

# DATA SHEET

## **BYC10B-600**

Rectifier diode

ultrafast, low switching loss

Product specification

August 2018



**WeEn**

WeEn Semiconductors

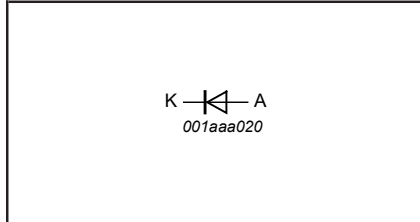
# Rectifier diode ultrafast, low switching loss

**BYC10B-600**

## 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

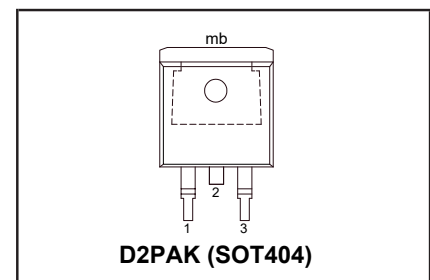
- Active power factor correction
- Half-bridge lighting ballasts
- Half-bridge/ full-bridge switched mode power supplies.

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

## PINNING

PIN	DESCRIPTION
1	no connection
2	cathode <sup>1</sup>
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			
$T_{stg}$	Storage temperature	with reappplied $V_{RWM(max)}$	-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

<sup>1</sup> it is not possible to make connection to pin 2 of the SOT404 package

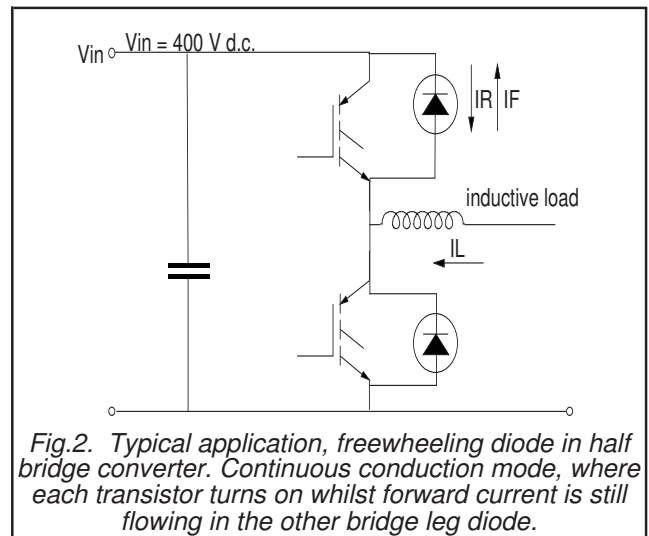
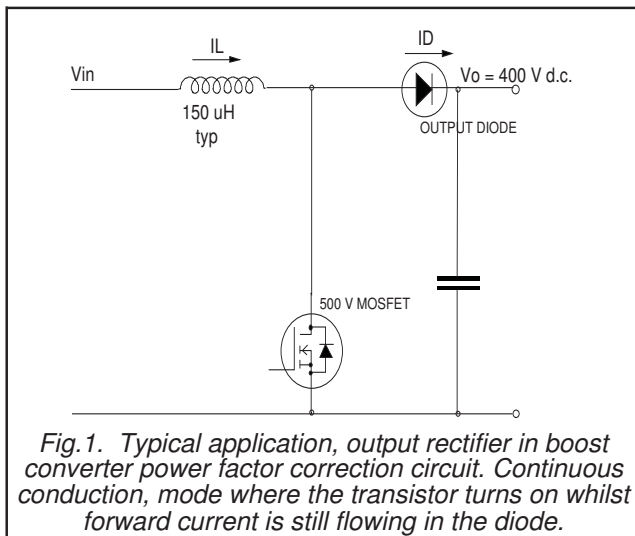
Rectifier diode  
ultrafast, low switching loss

BYC10B-600

**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	$\mu\text{A}$
		$V_R = 500\text{ V}; T_j = 100\text{ }^\circ\text{C}$	-	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



