

## ▶ SILICON MICROWAVE DIODES

### STEP RECOVERY DIODES

All the detail specification shall be read in conjunction with ESA/SCC Generic Specification N° 5010, the special requirements are included in the detail specification.

#### *Features*

Designed for harmonic generation from 0.2 GHz to 25 GHz of high power levels and / or high multiplication orders, the SRD diodes are ESA qualified. The detail specification ESA/SCC5512/016 is available upon request.

These diodes are available in package and chips.

#### *Main characteristics*

##### *Electrical characteristics*

Type	ESA/SCC5512/016		Total capacitance (pF)		Output	
	Variant	Package	min	max	Frequency (GHz)	Power (W)
DH252	01	F27D	1.1	2.2	2.0 - 8.0	3.0
DH256	02	F27D	0.7	1.3	5.0 - 12	2.0
DH292	03	F27D	0.4	0.7	8.0 - 16	0.6
DH267	04	F27D	0.4	0.5	10 - 25	0.2

#### *Maximum ratings*

Characteristics	Type	Variant	Maximum ratings
DC reverse voltage	DH252	01	40 V
	DH256	02	30 V
	DH292	03	20 V
	DH267	04	15 V
DC forward current	DH252 & DH256	01 & 02	200 mA
	DH292 & DH267	03 & 04	100 mA
RF power dissipation	DH252	01	1.5 W
	DH256	02	1.25 W
	DH292	03	1.1 W
	DH267	04	0.75 W
Operating temperature	All	All	- 55 to + 150° C
Storage temperature	All	All	- 65 to + 175° C
Soldering temperature	All	All	+ 220° C

Other package, specially M208 family can be used.

Other types have been successfully delivered for Aerospace applications: please, don't hesitate to request our aerospace project part list, periodically updated.



### ULTRAFAST SWITCHING PIN DIODES

All the detail specification shall be read in conjunction with ESA/SCC Generic Specification N° 5010, the special requirements are included in the detail specification.

#### Features

These diodes are specially designed for fast switching. They operate at frequencies from few MHz to 25 GHz. The passivated mesa technology, have medium ( $\leq 50 \mu\text{m}$ ) and thin layer ( $\leq 10 \mu\text{m}$ ). They are manufactured with proprietary technology.

They are ESA qualified. They are project part list qualified.

The detail specification ESA/SCC5513 is available upon request or from ESA CD-ROM.

#### Main characteristics

#### ULTRAFAST SWITCHING MEDIUM VOLTAGE PIN DIODES

Electrical characteristics: See table here under.

These diodes are available in M208 family package, see [page 1-23](#) of this data book.

