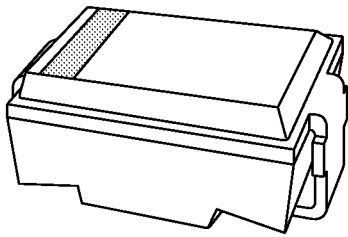


DATA SHEET



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

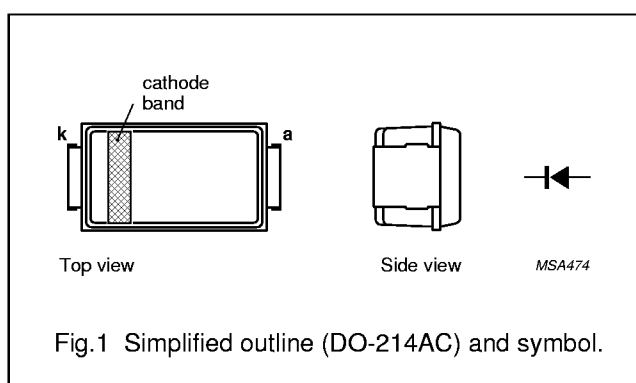
FEATURES

- 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.



LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{RRM}	repetitive peak reverse voltage				
	ES1A		—	50	V
	ES1B		—	100	V
	ES1C		—	150	V
V_R	continuous reverse voltage				
	ES1A		—	50	V
	ES1B		—	100	V
	ES1C		—	150	V
V_{RMS}	root mean square voltage				
	ES1A		—	35	V
	ES1B		—	70	V
	ES1C		—	105	V
$I_{F(AV)}$	average forward current	averaged over any 20 ms period; $T_{tp} = 120\text{ }^{\circ}\text{C}$; see Fig.2	—	1	A
	non-repetitive peak forward current	$t = 8.3\text{ ms}$ half sine wave; $T_j = 25\text{ }^{\circ}\text{C}$ prior to surge; $V_R = V_{RRMmax}$	—	25	A
T_{stg}	storage temperature		-65	+175	$^{\circ}\text{C}$
T_j	junction temperature	See Fig.3	-65	+175	$^{\circ}\text{C}$

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ELECTRICAL CHARACTERISTICS

$T_j = 25\text{ }^{\circ}\text{C}$ 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	μA
		$V_R = V_{RRMmax}$; $T_j = 165\text{ }^{\circ}\text{C}$; see Fig.5	–	100	μA
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