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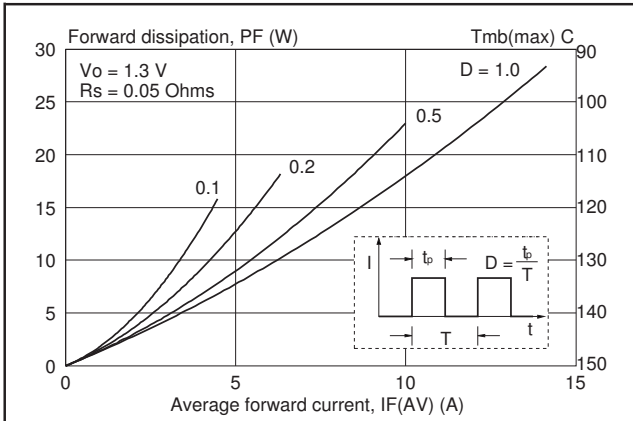


Fig.3. Maximum forward dissipation as a function of average forward current; rectangular current waveform where  $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$ .

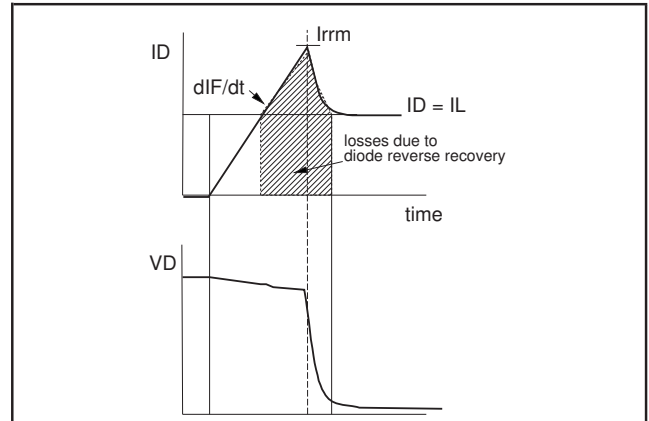


Fig.6. Origin of switching losses in transistor due to diode reverse recovery.

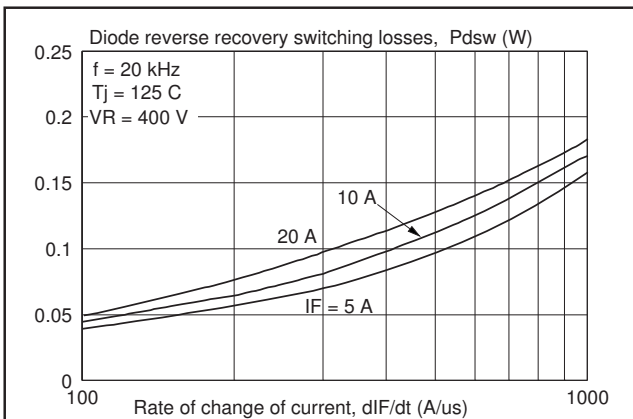


Fig.4. Typical reverse recovery switching losses in diode, as a function of rate of change of current  $dI_F/dt$ .

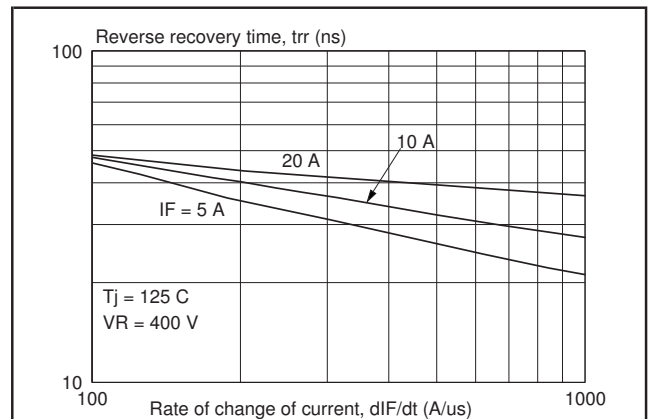


Fig.7. Typical reverse recovery time  $t_{rr}$  as a function of rate of change of current  $dI_F/dt$ .

