Automotive grade

Automotive IPS

Low side
AUIPS1025R

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.)

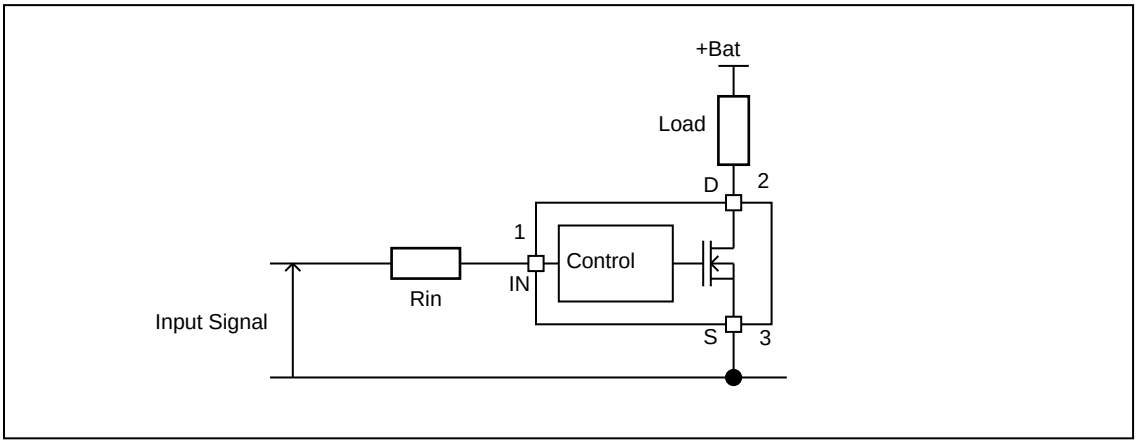
Package

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. (Tambient=25°C unless otherwise specified).

Symbol	Parameter	Min.	Max.	Units
Vds	Maximum drain to source voltage	-0.3	36	V
Vds cont.	Maximum continuous drain to source voltage	—	28	V
Vin	Maximum input voltage	-0.3	6	V
Isd cont.	Max. diode continuous current (limited by thermal dissipation)	—	4.5	A
Pd	Maximum power dissipation (internally limited by thermal protection) Rth=50°C/W AUIPS1025R 1" sqr. footprint	—	2.5	W
Tj max.	Maximum operating junction temperature	-40	150	°C
	Maximum storage temperature	-55	150	

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Units
Rth1	Thermal resistance junction to ambient D-Pak std. footprint	70	—	°C/W
Rth2	Thermal resistance junction to ambient D-Pak 1" sqr. footprint	50	—	
Rth3	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
Vin_On	High level input voltage	4.5	5.5	V
Vin_Off	Low level input voltage	0	0.5	
Ids	Continuous drain current, Tambient=85°C, Tj=150°C, Vin=5V Rth=50°C/W AUIPS1025R 1" sqr. footprint	—	4.9	A
Max F	Max. frequency	—	50	kHz
Rin	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

Tj= -40..150°C, Vcc=6..28V (unless otherwise specified), typical value are given for Tj=25°C

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
Rds(on)	ON state resistance Tj=25°C	—	28	35	mΩ	Vin=5V, Ids=10A
	ON state resistance Tj=150°C (2)	—	47	55		
Idss1	Drain to source leakage current	—	15	25	µA	Vcc=14V, Vin=0V, Tj=25°C
Idss2	Drain to source leakage current	—	45	60		Vcc=28V, Vin=0V, Tj=25°C
V clamp1	Drain to source clamp voltage 1	36	39	—	V	Id=20mA
V clamp2	Drain to source clamp voltage 2	—	39	—		Id=2A
Vin clamp	IN to source pin clamp voltage	5.5	6.5	7		Iin=1mA
Vth	Input threshold voltage	—	1.4	—		Vds-Vin=6V, Id=1mA
Iin, on	ON state IN positive current	50	130	230	µA	Vin=5V,Rin=10Ω
Tin_delay	Delay before turn ON by input signal	1	—	—	ms	Vdrain>6V

