

INTELLIGENT POWER LOW SIDE SWITCH

Features

- Over temperature shutdown
- Over current shutdown
- Active clamp
- Up to 50kHz
- Logic level input
- ESD protection

Description

The AUIPS1025R is a three terminal Intelligent Power Switch (IPS) that features a low side MOSFET with over-current, over-temperature, ESD protection and drain to source active clamp. This device offers protections and the high reliability required in harsh environments. The switch provides efficient protection by turning OFF the power MOSFET when the temperature exceeds 170°C or when the drain current reaches 22A. The device restarts once the input is cycled. The avalanche capability is significantly enhanced by the active clamp and covers most inductive load demagnetizations.

Product Summary

Rds(on)	35mΩ (max.)
Vclamp	39V
Ishutdown	15A (min.)

Package

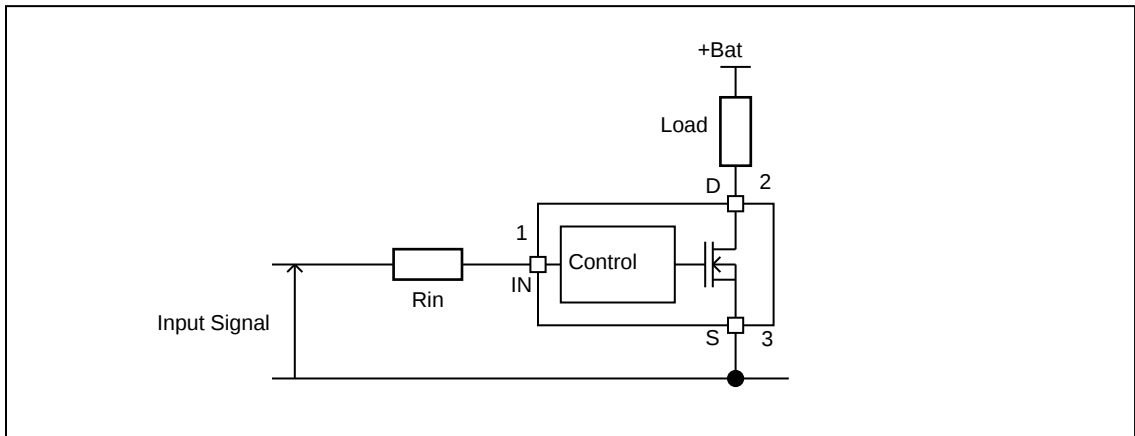


D-Pak
AUIPS1025R

Ordering Information

Base Part Number	Package Type	Standard Pack		Complete Part Number
		Form	Quantity	
AUIPS1025R	D-Pak-3-Lead	Tube	75	AUIPS1025R
		Tape and reel left	3000	AUIPS1025RTRL

Typical Connection



Absolute Maximum Ratings

Absolute maximum ratings indicate sustained limits beyond which damage to the device may occur. (T_{ambient}=25°C unless otherwise specified).

Symbol	Parameter	Min.	Max.	Units
V _{ds}	Maximum drain to source voltage	-0.3	36	V
V _{ds} cont.	Maximum continuous drain to source voltage	—	28	V
V _{in}	Maximum input voltage	-0.3	6	V
I _{sd} cont.	Max. diode continuous current (limited by thermal dissipation)	—	4.5	A
P _d	Maximum power dissipation (internally limited by thermal protection) R _{th} =50°C/W AUIPS1025R 1" sqr. footprint	—	2.5	W
T _j max.	Maximum operating junction temperature	-40	150	°C
	Maximum storage temperature	-55	150	

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Units
R _{th1}	Thermal resistance junction to ambient D-Pak std. footprint	70	—	°C/W
R _{th2}	Thermal resistance junction to ambient D-Pak 1" sqr. footprint	50	—	
R _{th3}	Thermal resistance junction to case D-Pak	2.6	—	

Recommended Operating Conditions

These values are given for a quick design.

