

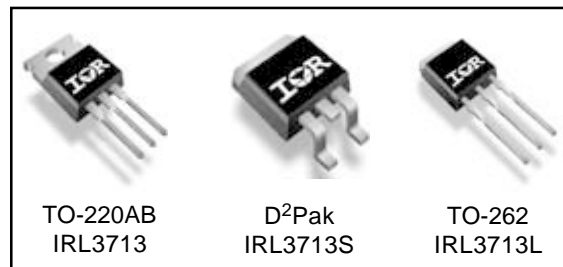
**Applications**

- High Frequency Isolated DC-DC Converters with Synchronous Rectification for Telecom and Industrial Use
- High Frequency Buck Converters for Computer Processor Power

<b>V<sub>DSS</sub></b>	<b>R<sub>DS(on)</sub> max</b>	<b>I<sub>D</sub></b>
<b>30V</b>	<b>3.0mΩ</b>	<b>200A<sup>Ⓔ</sup></b>

**Benefits**

- Ultra-Low Gate Impedance
- Very Low R<sub>DS(on)</sub> at 4.5V V<sub>GS</sub>
- Fully Characterized Avalanche Voltage and Current



**Absolute Maximum Ratings**

Symbol	Parameter	Max.	Units
V <sub>DS</sub>	Drain-Source Voltage	30	V
V <sub>GS</sub>	Gate-to-Source Voltage	± 20	V
I <sub>D</sub> @ T <sub>C</sub> = 25°C	Continuous Drain Current, V <sub>GS</sub> @ 10V	200 <sup>Ⓔ</sup>	A
I <sub>D</sub> @ T <sub>C</sub> = 70°C	Continuous Drain Current, V <sub>GS</sub> @ 10V	170 <sup>Ⓔ</sup>	
I <sub>DM</sub>	Pulsed Drain Current <sup>①</sup>	790	
P <sub>D</sub> @ T <sub>C</sub> = 25°C	Maximum Power Dissipation <sup>③</sup>	200	W
P <sub>D</sub> @ T <sub>C</sub> = 100°C	Maximum Power Dissipation <sup>③</sup>	100	W
	Linear Derating Factor	1.3	W/°C
T <sub>J</sub> , T <sub>STG</sub>	Junction and Storage Temperature Range	-55 to + 175	°C

**Thermal Resistance**

	Parameter	Typ.	Max.	Units
R <sub>θJC</sub>	Junction-to-Case	—	0.75	°C/W
R <sub>θCS</sub>	Case-to-Sink, Flat, Greased Surface <sup>④</sup>	0.50	—	
R <sub>θJA</sub>	Junction-to-Ambient <sup>④</sup>	—	62	
R <sub>θJA</sub>	Junction-to-Ambient (PCB mount) <sup>⑤</sup>	—	40	

Notes ① through ⑥ are on page 6

# IRL3713/3713S/3713L

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

	Parameter	Min.	Typ.	Max.	Units	Conditions
V <sub>(BR)DSS</sub>	Drain-to-Source Breakdown Voltage	30	—	—	V	V <sub>GS</sub> = 0V, I <sub>D</sub> = 250μA
ΔV <sub>(BR)DSS</sub> /ΔT <sub>J</sub>	Breakdown Voltage Temp. Coefficient	—	0.029	—	V/°C	Reference to 25°C, I <sub>D</sub> = 1mA
R <sub>DS(on)</sub>	Static Drain-to-Source On-Resistance	—	2.6	3.0	mΩ	V <sub>GS</sub> = 10V, I <sub>D</sub> = 38A ③
		—	3.3	4.0		V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 30A ③
V <sub>GS(th)</sub>	Gate Threshold Voltage	1.0	—	2.5	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> = 24V, V <sub>GS</sub> = 0V
		—	—	100		V <sub>DS</sub> = 24V, 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> = 16V
	Gate-to-Source Reverse Leakage	—	—	-200		V <sub>GS</sub> = -16V

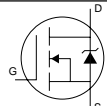
## Dynamic @ T<sub>J</sub> = 25°C (unless otherwise specified)

Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
g <sub>fs</sub>	Forward Transconductance	TBD	—	—	S	V <sub>DS</sub> = 15V, I <sub>D</sub> = 30A
Q <sub>g</sub>	Total Gate Charge	—	90	140	nC	I <sub>D</sub> = 30A
Q <sub>gs</sub>	Gate-to-Source Charge	—	20	—		V <sub>DS</sub> = 15V
Q <sub>gd</sub>	Gate-to-Drain ("Miller") Charge	—	40	—		V <sub>GS</sub> = 4.5V
Q <sub>oss</sub>	Output Gate Charge	—	90	—		V <sub>GS</sub> = 0V, V <sub>DS</sub> = 15V
t <sub>d(on)</sub>	Turn-On Delay Time	—	TBD	—	ns	V <sub>DD</sub> = 15V
t <sub>r</sub>	Rise Time	—	TBD	—		I <sub>D</sub> = 30A
t <sub>d(off)</sub>	Turn-Off Delay Time	—	TBD	—		R <sub>G</sub> = 1.8Ω
t <sub>f</sub>	Fall Time	—	TBD	—		V <sub>GS</sub> = 4.5V ③
C <sub>iss</sub>	Input Capacitance	—	TBD	—	pF	V <sub>GS</sub> = 0V
C <sub>oss</sub>	Output Capacitance	—	TBD	—		V <sub>DS</sub> = 15V
C <sub>rss</sub>	Reverse Transfer Capacitance	—	TBD	—		f = 1.0MHz

## Avalanche Characteristics

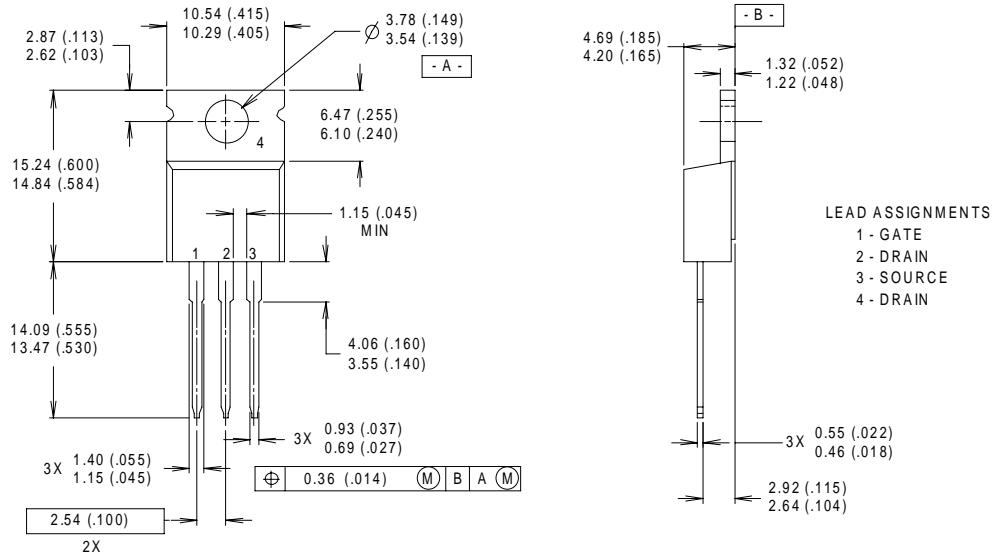
Symbol	Parameter	Typ.	Max.	Units
E <sub>AS</sub>	Single Pulse Avalanche Energy②	—	TBD	mJ
I <sub>AR</sub>	Avalanche Current①	—	TBD	A

## Diode Characteristics

Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
I <sub>S</sub>	Continuous Source Current (Body Diode)	—	—	200⑥	A	MOSFET symbol showing the integral reverse p-n junction diode. 
I <sub>SM</sub>	Pulsed Source Current (Body Diode) ①	—	—	790		
V <sub>SD</sub>	Diode Forward Voltage	—	—	1.3	V	T <sub>J</sub> = 25°C, I <sub>S</sub> = 30A, V <sub>GS</sub> = 0V ③
		—	TBD	—		T <sub>J</sub> = 125°C, I <sub>S</sub> = 30A, V <sub>GS</sub> = 0V ③
t <sub>rr</sub>	Reverse Recovery Time	—	TBD	TBD	ns	T <sub>J</sub> = 25°C, I <sub>F</sub> = 30A, V <sub>R</sub> = 15V
Q <sub>rr</sub>	Reverse Recovery Charge	—	TBD	TBD	nC	di/dt = 100A/μs ③
t <sub>rr</sub>	Reverse Recovery Time	—	TBD	TBD	ns	T <sub>J</sub> = 125°C, I <sub>F</sub> = 30A, V <sub>R</sub> = 15V
Q <sub>rr</sub>	Reverse Recovery Charge	—	TBD	TBD	nC	di/dt = 100A/μs ③

## TO-220AB Package Outline

Dimensions are shown in millimeters (inches)