ESA/SCC	Type	DC reverse voltage (min)	Junction capacitance (max)	Forward series resistance (max)	Minority carrier lifetime (max value)	ESA/SCC number
5513/032	DH50033	30 V	0.12 pF	1.8 $\Omega$	40 ns	ESA/SCC5513/032
/032	DH50034	30 V	0.17 pF	1.5 $\Omega$	50 ns	ESA/SCC5513/032
/032	DH50035	30 V	0.23 pF	1.0 $\Omega$	50 ns	ESA/SCC5513/032
/032	DH50036	30 V	0.40 pF	0.9 $\Omega$	60 ns	ESA/SCC5513/032
/032	DH50037	30 V	0.60 pF	0.7 $\Omega$	80 ns	ESA/SCC5513/032
/036	DH50052	50 V	0.08 pF	1.6 $\Omega$	80 ns	ESA/SCC5513/036
/036	DH50053	50 V	0.12 pF	1.4 $\Omega$	60 ns	ESA/SCC5513/036
/036	DH50054	50 V	0.17 pF	1.1 $\Omega$	70 ns	ESA/SCC5513/036
/036	DH50055	50 V	0.23 pF	1.0 $\Omega$	80 ns	ESA/SCC5513/036
/036	DH50056	50 V	0.40 pF	0.9 $\Omega$	100 ns	ESA/SCC5513/036
/03	DH50057	50 V	0.60 pF	0.7 $\Omega$	120 ns	ESA/SCC5513/036
/037	DH50071	70 V	0.06 pF	2.0 $\Omega$	100 ns	ESA/SCC5513/037
/037	DH50072	70 V	0.08 pF	1.7 $\Omega$	100 ns	ESA/SCC5513/037
/037	DH50073	70 V	0.12 pF	1.6 $\Omega$	120 ns	ESA/SCC5513/037
/037	DH50074	70 V	0.17 pF	1.4 $\Omega$	120 ns	ESA/SCC5513/037
/037	DH50075	70 V	0.23 pF	1.0 $\Omega$	200 ns	ESA/SCC5513/037
/037	DH50076	70 V	0.40 pF	0.9 $\Omega$	200 ns	ESA/SCC5513/037
/037	DH50077	70 V	0.60 pF	0.7 $\Omega$	300 ns	ESA/SCC5513/037
/038	DH50101	100 V	0.06 pF	1.9 $\Omega$	300 ns	ESA/SCC5513/038
/038	DH50102	100 V	0.08 pF	1.7 $\Omega$	300 ns	ESA/SCC5513/038
/038	DH50103	100 V	0.12 pF	1.4 $\Omega$	400 ns	ESA/SCC5513/038
/038	DH50104	100 V	0.17 pF	1.2 $\Omega$	500 ns	ESA/SCC5513/038
/038	DH50105	100 V	0.23 pF	1.0 $\Omega$	500 ns	ESA/SCC5513/038
/038	DH50106	100 V	0.40 pF	0.8 $\Omega$	800 ns	ESA/SCC5513/038
/038	DH50107	100 V	0.60 pF	0.6 $\Omega$	1000 ns	ESA/SCC5513/038

## FAST SWITCHING SILICON PIN DIODES

Electrical characteristics ESA/SCC 5513/OYY

 These diodes are available in M208 family package, see [page 1-24](#) of this data book

ESA/SCC	Type	DC reverse voltage (min)	Junction capacitance (max)	Forward series resistance (max)	Minority carrier lifetime (max)	ESA/SCC number
/031	DH50151	150 V	0.06 pF	2.0 Ω	160 ns	ESA/SCC5513/031
5513/031	DH50152	150 V	0.08 pF	1.7 Ω	185 ns	ESA/SCC5513/031
/031	DH50153	150 V	0.12 pF	1.5 Ω	240 ns	ESA/SCC5513/031
/031	DH50154	150 V	0.17 pF	1.4 Ω	400 ns	ESA/SCC5513/031
/031	DH50155	150 V	0.23 pF	1.0 Ω	440 ns	ESA/SCC5513/031
/031	DH50156	150 V	0.40 pF	0.8 Ω	640 ns	ESA/SCC5513/031
/031	DH50157	150 V	0.60 pF	0.6 Ω	760 ns	ESA/SCC5513/031
/033	DH50201	200 V	0.06 pF	2.3 Ω	240 ns	ESA/SCC5513/033
/033	DH50202	200 V	0.08 pF	2.1 Ω	320 ns	ESA/SCC5513/033
/033	DH50203	200 V	0.12 pF	1.5 Ω	400 ns	ESA/SCC5513/033
/033	DH50204	200 V	0.17 pF	1.3 Ω	520 ns	ESA/SCC5513/033
/033	DH50205	200 V	0.23 pF	1.0 Ω	640 ns	ESA/SCC5513/033
/033	DH50206	200 V	0.40 pF	0.8 Ω	710 ns	ESA/SCC5513/033
/033	DH50207	200 V	0.60 pF	0.7 Ω	840 ns	ESA/SCC5513/033
/033	DH50208	200 V	0.80 pF	0.6 Ω	1000 ns	ESA/SCC5513/033
/033	DH50209	200 V	1.20 pF	0.5 Ω	1200 ns	ESA/SCC5513/033
/034	DH50251	250 V	0.06 pF	2.4 Ω	265 ns	ESA/SCC5513/034
/034	DH50252	250 V	0.08 pF	2.2 Ω	400 ns	ESA/SCC5513/033
/034	DH50253	250 V	0.12 pF	2.0 Ω	600 ns	ESA/SCC5513/033
/034	DH50254	250 V	0.17 pF	1.4 Ω	720 ns	ESA/SCC5513/033
/034	DH50255	250 V	0.23 pF	0.9 Ω	800 ns	ESA/SCC5513/033
/034	DH50256	250 V	0.40 pF	0.8 Ω	970 ns	ESA/SCC5513/033
5513/035	DH50401	400 V	0.06 pF	2.5 Ω	560 ns	ESA/SCC5513/035
/035	DH50402	400 V	0.08 pF	2.3 Ω	640 ns	ESA/SCC5513/035
/035	DH50403	400 V	0.12 pF	2.1 Ω	800 ns	ESA/SCC5513/035
/035	DH50404	400 V	0.17 pF	1.8 Ω	1200 ns	ESA/SCC5513/035
/035	DH50405	400 V	0.23 pF	1.6 Ω	1600 ns	ESA/SCC5513/035

