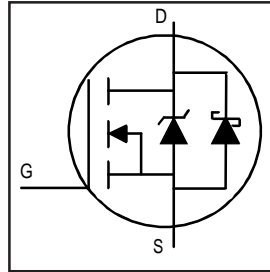




## FETKY™ MOSFET & SCHOTTKY RECTIFIER

- Co-packaged HEXFET® Power MOSFET and Schottky Diode
- Generation 5 Technology
- Logic Level Gate Drive
- Minimize Circuit Inductance
- Ideal For Synchronous Regulator Application

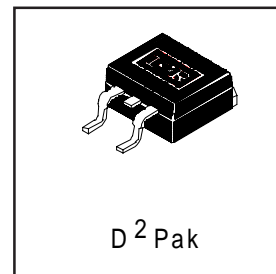


$V_{DSS} = 30V$
$R_{DS(on)} = 0.014\Omega$
$I_D = 64A$

### Description

The FETKY family of co-packaged HEXFET power MOSFETs and Schottky Diodes offer the designer an innovative board space saving solution for switching regulator applications. A low on resistance Gen 5 MOSFET with a low forward voltage drop Schottky diode and minimized component interconnect inductance and resistance result in maximized converter efficiencies.

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.



### Absolute Maximum Ratings

	Parameter	Max.	Units
$I_D @ T_C = 25^\circ C$	Continuous Drain Current, $V_{GS} @ 10V$ ③	64	A
$I_D @ T_C = 100^\circ C$	Continuous Drain Current, $V_{GS} @ 10V$ ③	45	
$I_{DM}$	Pulsed Drain Current ①③	220	
$P_D @ T_A = 25^\circ C$	Power Dissipation	3.1	W
$P_D @ T_C = 25^\circ C$	Power Dissipation	89	W
	Linear Derating Factor	0.56	W/°C
$V_{GS}$	Gate-to-Source Voltage	$\pm 16$	V
$T_J$	Operating Junction and	-55 to + 150	°C
$T_{STG}$	Storage Temperature Range		
	Soldering Temperature, for 10 seconds	300 (1.6mm from case )	

### Thermal Resistance

	Parameter	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-Case	—	1.4	°C/W
$R_{\theta JA}$	Junction-to-Ambient ( PCB Mounted, steady-state)**	—	40	

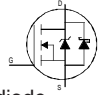
# IRL3103D1S

International  
**IR** Rectifier

## MOSFET 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	30	—	—	V	$V_{GS} = 0V, I_D = 250\mu A$
$\Delta V_{(BR)DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient	—	0.037	—	V/°C	Reference to $25^\circ\text{C}, I_D = 1\text{mA}$ ③
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	—	—	0.014	$\Omega$	$V_{GS} = 10V, I_D = 34A$ ②
		—	—	0.019		$V_{GS} = 4.5V, I_D = 28A$ ②
$V_{GS(th)}$	Gate Threshold Voltage	1.0	—	—	V	$V_{DS} = V_{GS}, I_D = 250\mu A$
$g_{fs}$	Forward Transconductance	23	—	—	S	$V_{DS} = 25V, I_D = 34A$ ③
$I_{DSS}$	Drain-to-Source Leakage Current	—	—	0.10	mA	$V_{DS} = 30V, V_{GS} = 0V$
		—	—	22		$V_{DS} = 24V, V_{GS} = 0V, T_J = 125^\circ\text{C}$
$I_{GSS}$	Gate-to-Source Forward Leakage	—	—	100	nA	$V_{GS} = 16V$
	Gate-to-Source Reverse Leakage	—	—	-100		$V_{GS} = -16V$
$Q_g$	Total Gate Charge	—	—	43	nC	$I_D = 32A$
$Q_{gs}$	Gate-to-Source Charge	—	—	14		$V_{DS} = 24V$
$Q_{gd}$	Gate-to-Drain ("Miller") Charge	—	—	23		$V_{GS} = 4.5V$ , See Fig. 6 ②
$t_{d(on)}$	Turn-On Delay Time	—	9.0	—	ns	$V_{DD} = 15V$
$t_r$	Rise Time	—	210	—		$I_D = 32A$
$t_{d(off)}$	Turn-Off Delay Time	—	20	—		$R_G = 3.4\Omega, V_{GS} = 4.5V$
$t_f$	Fall Time	—	54	—		$R_D = 0.43\Omega$ , ②③
$L_S$	Internal Source Inductance	—	7.5	—	nH	Between lead, and center of die contact
$C_{iss}$	Input Capacitance	—	1900	—		$V_{GS} = 0V$
$C_{oss}$	Output Capacitance	—	810	—		$V_{DS} = 25V$
$C_{rss}$	Reverse Transfer Capacitance	—	240	—		$f = 1.0\text{MHz}$ , See Fig. 5
$C_{iss}$	Input Capacitance	—	3500	—		$V_{GS} = 0V, V_{DS} = 0V$