Switching Electrical Characteristics

Tj= -40..150°C, Vcc=14V (unless otherwise specified), typical value are given for Tj=25°C
Resistive load=2Ω, Rinput=10Ω, Vin=5V

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
Tdon	Turn-on delay time to 10%	—	100	450	ns	See figure 2
Tr	Rise time 10% to 90%	—	250	900		
Tdoff	Turn-off delay time to 90%	—	500	1650		
Tf	Fall time 90% to 10%	—	300	1000		

Tj= -40..150°C, Vcc=14V (unless otherwise specified), typical value are given for Tj=25°C
Resistive load=2Ω, Rinput=1000Ω, Vin=5V

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
Tdon	Turn-on delay time to 10%	—	750	2500	ns	See figure 2
Tr	Rise time 10% to 90%	—	1400	4700		
Tdoff	Turn-off delay time to 90%	—	3800	12000		
Tf	Fall time 90% to 10%	—	2200	7000		

Protection Characteristics

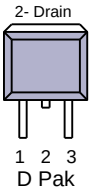
Tj= -40..150°C, Vcc=6..28V (unless otherwise specified), typical value are given for Tj=25°C

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
Tsd	Over temperature threshold	150	170	—	°C	See figure 1
Isd	Over current threshold	15	22	32	A	See figure 1
Vreset	IN protection reset threshold	1	2	3	V	
Treset	Time to reset protection	5	30	200	µs	Vin=0V

