

Si5402BDC-T1-E3-VB Datasheet

N-Channel 30-V (D-S) MOSFET

PRODUCT SUMMARY

| V_{DS} (V) | $R_{DS(on)}$ (Ω) | I_D (A) |
|--------------|---------------------------|-----------|
| 30 | 0.029 at $V_{GS} = 10$ V | 6.7 |
| | 0.035 at $V_{GS} = 4.5$ V | 6.1 |

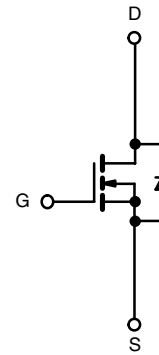
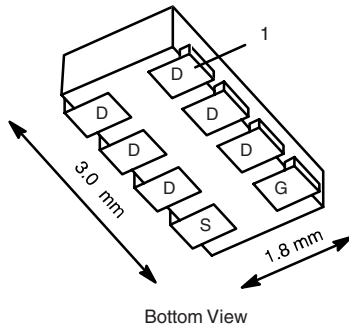
FEATURES

- Halogen-free According to IEC 61249-2-21 Available
- Trench Power MOSFET



RoHS
COMPLIANT
HALOGEN
FREE
Available

DFN 3x2



N-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS $T_A = 25^\circ\text{C}$, unless otherwise noted¹

| ABSOLUTE MAXIMUM RATINGS $T_A = 25\text{ }^{\circ}\text{C}$, unless otherwise noted' | | | | | |
|---|------------------------------------|----------------|-------------|--------------|--------------------|
| Parameter | | Symbol | 5 s | Steady State | Unit |
| Drain-Source Voltage | | V_{DS} | 30 | | V |
| Gate-Source Voltage | | V_{GS} | ± 20 | | |
| Continuous Drain Current ($T_J = 150\text{ }^{\circ}\text{C}$) ^a | $T_A = 25\text{ }^{\circ}\text{C}$ | I_D | 6.7 | 4.9 | A |
| | $T_A = 85\text{ }^{\circ}\text{C}$ | | 4.8 | 3.5 | |
| Pulsed Drain Current | | I_{DM} | 20 | | |
| Continuous Source Current (Diode Conduction) ^a | | I_S | 2.1 | 1.1 | |
| Maximum Power Dissipation ^a | $T_A = 25\text{ }^{\circ}\text{C}$ | P_D | 2.5 | 1.3 | W |
| | $T_A = 85\text{ }^{\circ}\text{C}$ | | 1.3 | 0.7 | |
| Operating Junction and Storage Temperature Range | | T_J, T_{stg} | - 55 to 150 | | $^{\circ}\text{C}$ |
| Soldering Recommendations (Peak Temperature) ^{b, c} | | | 260 | | |

THERMAL RESISTANCE RATINGS

| Parameter | Symbol | Typical | Maximum | Unit |
|--|------------|---------|---------|--------------------|
| Maximum Junction-to-Ambient ^a | R_{thJA} | 45 | 50 | $^\circ\text{C/W}$ |
| | | 80 | 95 | |
| Maximum Junction-to-Foot (Drain) | R_{thJF} | 18 | 22 | |

Notes:

a. Surface Mounted on 1" x 1" FR4 board.

b. See Reliability Manual for profile. The DFN3X2 is a leadless package. The end of the lead terminal is exposed copper (not plated) as a result of the singulation process in manufacturing. A solder fillet at the exposed copper tip cannot be guaranteed and is not required to ensure adequate bottom side solder interconnection.

c. Rework Conditions: manual soldering with a soldering iron is not recommended for leadless components.