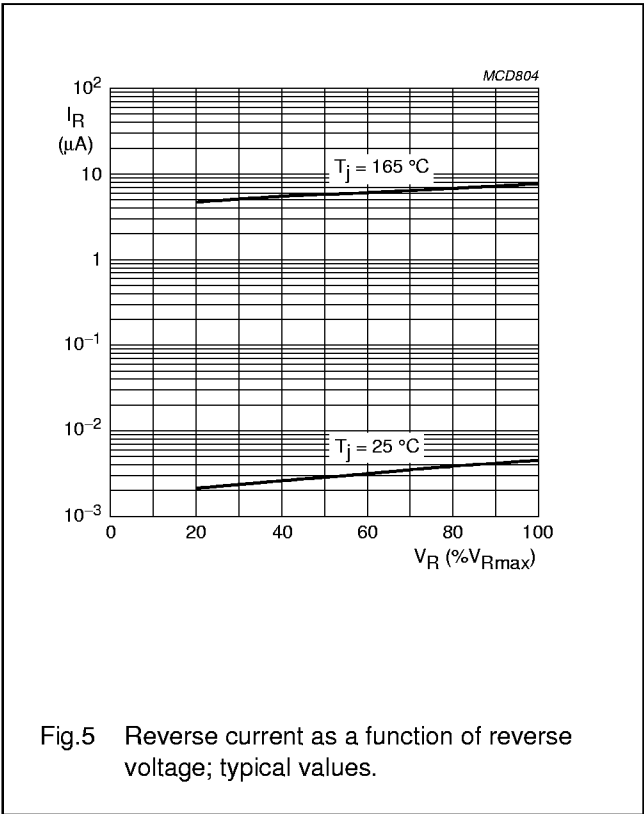
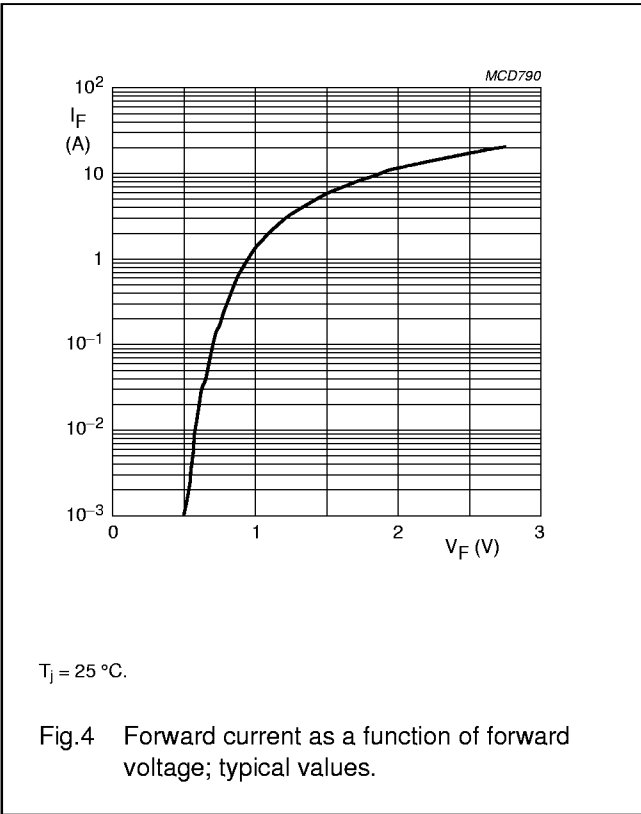
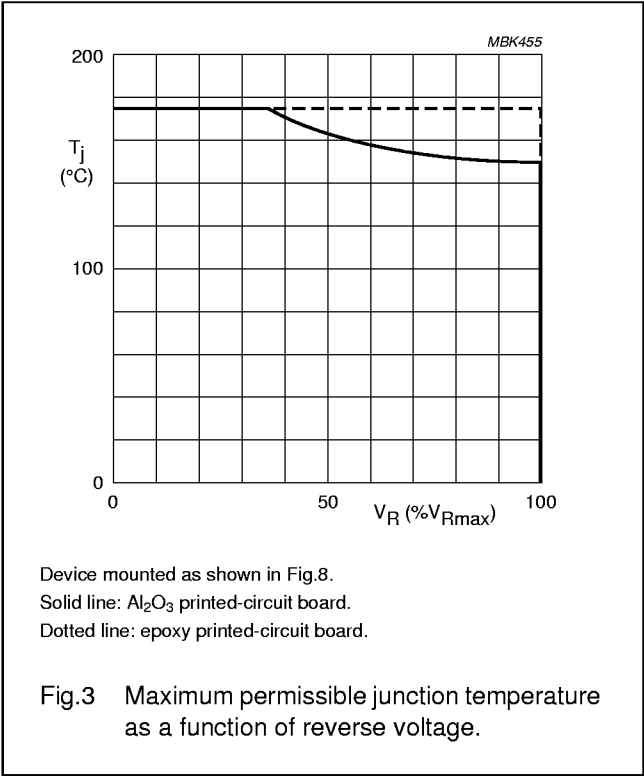
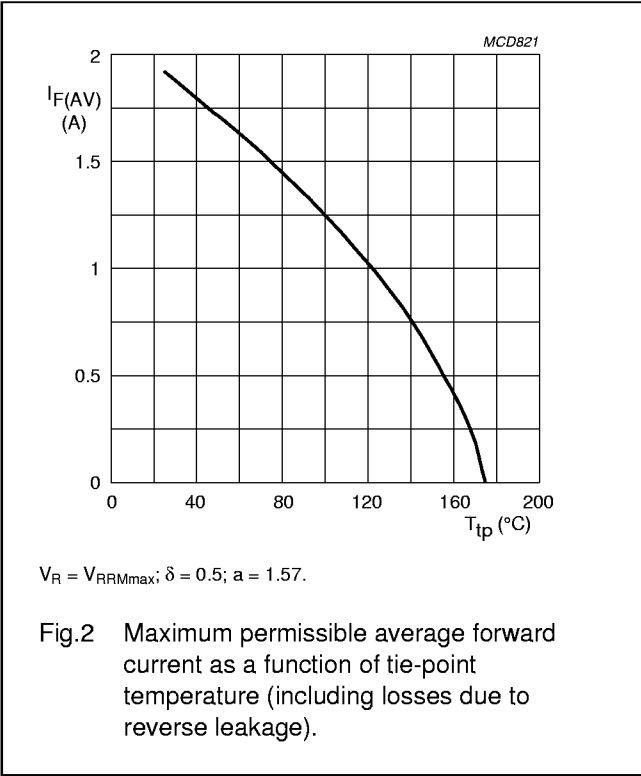
Notes

