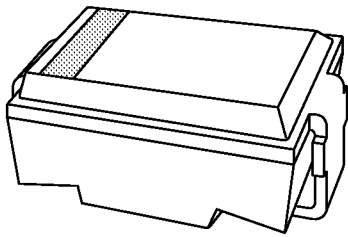


# DATA SHEET



Datasheet.Directory

## **ES1 series**

SMA ultra fast low-loss  
controlled avalanche rectifiers

Product specification

2000 Feb 14

# SMA ultra fast low-loss controlled avalanche rectifiers

## ES1 series

### FEATURES

- Glass passivated
- High maximum operating temperature
- Ideal for surface mount automotive applications
- Low leakage current
- Excellent stability
- Guaranteed avalanche energy absorption capability
- UL 94V-O classified plastic package
- Shipped in 12 mm embossed tape
- Marking: cathode, date code, type code
- Easy pick and place.

### DESCRIPTION

DO-214AC surface mountable package with glass passivated chip.

The well-defined void-free case is of a transfer-moulded thermo-setting plastic. The small rectangular package has two J bent leads.

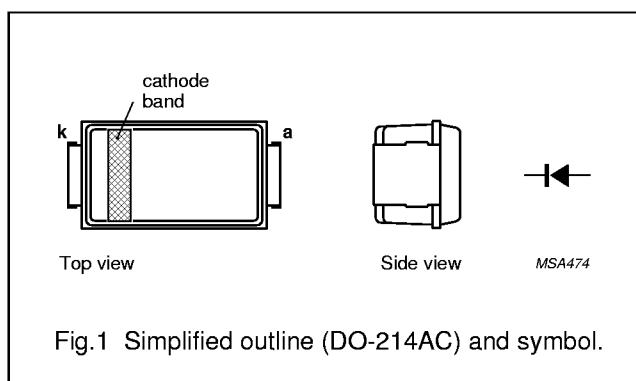


Fig.1 Simplified outline (DO-214AC) and symbol.

### LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V <sub>RRM</sub>	repetitive peak reverse voltage				
	ES1A		–	50	V
	ES1B		–	100	V
	ES1C		–	150	V
V <sub>R</sub>	continuous reverse voltage				
	ES1A		–	50	V
	ES1B		–	100	V
	ES1C		–	150	V
V <sub>RMS</sub>	root mean square voltage				
	ES1A		–	35	V
	ES1B		–	70	V
	ES1C		–	105	V
I <sub>F(AV)</sub>	average forward current	averaged over any 20 ms period; T <sub>tp</sub> = 120 °C; see Fig.2	–	1	A
	non-repetitive peak forward current	t = 8.3 ms half sine wave; T <sub>j</sub> = 25 °C prior to surge; V <sub>R</sub> = V <sub>RRMmax</sub>	–	25	A
	storage temperature		–65	+175	°C
	junction temperature	See Fig.3	–65	+175	°C

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## ES1 series

### ELECTRICAL CHARACTERISTICS

$T_j = 25\text{ °C}$  unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	TYP.	MAX.	UNIT
$V_F$	forward voltage	$I_F = 1\text{ A}$ ; see Fig.4	–	1.1	V
$I_R$	reverse current	$V_R = V_{RRMmax}$ ; see Fig.5	–	5	$\mu\text{A}$
		$V_R = V_{RRMmax}$ ; $T_j = 165\text{ °C}$ ; see Fig.5	–	100	$\mu\text{A}$
$t_{rr}$	reverse recovery time	when switched from $I_F = 0.5\text{ A}$ to $I_R = 1\text{ A}$ ; measured at $I_R = 0.25\text{ A}$ ; see Fig.9	–	25	ns
$C_d$	diode capacitance	$V_R = 4\text{ V}$ ; $f = 1\text{ MHz}$ ; see Fig.6	19	–	pF

### THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j-tp}$	thermal resistance from junction to tie-point; see Fig.7		27	K/W
$R_{th\ j-a}$	thermal resistance from junction to ambient	note 1	100	K/W
		note 2	150	K/W

