

FSD270

SILICON DUAL VARIABLE CAPACITANCE DIODE

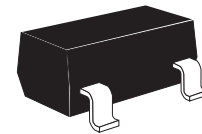
SUMMARY

$V_{BR}=25V$; $I_R=20nA$; $C_d=33pF(Nom)$

DESCRIPTION

The FSD270 is a new hyperabrupt SOT23 packaged dual common cathode varactor diode, offering users both compact circuit design and impressive performance comprising tightly controlled CV characteristics, a capacitance of typically 33 pf @ 2V, excellent phase noise performance and high Q of 200 min.

This superior performance in the VHF and UHF ranges has been optimised to meet the high filtering requirements of a wide range of Digital Audio Broadcasting (DAB) module circuits, mobile radios, pagers, voltage controlled crystal oscillators (VCXO) and temperature controlled crystal oscillators (TCXO).



SOT23

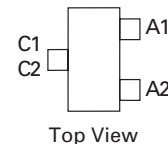
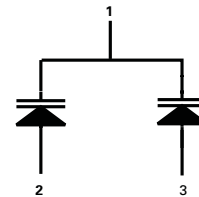
FEATURES

- Common Cathode dual Diode (monolithic construction)
- VHF- UHF operation
- Close tolerance CV characteristics
- High Tuning Ratio
- Low I_R , enabling excellent Phase Noise Performance (I_R typically $< 200pA @ 20V$)
- High Q

APPLICATIONS

- DAB Receiver Modules for use with:
 - Low voltage battery portables
 - Hi-Fi
 - In car radio
 - MP3 players
- Voltage and Temperature Controlled Crystal Oscillators
- Mobile Radio and Pagers.

PIN CONFIGURATION



ORDERING INFORMATION

| DEVICE | REEL SIZE | TAPE WIDTH | QUANTITY PER REEL |
|----------|------------|--------------|-------------------|
| FSD270TA | 7" (180mm) | 8mm embossed | 3000 units |

The FSD270 is capacitance selected into 3 bands. A reel will only contain one band - A,B or C. Shipments of more than 1 reel may contain reels from different bands.

FSD270

ABSOLUTE MAXIMUM RATINGS.

| PARAMETER | SYMBOL | VALUE | UNIT |
|--|----------------|-------------|-----------------------|
| Forward Current (single diode) | I_F | 200 | mA |
| Power Dissipation at $T_{amb}=25^{\circ}C$ (a) Linear Derating Factor | P_D | 330 3 | mW mW/ $^{\circ}C$ |
| Operating and Storage Temperature Range | $T_j; T_{stg}$ | -55 to +150 | $^{\circ}C$ |

NOTES

(a) For a device surface mounted on 25mm x 25mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions

ELECTRICAL CHARACTERISTICS (at $T_{amb} = 25^{\circ}C$).

| PARAMETER | SYMBOL | MIN. | TYP. | MAX. | UNIT | CONDITIONS. |
|---------------------------|-------------|------|------|------|------------------|------------------------|
| Reverse Breakdown Voltage | V_{BR} | 25 | | | V | $I_R = 10\mu A$ |
| Reverse Leakage Current | I_R | | 0.2 | 20 | nA | $V_R = 20V$ |
| Temperature Coefficient | η | | | 400 | ppm/ $^{\circ}C$ | $V_R = 3V, f=1MHz$ |
| Diode Capacitance | C_d | 29.7 | 33.0 | 36.3 | pF | $V_R = 2V, f=1MHz$ |
| Capacitance Ratio | C_d / C_d | 5.0 | | 6.5 | | $V_R = 2V/20V, f=1MHz$ |
| Figure of Merit | Q | 200 | | | | $V_R = 3V, f=50MHz$ |

Additional CV matching capability:

Zetex recognise that some applications ie filtering in digital audio receiver circuits, require these dual varactors to be very tightly matched. To meet this requirement devices can be supplied tested into capacitance bands at the 2V condition.

Each (TA) reel will contain 3000 devices carrying only diodes tested into a single band and each device will have a partmark identifying the capacitance band which they meet.

As this is a final test measurement customers will not have the option to specify a capacitance at the time of ordering and will be obliged to accept the band into which the devices are tested.

- **Purchase orders** can be placed in multiples of 3000 units / reel for device type **FSD270TA**
- **Samples** can be obtained from Zetex Plc quoting device type **#FSD270TA**

| | MIN. | MAX. | UNIT | PART NUMBER |
|--------|------|------|------|-------------|
| BAND A | 29.7 | 32.1 | pF | 70A |
| BAND B | 31.9 | 34.1 | pF | 70B |
| BAND C | 33.9 | 36.3 | pF | 70C |



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APPLICATIONS INFORMATION

FSD270 in Digital Audio Broadcasting (DAB) Circuits

Digital audio is set to dominate car radio and other mobile radio applications. Most of the required functions can be achieved with a single integrated circuit. One parts of the circuit that are not integrated are the Voltage Controlled Oscillator (VCO) used in the Phase-Locked Loop (PLL) channel selection circuit and the tracking filters. Figure 1 shows the FSD270 dual variable capacitance diode (also known as varactor or tuner diode) in a DAB application.

Most textbook circuits show a single variable capacitance diode in place of the FSD270. In practice radio frequency oscillations in the tracking filters can drive the single diode into conduction on peaks increasing the bias voltage and giving rise to undesirable harmonics. Common-cathode variable capacitance diodes are used to overcome this problem. The FSD270 dual common cathode device in the space saving SOT23 package has been optimized for this application. Zetex application note AN9 covers our range of variable capacitance diodes and their applications in detail.

