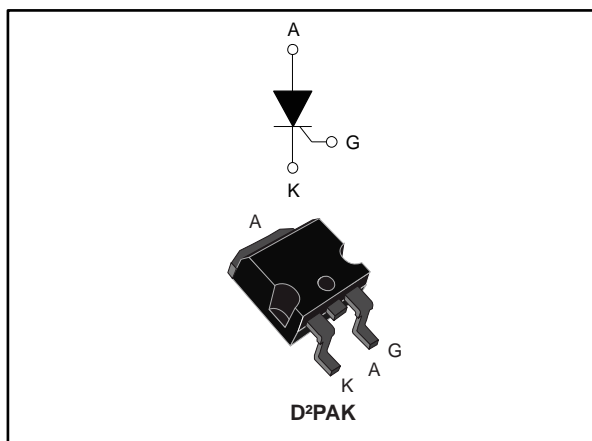


30 A - 1200 V automotive grade SCR Thyristor

Datasheet - production data



Description

This device is an automotive grade SCR Thyristor designed for applications such as automotive and stationary battery chargers.

Rated for a 30 A_{RMS} power switching, This SCR Thyristor offers superior performance in terms of peak voltage robustness (up to 1400 V) and surge current handling (sine wave pulse up to 300 A). Its key features allow the design of functions such as a 42 A_{RMS} AC switch (dual back-to-back SCRs) and a 38 A av. AC-DC controlled rectifier bridge.

Available in D²PAK package, it is ideal for compact SMD designs on surface mount boards or insulated metal substrate boards.

Features

- AEC-Q101 qualified
- High junction temperature: $T_j = 150\text{ °C}$
- AC off state voltage: +/- 1200 V
- Nominal on-state current: 30 A_{RMS}
- High noise immunity: 1000 V/μs
- Max. gate triggering current: 50 mA
- ECOPACK[®]2 compliant component



Applications

- Automotive applications: on board and off board battery charger
- Renewable energy inverters
- Solid state relay
- 3-Phase heating or motor soft start control
- UPS (uninterruptible power supply)
- Bypass SSR / hybrid relay
- Inrush current limiter in battery charger
- AC-DC voltage controlled rectifier
- Industrial welding systems

Table 1: Device summary

Symbol	Value
$I_{T(RMS)}$	30 A
V_{DRM}/V_{RRM}	1200 V
V_{DSM}/V_{RSM}	1400 V
I_{GT}	50 mA
T_j	150 °C

1 Characteristics

Table 2: Absolute ratings (limiting values)

Symbol	Parameter		Value	Unit
$I_{T(RMS)}$	RMS on-state current (180 ° conduction angle)		30	A
$I_{T(AV)}$	Average on-state current (180 ° conduction angle)			
$I_{TSM}^{(1)}$	Non repetitive surge peak on-state current	$t_p = 8.3 \text{ ms}$	330	A
		$t_p = 10 \text{ ms}$		
V_{DRM} / V_{RRM}	Repetitive off-state voltage (50-60 Hz)		1200	V
di/dt	Critical rate of rise of on-state current $I_G = 2 \times I_{GT}$, $t_r \leq 100 \text{ ns}$	$f = 50 \text{ Hz}$	200	A/ μs
V_{GM}	Peak forward gate voltage	$t_p = 20 \mu\text{s}$	10	V
I_{GM}	Peak forward gate current		8	A
$P_{G(AV)}$	Average gate power dissipation		1	W
V_{RGM}	Peak reverse gate voltage		5	V
T_{stg}	Storage junction temperature range			-40 to +150 °C
T_j	Operating junction temperature			-40 to +150 °C

Notes:

⁽¹⁾ST recommend I^2t value for fusing = 450 A²s for $T_j = 25 \text{ °C}$ and $t_p = 10 \text{ ms}$