(3) Guaranteed by design

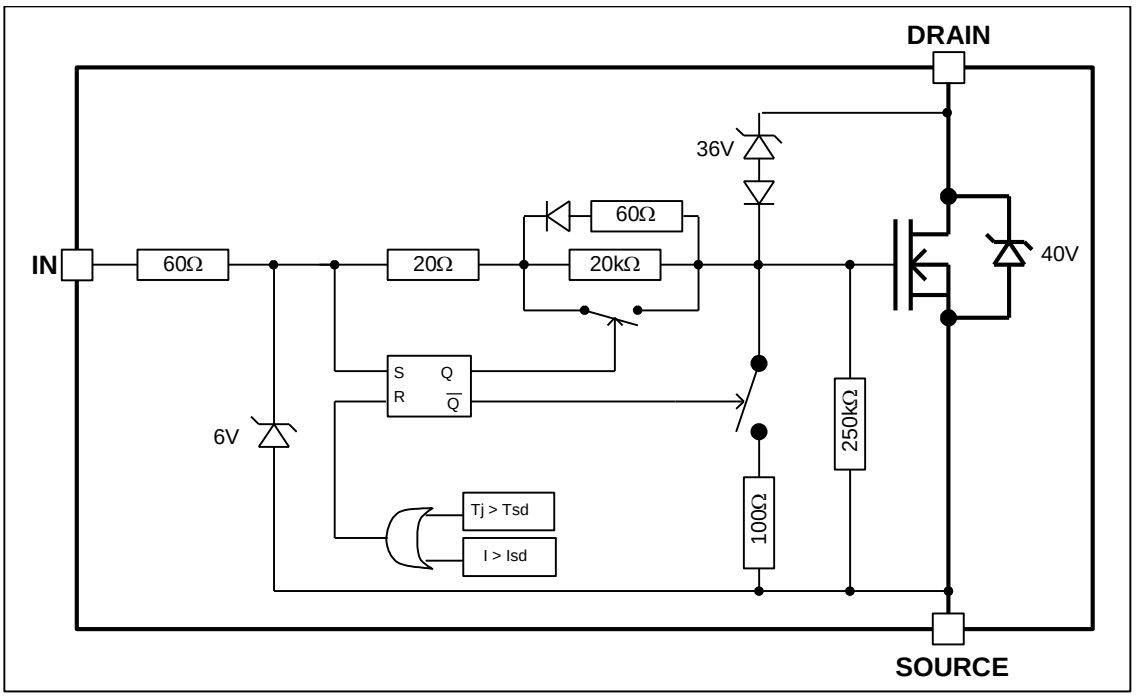
Lead Assignments

1- In
2- D
3- S



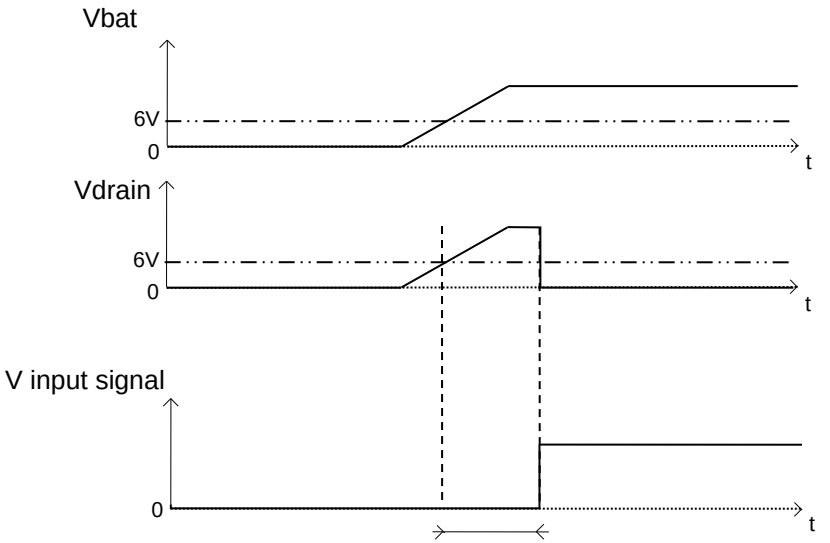
Functional Block Diagram

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..