SPECIFICATIONS

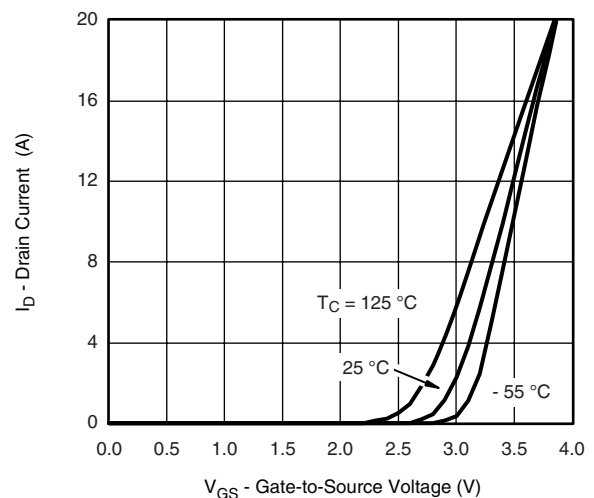
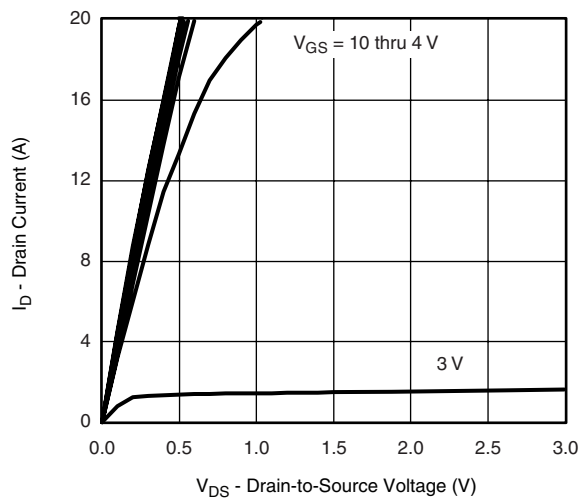
| Parameter | Symbol | Test Conditions | Min. | Typ. | Max. | Unit |
|---|--------------|---|------|-------|-----------|----------|
| Static | | | | | | |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS} = V_{GS}, I_D = 250 \mu A$ | 1.0 | | 3.0 | V |
| Gate-Body Leakage | I_{GSS} | $V_{DS} = 0 V, V_{GS} = \pm 20 V$ | | | ± 100 | nA |
| Zero Gate Voltage Drain Current | I_{DSS} | $V_{DS} = 30 V, V_{GS} = 0 V$ | | | 1 | μA |
| | | $V_{DS} = 30 V, V_{GS} = 0 V, T_J = 85^\circ C$ | | | 5 | |
| On-State Drain Current ^a | $I_{D(on)}$ | $V_{DS} \geq 5 V, V_{GS} = 10 V$ | 20 | | | A |
| Drain-Source On-State Resistance ^a | $R_{DS(on)}$ | $V_{GS} = 10 V, I_D = 4.9 A$ | | 0.029 | | Ω |
| | | $V_{GS} = 4.5 V, I_D = 4.4 A$ | | 0.035 | | |
| Forward Transconductance ^a | g_{fs} | $V_{DS} = 10 V, I_D = 4.9 A$ | | 19 | | S |
| Diode Forward Voltage ^a | V_{SD} | $I_S = 1.1 A, V_{GS} = 0 V$ | | 0.8 | 1.2 | V |
| Dynamic^b | | | | | | |
| Total Gate Charge | Q_g | $V_{DS} = 15 V, V_{GS} = 10 V, I_D = 4.9 A$ | | 10 | 20 | nC |
| Gate-Source Charge | Q_{gs} | | | 1.9 | | |
| Gate-Drain Charge | Q_{gd} | | | 1.6 | | |
| Gate Resistance | R_g | $f = 1 MHz$ | | 14 | | Ω |
| Turn-On Delay Time | $t_{d(on)}$ | $V_{DD} = 15 V, R_L = 15 \Omega$ $I_D \cong 1 A, V_{GEN} = 10 V, R_g = 6 \Omega$ | | 10 | 15 | ns |
| Rise Time | t_r | | | 10 | 15 | |
| Turn-Off Delay Time | $t_{d(off)}$ | | | 27 | 40 | |
| Fall Time | t_f | | | 10 | 15 | |
| Source-Drain Reverse Recovery Time | t_{rr} | $I_F = 1.1 A, dI/dt = 100 A/\mu s$ | | 20 | 60 | |

