

DATA SHEET

BYC10B-600

Rectifier diode

ultrafast, low switching loss

Product specification

August 2018



WeEn

WeEn Semiconductors

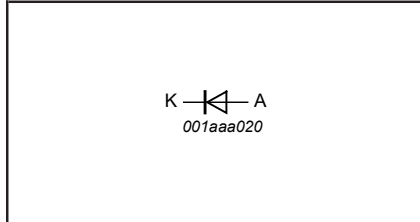
Rectifier diode ultrafast, low switching loss

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FEATURES

- Extremely fast switching
- Low reverse recovery current
- Low thermal resistance
- Reduces switching losses in associated MOSFET

SYMBOL



QUICK REFERENCE DATA

$V_R = 600\text{ V}$
$V_F \leq 1.8\text{ V}$
$I_{F(AV)} = 10\text{ A}$
$t_{rr} = 19\text{ ns (typ)}$

APPLICATIONS

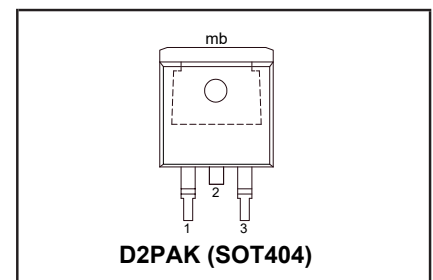
- Active power factor correction
- Half-bridge lighting ballasts
- Half-bridge/ full-bridge switched mode power supplies.

The BYC10B-600 is supplied in the SOT404 surface mounting package.

PINNING

PIN	DESCRIPTION
1	no connection
2	cathode ¹
3	anode
tab	cathode

SOT404



LIMITING VALUES

Limiting values in accordance with the Absolute Maximum System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{RRM}	Peak repetitive reverse voltage		-	600	V
V_{RWM}	Crest working reverse voltage		-	600	V
V_R	Continuous reverse voltage	$T_{mb} \leq 114\text{ °C}$	-	500	V
$I_{F(AV)}$	Average forward current	$\delta = 0.5$; with reappplied $V_{RRM(max)}$; $T_{mb} \leq 78\text{ °C}$	-	10	A
I_{FRM}	Repetitive peak forward current	$\delta = 0.5$; with reappplied $V_{RRM(max)}$; $T_{mb} \leq 78\text{ °C}$	-	20	A
I_{FSM}	Non-repetitive peak forward current.	$t = 10\text{ ms}$	-	65	A
		$t = 8.3\text{ ms}$	-	71	A
		sinusoidal; $T_j = 150\text{ °C}$ prior to surge with reappplied $V_{RWM(max)}$			
T_{stg}	Storage temperature		-40	150	°C
T_j	Operating junction temperature		-	150	°C

THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\ j-mb}$	Thermal resistance junction to mounting base		-	-	2	K/W
$R_{th\ j-a}$	Thermal resistance junction to ambient	minimum footprint, FR4 board	-	50	-	K/W

¹ it is not possible to make connection to pin 2 of the SOT404 package

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ELECTRICAL CHARACTERISTICS

$T_j = 25\text{ }^\circ\text{C}$ unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	Forward voltage	$I_F = 10\text{ A}; T_j = 150\text{ }^\circ\text{C}$	-	1.4	1.8	V
		$I_F = 20\text{ A}; T_j = 150\text{ }^\circ\text{C}$	-	1.7	2.3	V
		$I_F = 10\text{ A}; V_R = 600\text{ V}$	-	2.0	2.9	V
I_R	Reverse current	$V_R = 600\text{ V}$	-	9	200	μA
		$V_R = 500\text{ V}; T_j = 100\text{ }^\circ\text{C}$	-	1.1	3.0	mA
t_{rr}	Reverse recovery time	$I_F = 1\text{ A}; V_R = 30\text{ V}; dI_F/dt = 50\text{ A}/\mu\text{s}$	-	35	55	ns
t_{rr}	Reverse recovery time	$I_F = 10\text{ A}; V_R = 400\text{ V}; dI_F/dt = 500\text{ A}/\mu\text{s}$	-	19	-	ns
t_{rr}	Reverse recovery time	$I_F = 10\text{ A}; V_R = 400\text{ V}; dI_F/dt = 500\text{ A}/\mu\text{s}; T_j = 100\text{ }^\circ\text{C}$	-	32	40	ns
I_{rrm}	Peak reverse recovery current	$I_F = 10\text{ A}; V_R = 400\text{ V}; dI_F/dt = 100\text{ A}/\mu\text{s}; T_j = 125\text{ }^\circ\text{C}$	-	3	7.5	A
I_{rrm}	Peak reverse recovery current	$I_F = 10\text{ A}; V_R = 400\text{ V}; dI_F/dt = 500\text{ A}/\mu\text{s}; T_j = 125\text{ }^\circ\text{C}$	-	9.5	12	A
V_{fr}	Forward recovery voltage	$I_F = 10\text{ A}; dI_F/dt = 100\text{ A}/\mu\text{s}$	-	8	11	V