1. Device mounted on Al_2O_3 printed-circuit board, 0.7 mm thick; thickness of copper $\geq 35\text{ }\mu\text{m}$.
2. Device mounted on epoxy-glass printed-circuit board, 1.5 mm thick; thickness of copper $\geq 40\text{ }\mu\text{m}$. For more information please refer to the 'General Part of associated Handbook'.

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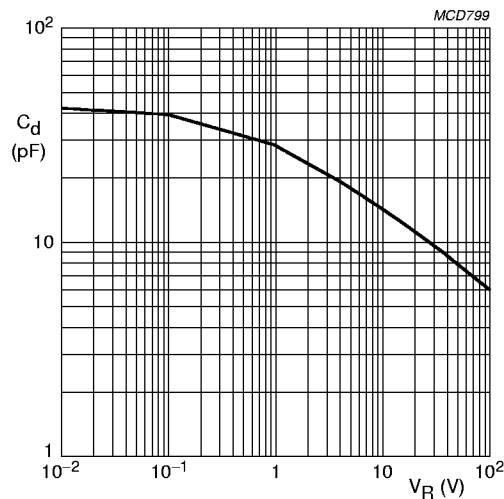
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GRAPHICAL DATA



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controlled avalanche rectifiers

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$f = 1\text{ MHz}; T_j = 25\text{ }^\circ\text{C}.$

Fig.6 Diode capacitance as a function of reverse voltage; typical values.

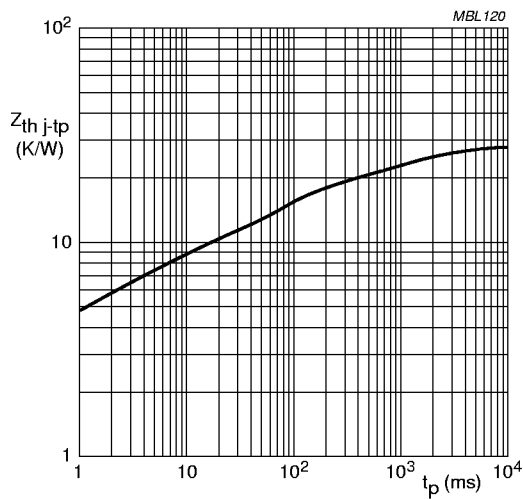
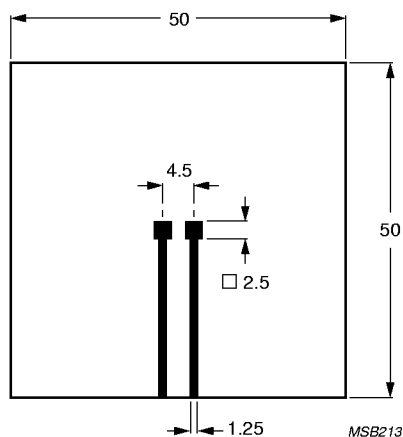


Fig.7 Transient thermal impedance as a function of pulse width.