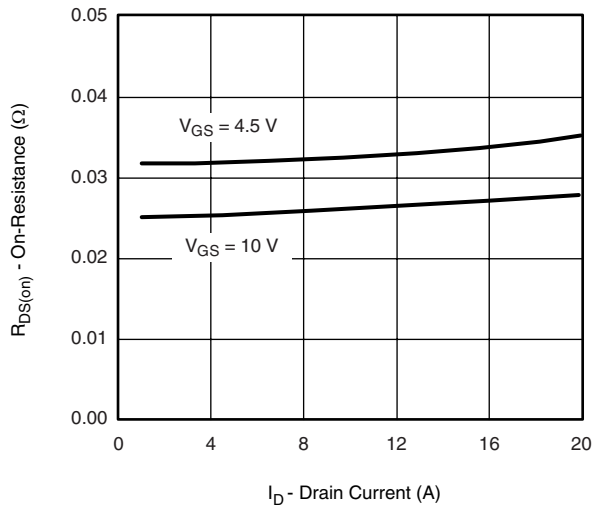
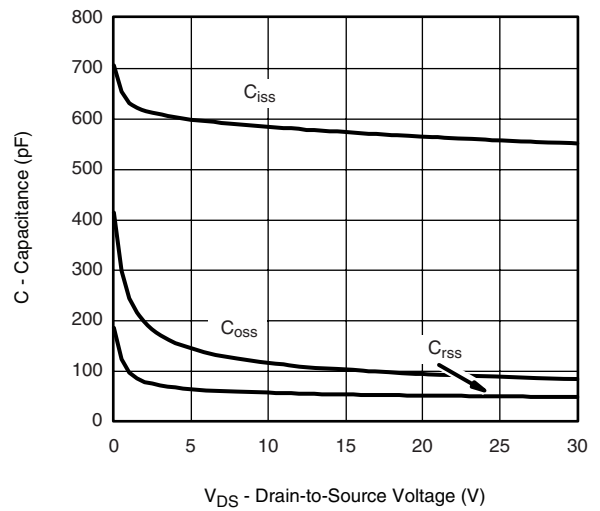
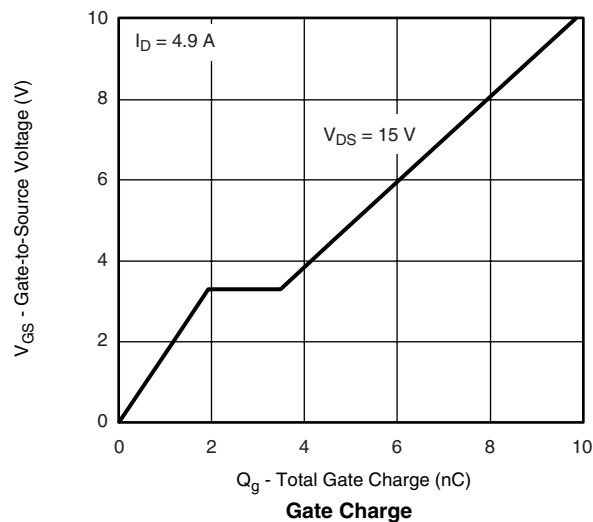
