

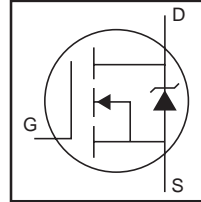
**Applications**

- High Efficiency Synchronous Rectification in SMPS
- Uninterruptible Power Supply
- High Speed Power Switching
- Hard Switched and High Frequency Circuits

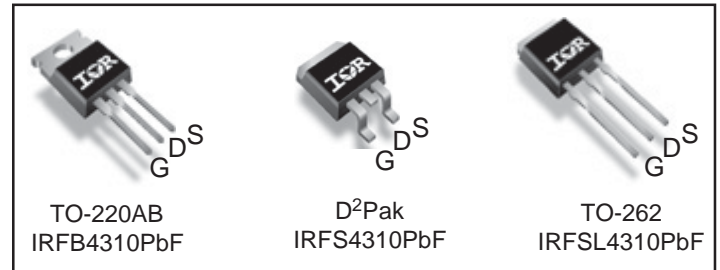
**Benefits**

- Improved Gate, Avalanche and Dynamic dV/dt Ruggedness
- Fully Characterized Capacitance and Avalanche SOA
- Enhanced body diode dV/dt and dI/dt Capability
- Lead-Free

HEXFET® Power MOSFET



<b>V<sub>DSS</sub></b>	<b>100V</b>
<b>R<sub>DS(on)</sub> typ.</b>	<b>5.6mΩ</b>
	<b>7.0mΩ</b>
<b>I<sub>D</sub></b>	<b>130A</b>



**Absolute Maximum Ratings**

Symbol	Parameter	Max.	Units
I <sub>D</sub> @ T <sub>C</sub> = 25°C	Continuous Drain Current, V <sub>GS</sub> @ 10V	130①	A
I <sub>D</sub> @ T <sub>C</sub> = 100°C	Continuous Drain Current, V <sub>GS</sub> @ 10V	92①	
I <sub>DM</sub>	Pulsed Drain Current ②	550	
P <sub>D</sub> @ T <sub>C</sub> = 25°C	Maximum Power Dissipation	300	W
	Linear Derating Factor	2.0	W/°C
V <sub>GS</sub>	Gate-to-Source Voltage	± 20	V
dV/dt	Peak Diode Recovery ④	14	V/ns
T <sub>J</sub>	Operating Junction and	-55 to + 175	°C
T <sub>STG</sub>	Storage Temperature Range		
	Soldering Temperature, for 10 seconds (1.6mm from case)	300	
	Mounting torque, 6-32 or M3 screw	10lb·in (1.1N·m)	

**Avalanche Characteristics**

E <sub>AS</sub> (Thermally limited)	Single Pulse Avalanche Energy ③	980	mJ
I <sub>AR</sub>	Avalanche Current ①	See Fig. 14, 15, 22a, 22b,	A
E <sub>AR</sub>	Repetitive Avalanche Energy ⑤		mJ

**Thermal Resistance**

Symbol	Parameter	Typ.	Max.	Units
R <sub>θJC</sub>	Junction-to-Case ⑥	—	0.50	°C/W
R <sub>θCS</sub>	Case-to-Sink, Flat Greased Surface , TO-220	0.50	—	
R <sub>θJA</sub>	Junction-to-Ambient, TO-220 ⑦	—	62	
R <sub>θJA</sub>	Junction-to-Ambient (PCB Mount) , D²Pak ⑧⑨	—	40	

Static @ T<sub>J</sub> = 25°C (unless otherwise specified)

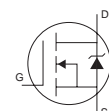
Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
V <sub>(BR)DSS</sub>	Drain-to-Source Breakdown Voltage	100	—	—	V	V <sub>GS</sub> = 0V, I <sub>D</sub> = 250μA
ΔV <sub>(BR)DSS/ΔT<sub>J</sub></sub>	Breakdown Voltage Temp. Coefficient	—	0.064	—	V/°C	Reference to 25°C, I <sub>D</sub> = 1mA <sup>②</sup>
R <sub>DS(on)</sub>	Static Drain-to-Source On-Resistance	—	5.6	7.0	mΩ	V <sub>GS</sub> = 10V, I <sub>D</sub> = 75A <sup>③</sup>
V <sub>GS(th)</sub>	Gate Threshold Voltage	2.0	—	4.0	V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA
I <sub>DSS</sub>	Drain-to-Source Leakage Current	—	—	20	μA	V <sub>DS</sub> = 100V, V <sub>GS</sub> = 0V
		—	—	250		V <sub>DS</sub> = 100V, V <sub>GS</sub> = 0V, T <sub>J</sub> = 125°C
I <sub>GSS</sub>	Gate-to-Source Forward Leakage	—	—	200	nA	V <sub>GS</sub> = 20V
	Gate-to-Source Reverse Leakage	—	—	-200		V <sub>GS</sub> = -20V
R <sub>G</sub>	Gate Input Resistance	—	1.4	—	Ω	f = 1MHz, open drain

