## Silicon PIN diode

## FEATURES

BAP63-03

- High speed switching for RF signals
- Low diode capacitance
- Low diode forward resistance

Very low series inductance
For applications up to 3 GHz .

## APPLICATIONS

RF attenuators and switches.

## DESCRIPTION

Planar PIN diode in a SOD323 small SMD plastic package.



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

| SYMBOL | PARAMETER | CONDITIONS | MIN. | MAX. | UNIT |
| :---: | :---: | :---: | :---: | :---: | :---: |
| $\mathrm{V}_{\mathrm{R}}$ | continuous reverse voltage |  | - | 50 | V |
| $\mathrm{I}_{\mathrm{F}}$ | continuous forward current |  | - | 100 | mA |
| $\mathrm{P}_{\text {tot }}$ | total power dissipation | $\mathrm{T}_{\mathrm{s}} \leq 90^{\circ} \mathrm{C}$ | - | 500 | mW |
| $\mathrm{~T}_{\text {stg }}$ | storage temperature |  | -65 | +150 | ${ }^{\circ} \mathrm{C}$ |
| $\mathrm{T}_{\mathrm{j}}$ | junction temperature |  | -65 | +150 | ${ }^{\circ} \mathrm{C}$ |

ELECTRICAL CHARACTERISTICS $\mathrm{T}_{\mathrm{j}}=25^{\circ} \mathrm{C}$ unless otherwise specified.

| SYMBOL | PARAMETER | CONDITIONS | TYP. | MAX. | UNIT |
| :---: | :---: | :---: | :---: | :---: | :---: |
| $\mathrm{V}_{\text {F }}$ | forward voltage | $\mathrm{I}_{\mathrm{F}}=50 \mathrm{~mA}$ | 0.95 | 1.1 | V |
| $\mathrm{I}_{\mathrm{R}}$ | reverse current | $\mathrm{V}_{\mathrm{R}}=35 \mathrm{~V}$ | - | 10 | nA |
| $\mathrm{C}_{\text {d }}$ | diode capacitance | $\mathrm{V}_{\mathrm{R}}=0 ; \mathrm{f}=1 \mathrm{MHz}$ | 0.4 | - | pF |
|  |  | $\mathrm{V}_{\mathrm{R}}=1 \mathrm{~V} ; \mathrm{f}=1 \mathrm{MHz}$ | 0.35 | - | pF |
|  |  | $\mathrm{V}_{\mathrm{R}}=20 \mathrm{~V} ; \mathrm{f}=1 \mathrm{MHz}$ | 0.27 | 0.32 | pF |
| $\mathrm{r}_{\mathrm{D}}$ | diode forward resistance | $\mathrm{I}_{\mathrm{F}}=0.5 \mathrm{~mA} ; \mathrm{f}=100 \mathrm{MHz}$; note 1 | 2.5 | 3.5 | $\Omega$ |
|  |  | $\mathrm{I}_{\mathrm{F}}=1 \mathrm{~mA} ; \mathrm{f}=100 \mathrm{MHz}$; note 1 | 1.95 | 3 | $\Omega$ |
|  |  | $\mathrm{I}_{\mathrm{F}}=10 \mathrm{~mA} ; \mathrm{f}=100 \mathrm{MHz}$; note 1 | 1.17 | 1.8 | $\Omega$ |
|  |  | $\mathrm{I}_{\mathrm{F}}=100 \mathrm{~mA} ; \mathrm{f}=100 \mathrm{MHz}$; note 1 | 0.9 | 1.5 | $\Omega$ |
| $\left\|S_{21}\right\|^{2}$ | isolation | $\mathrm{V}_{\mathrm{R}}=0 ; \mathrm{f}=900 \mathrm{MHz}$ | 15.4 | - | dB |
|  |  | $V_{R}=0 ; f=1800 \mathrm{MHz}$ | 10.1 | - | dB |
|  |  | $V_{R}=0 ; f=2450 \mathrm{MHz}$ | 7.8 | - | dB |
| $\left\|S_{21}\right\|^{2}$ | insertion loss | $\mathrm{I}_{\mathrm{F}}=0.5 \mathrm{~mA} ; f=900 \mathrm{MHz}$ | 0.21 | - | dB |
|  |  | $\mathrm{I}_{\mathrm{F}}=0.5 \mathrm{~mA} ; \mathrm{f}=1800 \mathrm{MHz}$ | 0.28 | - | dB |
|  |  | $\mathrm{I}_{\mathrm{F}}=0.5 \mathrm{~mA} ; \mathrm{f}=2450 \mathrm{MHz}$ | 0.38 | - | dB |
| $\left\|S_{21}\right\|^{2}$ | insertion loss | $\mathrm{I}_{\mathrm{F}}=1 \mathrm{~mA} ; \mathrm{f}=900 \mathrm{MHz}$ | 0.18 | - | dB |
|  |  | $\mathrm{I}_{\mathrm{F}}=1 \mathrm{~mA} ; \mathrm{f}=1800 \mathrm{MHz}$ | 0.26 | - | dB |
|  |  | $\mathrm{I}_{\mathrm{F}}=1 \mathrm{~mA} ; \mathrm{f}=2450 \mathrm{MHz}$ | 0.35 | - | dB |
| $\left\|S_{21}\right\|^{2}$ | insertion loss | $\mathrm{I}_{\mathrm{F}}=10 \mathrm{~mA} ; \mathrm{f}=900 \mathrm{MHz}$ | 0.13 | - | dB |
|  |  | $\mathrm{I}_{\mathrm{F}}=10 \mathrm{~mA} ; \mathrm{f}=1800 \mathrm{MHz}$ | 0.20 | - | dB |
|  |  | $\mathrm{I}_{\mathrm{F}}=10 \mathrm{~mA} ; \mathrm{f}=2450 \mathrm{MHz}$ | 0.30 | - | dB |
| $\left\|S_{21}\right\|^{2}$ | insertion loss | $\mathrm{I}_{\mathrm{F}}=100 \mathrm{~mA} ; \mathrm{f}=900 \mathrm{MHz}$ | 0.10 | - | dB |
|  |  | $\mathrm{I}_{\mathrm{F}}=100 \mathrm{~mA} ; f=1800 \mathrm{MHz}$ | 0.18 | - | dB |
|  |  | $\mathrm{I}_{\mathrm{F}}=100 \mathrm{~mA} ; \mathrm{f}=2450 \mathrm{MHz}$ | 0.28 | - | dB |