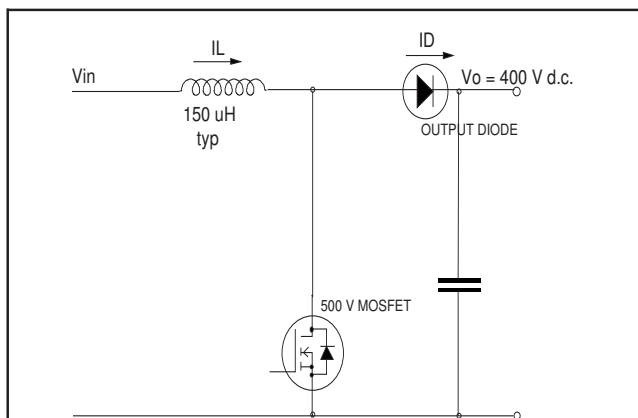


Fig.1. Typical application, output rectifier in boost converter power factor correction circuit. Continuous conduction, mode where the transistor turns on whilst forward current is still flowing in the diode.

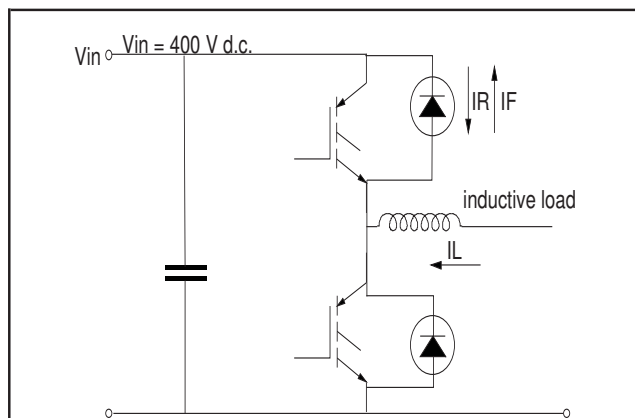


Fig.2. Typical application, freewheeling diode in half bridge converter. Continuous conduction mode, where each transistor turns on whilst forward current is still flowing in the other bridge leg diode.

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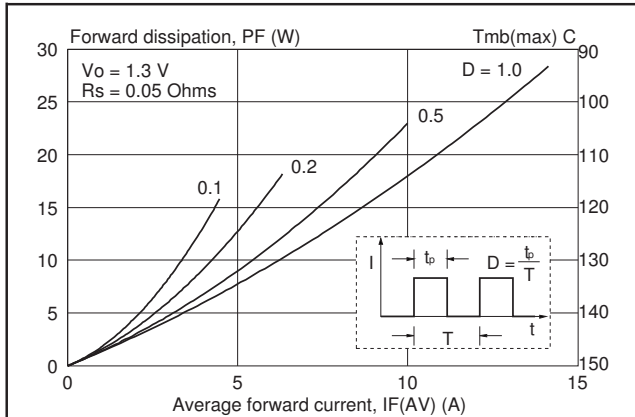


Fig.3. Maximum forward dissipation as a function of average forward current; rectangular current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

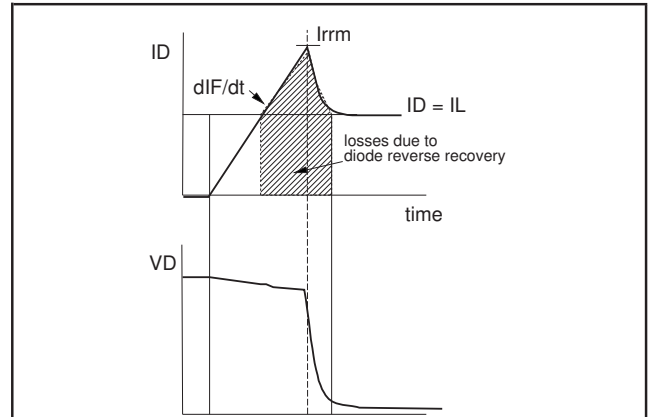


Fig.6. Origin of switching losses in transistor due to diode reverse recovery.