Dynamic @ T<sub>J</sub> = 25°C (unless otherwise specified)

Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
gfs	Forward Transconductance	160	—	—	S	V <sub>DS</sub> = 50V, I <sub>D</sub> = 75A
Q <sub>g</sub>	Total Gate Charge	—	170	250	nC	I <sub>D</sub> = 75A
Q <sub>gs</sub>	Gate-to-Source Charge	—	46	—		V <sub>DS</sub> = 80V
Q <sub>gd</sub>	Gate-to-Drain ("Miller") Charge	—	62	—		V <sub>GS</sub> = 10V <sup>⑤</sup>
t <sub>d(on)</sub>	Turn-On Delay Time	—	26	—	ns	V <sub>DD</sub> = 65V
t <sub>r</sub>	Rise Time	—	110	—		I <sub>D</sub> = 75A
t <sub>d(off)</sub>	Turn-Off Delay Time	—	68	—		R <sub>G</sub> = 2.6Ω
t <sub>f</sub>	Fall Time	—	78	—		V <sub>GS</sub> = 10V <sup>⑤</sup>
C <sub>iss</sub>	Input Capacitance	—	7670	—	pF	V <sub>GS</sub> = 0V
C <sub>oss</sub>	Output Capacitance	—	540	—		V <sub>DS</sub> = 50V
C <sub>rss</sub>	Reverse Transfer Capacitance	—	280	—		f = 1.0MHz
C <sub>oss</sub> eff. (ER)	Effective Output Capacitance (Energy Related) <sup>⑦</sup>	—	650	—		V <sub>GS</sub> = 0V, V <sub>DS</sub> = 0V to 80V <sup>⑧</sup> , See Fig.11
C <sub>oss</sub> eff. (TR)	Effective Output Capacitance (Time Related) <sup>⑥</sup>	—	720.1	—		V <sub>GS</sub> = 0V, V <sub>DS</sub> = 0V to 80V <sup>⑥</sup> , See Fig. 5

Diode Characteristics

Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
I <sub>S</sub>	Continuous Source Current (Body Diode)	—	—	130 <sup>①</sup>	A	MOSFET symbol showing the integral reverse p-n junction diode.
I <sub>SM</sub>	Pulsed Source Current (Body Diode) <sup>②⑦</sup>	—	—	550		
V <sub>SD</sub>	Diode Forward Voltage	—	—	1.3	V	T <sub>J</sub> = 25°C, I <sub>S</sub> = 75A, V <sub>GS</sub> = 0V <sup>⑤</sup>
t <sub>rr</sub>	Reverse Recovery Time	—	45	68	ns	T <sub>J</sub> = 25°C
		—	55	83		T <sub>J</sub> = 125°C
Q <sub>rr</sub>	Reverse Recovery Charge	—	82	120	nC	T <sub>J</sub> = 25°C
		—	120	180		T <sub>J</sub> = 125°C
I <sub>RSM</sub>	Reverse Recovery Current	—	3.3	—	A	T <sub>J</sub> = 25°C
t <sub>on</sub>	Forward Turn-On Time	Intrinsic turn-on time is negligible (turn-on is dominated by LS+LD)				