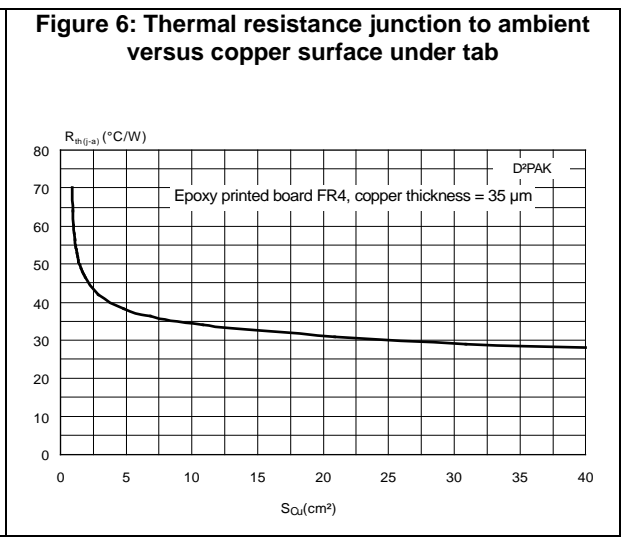
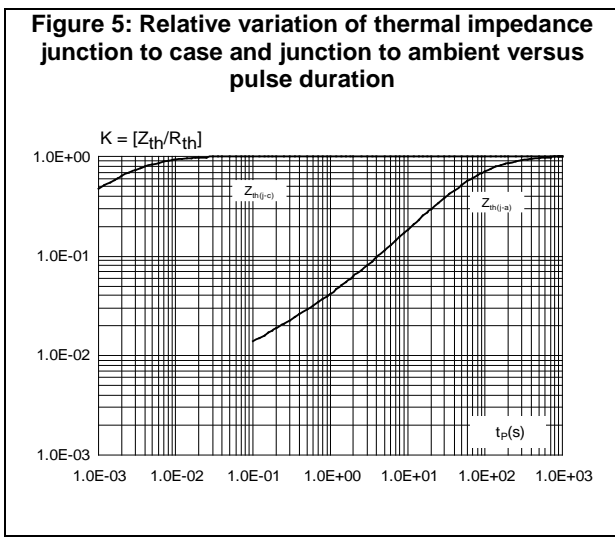
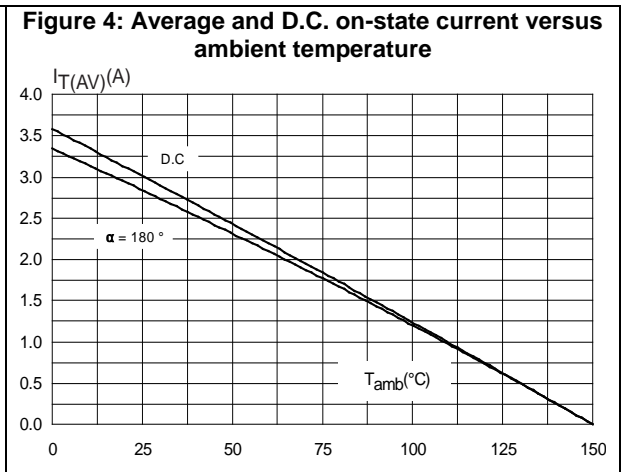
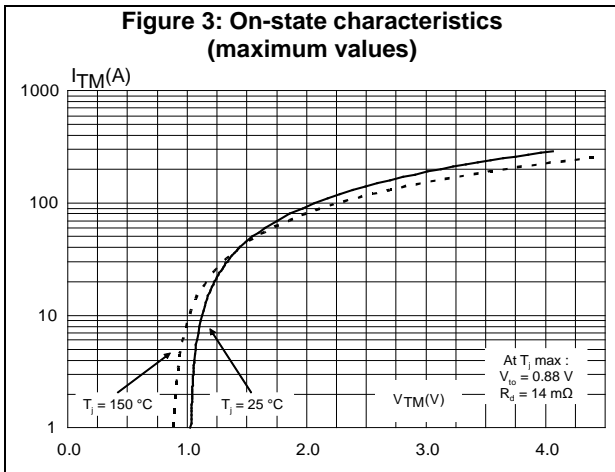
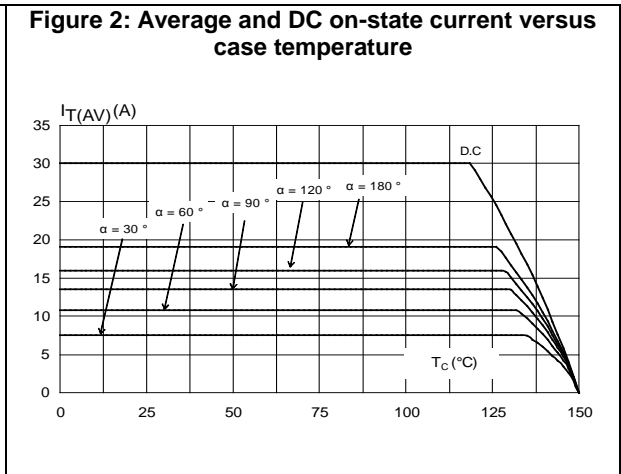
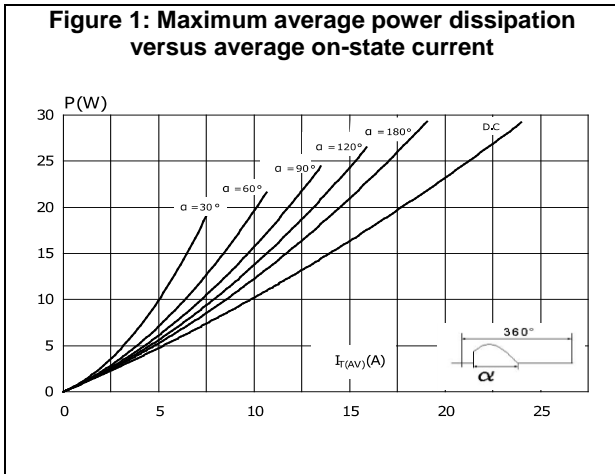
Table 3: Electrical characteristics ($T_j = 25\text{ °C}$ unless otherwise specified)