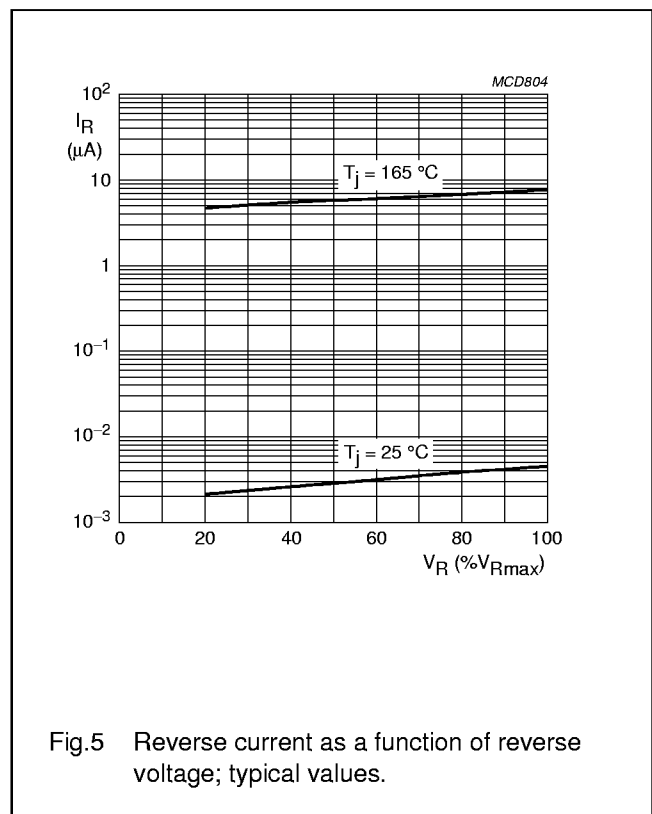
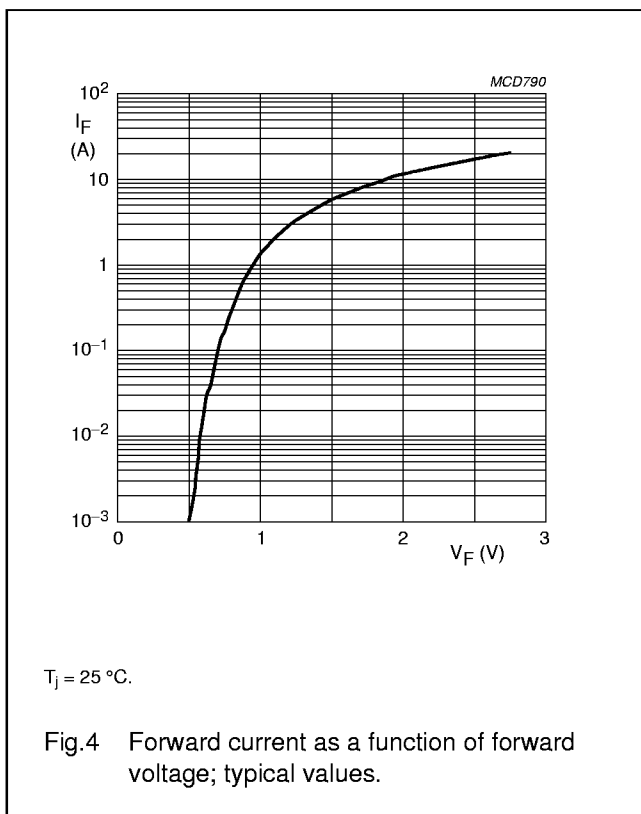