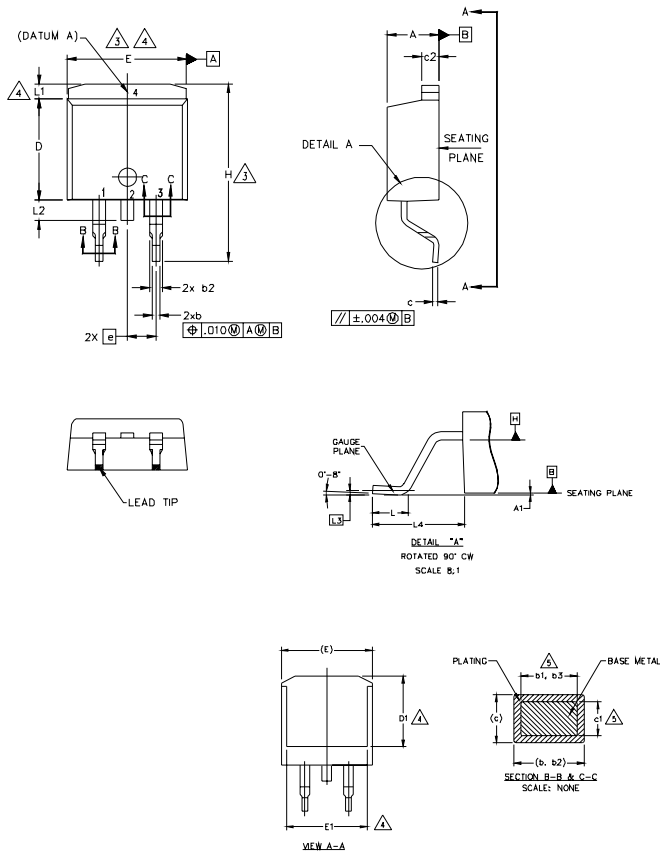


Notes:

- ① Calculated continuous current based on maximum allowable junction temperature. Package limitation current is 75A
- ② Repetitive rating; pulse width limited by max. junction temperature.
- ③ Limited by T<sub>Jmax</sub>, starting T<sub>J</sub> = 25°C, L = 0.35mH  
R<sub>G</sub> = 25Ω, I<sub>AS</sub> = 75A, V<sub>GS</sub> = 10V. Part not recommended for use above this value.
- ④ I<sub>SD</sub> ≤ 75A, di/dt ≤ 550A/μs, V<sub>DD</sub> ≤ V<sub>(BR)DSS</sub>, T<sub>J</sub> ≤ 175°C.
- ⑤ Pulse width ≤ 400μs; duty cycle ≤ 2%.
- ⑥ C<sub>oss</sub> eff. (TR) is a fixed capacitance that gives the same charging time as C<sub>oss</sub> while V<sub>DS</sub> is rising from 0 to 80% V<sub>DSS</sub>.
- ⑦ C<sub>oss</sub> eff. (ER) is a fixed capacitance that gives the same energy as C<sub>oss</sub> while V<sub>DS</sub> is rising from 0 to 80% V<sub>DSS</sub>.
- ⑧ When mounted on 1" square PCB (FR-4 or G-10 Material). For recommended footprint and soldering techniques refer to application note #AN-994.
- ⑨ R<sub>θ</sub> is measured at T<sub>J</sub> approximately 90°C.

**D<sup>2</sup>Pak (TO-263AB) 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 AT DATUM H.
  4. THERMAL PAD CONTOUR OPTIONAL WITHIN DIMENSION E, L1, D1 & E1.
  5. DIMENSION b1 AND c1 APPLY TO BASE METAL ONLY.
  6. DATUM A & B TO BE DETERMINED AT DATUM PLANE H.
  7. CONTROLLING DIMENSION: INCH.
  8. OUTLINE CONFORMS TO JEDEC OUTLINE TO-263AB.

SYMBOL	DIMENSIONS				NOTES
	MILLIMETERS		INCHES		
	MIN.	MAX.	MIN.	MAX.	
A	4.06	4.83	.160	.190	
A1	0.00	0.254	.000	.010	
b	0.51	0.99	.020	.039	
b1	0.51	0.89	.020	.035	5
b2	1.14	1.78	.045	.070	
b3	1.14	1.73	.045	.068	5
c	0.38	0.74	.015	.029	
c1	0.38	0.58	.015	.023	5
c2	1.14	1.65	.045	.065	
D	8.38	9.65	.330	.380	
D1	6.86	-	.270	-	4
E	9.65	10.67	.380	.420	3,4
E1	6.22	-	.245	-	4
e	2.54 BSC		.100 BSC		
H	14.61	15.88	.575	.625	
L	1.78	2.79	.070	.110	
L1	-	1.65	-	.066	4
L2	1.27	1.78	-	.070	
L3	0.25 BSC		.010 BSC		
L4	4.78	5.28	.188	.208	

LEAD ASSIGNMENTS

HEXFET

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

IGBTs, CoPACK

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

DIODES

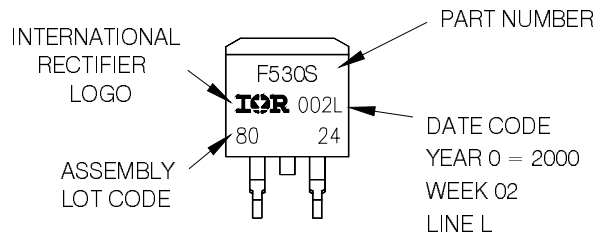
- 1.- ANODE \*
- 2, 4.- CATHODE
- 3.- ANODE

\* PART DEPENDENT.