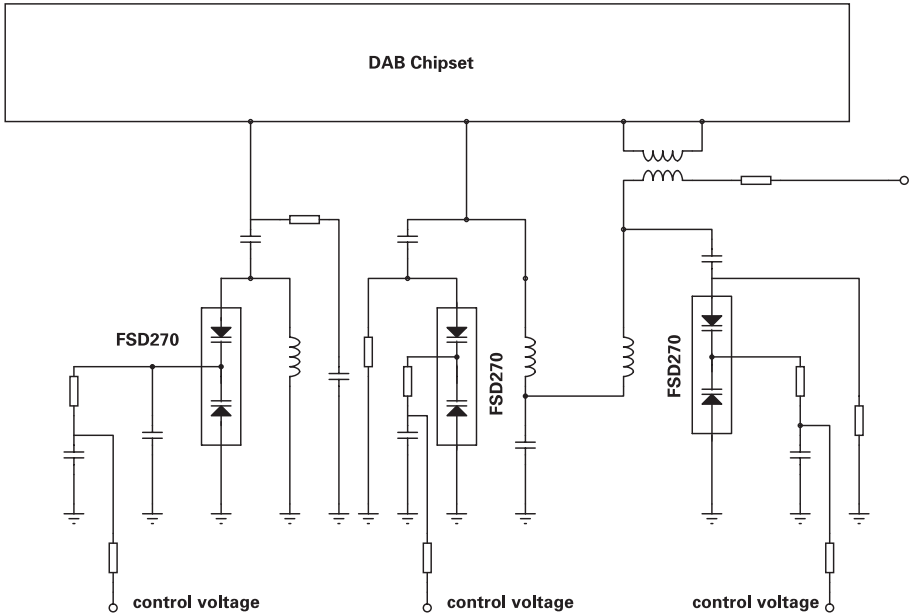
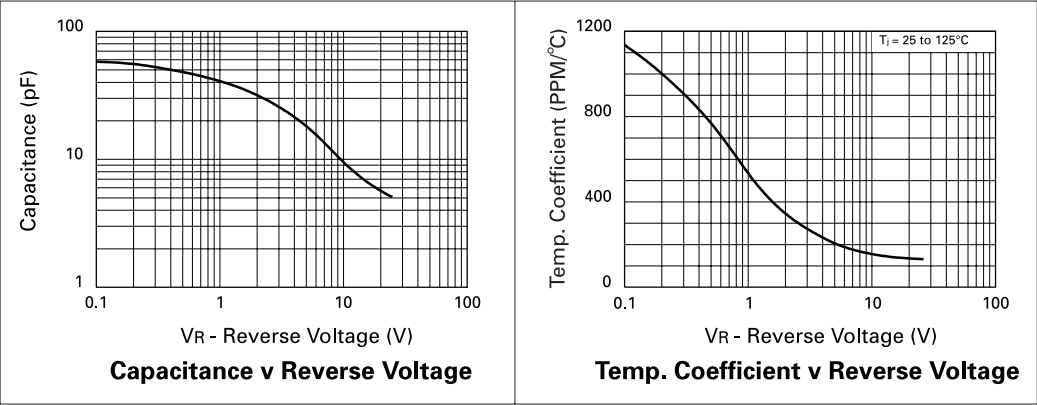


Figure 1.

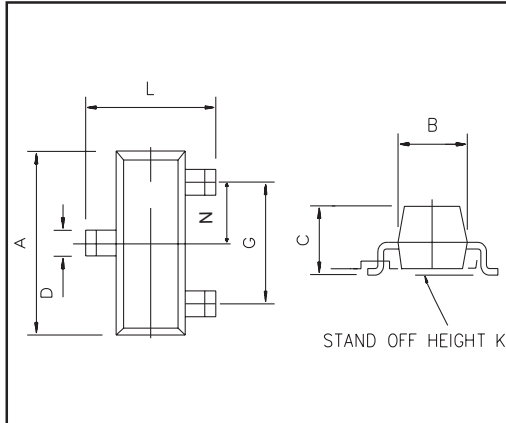
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CHARACTERISTICS

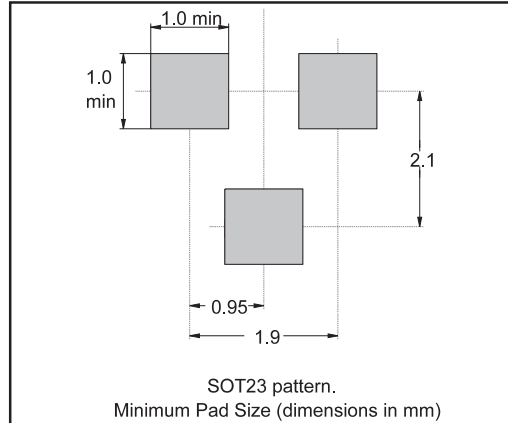


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PACKAGE OUTLINE



PAD LAYOUT DETAILS



PACKAGE DIMENSIONS

| DIM | Millimetres | | Inches | |
|-----|-------------|------|-----------|--------|
| | Min | Max | Min | Max |
| A | 2.67 | 3.05 | 0.105 | 0.120 |
| B | 1.20 | 1.40 | 0.047 | 0.055 |
| C | - | 1.10 | - | 0.043 |
| D | 0.37 | 0.53 | 0.0145 | 0.021 |
| F | 0.085 | 0.15 | 0.0033 | 0.0059 |
| G | NOM 1.9 | | NOM 0.075 | |
| K | 0.01 | 0.10 | 0.0004 | 0.004 |
| L | 2.10 | 2.50 | 0.0825 | 0.0985 |
| N | NOM 0.95 | | NOM 0.037 | |

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