

20V N-CHANNEL ENHANCEMENT MODE MOSFET**SUMMARY** **$V_{(BR)DSS}=20V$; $R_{DS(ON)}=0.18\Omega$; $I_D=1.7A$** **DESCRIPTION**

This new generation of high density MOSFETs from Zetex utilises a unique structure that combines the benefits of low on-resistance with fast switching speed. This makes them ideal for high efficiency, low voltage, power management applications.

FEATURES

- Low on-resistance
- Fast switching speed
- Low threshold
- Low gate drive
- SOT23 package

APPLICATIONS

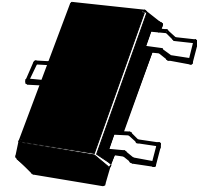
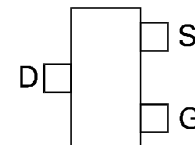
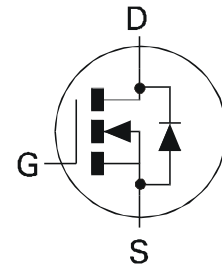
- DC - DC Converters
- Power Management Functions
- Disconnect switches
- Motor control

ORDERING INFORMATION

| DEVICE | REEL SIZE (inches) | TAPE WIDTH (mm) | QUANTITY PER REEL |
|-------------|--------------------|-----------------|-------------------|
| ZXM61N02FTA | 7 | 8mm embossed | 3000 units |
| ZXM61N02FTC | 13 | 8mm embossed | 10000 units |

DEVICE MARKING

- N02

**SOT23**

Top View

ZXM61N02F

ABSOLUTE MAXIMUM RATINGS.

| PARAMETER | SYMBOL | LIMIT | UNIT |
|---|---------------|-------------|----------------------|
| Drain-Source Voltage | V_{DSS} | 20 | V |
| Gate Source Voltage | V_{GS} | ± 12 | V |
| Continuous Drain Current ($V_{GS}=4.5V$; $T_A=25^\circ C$)(b) ($V_{GS}=4.5V$; $T_A=70^\circ C$)(b) | I_D | 1.7 1.3 | A |
| Pulsed Drain Current (c) | I_{DM} | 7.4 | A |
| Continuous Source Current (Body Diode) (b) | I_S | 0.8 | A |
| Pulsed Source Current (Body Diode) | I_{SM} | 7.4 | A |
| Power Dissipation at $T_A=25^\circ C$ (a) Linear Derating Factor | P_D | 625 5 | mW mW/ $^\circ C$ |
| Power Dissipation at $T_A=25^\circ C$ (b) Linear Derating Factor | P_D | 806 6.4 | mW mW/ $^\circ C$ |
| Operating and Storage Temperature Range | $T_j:T_{stg}$ | -55 to +150 | $^\circ C$ |

THERMAL RESISTANCE

| PARAMETER | SYMBOL | VALUE | UNIT |
|-------------------------|-----------------|-------|--------------|
| Junction to Ambient (a) | $R_{\theta JA}$ | 200 | $^\circ C/W$ |
| Junction to Ambient (b) | $R_{\theta JA}$ | 155 | $^\circ C/W$ |