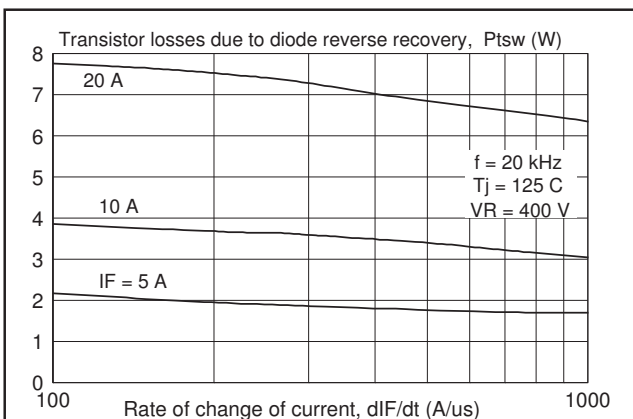


Fig.5. Typical switching losses in transistor due to reverse recovery of diode, as a function of of change of current  $dI_F/dt$ .

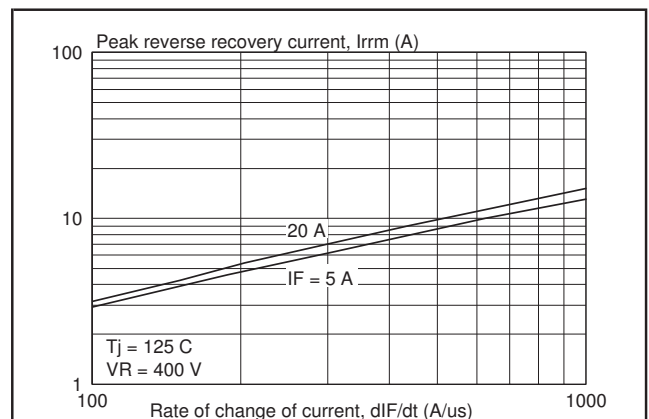
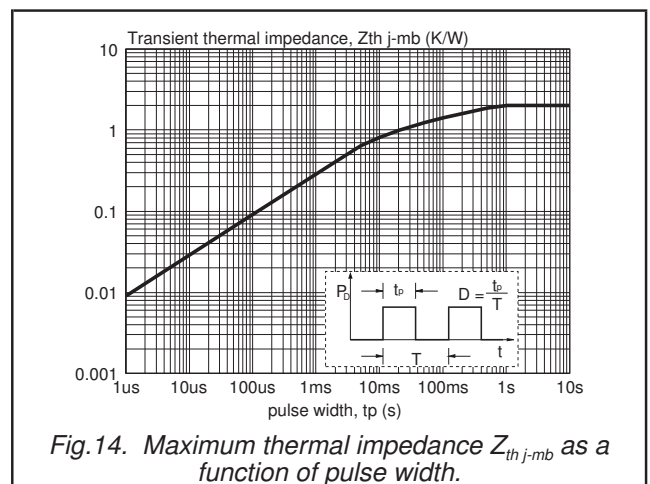