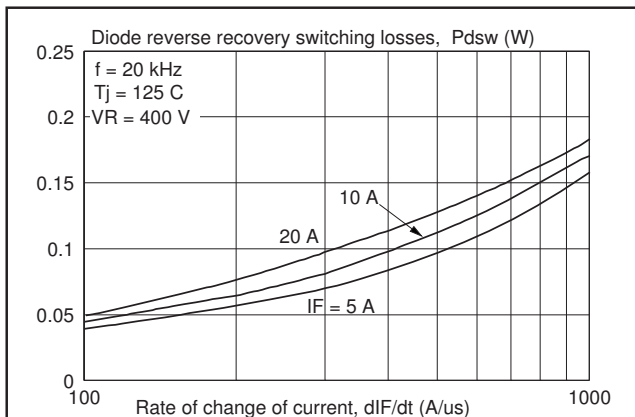


Fig.4. Typical reverse recovery switching losses in diode, as a function of rate of change of current dI_F/dt .

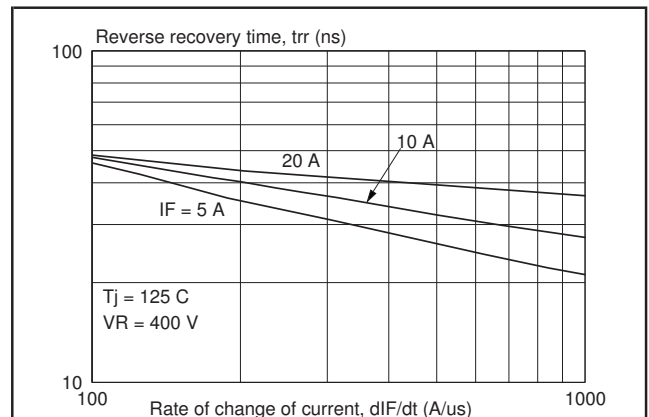


Fig.7. Typical reverse recovery time t_{rr} as a function of rate of change of current dI_F/dt .

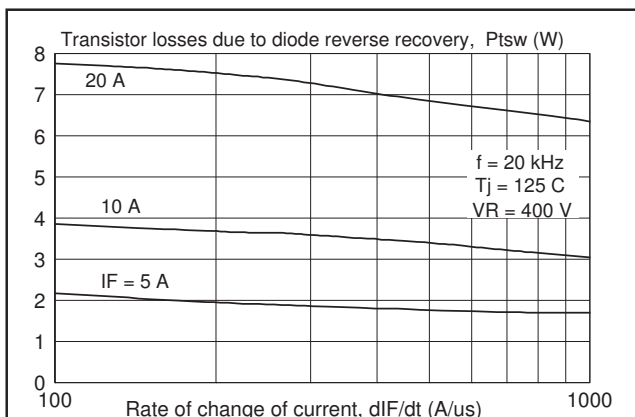


Fig.5. Typical switching losses in transistor due to reverse recovery of diode, as a function of of change of current dI_F/dt .