Symbol	Parameter	Min.	Max.	Units
V _{in} On	High level input voltage	4.5	5.5	V
V _{in} Off	Low level input voltage	0	0.5	
I _{ds}	Continuous drain current, T _{ambient} =85°C, T _j =150°C, V _{in} =5V R _{th} =50°C/W AUIPS1025R 1" sqr. footprint	—	4.9	A
Max F	Max. frequency	—	50	kHz
R _{in}	Recommended resistor in series with IN pin (1)	10	1000	Ω
Max Tr _{in}	Max. input rising time (from 10% to 90%) (2)	—	50	ns

(1) Input signal of the pulse generator not the voltage on the IN pin of the device. Do not connect any other component on the input.

(2) Max. Tr_{in} is for the input signal of the pulse generator not on the IN pin voltage of the device.

Static Electrical Characteristics

T_J = -40...150°C, V_{CC} = 6.28V (unless otherwise specified), typical value are given for T_J = 25°C

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
R _{ds(on)}	ON state resistance T _J = 25°C	—	28	35	mΩ	V _{in} = 5V, I _{ds} = 10A
	ON state resistance T _J = 150°C (2)	—	47	55		
I _{dss1}	Drain to source leakage current	—	15	25	μA	V _{CC} = 14V, V _{in} = 0V, T _J = 25°C
I _{dss2}	Drain to source leakage current	—	45	60		V _{CC} = 28V, V _{in} = 0V, T _J = 25°C
V _{clamp1}	Drain to source clamp voltage 1	36	39	—	V	I _d = 20mA
V _{clamp2}	Drain to source clamp voltage 2	—	39	—		I _d = 2A
V _{in clamp}	IN to source pin clamp voltage	5.5	6.5	7		I _{in} = 1mA
V _{th}	Input threshold voltage	—	1.4	—		V _{ds} - V _{in} = 6V, I _d = 1mA
I _{in, on}	ON state IN positive current	50	130	230	μA	V _{in} = 5V, R _{in} = 10Ω
T _{in_delay}	Delay before turn ON by input signal	1	—	—	ms	V _{drain} > 6V

Switching Electrical Characteristics

T_J = -40...150°C, V_{CC} = 14V (unless otherwise specified), typical value are given for T_J = 25°C

Resistive load = 2Ω, R_{input} = 10Ω, V_{in} = 5V

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
T _{don}	Turn-on delay time to 10%	—	100	450	ns	See figure 2
T _r	Rise time 10% to 90%	—	250	900		
T _{doff}	Turn-off delay time to 90%	—	500	1650		
T _f	Fall time 90% to 10%	—	300	1000		

T_J = -40...150°C, V_{CC} = 14V (unless otherwise specified), typical value are given for T_J = 25°C

Resistive load = 2Ω, R_{input} = 1000Ω, V_{in} = 5V

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
T _{don}	Turn-on delay time to 10%	—	750	2500	ns	See figure 2
T _r	Rise time 10% to 90%	—	1400	4700		
T _{doff}	Turn-off delay time to 90%	—	3800	12000		
T _f	Fall time 90% to 10%	—	2200	7000		

Protection Characteristics

T_J = -40...150°C, V_{CC} = 6.28V (unless otherwise specified), typical value are given for T_J = 25°C

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
T _{sd}	Over temperature threshold	150	170	—	°C	See figure 1
I _{sd}	Over current threshold	15	22	32	A	See figure 1
V _{reset}	IN protection reset threshold	1	2	3	V	
T _{reset}	Time to reset protection	5	30	200	μs	V _{in} = 0V