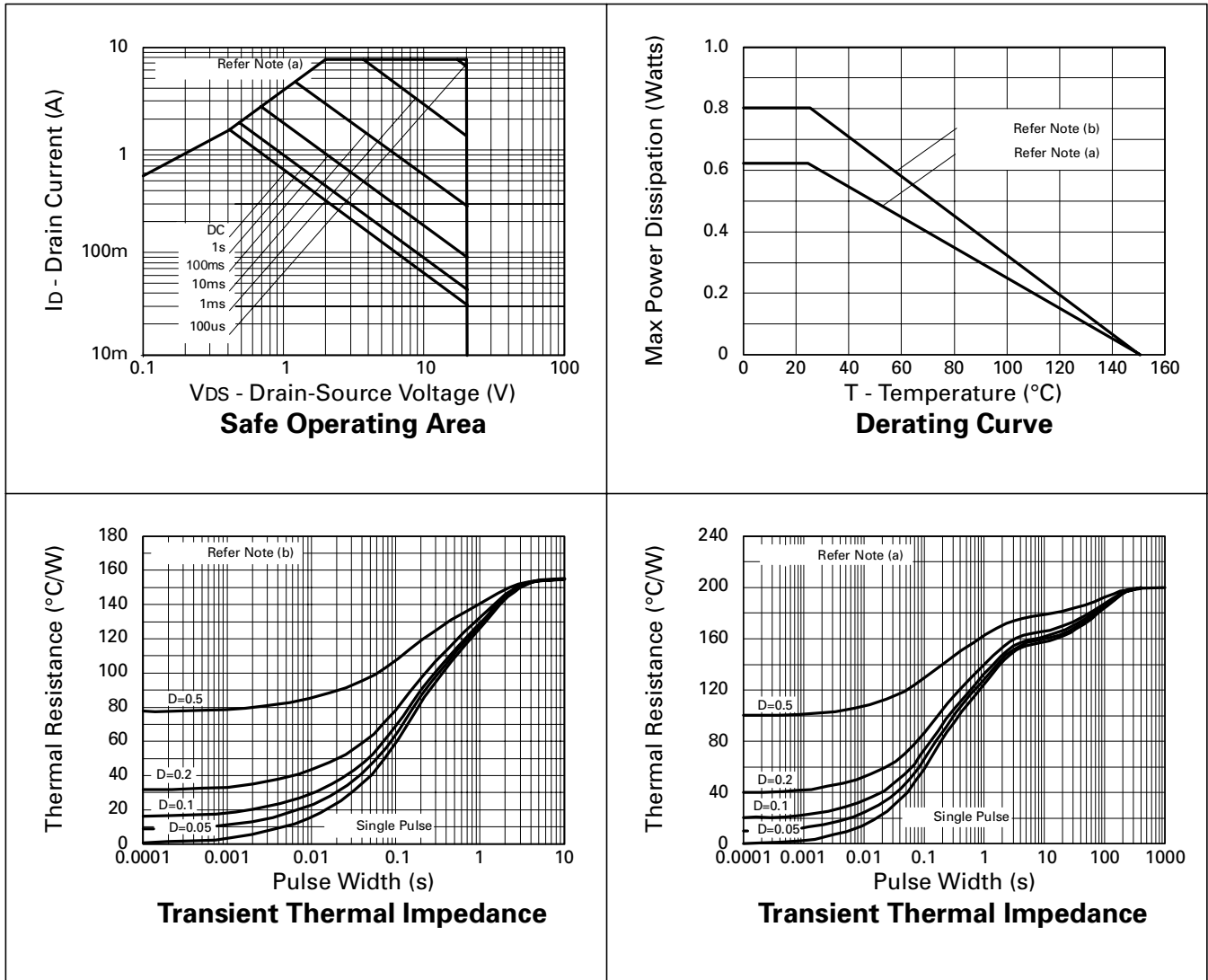
NOTES

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

(b) For a device surface mounted on FR4 PCB measured at $t \leq 5$ secs.

(c) Repetitive rating - pulse width limited by maximum junction temperature. Refer to Transient Thermal Impedance graph.