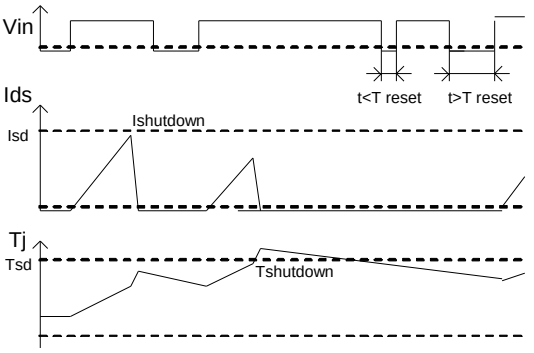


Figure 1 – Timing diagram

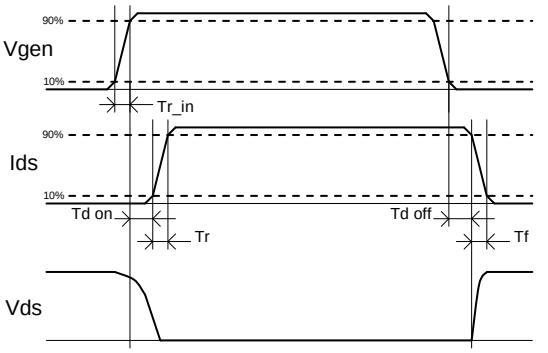


Figure 2 – IN rise time & switching definitions

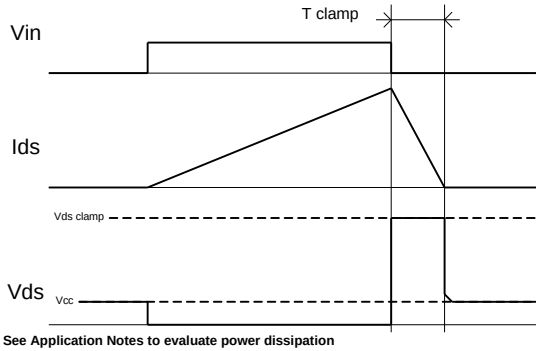


Figure 3 – Active clamp waveforms

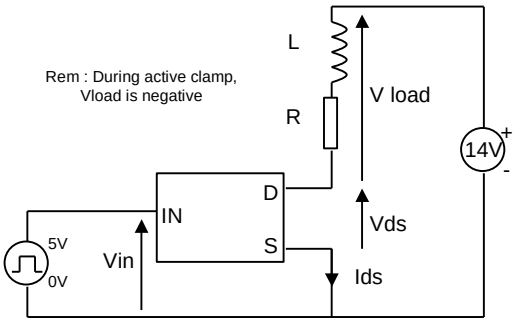


Figure 4 – Active clamp test circuit

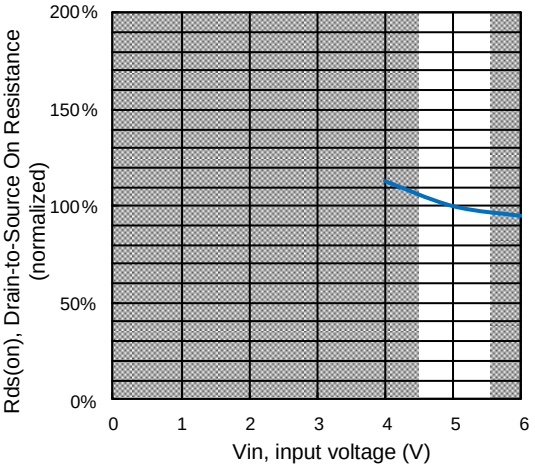


Figure 5 – Normalized Rds(on) (%) Vs Input voltage (V)

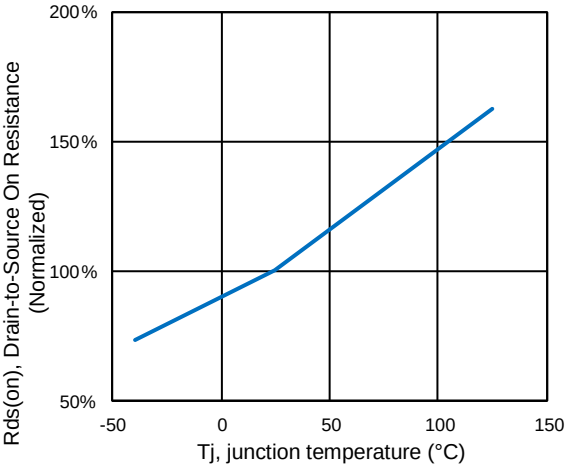


Figure 6 - Normalized Rds(on) (%) Vs Tj (°C)

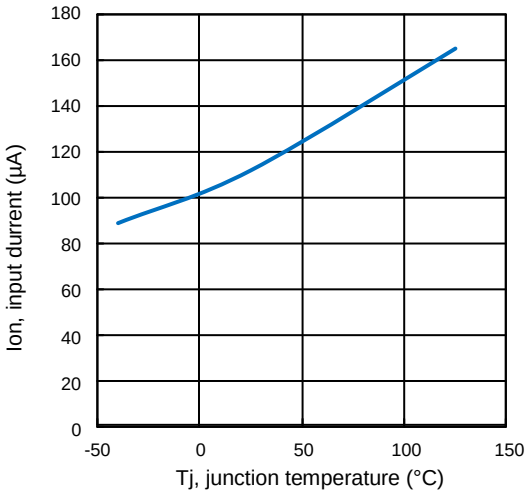


Figure 7 – Input current (µA) On Vs junction temperature (°C)

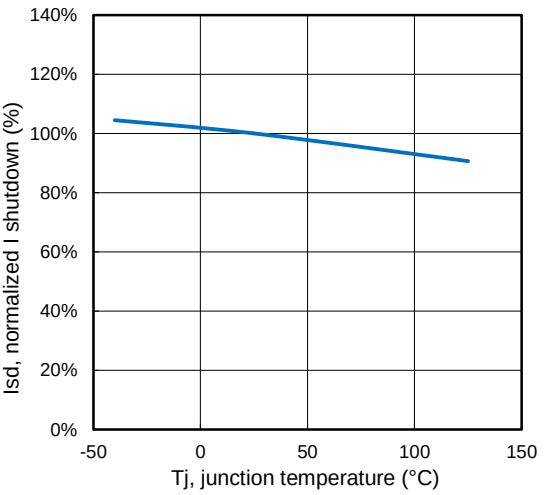


Figure 8 – Normalized I shutdown (%) Vs junction temperature (°C)