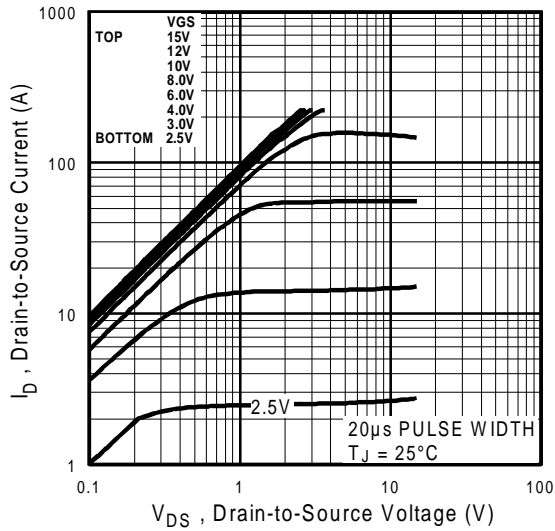
## Body Diode & Schottky Diode Ratings and Characteristics

	Parameter	Min.	Typ.	Max.	Units	Conditions
$I_F$ (AV)	( Schottky)	—	—	2.0	A	MOSFET symbol showing the integral reverse p-n junction and Schottky diode. 
$I_{SM}$	Pulsed Source Current (Body Diode) ①	—	—	220		
$V_{SD1}$	Diode Forward Voltage	—	—	1.3	V	$T_J = 25^\circ\text{C}, I_S = 32A, V_{GS} = 0V$ ②
$V_{SD2}$	Diode Forward Voltage	—	—	0.50	V	$T_J = 25^\circ\text{C}, I_S = 1.0A, V_{GS} = 0V$ ②
$t_{rr}$	Reverse Recovery Time	—	51	77	ns	$T_J = 25^\circ\text{C}, I_F = 32A$
$Q_{rr}$	Reverse Recovery Charge	—	49	73	nC	$di/dt = 100A/\mu s$ ②
$t_{on}$	Forward Turn-On Time	Intrinsic turn-on time is negligible (turn-on is dominated by $L_S+L_D$ )				

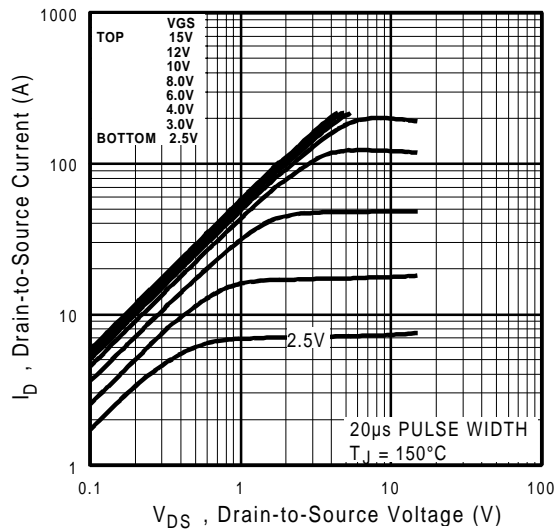
### Notes:

- ① Repetitive rating; pulse width limited by max. junction temperature. ( See fig. 10 )
- ② Pulse width  $\leq 300\mu s$ ; duty cycle  $\leq 2\%$ .
- ③ Uses IRL3103D1 data and test conditions

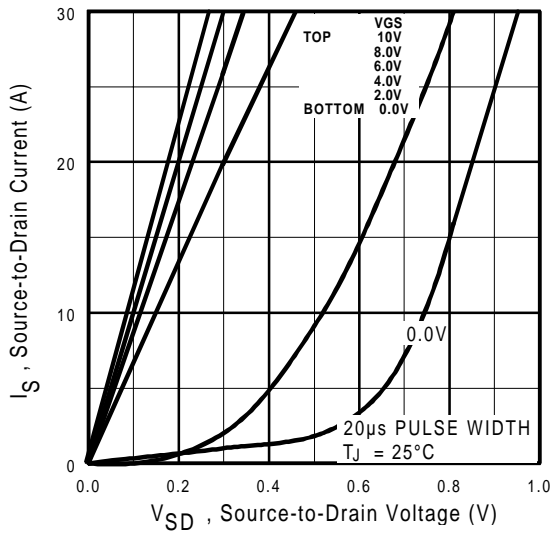
\*\* When mounted on 1" square PCB ( FR-4 or G-10 Material ).  
For recommended footprint and soldering techniques refer to application note #AN-994.