CHARACTERISTICS



ZXM61N02F

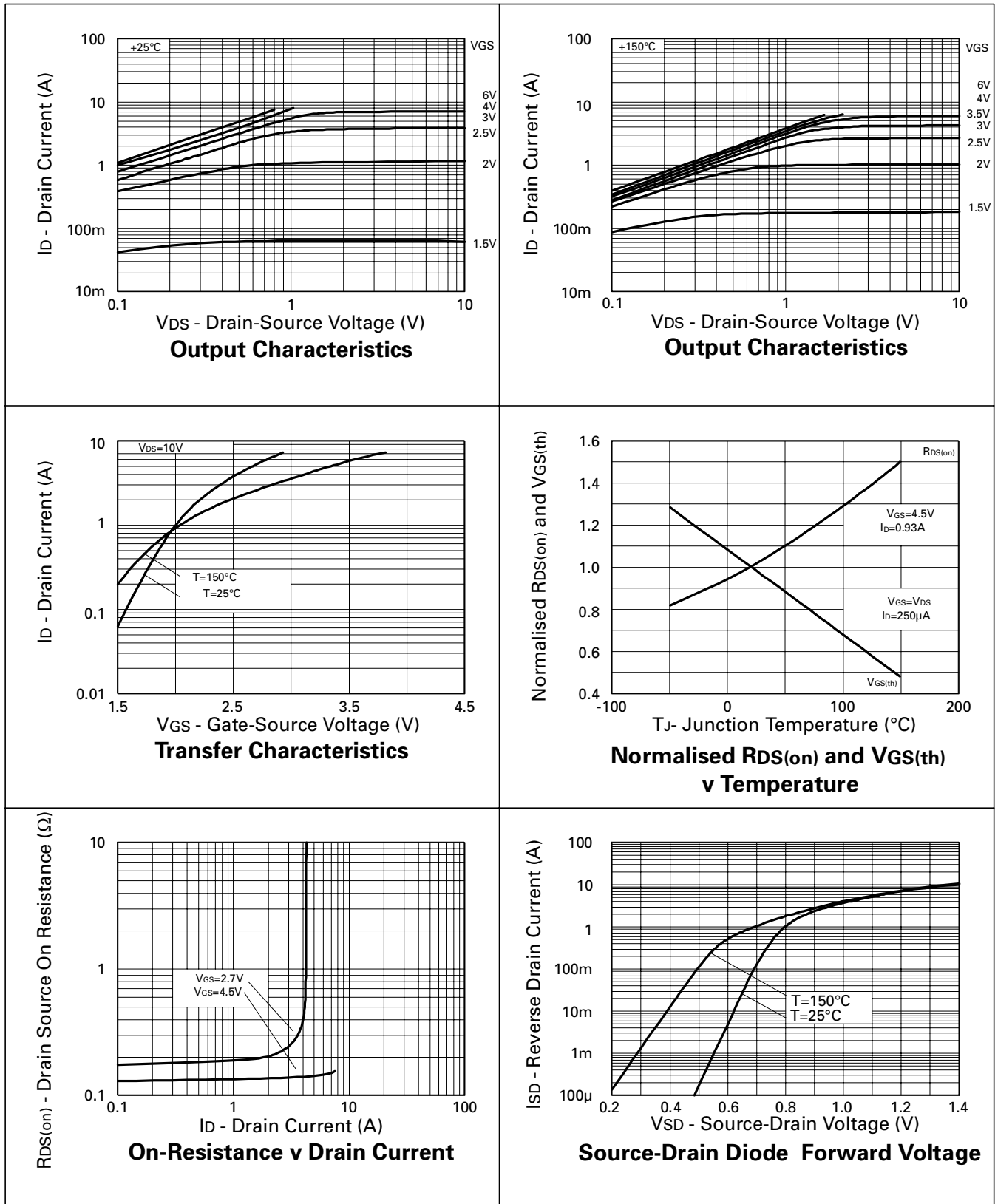
ELECTRICAL CHARACTERISTICS (at $T_A = 25^\circ\text{C}$ unless otherwise stated).

| PARAMETER | SYMBOL | MIN. | TYP.(3) | MAX. | UNIT | CONDITIONS. |
|---|---------------|------|---------|--------------|----------------------|---|
| STATIC | | | | | | |
| Drain-Source Breakdown Voltage | $V_{(BR)DSS}$ | 20 | | | V | $I_D=250\mu\text{A}, V_{GS}=0\text{V}$ |
| Zero Gate Voltage Drain Current | I_{DSS} | | | 1 | μA | $V_{DS}=20\text{V}, V_{GS}=0\text{V}$ |
| Gate-Body Leakage | I_{GSS} | | | 100 | nA | $V_{GS}=\pm 12\text{V}, V_{DS}=0\text{V}$ |
| Gate-Source Threshold Voltage | $V_{GS(th)}$ | 0.7 | | | V | $I_D=250\mu\text{A}, V_{DS}=V_{GS}$ |
| Static Drain-Source On-State Resistance (1) | $R_{DS(on)}$ | | | 0.18 0.24 | Ω Ω | $V_{GS}=4.5\text{V}, I_D=0.93\text{A}$ $V_{GS}=2.7\text{V}, I_D=0.47\text{A}$ |
| Forward Transconductance (3) | g_{fs} | 1.3 | | | S | $V_{DS}=10\text{V}, I_D=0.47\text{A}$ |
| DYNAMIC (3) | | | | | | |
| Input Capacitance | C_{iss} | | 160 | | pF | $V_{DS}=15\text{V}, V_{GS}=0\text{V},$ $f=1\text{MHz}$ |
| Output Capacitance | C_{oss} | | 50 | | pF | |
| Reverse Transfer Capacitance | C_{rss} | | 30 | | pF | |
| SWITCHING(2) (3) | | | | | | |
| Turn-On Delay Time | $t_{d(on)}$ | | 2.4 | | ns | $V_{DD}=10\text{V}, I_D=0.93\text{A}$ $R_G=6.2\Omega, R_D=11\Omega$ (refer to test circuit) |
| Rise Time | t_r | | 4.2 | | ns | |
| Turn-Off Delay Time | $t_{d(off)}$ | | 7.8 | | ns | |
| Fall Time | t_f | | 4.2 | | ns | |
| Total Gate Charge | Q_g | | | 3.4 | nC | $V_{DS}=16\text{V}, V_{GS}=4.5\text{V},$ $I_D=0.93\text{A}$ (refer to test circuit) |
| Gate-Source Charge | Q_{gs} | | | 0.41 | nC | |
| Gate-Drain Charge | Q_{gd} | | | 0.8 | nC | |
| SOURCE-DRAIN DIODE | | | | | | |
| Diode Forward Voltage (1) | V_{SD} | | | 0.95 | V | $T_J=25^\circ\text{C}, I_S=0.93\text{A},$ $V_{GS}=0\text{V}$ |
| Reverse Recovery Time (3) | t_{rr} | | 12.9 | | ns | $T_J=25^\circ\text{C}, I_F=0.93\text{A},$ $di/dt= 100\text{A}/\mu\text{s}$ |
| Reverse Recovery Charge (3) | Q_{rr} | | 5.2 | | nC | |