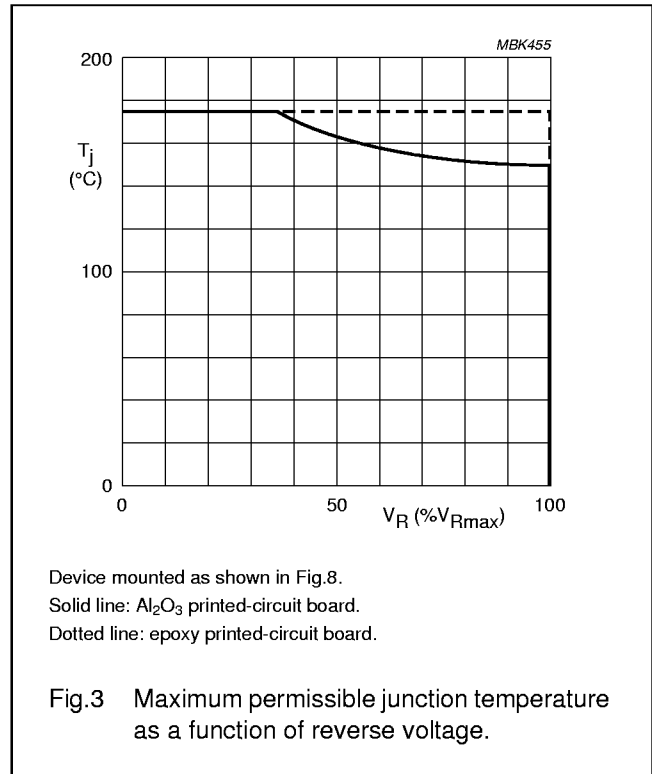
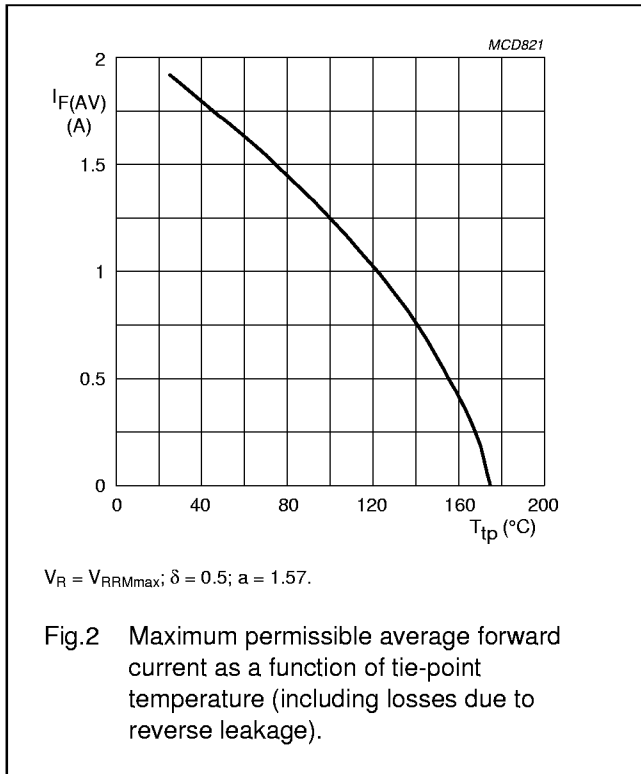
### Notes