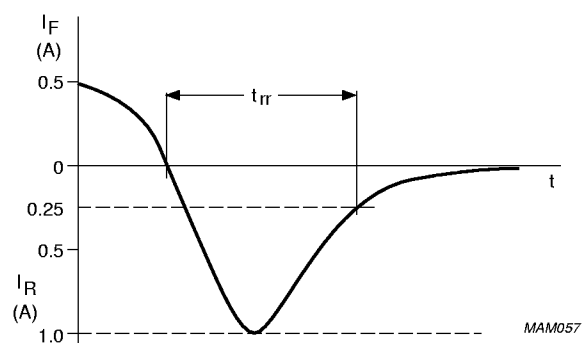
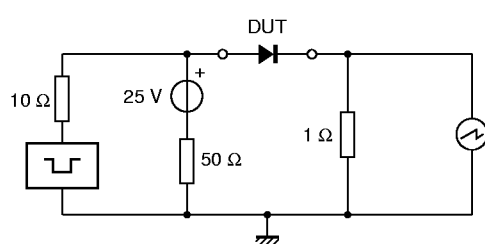


Dimensions in mm.
Material: Al_2O_3 or epoxy-glass.

Fig.8 Printed-circuit board for surface mounting.

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Input impedance oscilloscope: 1 M Ω , 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.

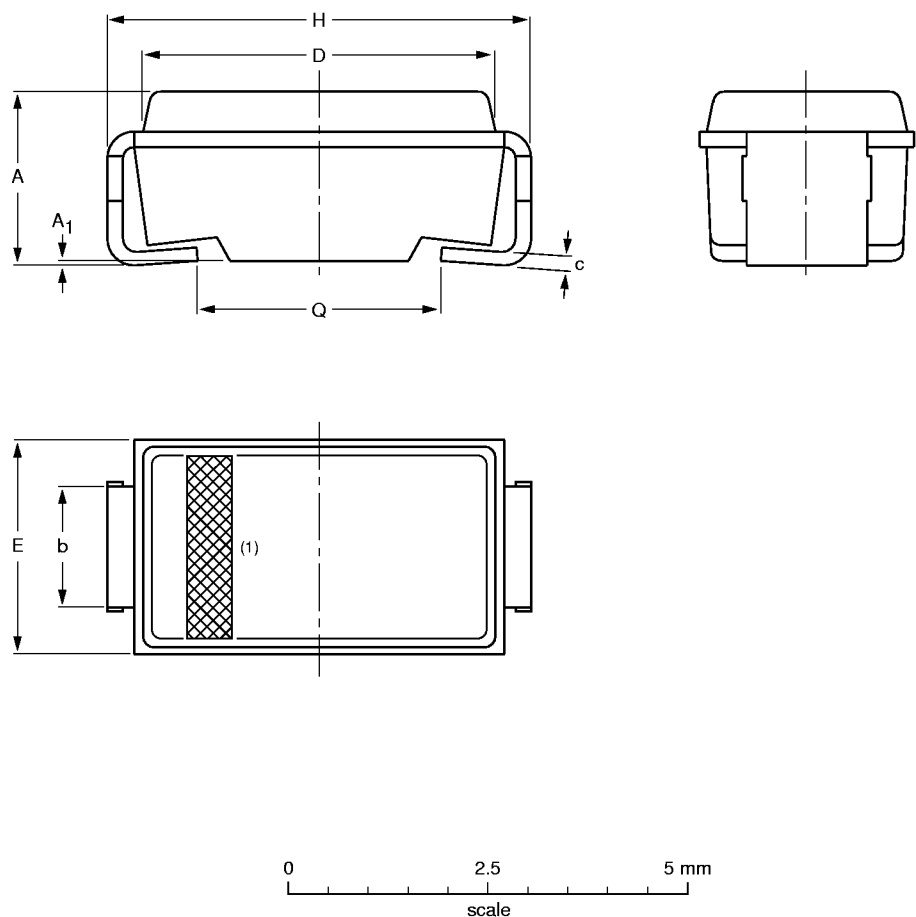
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PACKAGE OUTLINE

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

SOD124



DIMENSIONS (mm are the original dimensions)

UNIT	A	A ₁	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