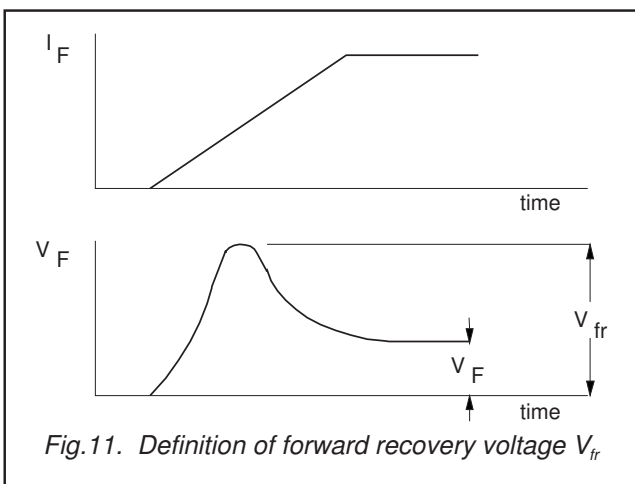
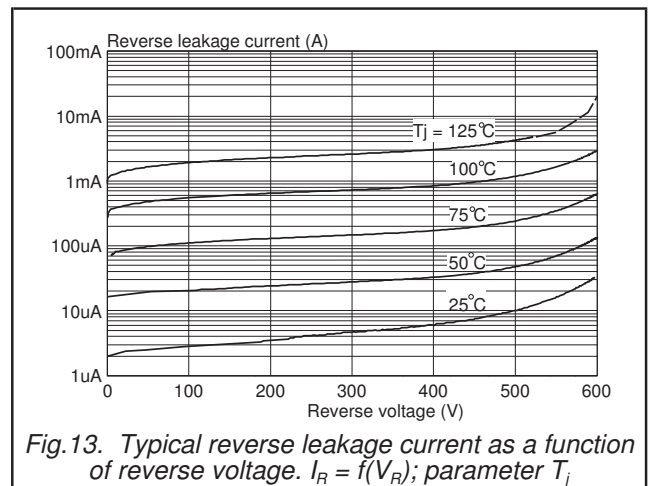
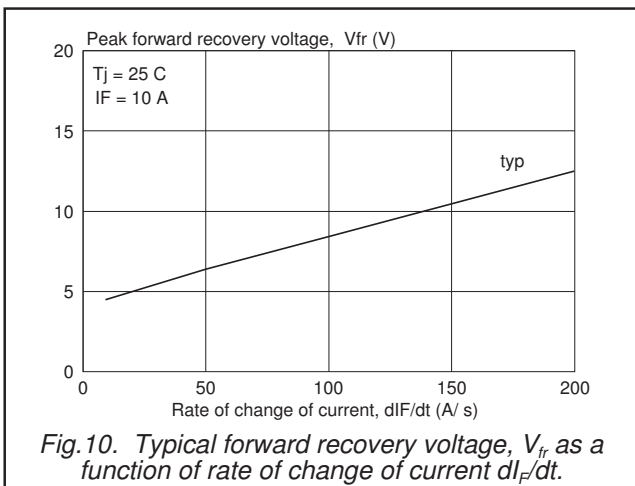
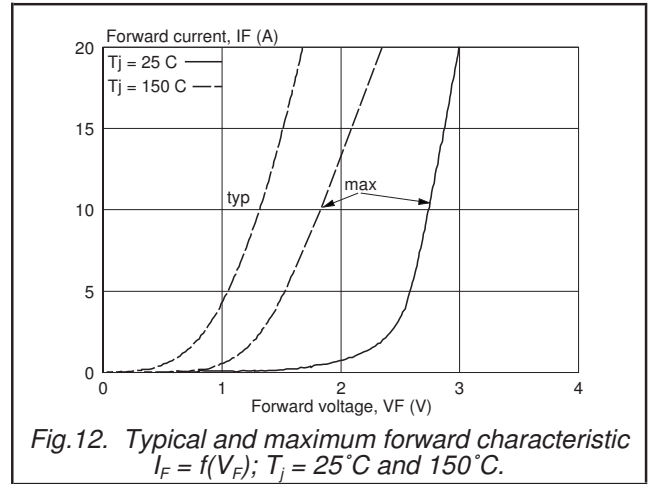


Fig.8. Typical peak reverse recovery current,  $I_{rrm}$  as a function of rate of change of current  $dI_F/dt$ .