### Maximum ratings

For all variants:

Temperature Tcase	
Operating temperature	- 55 to + 125° C
Storage temperature	- 65 to + 150° C
Soldering temperature	+ 220° C

### Package

For all variants: the detail specification gives the variant with the F27d and M208 family (different possibilities of ribbons). Other hermetic packages can be supplied upon request.

## Tuning varactors

All the detail specification shall be read in conjunction with ESA/SCC Generic Specification N° 5010, the special requirements are included in the detail specification.

## TUNING VARACTORS

### Features

Designed for tuning in VCO and VCXO, the DH7XXX series offer a large selection of capacitance range and quality factor.

These diodes can be used in other applications such as phase shifters, delay line, etc.

The wafer technology has a passivated epitaxial mesa.

These diodes are available in packages and chips.

ESA qualification is in progress. Detail specification: ESA/SCC 5512/022 is available upon request.

### Main characteristics

#### Electrical characteristics

		Figure of merit (Q)	Total capacitance (pF) Ct				Tuning ratio		Chip
Test conditions			f = 50 MHz Vr = 4 V	f = 1 MHz Vr = 1 V	f = 1 MHz Vr = 4 V	f = 1 MHz Vr = 12 V	f = 1 MHz Vr = 20 V	Ct1V/Ct12V f = 1 MHz	
Type	Case(1)	typ.	typ.	±20%	typ.	typ.	typ.	typ.	
DH76010	F27d	2200	2.5	1.2	0.6	0.5	4.1	4.9	EH76010
DH76015	F27d	2000	3.6	1.7	0.8	0.7	4.4	5.4	EH76015
DH76022	F27d	1700	5.2	2.4	1.1	0.9	4.7	5.8	EH76022
DH76033	F27d	1400	7.7	3.5	1.6	1.3	4.9	6.1	EH76033
DH76047	F27d	1000	11	4.9	2.2	1.7	5.0	6.4	EH76047
DH76068	F27d	700	16	6.9	3.0	2.4	5.1	6.5	EH76068
DH76100	F27d	400	23	10.2	4.5	3.5	5.2	6.7	EH76100
DH76150	F27d	140	34	15.2	6.6	5.1	5.2	6.8	EH76150

(1) Custom cases available on request

#### Temperature ranges:

Operating junction (T<sub>j</sub>) : -55° C to +150° C

Storage : -65° C to +150° C

#### Maximum ratings

Characteristics	Type	Variant	Maximum ratings
Operating temperature	All	All	- 55 to + 125° C
Storage temperature	All	All	- 65 to + 150° C
Soldering temperature	All	All	+ 220° C

### Qualification status

This tuning varactor series is PPL qualified.



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## **BARRIER SCHOTTKY FOR MIXING**

### *Features*

These low barrier diodes are specially required for mixing application where the local oscillator (LO) drive level is between -10 dBm and +10 dBm.

From 1 to 18 GHz, wide band, the low value for silicon diode of noise figure, these kind of diodes represent the component that can be used for telecommunication satellite application.