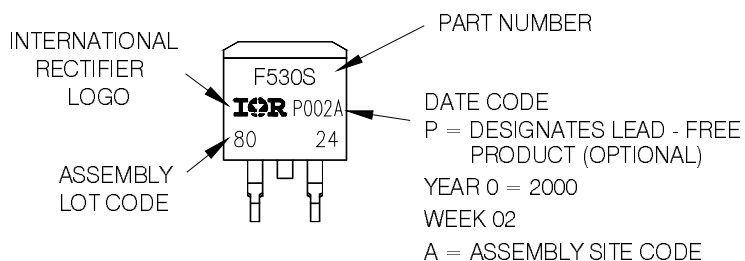
**D<sup>2</sup>Pak (TO-263AB) Part Marking Information**

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

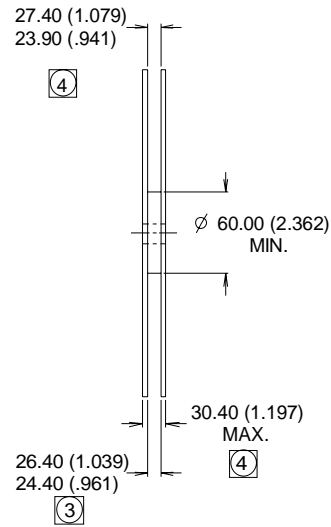
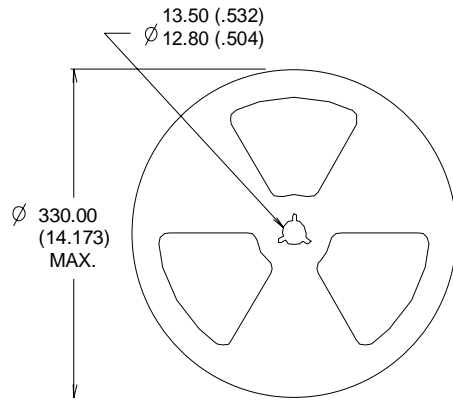
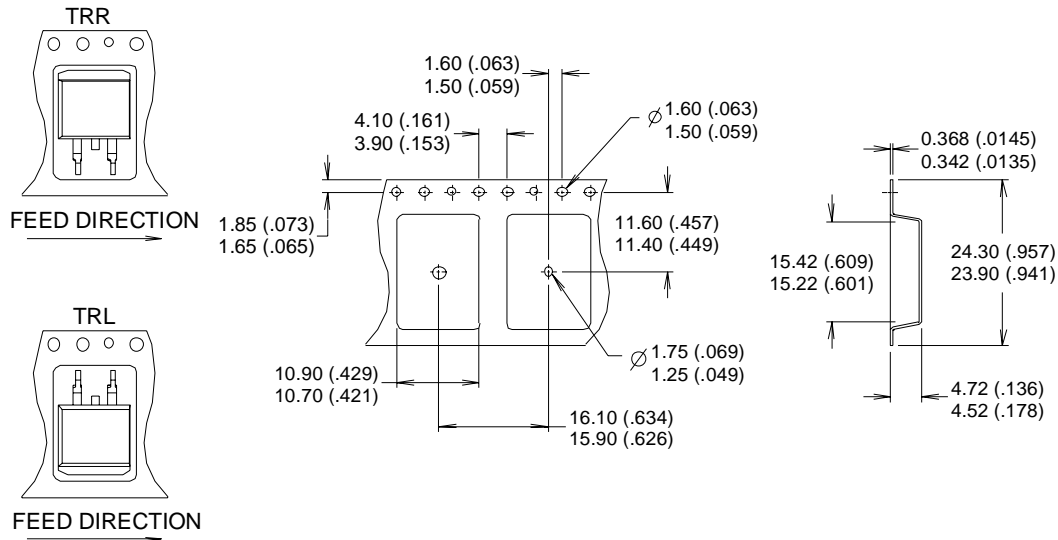
Note: "P" in assembly line position  
 indicates "Lead - Free"



OR



D<sup>2</sup>Pak (TO-263AB) Tape & Reel Information



- NOTES :
1. CONFORMS TO EIA-418.
  2. CONTROLLING DIMENSION: MILLIMETER.
  - ③ DIMENSION MEASURED @ HUB.
  - ④ INCLUDES FLANGE DISTORTION @ OUTER EDGE.

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