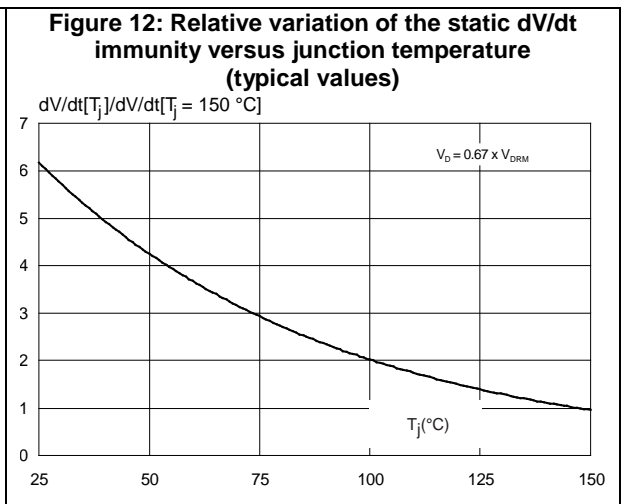
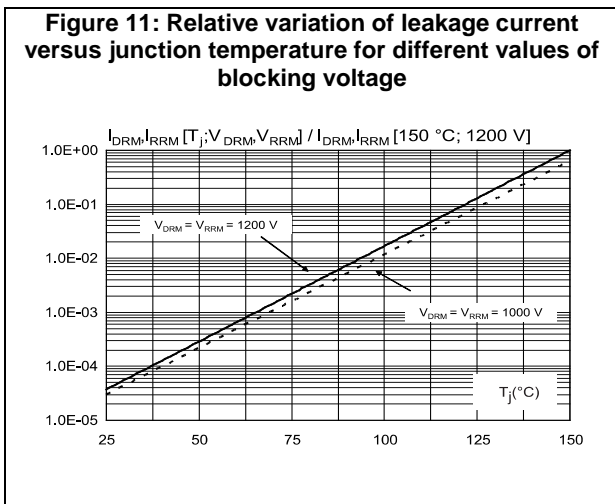
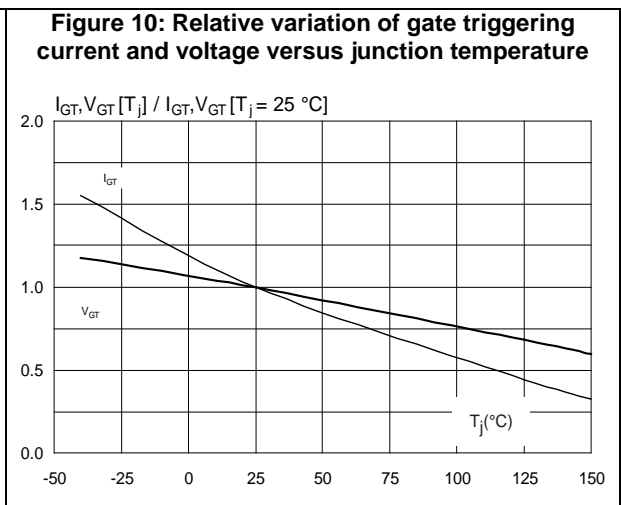
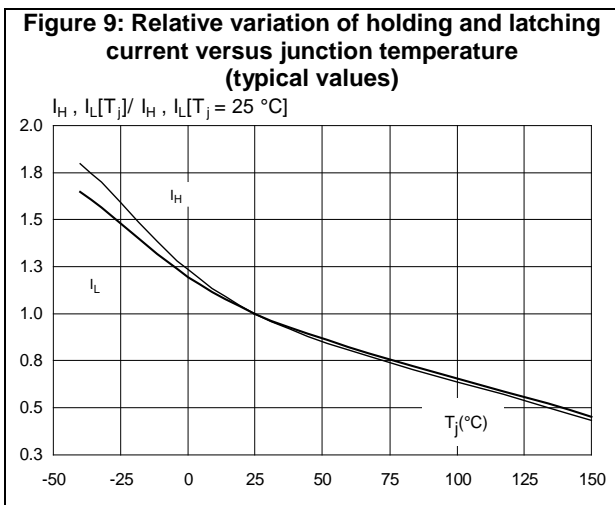
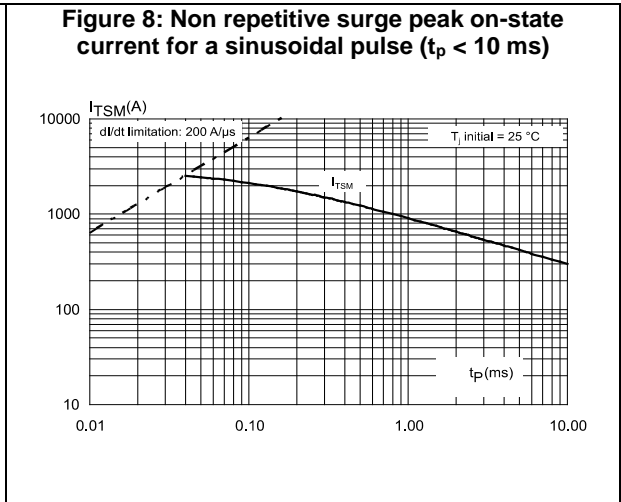
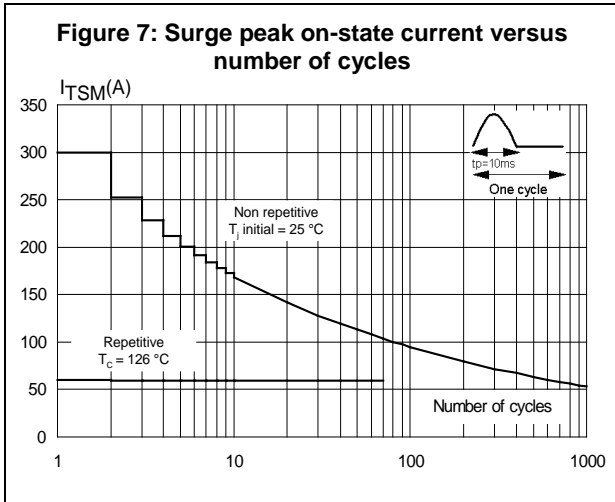
Symbol	Test conditions		Value	Unit	
I_{GT}	$V_D = 12\text{ V}, R_L = 33\ \Omega$	Min.	10	mA	
		Max.	50		
V_{GT}	$V_D = 12\text{ V}, R_L = 33\ \Omega$	Max.	1.3	V	
V_{GD}	$V_D = 2/3 \times V_{DRM}, R_L = 3.3\text{ k}\Omega$	$T_j = 150\text{ °C}$	Min.	0.2	V
I_H	$I_T = 500\text{ mA}$, gate open		Max.	100	mA
I_L	$I_G = 1.2 \times I_{GT}$		Max.	125	mA
t_{gt}	$I_T = 60\text{ A}, V_D = 2/3 \times V_{DRM}, I_G = 100\text{ mA}$, $di_G/dt = 0.2\text{ A}/\mu\text{s}$		Typ.	1	μs