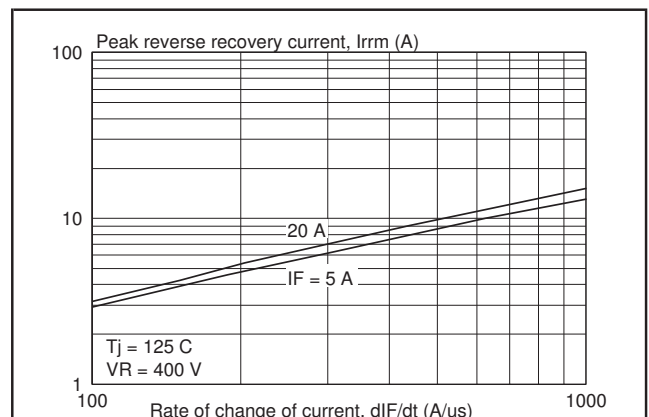
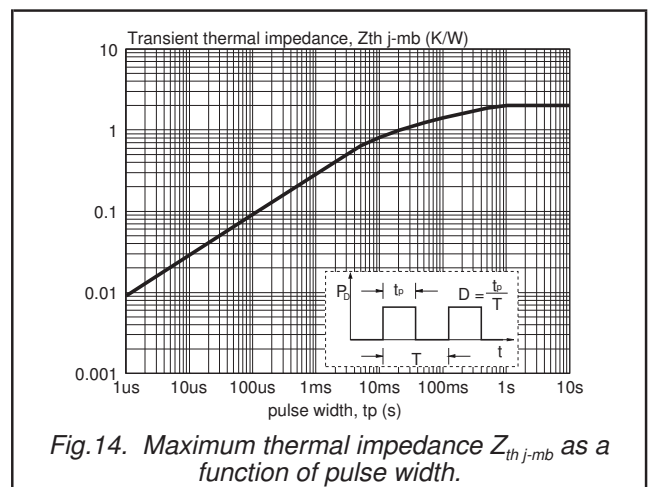
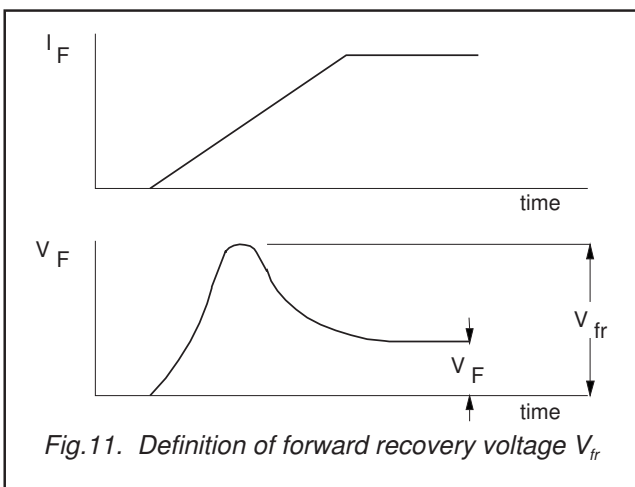
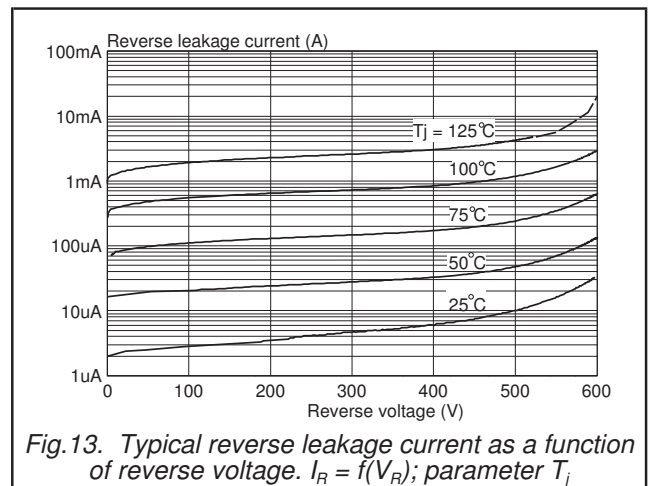
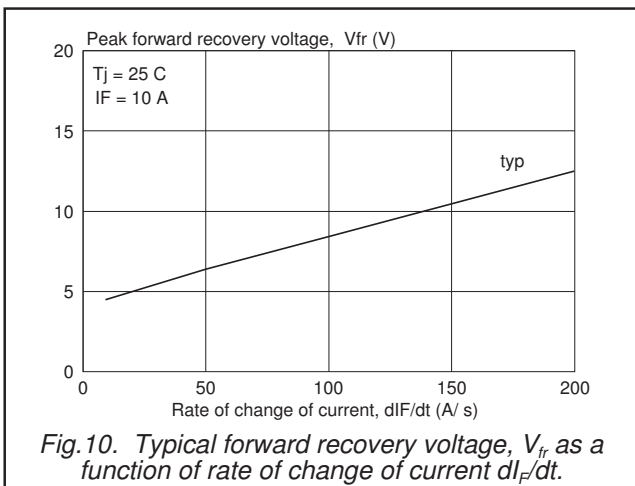
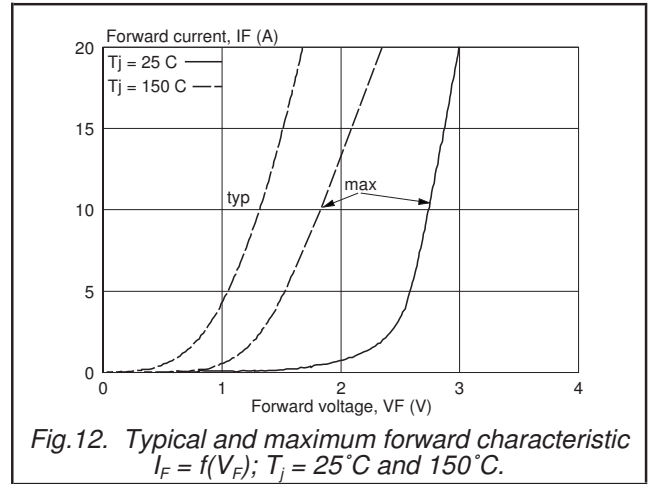


Fig.8. Typical peak reverse recovery current, I_{rrm} as a function of rate of change of current dI_F/dt .

