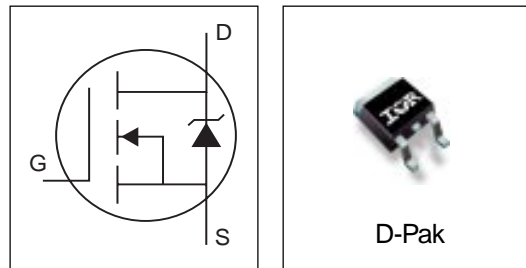


- N-Channel Application-Specific MOSFETs
- Ideal for CPU Core DC-DC Converters
- Low Conduction Losses
- Low Switching Losses
- Minimizes Parallel MOSFETs for high current applications

**HEXFET® Chipset for DC-DC Converters**

**Description**

These new devices employ advanced HEXFET® power MOSFET technology to achieve an unprecedented balance of on-resistance and gate charge. The reduced conduction and switching losses make them ideal for high efficiency DC-DC converters that power the latest generation of microprocessors.



Both the IRLR8103 and IRLR8503 have been optimized and are 100% tested for all parameters that are critical in synchronous buck converters including  $R_{DS(on)}$ , gate charge and Cdv/dt-induced turn-on immunity. The IRLR8103 offers particularly low  $R_{DS(on)}$  and high Cdv/dt immunity for synchronous FET applications. The IRLR8503 offers an extremely low combination of  $Q_{sw}$  &  $R_{DS(on)}$  for reduced losses in control FET applications.

**DEVICE RATINGS (typ.)**

	<b>IRLR8103</b>	<b>IRLR8503</b>
$V_{DS}$	30V	30V
$R_{DS(on)}$	6 mΩ	12 mΩ
$Q_G$	45 nC	15 nC
$Q_{sw}$	20.3 nC	5.4 nC
$Q_{oss}$	23 nC	23 nC

The package is designed for vapor phase, infrared, convection, or wave soldering techniques. Power dissipation of greater than 80W is possible in a typical PCB mount application.

**Absolute Maximum Ratings**

Parameter	Symbol	<b>IRLR8103</b>	<b>IRLR8503</b>	Units
Drain-Source Voltage	$V_{DS}$	30		V
Gate-Source Voltage	$V_{GS}$	±20		
Continuous Drain or Source Current ( $V_{GS} \geq 10V$ )	$T_A = 25^\circ C$	89 <sup>⑤</sup>	49 <sup>⑤</sup>	A
	$T_L = 90^\circ C$	61 <sup>⑤</sup>	34 <sup>⑤</sup>	
Pulsed Drain Current <sup>①</sup>	$I_{DM}$	350	196	
Power Dissipation	$T_A = 25^\circ C$	89	62	W
	$T_L = 90^\circ C$	42	30	
Junction & Storage Temperature Range	$T_J, T_{STG}$	-55 to 150		°C
Continuous Source Current (Body Diode)	$I_S$	89 <sup>⑤</sup>	49 <sup>⑤</sup>	A
Pulsed Source Current <sup>①</sup>	$I_{SM}$	350	196	

**Thermal Resistance**

Parameter		<b>Max.</b>		Units
Maximum Junction-to-Ambient PCB <sup>③</sup>	$R_{\theta JA}$	50		°C/W
Maximum Junction-to-Case	$R_{\theta JC}$	1.4	2.0	°C/W