dV/dt	$V_D = 2/3 \times V_{DRM}$, gate open	$T_j = 150\text{ °C}$	Min.	1000	$\text{V}/\mu\text{s}$
t_q	$I_T = 20\text{ A}$, $di_T/dt = 10\text{ A}/\mu\text{s}$, $V_R = 75\text{ V}$, $V_D = 2/3 \times V_{DRM}$, $dV_D/dt = 20\text{ V}/\mu\text{s}$, $t_P = 100\ \mu\text{s}$	$T_j = 150\text{ °C}$	Typ.	150	μs
V_{TM}	$I_{TM} = 60\text{ A}$, $t_P = 380\ \mu\text{s}$		Max.	1.65	V
V_{TO}	Threshold voltage	$T_j = 150\text{ °C}$	Max.	0.88	V
R_D	Dynamic resistance	$T_j = 150\text{ °C}$	Max.	14	$\text{m}\Omega$
I_{DRM}/I_{RRM}	$V_D = V_{DRM}, V_R = V_{RRM}$	$T_j = 25\text{ °C}$	Max.	5	μA
		$T_j = 125\text{ °C}$	Max.	3	mA
		$T_j = 150\text{ °C}$	Max.	5	mA
I_{DSM}/I_{RSM}	$V_D = V_{DSM}, V_R = V_{RSM}$	$T_j = 25\text{ °C}$	Max.	10	μA