NOTES

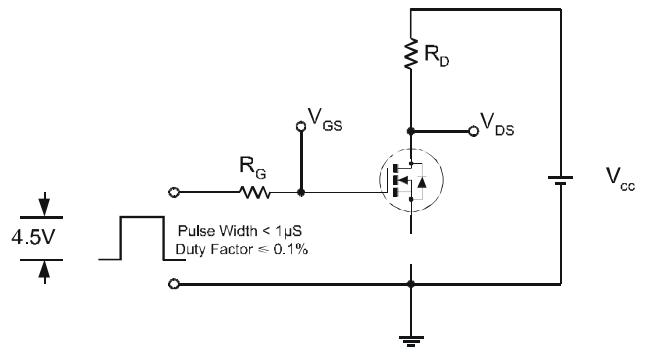
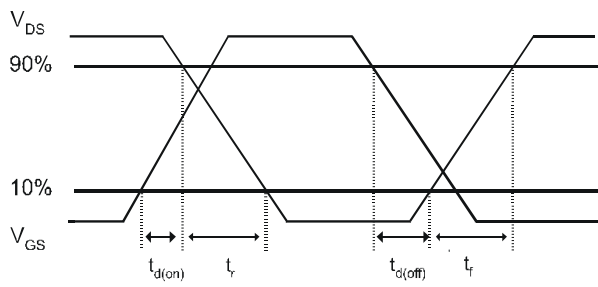
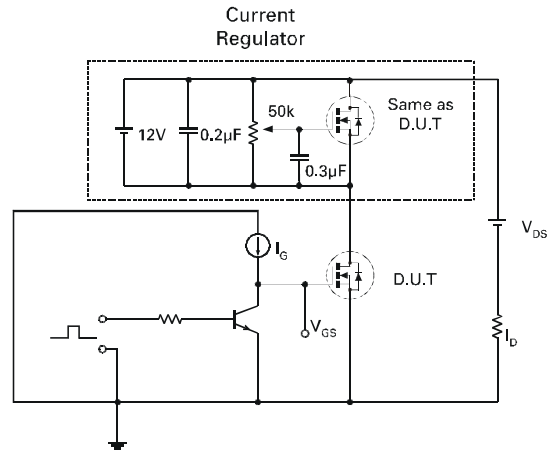
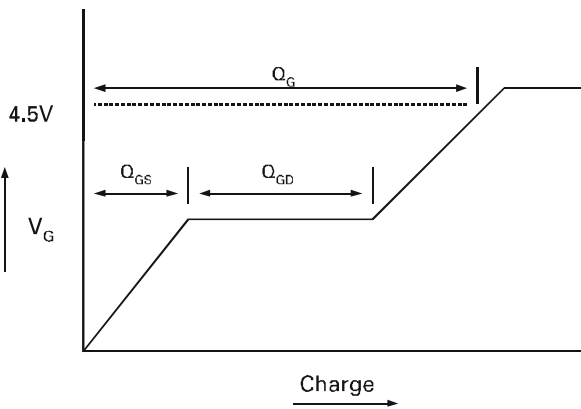
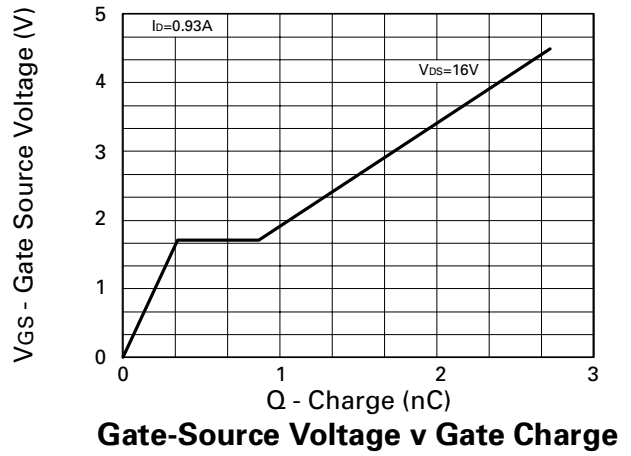
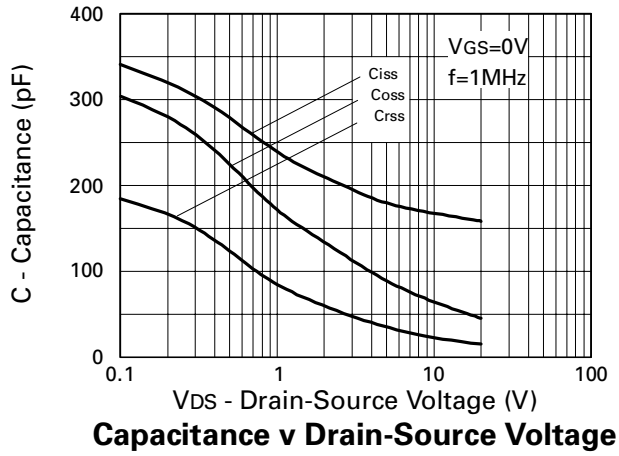
- (1) Measured under pulsed conditions. Width $\leq 300\mu\text{s}$. Duty cycle $\leq 2\%$.
 (2) Switching characteristics are independent of operating junction temperature.
 (3) For design aid only, not subject to production testing.