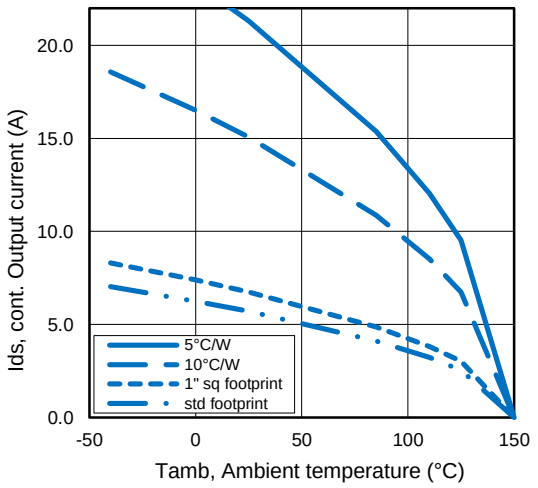


Figure 9 – Max. continuous output current (A) Vs Ambient temperature (°C)

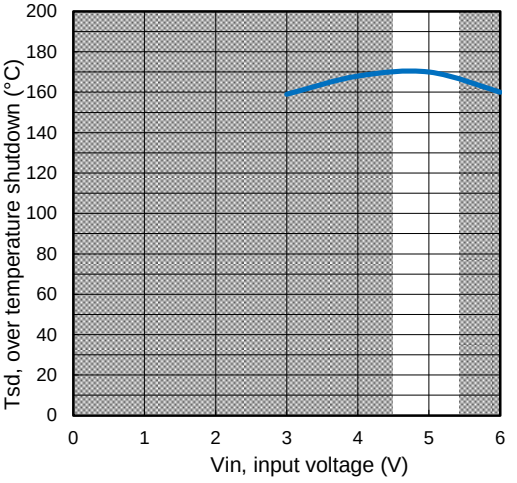


Figure 10 – Over temperature shutdown (°C) Vs input voltage (V)

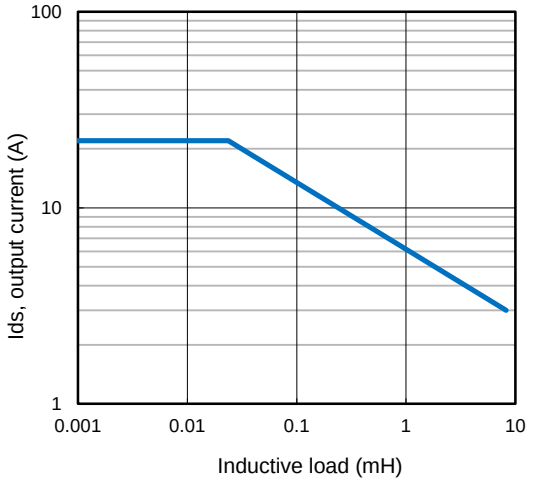


Figure 11 – Max. ouput current (A) Vs Inductive load (mH)

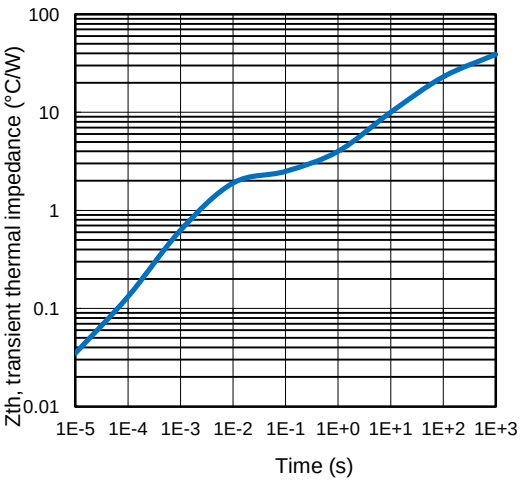


Figure 12 – Transient thermal impedance (°C/W) Vs time (s)