(3) Guaranteed by design

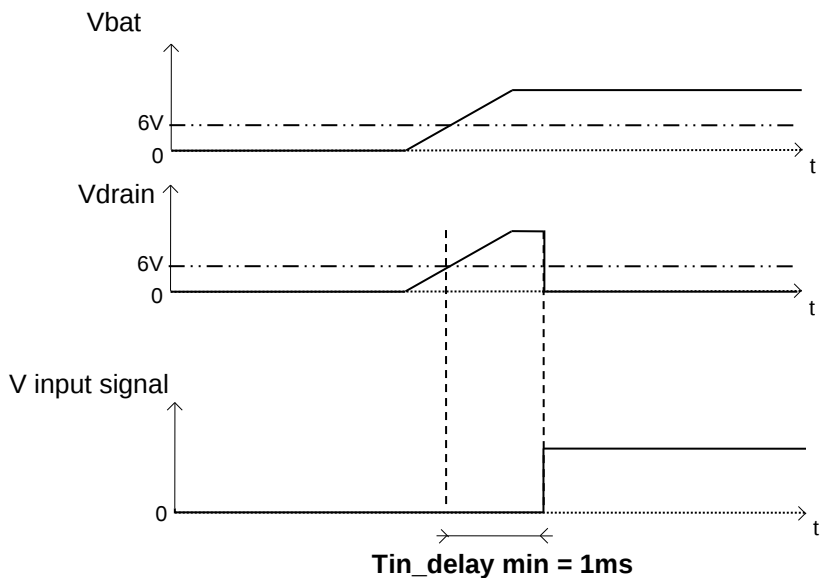
Diagram of a 3-pin MOSFET package (D Pak) with pins labeled 1- In, 2- Drain, and 3- S.

All values are typical



Tin_delay explanation

The voltage in Drain pin of AUIPS1025R is must be above 6V more than 1ms before turning ON the part by applying the input signal.
Otherwise the part could be latched.



All curves are typical values..