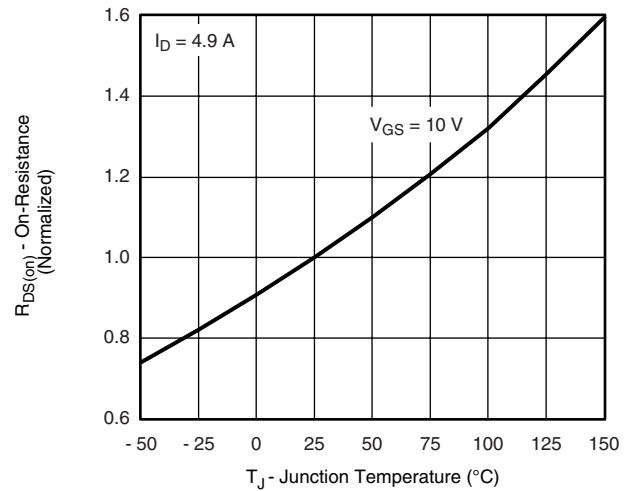
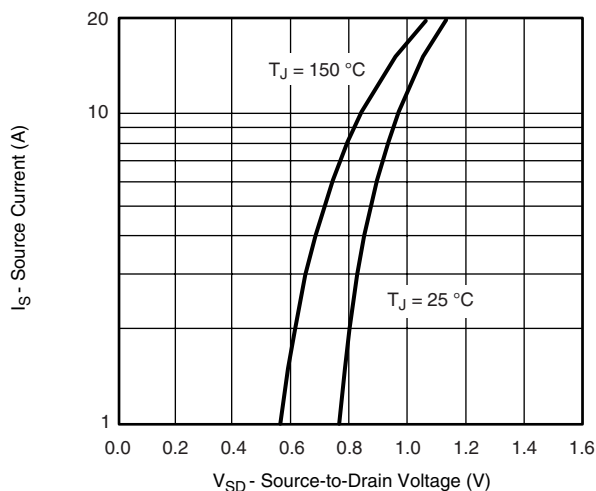
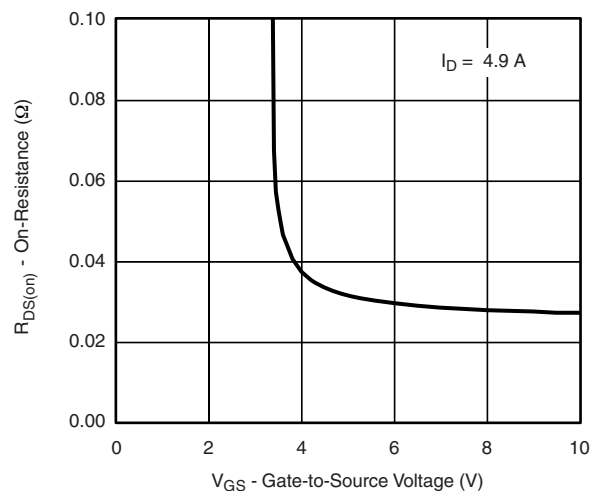
Notes:

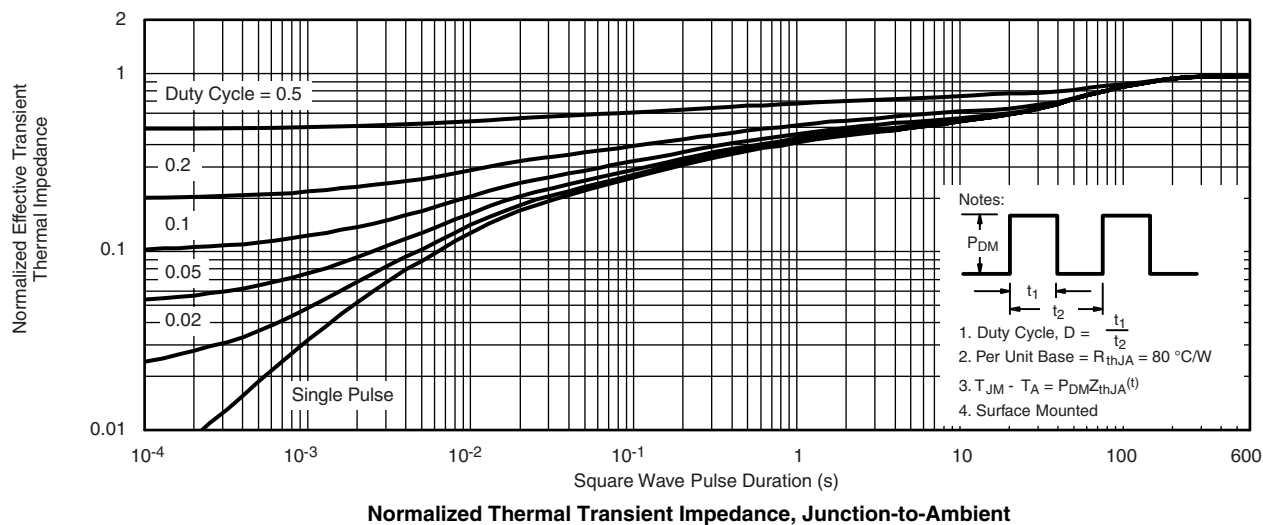
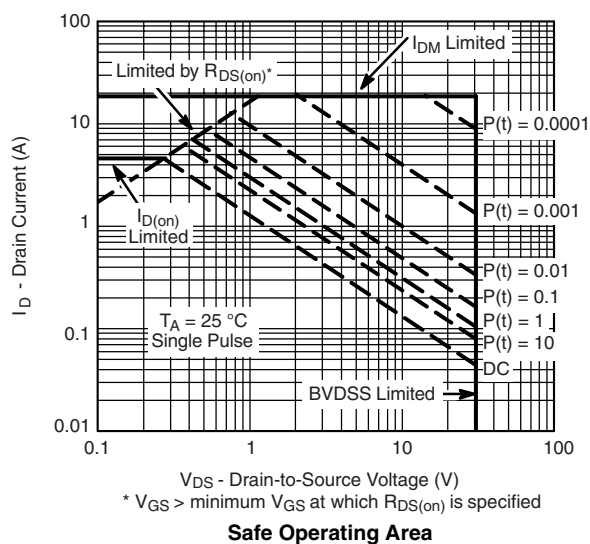
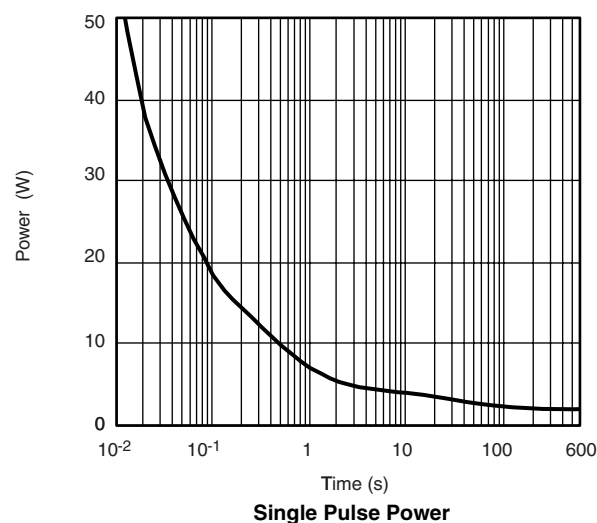
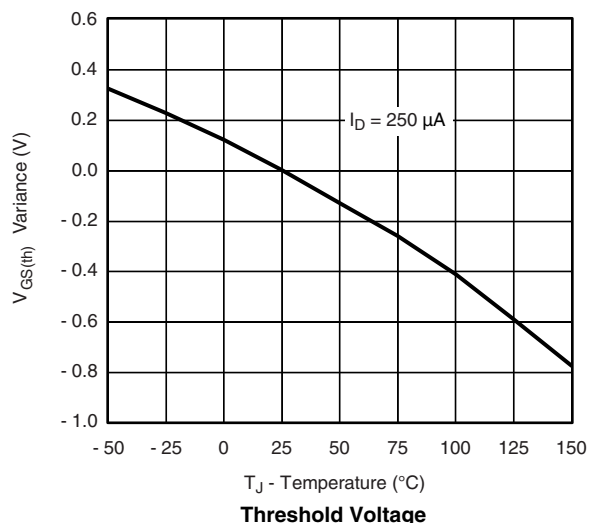
a. Pulse test; pulse width $\leq 300 \mu s$, duty cycle $\leq 2\%$.