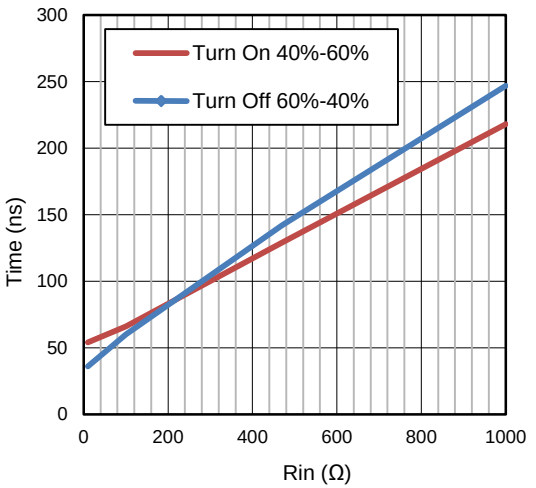


Figure 13 – time (ns) vs Rin (Ω)

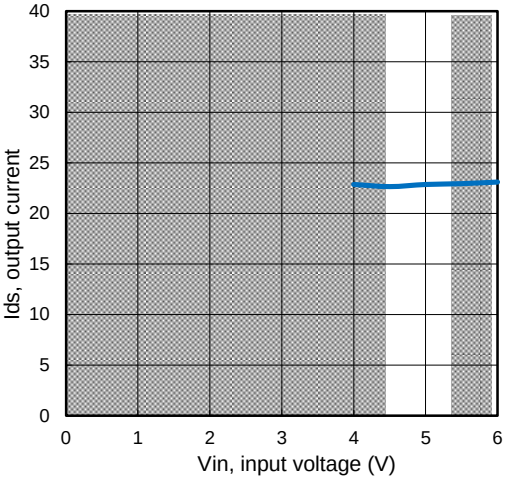
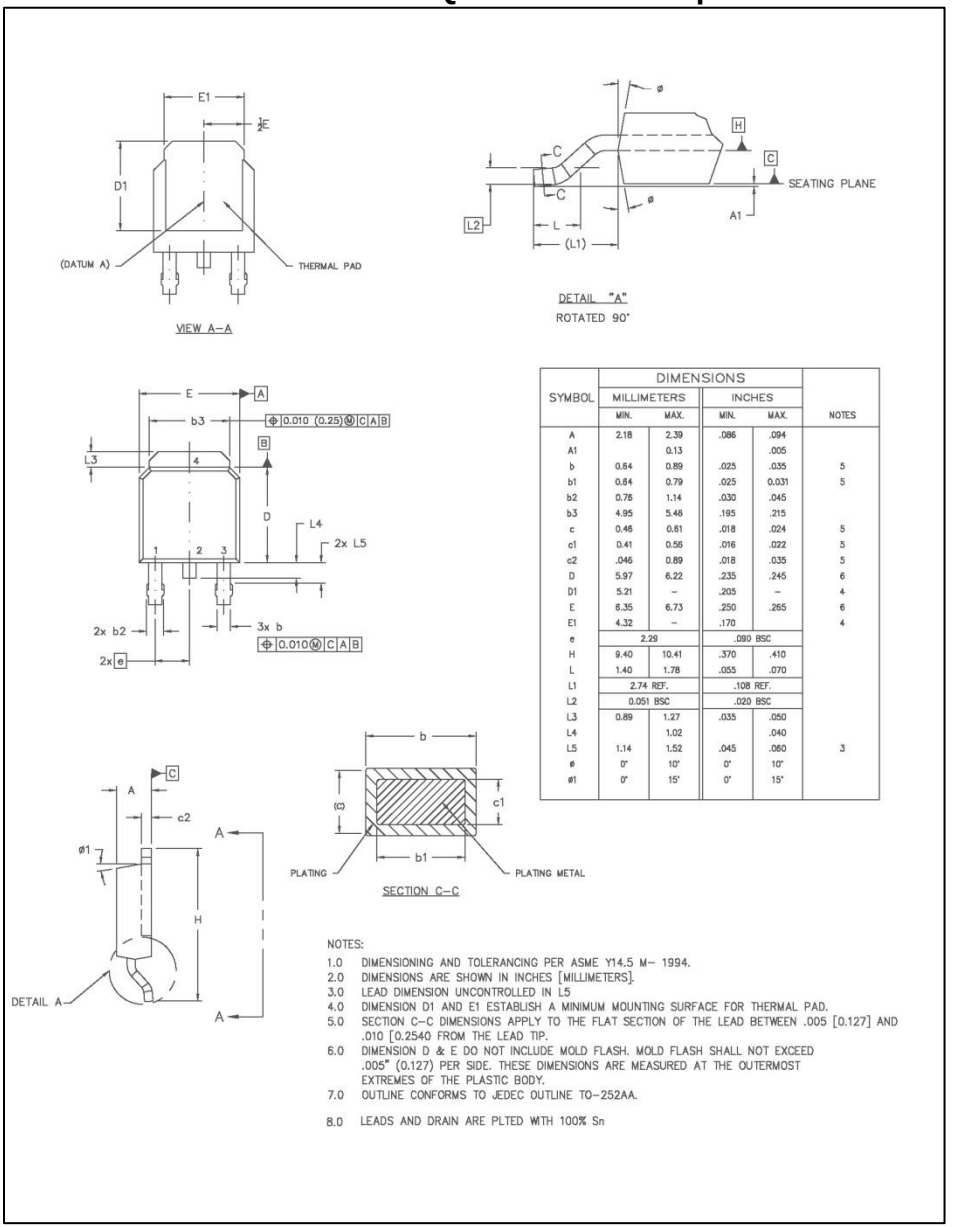