TYPICAL CHARACTERISTICS



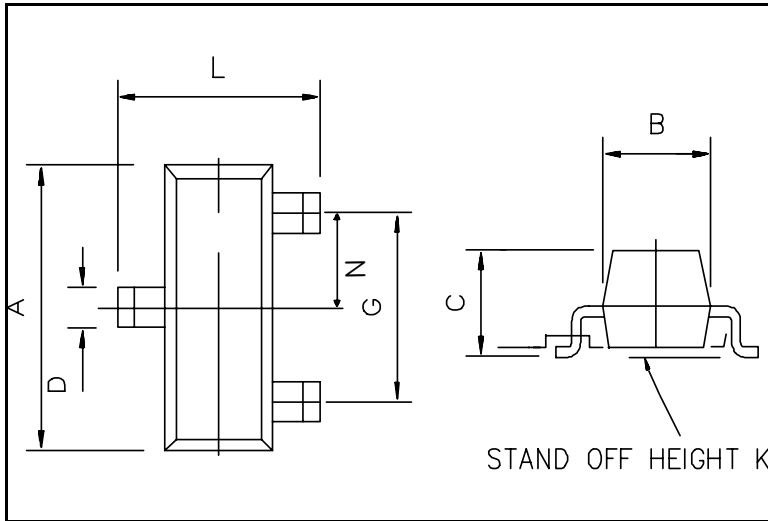
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TYPICAL CHARACTERISTICS



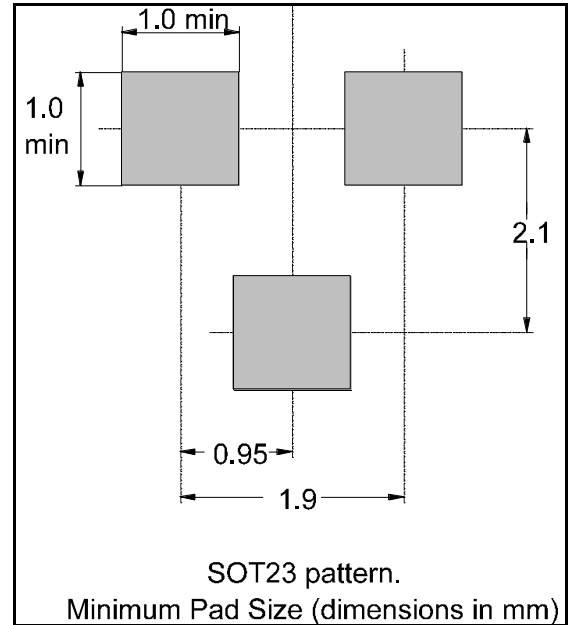
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PACKAGE DIMENSIONS



| 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 | |

PAD LAYOUT DETAILS



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