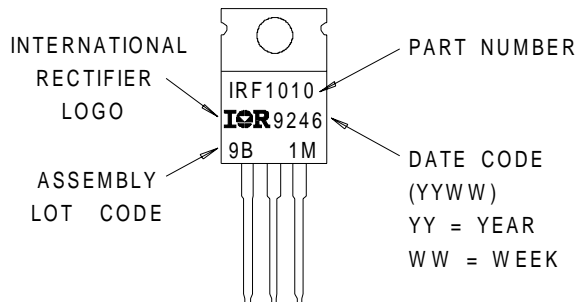
**NOTES:**

- 1 DIMENSIONING & TOLERANCING PER ANSI Y14.5M, 1982.
- 2 CONTROLLING DIMENSION : INCH

- 3 OUTLINE CONFORMS TO JEDEC OUTLINE TO-220AB.
- 4 HEATSINK & LEAD MEASUREMENTS DO NOT INCLUDE BURRS.

## TO-220AB Part Marking Information

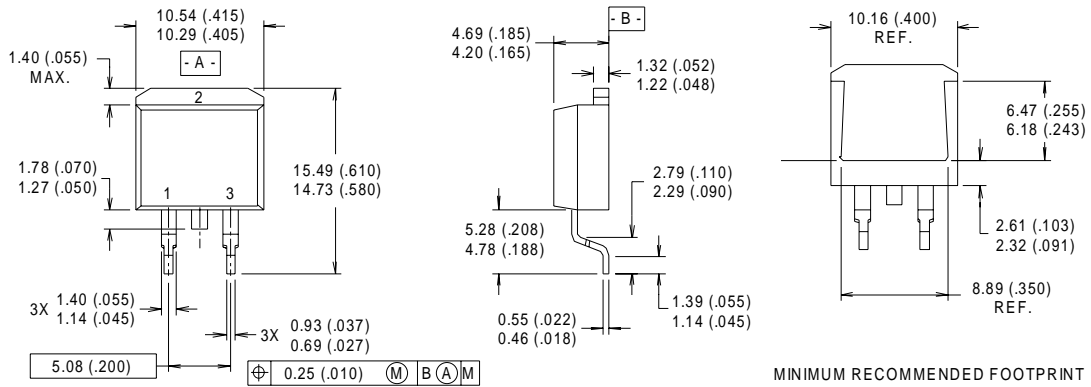
EXAMPLE : THIS IS AN IRF1010  
 WITH ASSEMBLY  
 LOT CODE 9B1M



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## D<sup>2</sup>Pak Package Outline



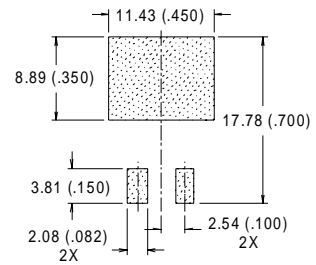
**NOTES:**

- 1 DIMENSIONS AFTER SOLDER DIP.
- 2 DIMENSIONING & TOLERANCING PER ANSI Y14.5M, 1982.
- 3 CONTROLLING DIMENSION : INCH.
- 4 HEATSINK & LEAD DIMENSIONS DO NOT INCLUDE BURRS.