# IRLR8103/IRLR8503

International  
**IRF** Rectifier

Electrical Characteristics		IRLR8103			IRLR8503			Units	Conditions
Parameter		Min	Typ	Max	Min	Typ	Max		
Drain-to-Source Breakdown Voltage*	$V_{DS}$	30	-	-	30	-	-	V	$V_{GS} = 0V, I_D = 250\mu A$
Static Drain-Source on Resistance*	$R_{DS(ON)}$	-	6	7.0	-	12	16	m $\Omega$	$V_{GS} = 10V, I_D = 15A$ ②
		-	7	8.5	-	14	18	m $\Omega$	$V_{GS} = 4.5V, I_D = 15A$ ②
Gate Threshold Voltage*	$V_{GS(th)}$	2.0	-	-	1.0	-	-	V	$V_{DS} = V_{GS}, I_D = 250\mu A$
Drain-Source Leakage Current*	$I_{DSS}$	-	-	30	-	-	30	$\mu A$	$V_{DS} = 24V, V_{GS} = 0$
		-	-	150	-	-	150		$V_{DS} = 24V, V_{GS} = 0,$ $T_j = 100^\circ C$
Gate-Source Leakage Current*	$I_{GSS}$	-	-	$\pm 100$	-	-	$\pm 100$	nA	$V_{GS} = \pm 20V$
Total Gate Chg Cont FET*	$Q_G$	-	50	-	-	15	-	nC	$V_{GS} = 5V, I_D = 15A, V_{DS} = 16V$
Total Gate Chg Sync FET*	$Q_G$	-	45	-	-	13	-		$V_{GS} = 5V, V_{DS} < 100mV$
Pre-Vth Gate-Source Charge	$Q_{GS1}$	-	17	-	-	3.7	-		$V_{DS} = 16V, I_D = 15A$
Post-Vth Gate-Source Charge	$Q_{GS2}$	-	4.3	-	-	1.3	-		
Gate to Drain Charge	$Q_{GD}$	-	16	-	-	4.1	-		
Switch Chg( $Q_{GS2} + Q_{GD}$ )*	$Q_{sw}$	-	20.3	-	-	5.4	-		
Output Charge*	$Q_{oss}$	-	23	-	-	23	-		$V_{DS} = 16V, V_{GS} = 0$
Gate Resistance	$R_G$	-	1.5	-	-	2.0	-	$\Omega$	
Turn-on Delay Time	$t_d(on)$	-	TBD	-	-	TBD	-	ns	$V_{DD} = 16V, I_D = 15A$
Rise Time	$t_r$	-	TBD	-	-	TBD	-		$V_{GS} = 5V$
Turn-off Delay Time	$t_d(off)$	-	TBD	-	-	TBD	-		Clamped Inductive Load
Fall Time	$t_f$	-	TBD	-	-	TBD	-		See test diagram Fig 19.
Input Capacitance	$C_{iss}$	-	TBD	-	-	TBD	-	pF	$V_{DS} = 16V, V_{GS} = 0$
Output Capacitance	$C_{oss}$	-	TBD	-	-	TBD	-		
Reverse Transfer Capacitance	$C_{rss}$	-	TBD	-	-	TBD	-		

## Source-Drain Rating & Characteristics

Parameter		Min	Typ	Max	Min	Typ	Max	Units	Conditions
Diode Forward Voltage*	$V_{SD}$	-	-	0.9	-	-	1.0	V	$I_S = 15A$ ②, $V_{GS} = 0V$
Reverse Recovery Charge④	$Q_{rr}$	-	100	-	-	89	-	nC	$di/dt \sim 700A/\mu s$ $V_{DS} = 16V, V_{GS} = 0V, I_S = 15A$
Reverse Recovery Charge (with Parallel Schottky)④	$Q_{rr(s)}$	-	77	-	-	75	-		$di/dt = 700A/\mu s$ (with 10BQ040) $V_{DS} = 16V, V_{GS} = 0V, I_S = 15A$

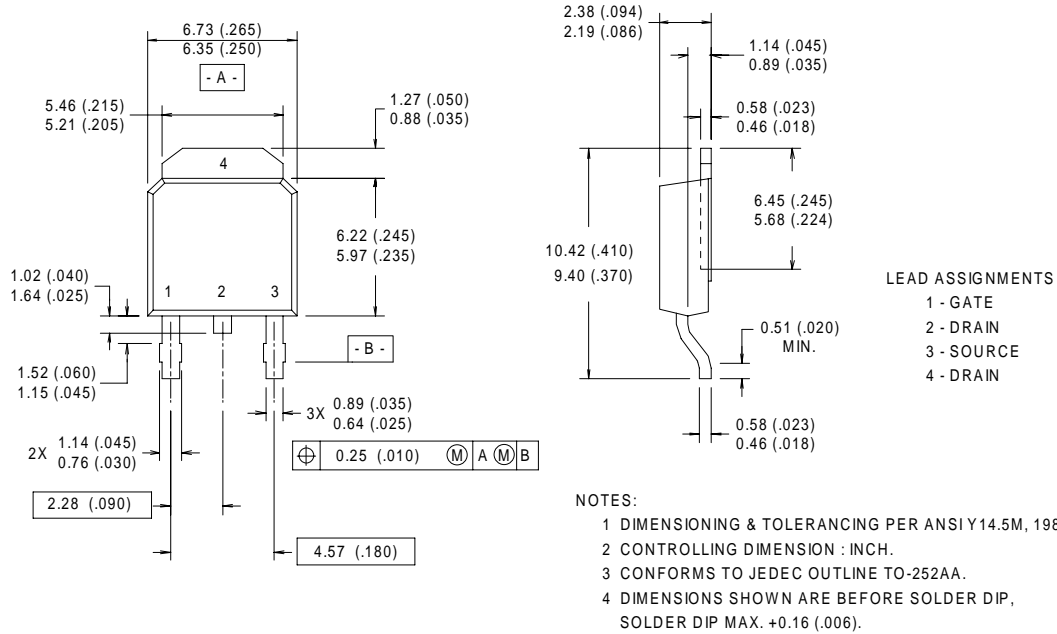
### Notes:

