	ns	$V_{DD} = 50V$
$t_r$	Rise Time	—	58	—		$I_D = 28A$
$t_{d(off)}$	Turn-Off Delay Time	—	45	—		$R_G = 2.5\Omega$
$t_f$	Fall Time	—	47	—		$V_{GS} = 10V$ , See Fig. 10 ④⑦
$L_D$	Internal Drain Inductance	—	4.5	—	nH	Between lead, 6mm (0.25in.) from package and center of die contact
$L_S$	Internal Source Inductance	—	7.5	—		
$C_{iss}$	Input Capacitance	—	3130	—	pF	$V_{GS} = 0V$
$C_{oss}$	Output Capacitance	—	410	—		$V_{DS} = 25V$
$C_{rss}$	Reverse Transfer Capacitance	—	72	—		$f = 1.0\text{MHz}$ , See Fig. 5⑦
$E_{AS}$	Single Pulse Avalanche Energy②⑦	—	1060③	280⑥		mJ



## Source-Drain Ratings and Characteristics

	Parameter	Min.	Typ.	Max.	Units	Conditions
$I_S$	Continuous Source Current (Body Diode)	—	—	57	A	MOSFET symbol showing the integral reverse p-n junction diode.
$I_{SM}$	Pulsed Source Current (Body Diode)①	—	—	230		
$V_{SD}$	Diode Forward Voltage	—	—	1.2	V	$T_J = 25^\circ\text{C}, I_S = 28A, V_{GS} = 0V$ ④
$t_{rr}$	Reverse Recovery Time	—	140	220	ns	$T_J = 25^\circ\text{C}, I_F = 28A$
$Q_{rr}$	Reverse Recovery Charge	—	670	1010	nC	$di/dt = 100A/\mu s$ ④
$t_{on}$	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  $T_J = 25^\circ\text{C}$ ,  $L = 0.70\text{mH}$ ,  $R_G = 25\Omega$ ,  $I_{AS} = 28A$ ,  $V_{GS} = 10V$ . (See Figure 12).
- ③  $I_{SD} \leq 28A$ ,  $di/dt \leq 380A/\mu s$ ,  $V_{DD} \leq V_{(BR)DSS}$ ,  $T_J \leq 175^\circ\text{C}$ .
- ④ Pulse width  $\leq 400\mu s$ ; duty cycle  $\leq 2\%$ .

⑤ This is a typical value at device destruction and represents operation outside rated limits.

⑥ This is a calculated value limited to  $T_J = 175^\circ\text{C}$ .

⑦ Uses IRF3710 data and test conditions.

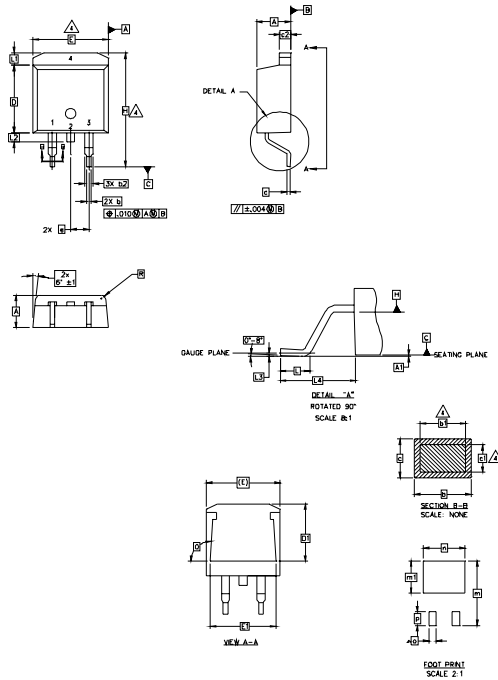
\*\*When mounted on 1" square PCB (FR-4 or G-10 Material). For recommended footprint and soldering techniques refer to application note #AN-994.