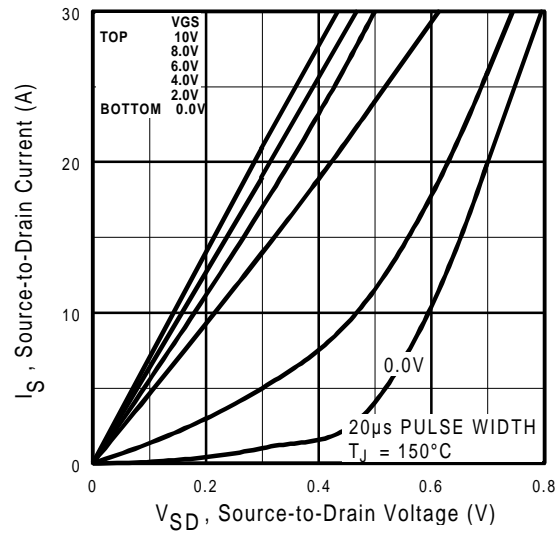
**Fig 1.** Typical Output Characteristics



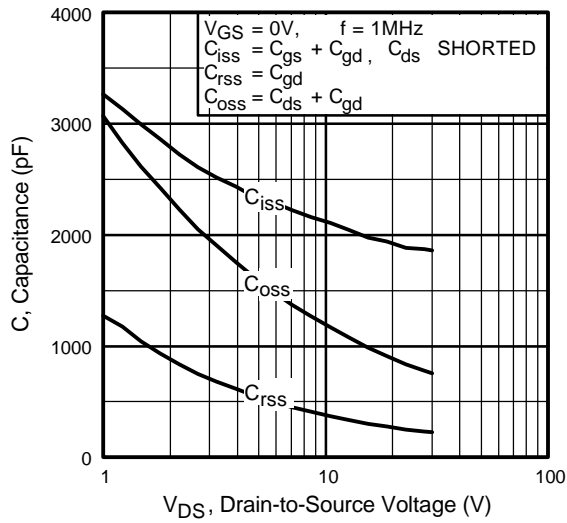
**Fig 2.** Typical Output Characteristics



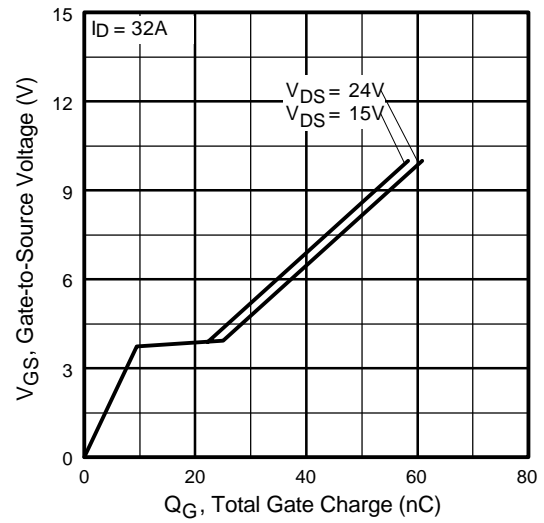
**Fig 3.** Typical Reverse Output Characteristics



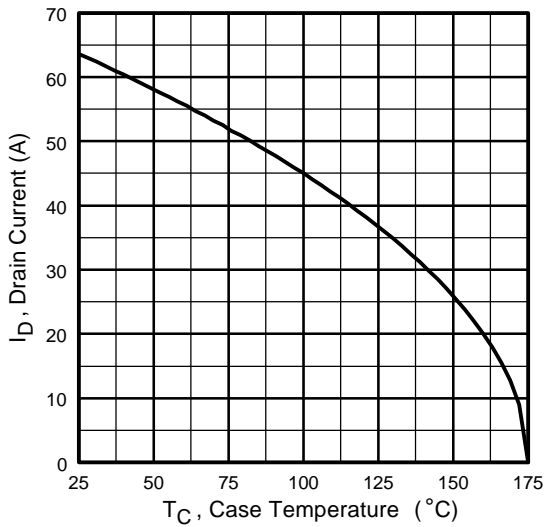
**Fig 4.** Typical Reverse Output Characteristics