Table 4: Thermal parameters

Symbol	Parameter	Value	Unit
$R_{th(j-c)}$	Junction to case (DC, max.)	0.8	$^{\circ}\text{C}/\text{W}$
$R_{th(j-a)}$	Junction to ambient (DC, typ., $S_{cu} = 1\text{ cm}^2$)		
		45	

1.1 Characteristics (curves)





2 Package information

In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK® packages, depending on their level of environmental compliance. ECOPACK® specifications, grade definitions and product status are available at: www.st.com. ECOPACK® is an ST trademark.

- Package molding resin is halogen free and meets UL94 level V0
- Lead-free package leads
- Cooling method: by conduction (C)

2.1 D²PAK package information

Figure 13: D²PAK package outline

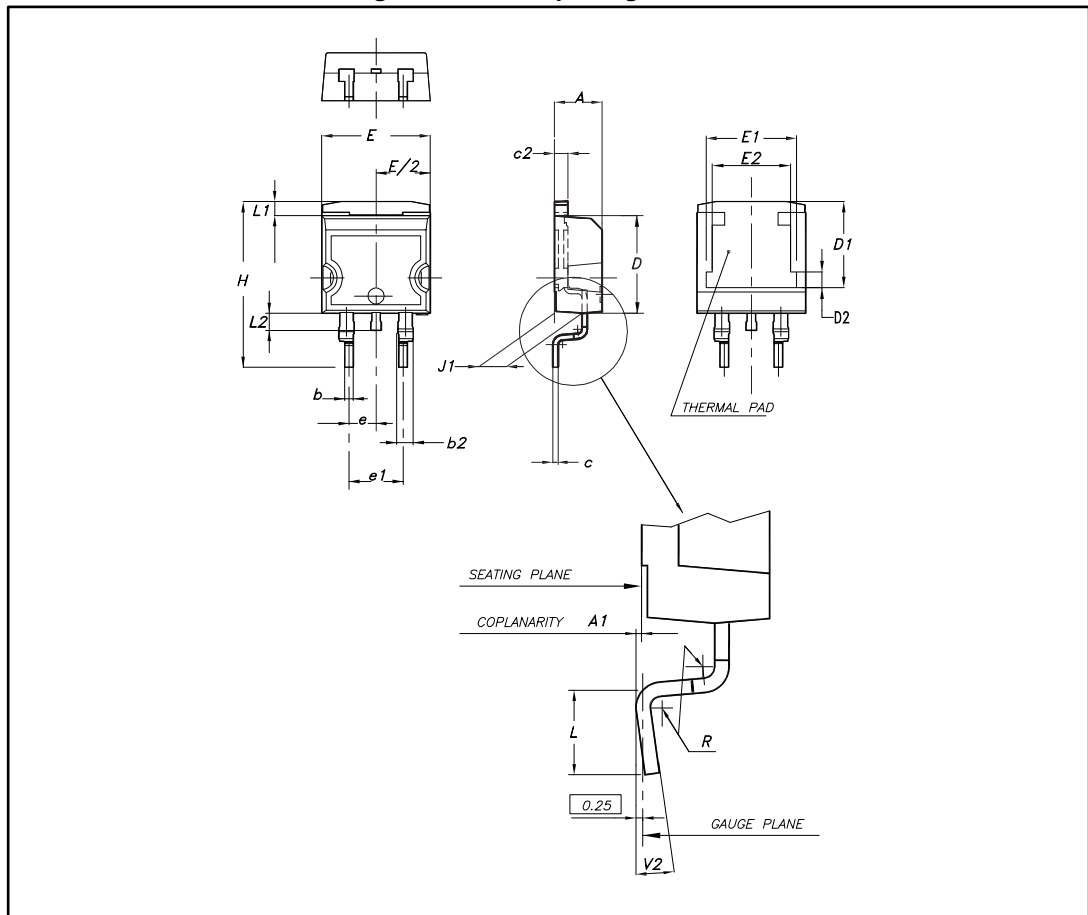
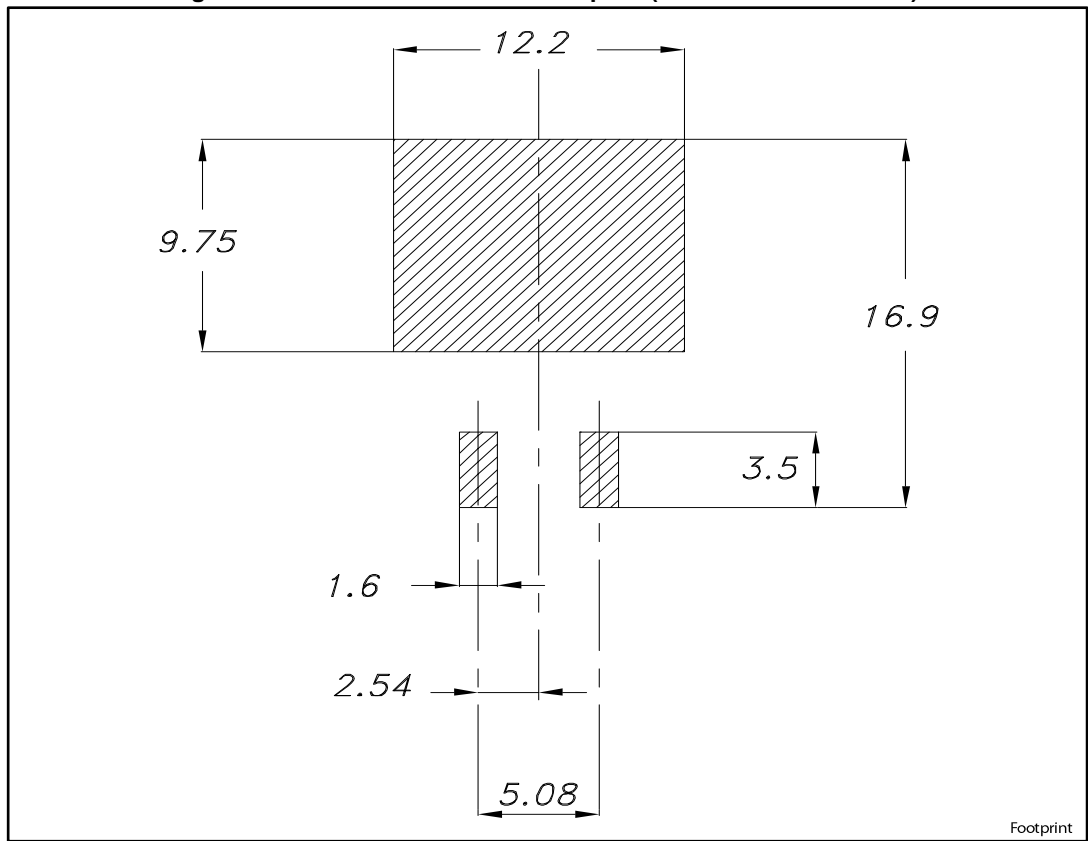