The wafer technology with a passivated planar construction is as reliable as these diodes are used for aerospace applications since 1976.

The detail specification ESA/SCC5512/017 is available upon request.

These diodes are available in package and chips.

### *Electrical characteristics ESA/SCC5512/017*

These diodes are available in F51 family package. Please consult [page 1-30](#) of this data book.

Variant	Type	Frequency range (GHz) (typ)	Total junction capacitance (max)	Noise figure (dB) (max)
01 to 06	DH301	1.0 - 6.0	0.48 pF	6.5
07 to 12	DH302	1.0 - 6.0	0.48 pF	6.0
13 to 18	DH303	1.0 - 6.0	0.48 pF	5.5
19 to 24	DH312	6.0 - 12.0	0.30 pF	7.0
25 to 30	DH313	6.0 - 12.0	0.30 pF	6.5
31 to 36	DH314	6.0 - 12.0	0.30 pF	6.0
37 to 42	DH315	6.0 - 12.0	0.30 pF	5.5
43 to 48	DH322	12.0 - 18.0	0.21 pF	7.5
49 to 54	DH323	12.0 - 18.0	0.21 pF	7.0
55 to 60	DH324	12.0 - 18.0	0.21 pF	6.5
61 to 66	DH325	12.0 - 18.0	0.21 pF	6.0

### *Maximum ratings*

Characteristics	Type	Variant	Maximum ratings
DC reverse voltage	All	01 to 66	3 V
DC forward current	All	01 to 66	50 mA
Power dissipation	All	01 to 66	50 mW
Burn-out energy	All	01 to 66	5.0 erg
Operating temperature	All	All	- 55 to + 150° C
Storage temperature	All	All	- 65 to + 175° C
Soldering temperature	All	All	+ 220° C

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## SILICON MOS CAPACITORS

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All the detail specification shall be read in conjunction with ESA/SCC Generic Specification N° 5010, the special requirements are included in the detail specification.

### *General Features*

MOS (Metal Oxide Silicon) capacitors chips and array capacitors are suitable for hybrid microwave circuits up to 30 GHz.

Their extreme stability versus temperature make them the best capacitors for all wide temperature range and wide frequency range on the market.

The top metallization are titanium sputtered (700 Å) and gold (6000 Å) which allow: thermocompression, thermosonic and wedge bonding.

The bottom termination of 1.5 µm Au allows high temperature soldering as: AuSn eutectic at melting point 280° C, or AuGe eutectic at melting point 350° C.

Gluing can be also used for die attach.

### *Single-pad chips capacitors (CS series)*

#### *Features*

They are designed for impedance matching, decoupling, RF by-pass, DC-Block

#### *Typical characteristics*

Values are available from 0.22 pF up to 100 pF. Please, consult [page 1-49](#) of this data book.

### *Multi-pads capacitors arrays (CJ series)*

#### *Features*

These capacitors arrays are designed for fine and precise tuning in hybrid.

They are suitable for frequency tuning when the frequency band must be tuned after the design of the equipment, by bonding only the right capacitance without a rework on hybrid. The adjustment is kept whatever the mechanical and environmental conditions are.

#### *Typical characteristics*

Values are available from: 0.125 pF up to 60 pF, with steps of 2S, 4S, 10S.  
(S value of the smallest capacity of the array)

Please, consult [page 1-50](#) of this data book.



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#### *Multi-pads BAR capacitors (CB series)*

##### *Features*

These capacitors bar arrays are designed for by-pass decoupling MMIC's.

They can also be used in hybrid circuits where high performances and stable capacitors are required. They are suitable for frequency tuning when the frequency band must be tuned after the design of the equipment, by bonding only the right capacitance without a rework on hybrid. The adjustment is kept whatever the mechanical and environmental conditions are.

##### *Typical characteristics*

Values are available from: 0.125 pF up to 60 pF, with steps of 2S, 4S, 10S.  
(S value of the smallest capacity of the array).

Please, consult [page 1-51](#) of this data book.