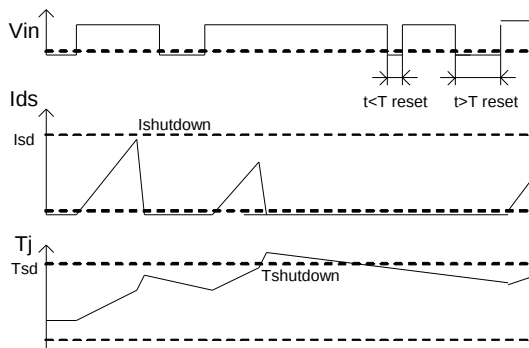


Figure 1 – Timing diagram

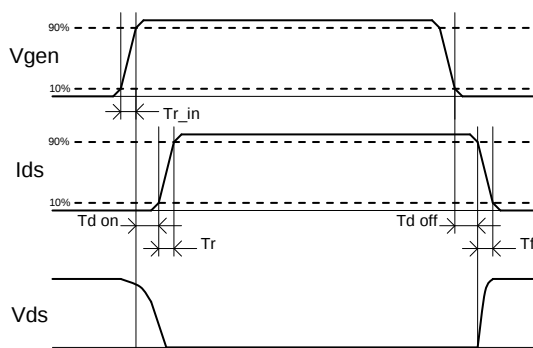


Figure 2 – IN rise time & switching definitions

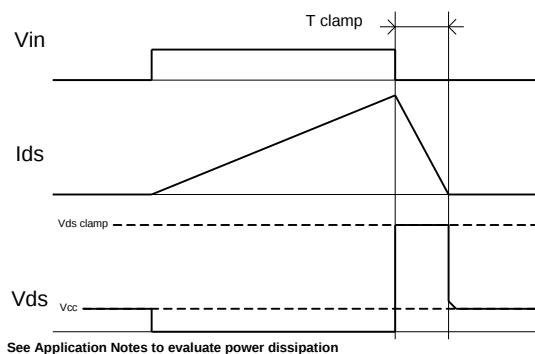


Figure 3 – Active clamp waveforms

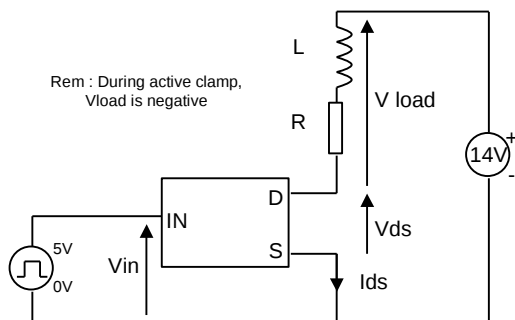


Figure 4 – Active clamp test circuit

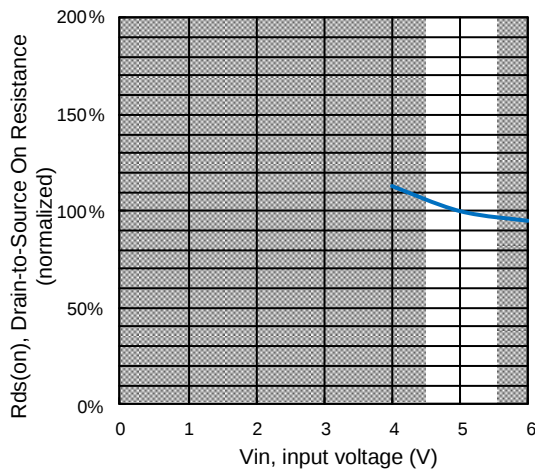


Figure 5 – Normalized Rds(on) (%) Vs Input voltage (V)

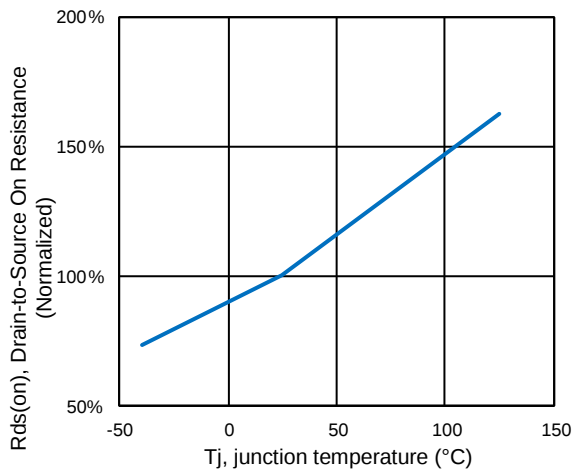


Figure 6 - Normalized Rds(on) (%) Vs Tj (°C)

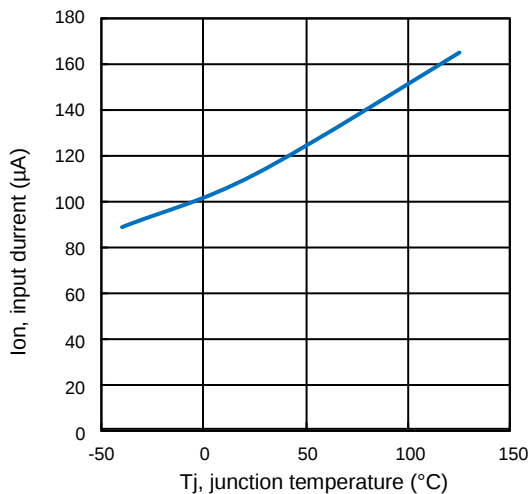


Figure 7 – Input current (µA) On Vs junction temperature (°C)

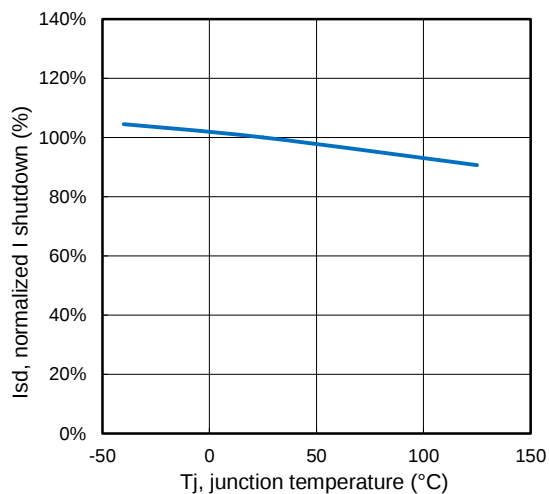
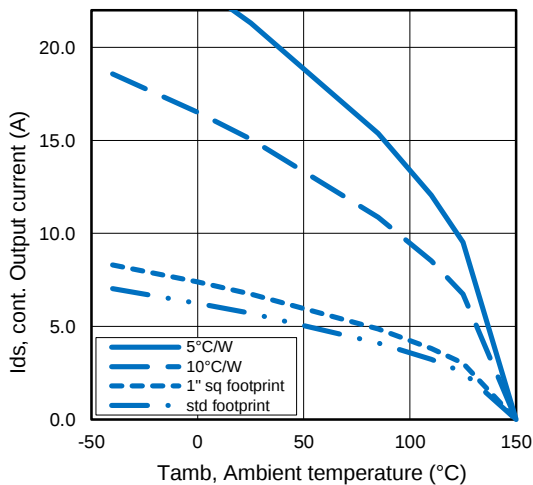
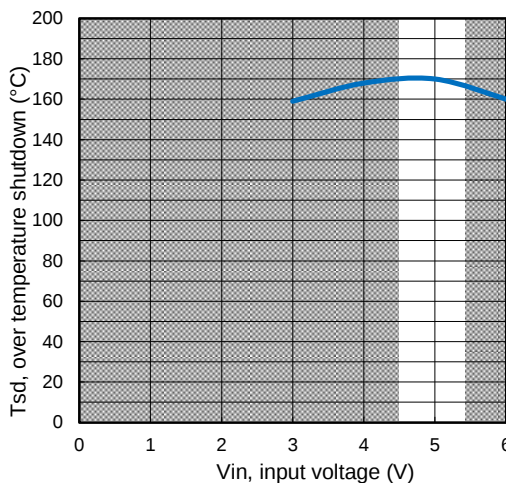