- ① Repetitive rating; pulse width limited by max. junction temperature.      ④ Typ = measured -  $Q_{oss}$   
 ② Pulse width  $\leq 300 \mu s$ ; duty cycle  $\leq 2\%$ .      ⑤ Calculated continuous current based on maximum allowable Junction temperature; package limitation current = 20A  
 ③ When mounted on 1 inch square copper board,  $t < 10$  sec.      \* Devices are 100% tested to these parameters.

## Package Outline

### TO-252AA Outline

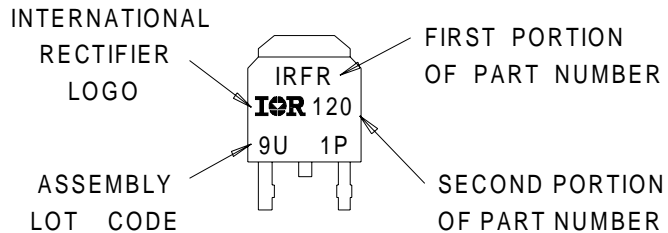
Dimensions are shown in millimeters (inches)



## Part Marking Information

### TO-252AA (D-PARK)

EXAMPLE : THIS IS AN IRFR120  
 WITH ASSEMBLY  
 LOT CODE 9U1P

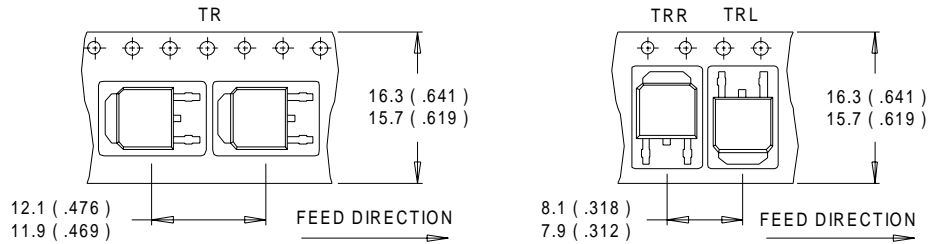


# IRLR8103/IRLR8503

International  
**IR** Rectifier

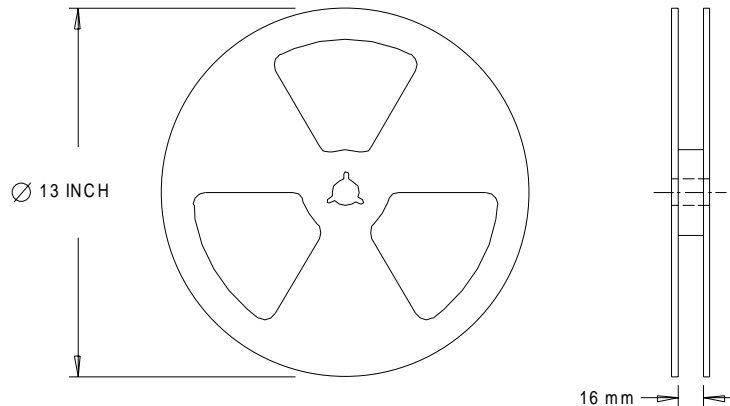
## Tape & Reel Information

TO-252AA



NOTES :

1. CONTROLLING DIMENSION : MILLIMETER.
2. ALL DIMENSIONS ARE SHOWN IN MILLIMETERS ( INCHES ).
3. OUTLINE CONFORMS TO EIA-481 & EIA-541.



NOTES :

1. OUTLINE CONFORMS TO EIA-481.

International  
**IR** Rectifier

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<http://www.irf.com/> Data and specifications subject to change without notice. 11/98