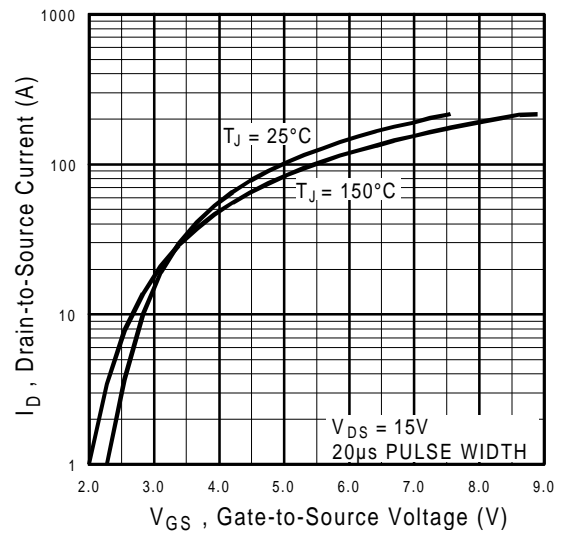
**Fig 5.** Typical Capacitance Vs. Drain-to-Source Voltage



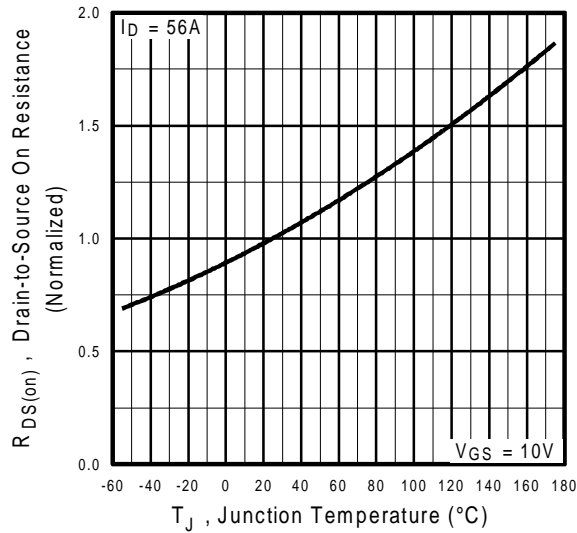
**Fig 6.** Typical Gate Charge Vs. Gate-to-Source Voltage



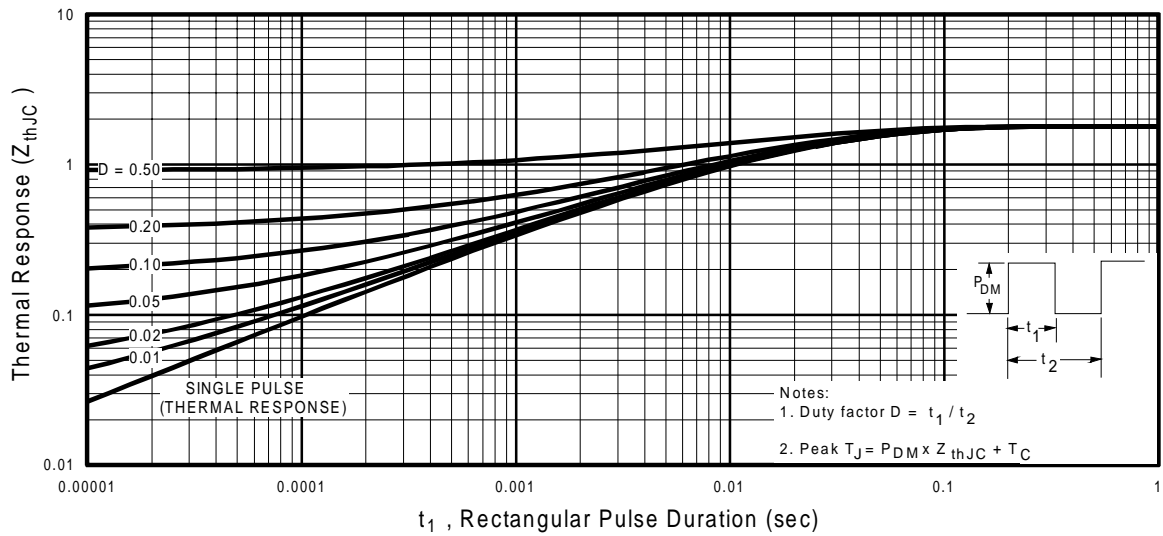
**Fig 7.** Maximum Drain Current Vs. Case Temperature