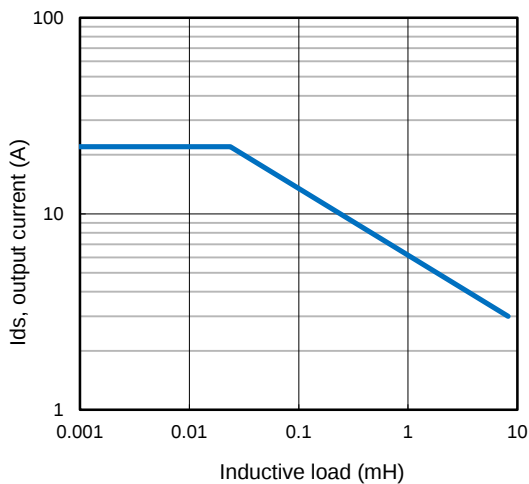
Figure 8 – Normalized I shutdown (%) Vs junction temperature (°C)



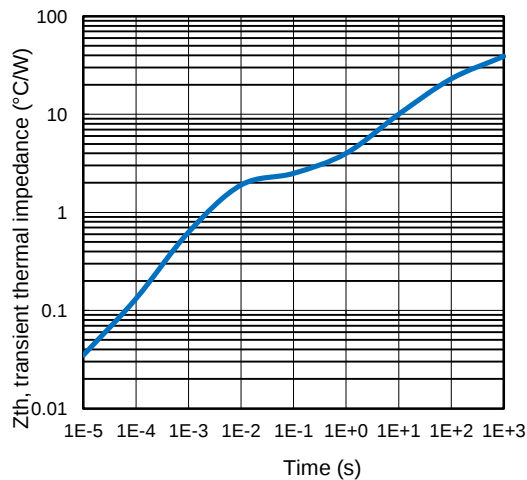
**Figure 9 – Max. continuous output current (A)
Vs Ambient temperature (°C)**