Table 5: D²PAK package mechanical data

Ref.	Dimensions					
	Millimeters			Inches ⁽¹⁾		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	4.40		4.60	0.1732		0.1811
A1	0.03		0.23	0.0012		0.0091
b	0.70		0.93	0.0276		0.0366
b2	1.14		1.70	0.0449		0.0669
c	0.45		0.60	0.0177		0.0236
c2	1.23		1.36	0.0484		0.0535
D	8.95		9.35	0.3524		0.3681
D1	7.50	7.75	8.00	0.2953	0.3051	0.3150
D2	1.10	1.30	1.50	0.0433	0.0511	0.0591
E	10		10.40	0.3937		0.4094
E1	8.50	8.70	8.90	0.3346	0.3425	0.3504
E2	6.85	7.05	7.25	0.2697	0.2776	0.2854
e		2.54			0.1000	
e1	4.88		5.28	0.1921		0.2079
H	15		15.85	0.5906		0.6240
J1	2.49		2.69	0.0980		0.1059
L	2.29		2.79	0.0902		0.1098
L1	1.27		1.40	0.0500		0.0551
L2	1.30		1.75	0.0512		0.0689
R		0.4			0.0157	
V2	0°		8°	0°		8°

Notes:⁽¹⁾Dimensions in inches are given for reference only

Figure 14: D²PAK recommended footprint (dimensions are in mm)



Footprint

3 Ordering information

Table 6: Ordering information

Order code	Marking	Package	Weight	Base qty.	Delivery mode
TN3050H-12GY-TR	TN3050H12Y	D ² PAK	1.4 g	1000	Tape and reel

4 Revision history

Table 7: Document revision history

Date	Revision	Changes
01-Sep-2016	1	Initial release.
24-Aug-2017	2	Minor text changes to improve readability. Updated Section "Features" , Table 2: "Absolute ratings (limiting values)" and Section 2: "Package information" .

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