**Fig 8.** Typical Transfer Characteristics



**Fig 9.** Normalized On-Resistance Vs. Temperature

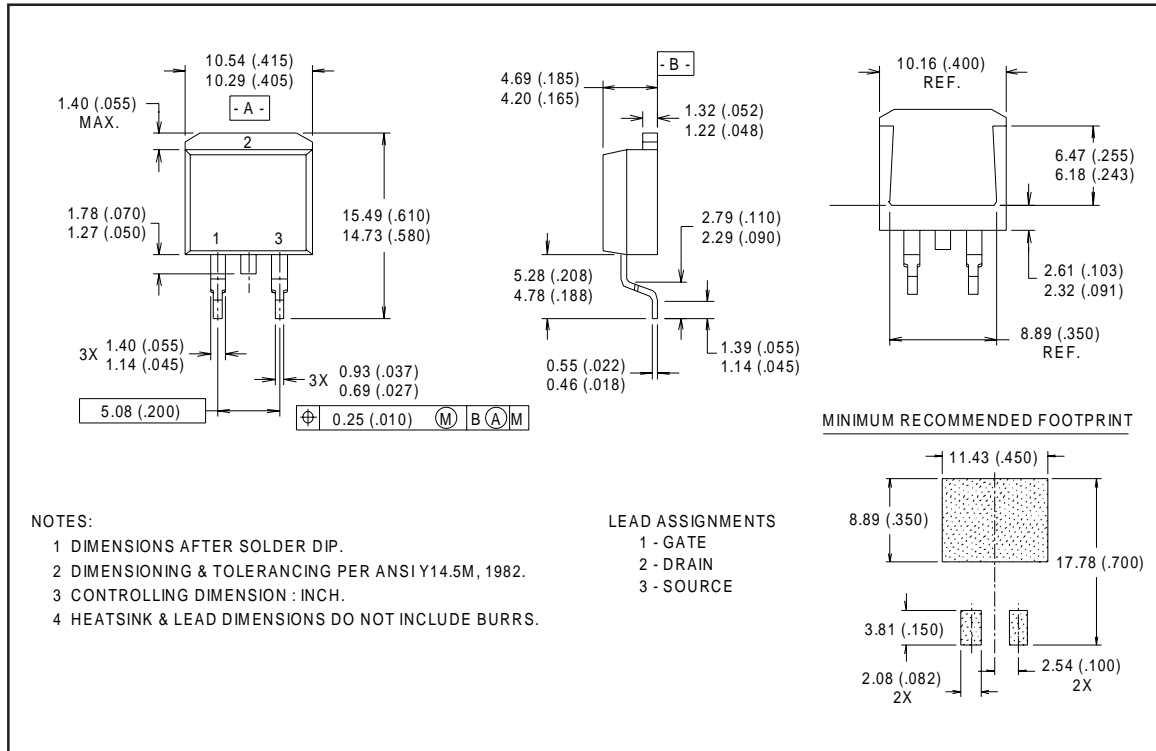


**Fig 10.** Maximum Effective Transient Thermal Impedance, Junction-to-Case

# IRL3103D1S

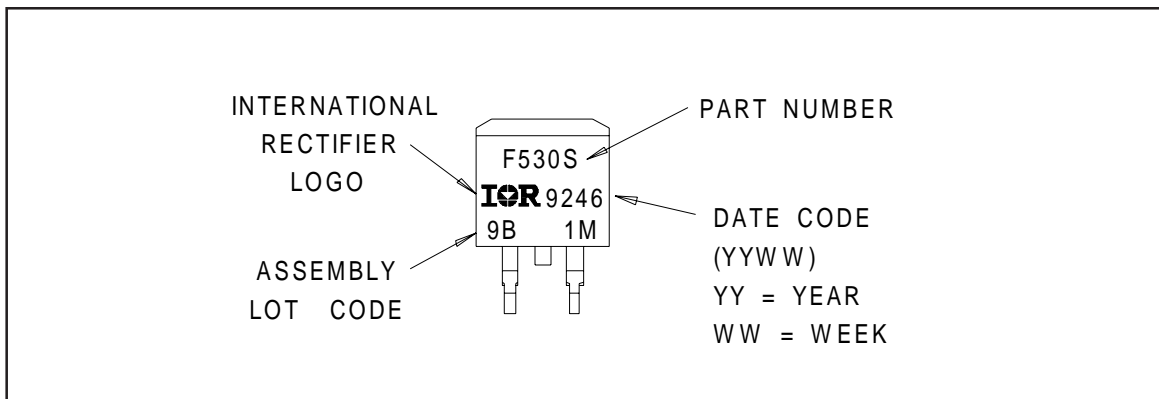
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**IR** Rectifier