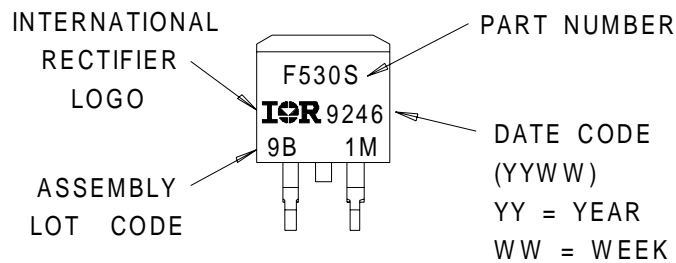
**LEAD ASSIGNMENTS**

- 1 - GATE
- 2 - DRAIN
- 3 - SOURCE

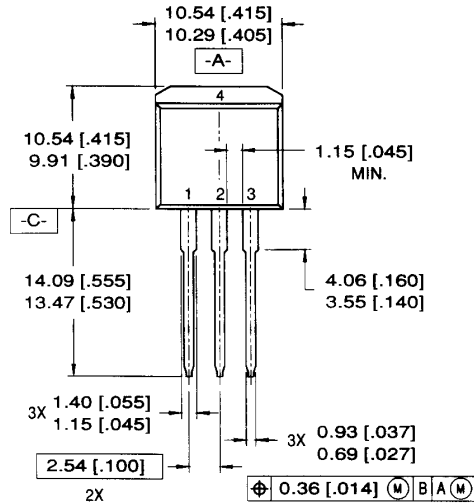
**MINIMUM RECOMMENDED FOOTPRINT**



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

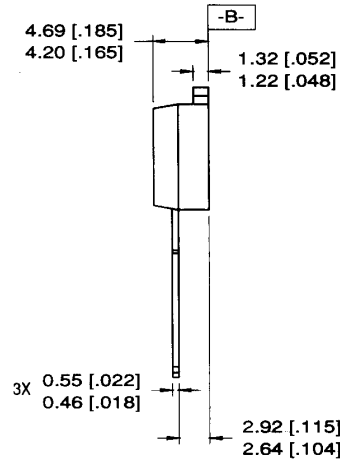


## TO-262 Package Outline



**LEAD ASSIGNMENTS**

- 1 = GATE      3 = SOURCE
- 2 = DRAIN    4 = DRAIN

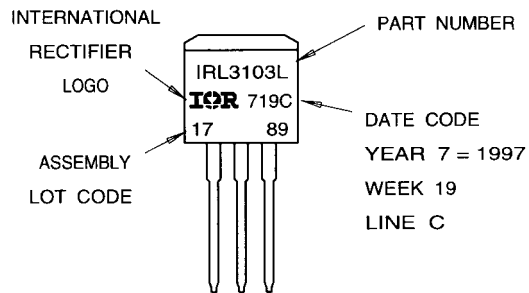


**NOTES:**

1. DIMENSIONING & TOLERANCING PER ANSI Y14.5M-1982
2. CONTROLLING DIMENSION: INCH.
3. DIMENSIONS ARE SHOWN IN MILLIMETERS [INCHES].
4. HEATSINK & LEAD DIMENSIONS DO NOT INCLUDE BURRS.

## TO-262 Part Marking Information

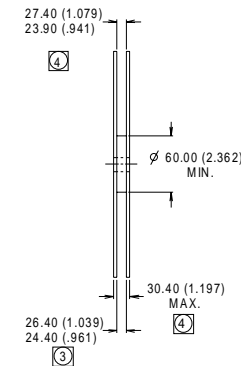
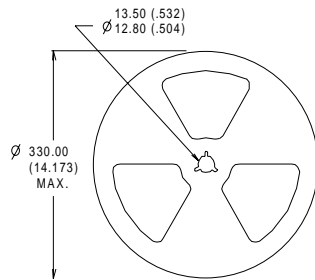
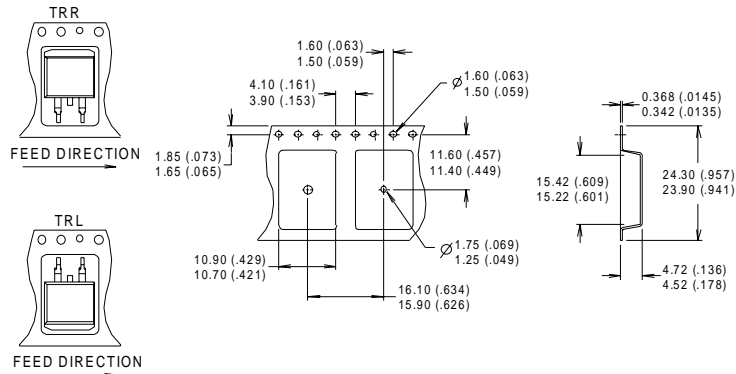
EXAMPLE: THIS IS AN IRL3103L  
 LOT CODE 1789  
 ASSEMBLED ON WW 19, 1997  
 IN THE ASSEMBLY LINE "C"



# IRL3713/3713S/3713L

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



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

### Notes:

- ① Repetitive rating; pulse width limited by max. junction temperature.
- ② Starting  $T_J = 25^\circ\text{C}$ ,  $L = \text{TBD mH}$   
 $R_G = 25\Omega$ ,  $I_{AS} = \text{TBD A}$ .
- ③ Pulse width  $\leq 400\mu\text{s}$ ; duty cycle  $\leq 2\%$ .
- ④ This is only applied to TO-220AB package.
- ⑤ This is applied to D<sup>2</sup>Pak, when mounted on 1" square PCB (FR-4 or G-10 Material). For recommended footprint and soldering techniques refer to application note #AN-994.
- ⑥ Calculated continuous current based on maximum allowable junction temperature. Package limitation current is 75A.

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

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