1. Device mounted on  $\text{Al}_2\text{O}_3$  printed-circuit board, 0.7 mm thick; thickness of copper  $\geq 35\ \mu\text{m}$ .
2. Device mounted on epoxy-glass printed-circuit board, 1.5 mm thick; thickness of copper  $\geq 40\ \mu\text{m}$ . For more information please refer to the 'General Part of associated Handbook'.

SMA ultra fast low-loss controlled avalanche rectifiers

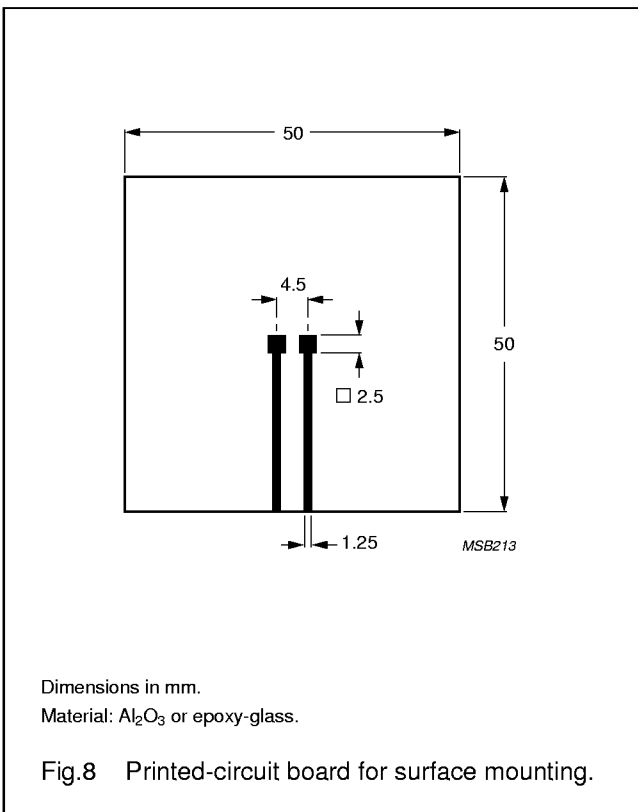
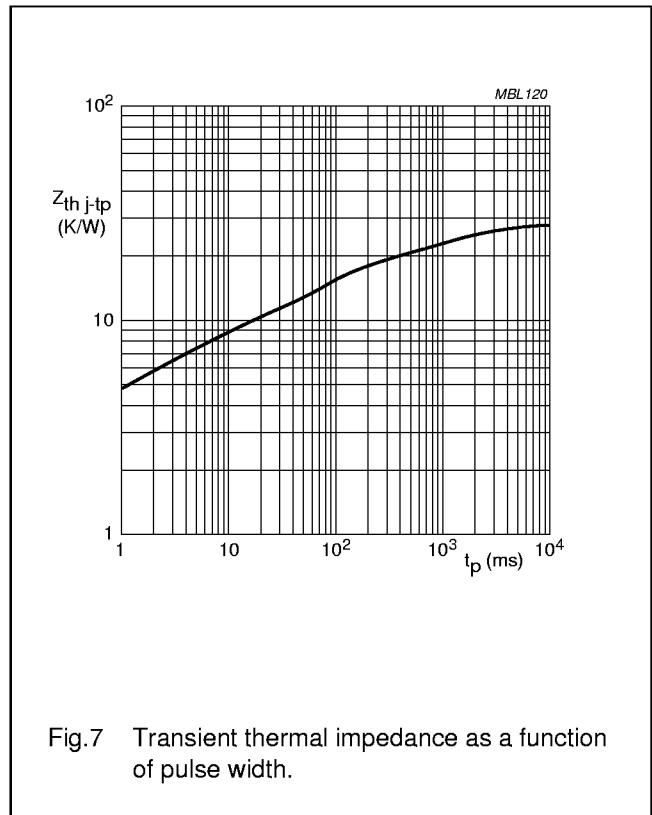
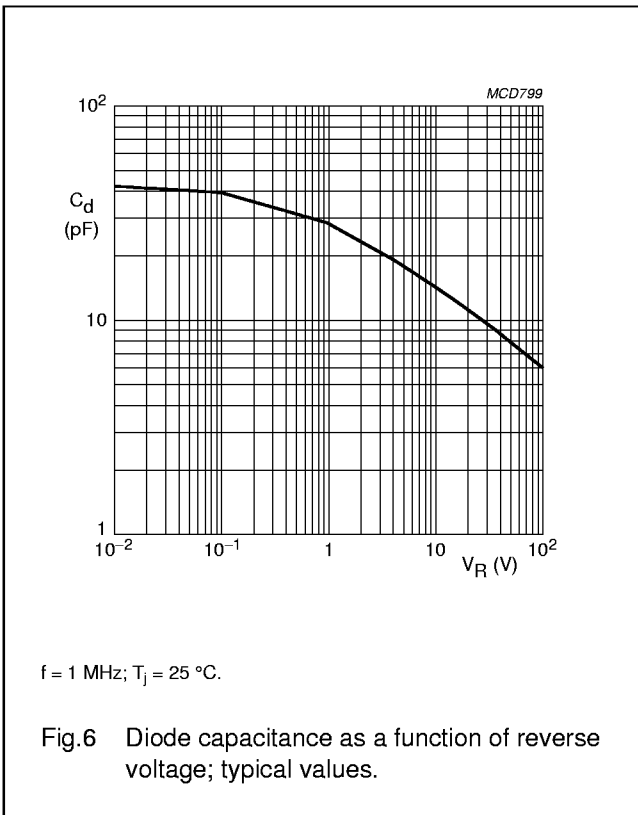
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GRAPHICAL DATA