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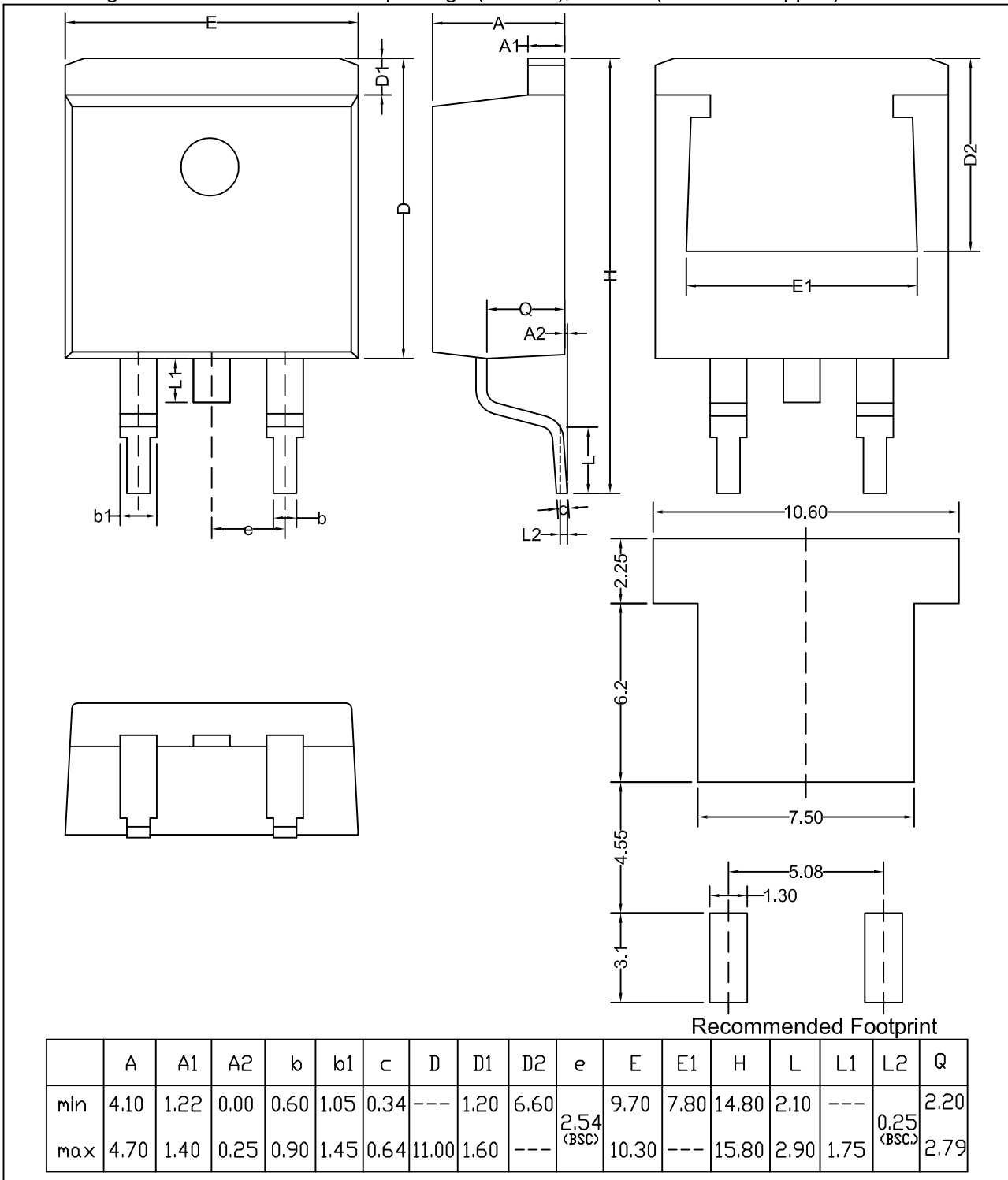
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MECHANICAL DATA

Plastic single-ended surface-mounted package (D2PAK); 3 leads (one lead cropped)

TO263



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Document status [1][2]	Product status [3]	Definition
Objective [short] data sheet	Development	This document contains data from the objective specification for product development.
Preliminary [short] data sheet	Qualification	This document contains data from the preliminary specification.
Product [short] data sheet	Production	This document contains the product specification.

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- [2] The term 'short data sheet' is explained in section "Definitions".
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