**Figure 10 – Over temperature shutdown (°C)
Vs input voltage (V)**



**Figure 11 – Max. output current (A)
Vs Inductive load (mH)**



**Figure 12 – Transient thermal impedance (°C/W)
Vs time (s)**

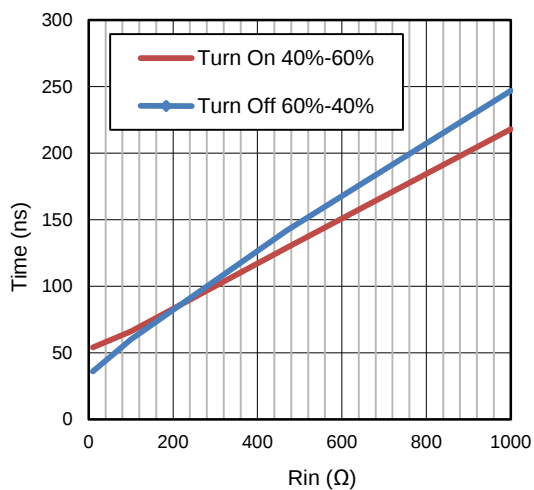
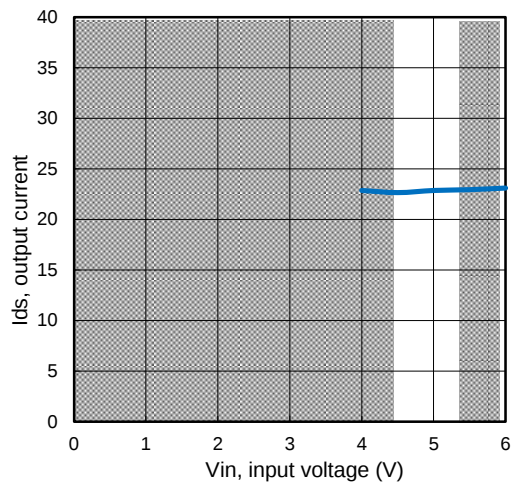
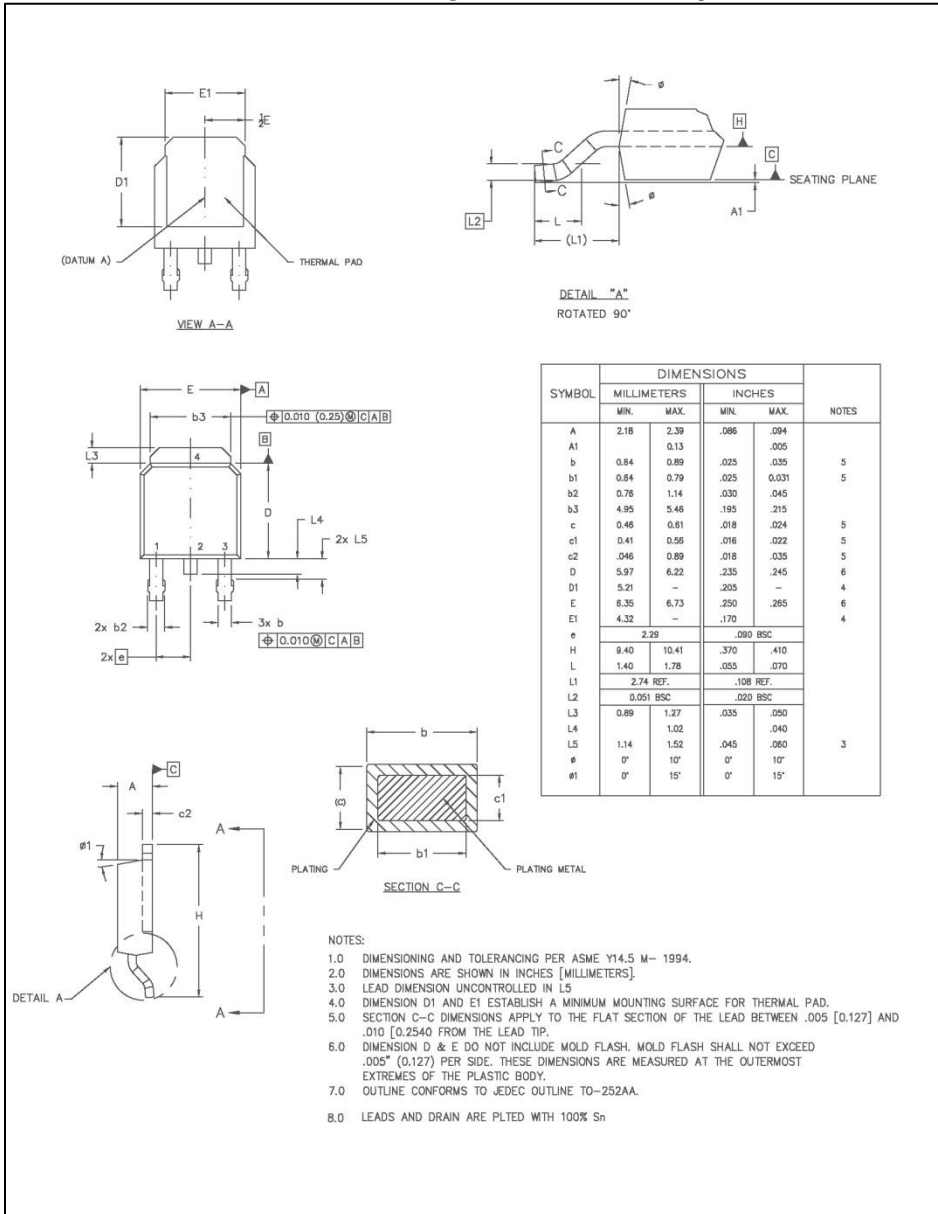