Figure 14 – Current shutdown (A) Vs Input voltage (V)

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

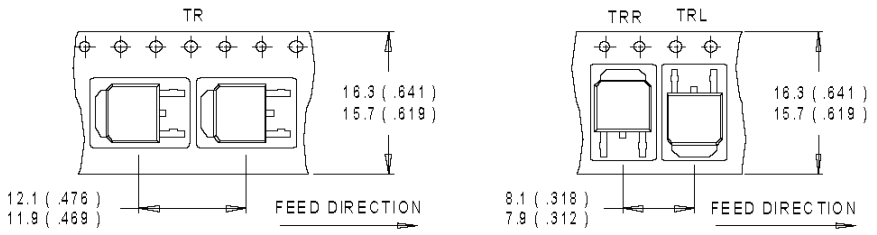


SYMBOL	DIMENSIONS				NOTES
	MILLIMETERS		INCHES		
	MIN.	MAX.	MIN.	MAX.	
A	2.18	2.39	.086	.094	
A1		0.13		.005	
b	0.64	0.89	.025	.035	5
b1	0.64	0.79	.025	0.031	5
b2	0.76	1.14	.030	.045	
b3	4.95	5.46	.195	.215	
c	0.46	0.61	.018	.024	5
c1	0.41	0.56	.016	.022	5
c2	.046	0.89	.018	.035	5
D	5.97	6.22	.235	.245	6
D1	5.21	–	.205	–	4
E	6.35	6.73	.250	.265	6
E1	4.32	–	.170		4
e	2.29		.090 BSC		
H	9.40	10.41	.370	.410	
L	1.40	1.78	.055	.070	
L1	2.74 REF.		.108 REF.		
L2	0.051 BSC		.020 BSC		
L3	0.89	1.27	.035	.050	
L4		1.02		.040	
L5	1.14	1.52	.045	.060	3
ø	0°	10°	0°	10°	
ø1	0°	15°	0°	15°	