# IRF3710S/IRF3710L

International  
**IR** Rectifier

## D<sup>2</sup>Pak 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	
b1	0.51	0.99	.020	.035	
b2	1.14	1.78	.045	.070	4
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	IGBTs, CoPACK
L	1.78	2.79	.070	.110	
L1		1.65		.065	1.- ANODE * 2, 4.- CATHODE 3.- EMITTER
L2	1.27	1.78	.050	.070	
L3	0.25 BSC		.010 BSC		
L4	4.78	5.28	.188	.208	DIODES
m	17.78		.700		
m1	8.89		.350		1.- ANODE * 2, 4.- CATHODE 3.- ANODE
n	11.43		.460		
o	2.08		.082		* PART DEPENDENT.
p	3.81		.150		
R	0.51	0.71	.020	.028	
θ	90°	93°	90°	93°	

LEAD ASSIGNMENTS

HEXFEEET

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

IGBTs, CoPACK

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

DIODES

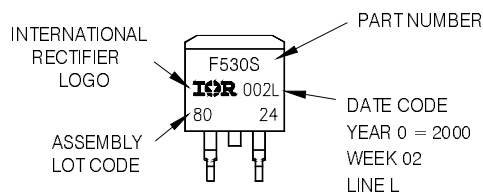
- 1.- ANODE \*
- 2, 4.- CATHODE
- 3.- ANODE

\* PART DEPENDENT.

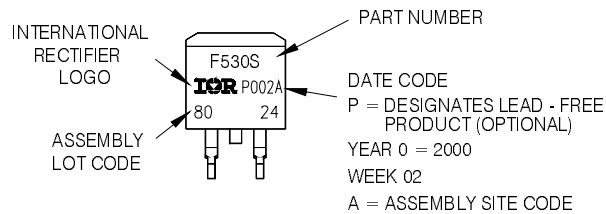
## D<sup>2</sup>Pak Part Marking Information

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

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



OR

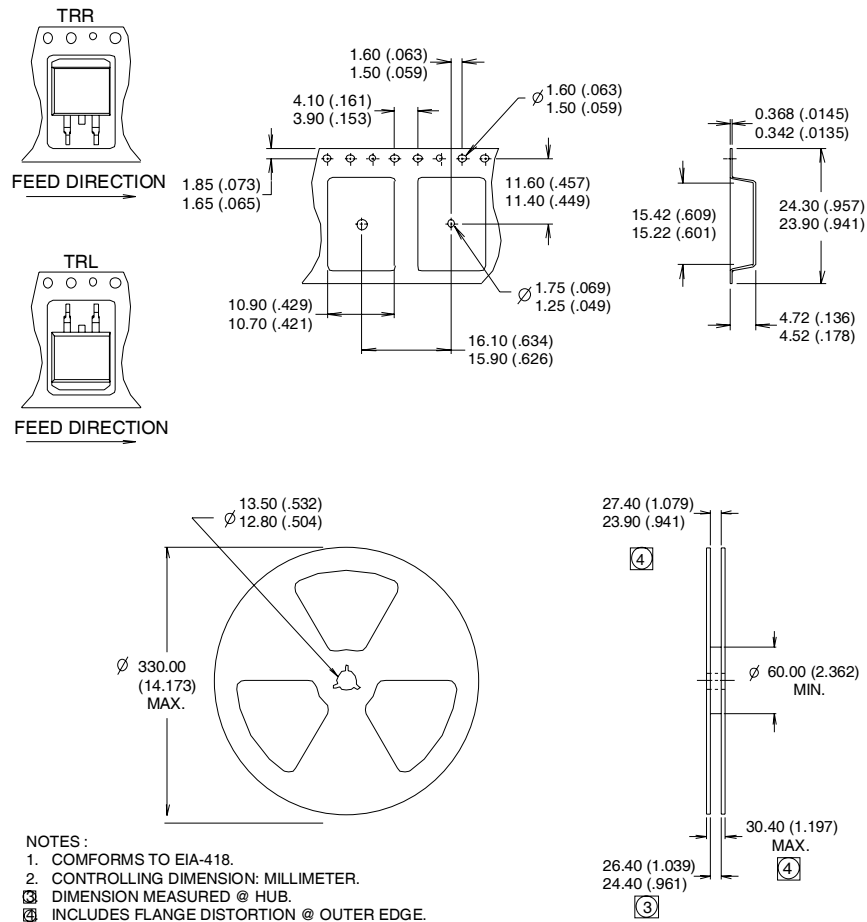


# IRF3710S/IRF3710L

International  
**IR** Rectifier

## D<sup>2</sup>Pak Tape & Reel Information

Dimensions are shown in millimeters (inches)



Data and specifications subject to change without notice.  
This product has been designed and qualified for the Industrial market.  
Qualification Standards can be found on IR's Web site.

International  
**IR** Rectifier