Figure 13 – time (ns) vs Rin (Ω)



**Figure 14 – Current shutdown (A)
Vs Input voltage (V)**

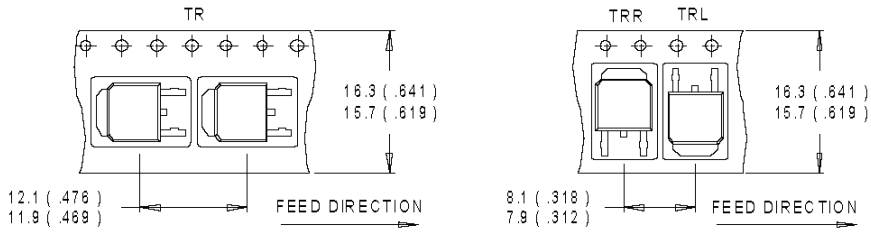
Case Outline – D-Pak - Automotive Q100 PbF MSL1 qualified



Note: For the most current drawings please refer to the IR website at:

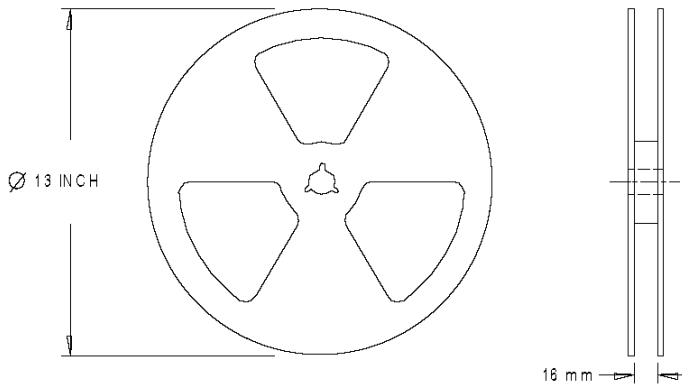
<http://www.irf.com/package/>

Tape & Reel - D-Pak



NOTES:

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



NOTES:

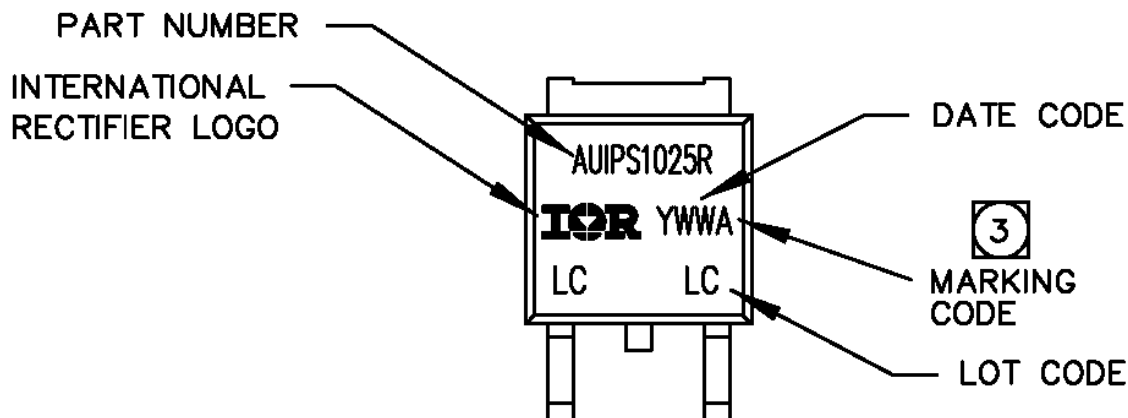
1. OUTLINE CONFORMS TO EIA-481.