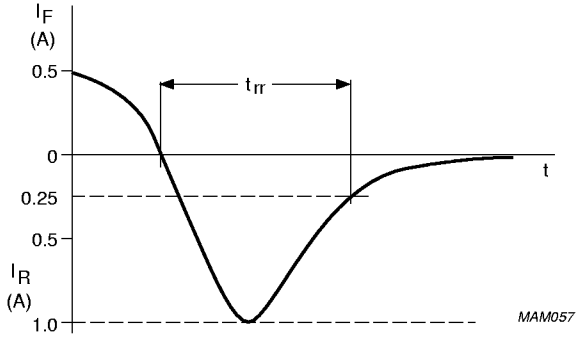
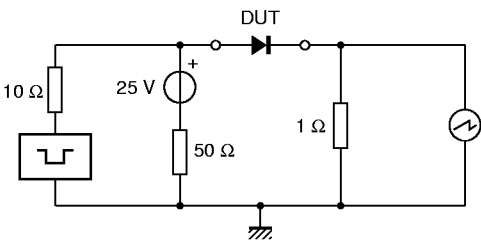
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# SMA ultra fast low-loss controlled avalanche rectifiers

## ES1 series



Input impedance oscilloscope: 1 MΩ, 22 pF;  $t_r \leq 7$  ns.  
Source impedance: 50 Ω;  $t_r \leq 15$  ns.

Fig.9 Test circuit and reverse recovery time waveform and definition.

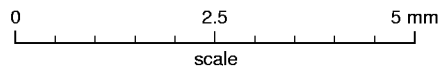
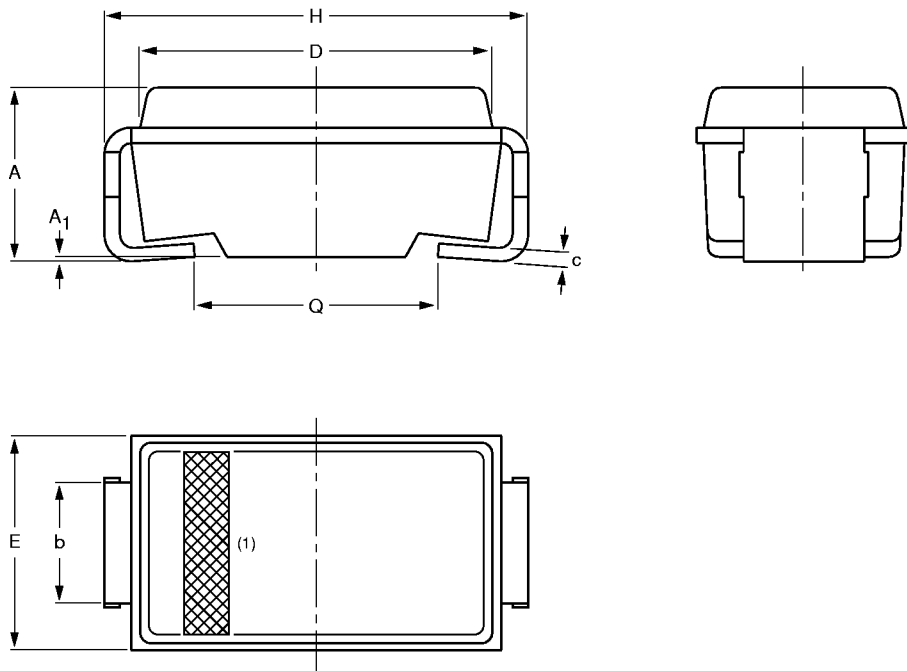
SMA ultra fast low-loss  
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ES1 series

PACKAGE OUTLINE

Transfer-moulded thermo-setting plastic small rectangular surface mounted package;  
2 connectors

SOD124



DIMENSIONS (mm are the original dimensions)

UNIT	A	A <sub>1</sub>	b	c	D	E	H	Q
mm	2.3 2.0	0.05	1.6 1.4	0.2	4.5 4.3	2.8 2.4	5.5 5.1	3.3 2.7

Note

1. The marking band indicates the cathode.

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOD124		DO-214AC				99-10-22