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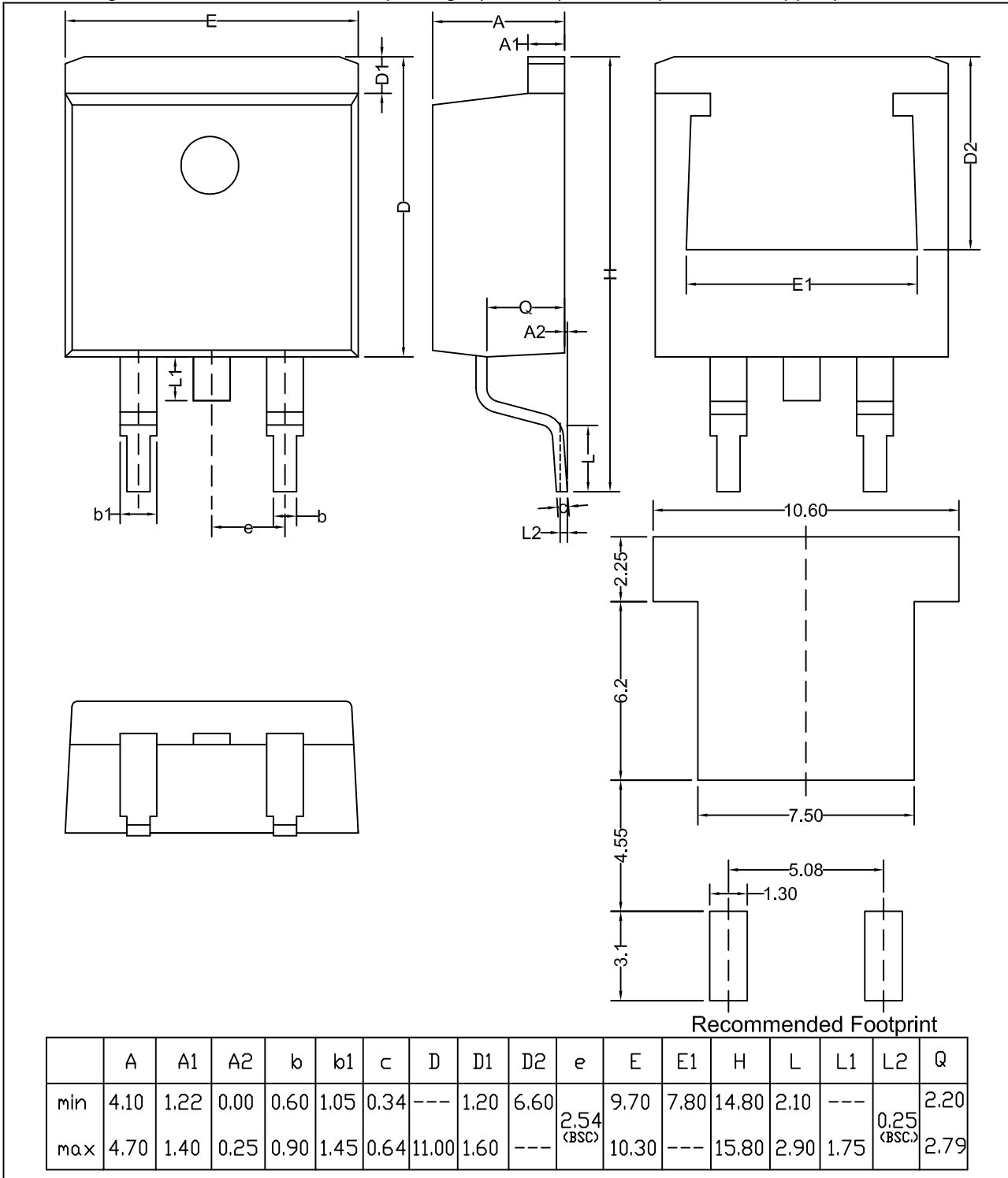
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**MECHANICAL DATA**

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

TO263



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Objective [short] data sheet	Development	This document contains data from the objective specification for product development.
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