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



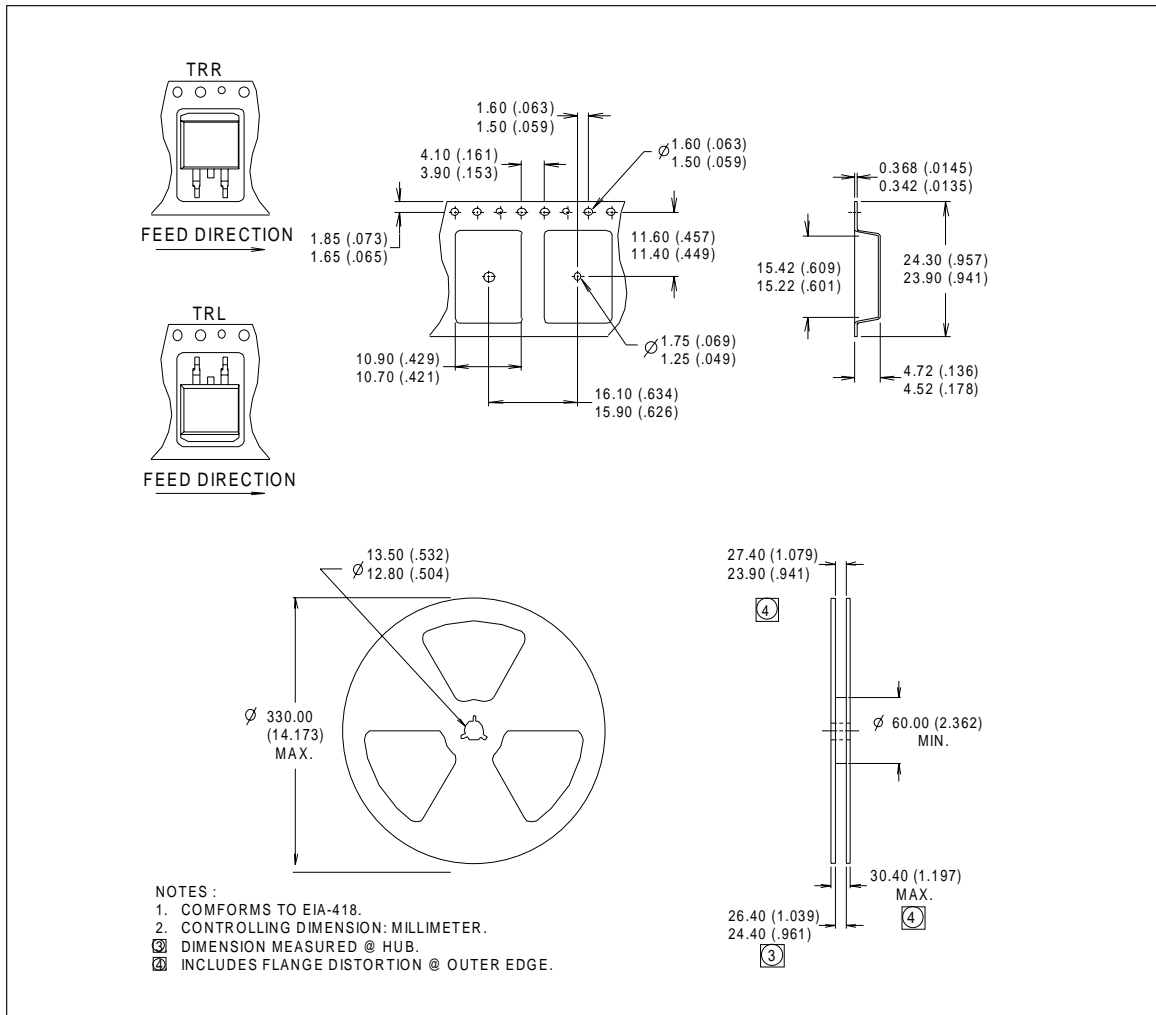
## Part Marking Information

D<sup>2</sup>Pak



## Tape & Reel Information

D<sup>2</sup>Pak



Note: For the most current drawings please refer to the IR website at:  
<http://www.irf.com/package/>

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