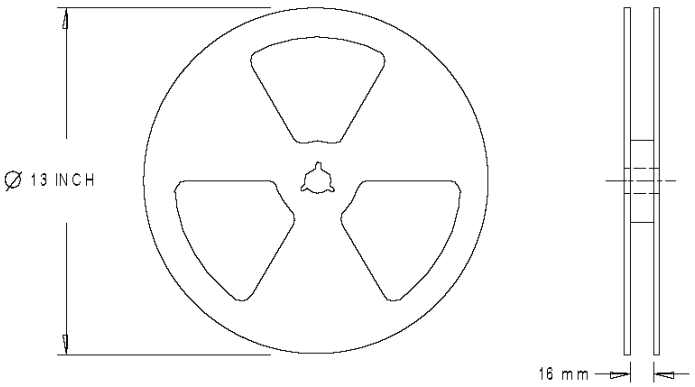
NOTES:
1.0 DIMENSIONING AND TOLERANCING PER ASME Y14.5 M– 1994.
2.0 DIMENSIONS ARE SHOWN IN INCHES [MILLIMETERS].
3.0 LEAD DIMENSION UNCONTROLLED IN L5
4.0 DIMENSION D1 AND E1 ESTABLISH A MINIMUM MOUNTING SURFACE FOR THERMAL PAD.
5.0 SECTION C–C DIMENSIONS APPLY TO THE FLAT SECTION OF THE LEAD BETWEEN .005 [0.127] AND .010 [0.2540 FROM THE LEAD TIP.
6.0 DIMENSION D & E DO NOT INCLUDE MOLD FLASH. MOLD FLASH SHALL NOT EXCEED .005" (0.127) PER SIDE. THESE DIMENSIONS ARE MEASURED AT THE OUTERMOST EXTREMES OF THE PLASTIC BODY.
7.0 OUTLINE CONFORMS TO JEDEC OUTLINE TO–252AA.
8.0 LEADS AND DRAIN ARE PLTED WITH 100% Sn

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.

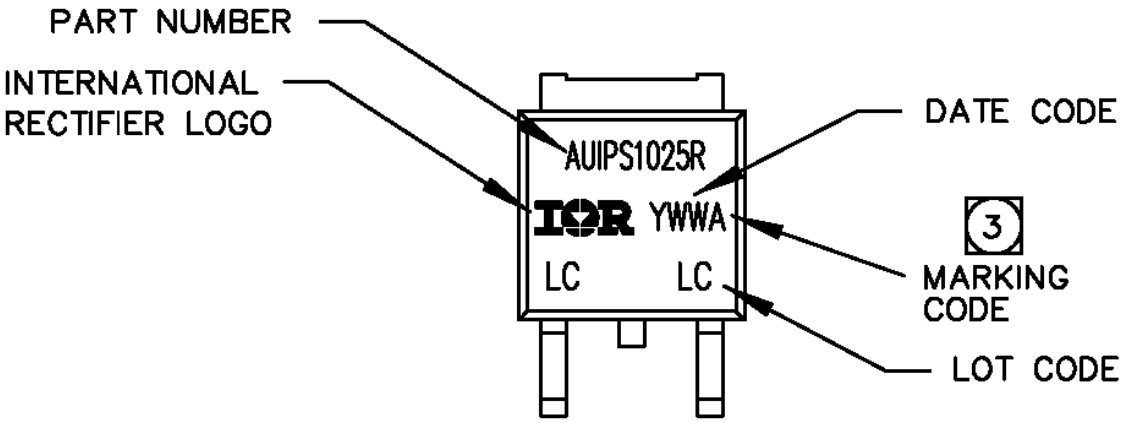


NOTES :
1. OUTLINE CONFORMS TO EIA-481.

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/

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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

单击下面可查看定价，库存，交付和生命周期等信息

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