Dimensions are shown in millimeters (inches)

Note: For the most current drawings please refer to the IR website at:

<http://www.irf.com/package/>

Part Marking Information



Qualification Information[†]

Qualification Level		Automotive (per AEC-Q100)	
		Comments: This family of ICs has passed an Automotive qualification. IR's Industrial and Consumer qualification level is granted by extension of the higher Automotive level.	
Moisture Sensitivity Level		DPAK-3L	MSL1, 260°C (per IPC/JEDEC J-STD-020)
ESD	Machine Model	Class M4 (+/-500V) (per AEC-Q100-003)	
	Human Body Model	Class 3A (+/-4500V) (per AEC-Q100-002)	
	Charged Device Model	Class C5 (+/-1000V) (per AEC-Q100-011)	
IC Latch-Up Test		Class II Level A (per AEC-Q100-004)	
RoHS Compliant		Yes	

[†] Qualification standards can be found at International Rectifier's web site <http://www.irf.com/>

Published by
Infineon Technologies AG
81726 München, Germany
© Infineon Technologies AG 2015
All Rights Reserved.

IMPORTANT NOTICE

The information given in this document shall in no event be regarded as a guarantee of conditions or characteristics ("Beschaffenheitsgarantie"). With respect to any examples, hints or any typical values stated herein and/or any information regarding the application of the product, Infineon Technologies hereby disclaims any and all warranties and liabilities of any kind, including without limitation warranties of non-infringement of intellectual property rights of any third party.

In addition, any information given in this document is subject to customer's compliance with its obligations stated in this document and any applicable legal requirements, norms and standards concerning customer's products and any use of the product of Infineon Technologies in customer's applications.

The data contained in this document is exclusively intended for technically trained staff. It is the responsibility of customer's technical departments to evaluate the suitability of the product for the intended application and the completeness of the product information given in this document with respect to such application.

For further information on the product, technology, delivery terms and conditions and prices please contact your nearest Infineon Technologies office (www.infineon.com).

WARNINGS

Due to technical requirements products may contain dangerous substances. For information on the types in question please contact your nearest Infineon Technologies office.

Except as otherwise explicitly approved by Infineon Technologies in a written document signed by authorized representatives of Infineon Technologies, Infineon Technologies' products may not be used in any applications where a failure of the product or any consequences of the use thereof can reasonably be expected to result in personal injury.

Revision History

Revision	Date	Notes/Changes
A	October 10, 2015	Initial release
Rev 1.1	March 25, 2016	Page 6 curve updated for Tin_delay explanation



**Стандарт
Электрон
Связь**

Мы молодая и активно развивающаяся компания в области поставок электронных компонентов. Мы поставляем электронные компоненты отечественного и импортного производства напрямую от производителей и с крупнейших складов мира.

Благодаря сотрудничеству с мировыми поставщиками мы осуществляем комплексные и плановые поставки широчайшего спектра электронных компонентов.

Собственная эффективная логистика и склад в обеспечивает надежную поставку продукции в точно указанные сроки по всей России.

Мы осуществляем техническую поддержку нашим клиентам и предпродажную проверку качества продукции. На все поставляемые продукты мы предоставляем гарантию .

Осуществляем поставки продукции под контролем ВП МО РФ на предприятия военно-промышленного комплекса России , а также работаем в рамках 275 ФЗ с открытием отдельных счетов в уполномоченном банке. Система менеджмента качества компании соответствует требованиям ГОСТ ISO 9001.

Минимальные сроки поставки, гибкие цены, неограниченный ассортимент и индивидуальный подход к клиентам являются основой для выстраивания долгосрочного и эффективного сотрудничества с предприятиями радиоэлектронной промышленности, предприятиями ВПК и научно-исследовательскими институтами России.

С нами вы становитесь еще успешнее!

Наши контакты:

Телефон: +7 812 627 14 35

Электронная почта: sales@st-electron.ru

Адрес: 198099, Санкт-Петербург,
Промышленная ул, дом № 19, литера Н,
помещение 100-Н Офис 331