ELECTRICAL CHARACTERISTICS $\mathrm{T}_{\mathrm{j}}=25^{\circ} \mathrm{C}$ unless otherwise specified. (Continue)

| SYMBOL | PARAMETER | CONDITIONS | TYP. | MAX. | UNIT |
| :---: | :---: | :---: | :---: | :---: | :---: |
| $\tau_{L}$ | charge carrier life time | when switched from $I_{F}=10 \mathrm{~mA}$ to <br> $\mathrm{I}_{\mathrm{R}}=6 \mathrm{~mA} ; \mathrm{R}_{\mathrm{L}}=100 \Omega ;$ <br> measured at $\mathrm{I}_{\mathrm{R}}=3 \mathrm{~mA}$ | 310 | - | ns |
|  |  |  |  | 1.5 | - |
| $\mathrm{L}_{\mathrm{s}}$ | series inductance |  | nH |  |  |

## Note

1. Guaranteed on AQL basis: inspection level S4, AQL 1.0.

THERMALCHARACTERISTICS

| SYMBOL | PARAMETER | VALUE | UNIT |
| :---: | :---: | :---: | :---: | :---: |
| $R_{\text {th } j \text {-s }}$ | thermal resistance from junction to soldering-point | 120 | KW |



Fig. 1 Forward resistance as a function of forward current; typical values.


Fig. 3 Insertion loss ( $\left|\mathbf{s}_{21}\right|^{2}$ ) of the diode in on-state as a function of frequency; typical values.


Fig. 2 Diode capacitance as a function of reverse voltage; typical values.


Fig. 4 Isolation $\left(\left|s_{21}\right|^{2}\right)$ of the diode in off-state as a function of frequency; typical values.