b. Guaranteed by design, not subject to production testing.

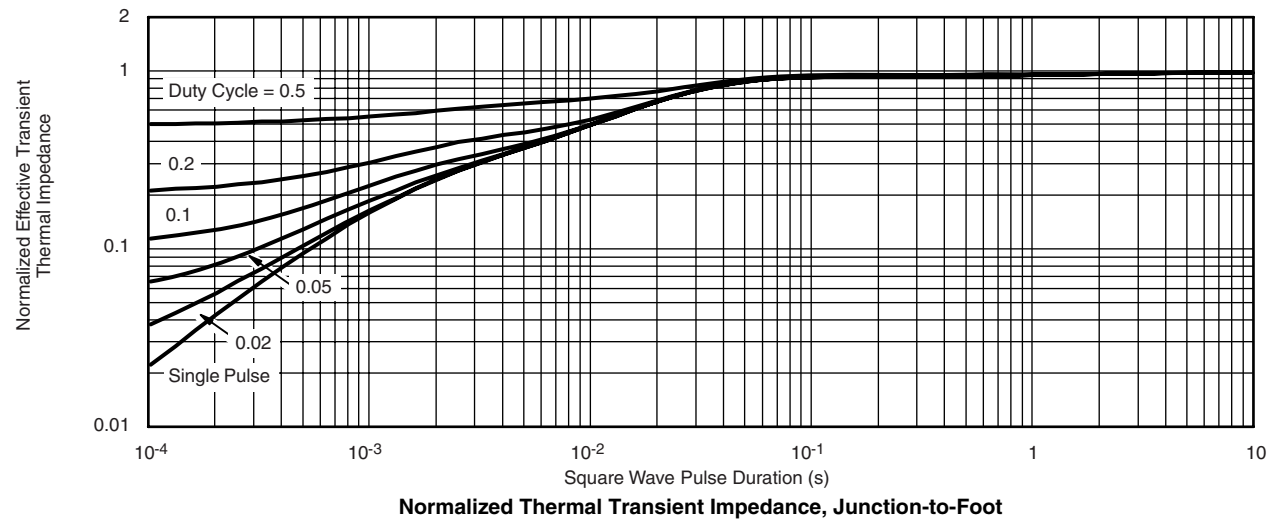
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

TYPICAL CHARACTERISTICS $T_J = 25^\circ C$, unless otherwise noted

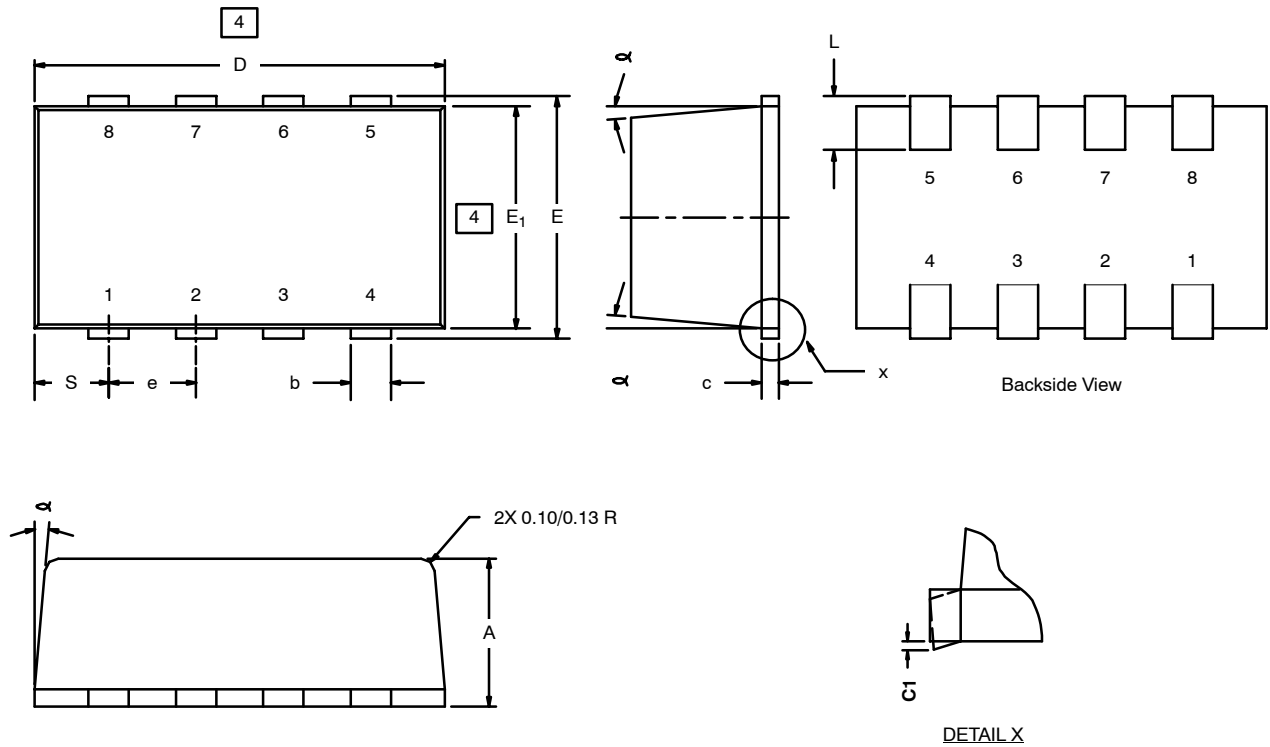
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted**On-Resistance vs. Drain Current****Capacitance****Gate Charge****On-Resistance vs. Junction Temperature****Source-Drain Diode Forward Voltage****On-Resistance vs. Gate-to-Source Voltage**

TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted


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DFN 3x2

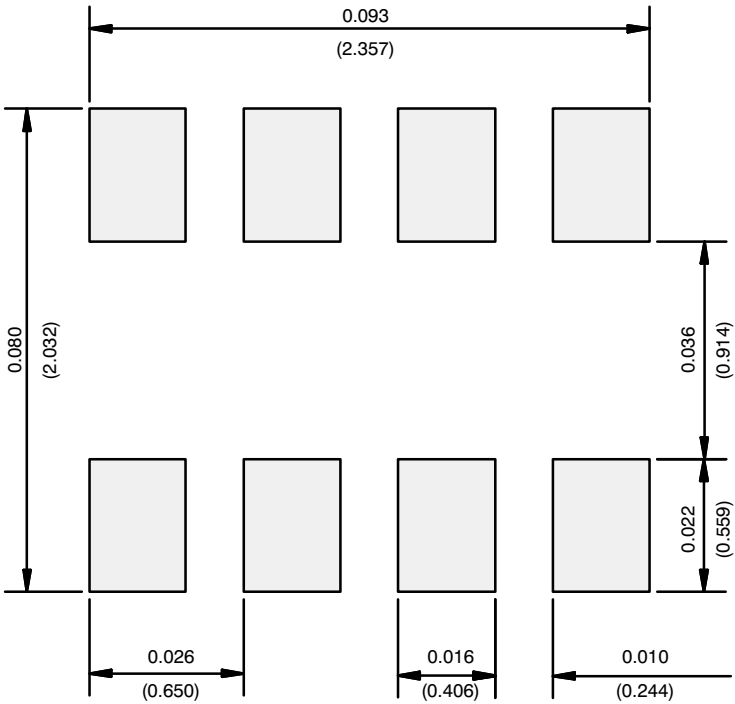


NOTES:

1. All dimensions are in millimeters.
2. Mold gate burrs shall not exceed 0.13 mm per side.
3. Leadframe to molded body offset is horizontal and vertical shall not exceed 0.08 mm.
4. Dimensions exclusive of mold gate burrs.
5. No mold flash allowed on the top and bottom lead surface.

| Dim | MILLIMETERS | | | INCHES | | |
|---|-------------|------|-------|------------|-------|--------|
| | Min | Nom | Max | Min | Nom | Max |
| A | 1.00 | – | 1.10 | 0.039 | – | 0.043 |
| b | 0.25 | 0.30 | 0.35 | 0.010 | 0.012 | 0.014 |
| c | 0.1 | 0.15 | 0.20 | 0.004 | 0.006 | 0.008 |
| c1 | 0 | – | 0.038 | 0 | – | 0.0015 |
| D | 2.95 | 3.05 | 3.10 | 0.116 | 0.120 | 0.122 |
| E | 1.825 | 1.90 | 1.975 | 0.072 | 0.075 | 0.078 |
| E ₁ | 1.55 | 1.65 | 1.70 | 0.061 | 0.065 | 0.067 |
| e | 0.65 BSC | | | 0.0256 BSC | | |
| L | 0.28 | – | 0.42 | 0.011 | – | 0.017 |
| S | 0.55 BSC | | | 0.022 BSC | | |
| α | 5°Nom | | | 5°Nom | | |
| ECN: C-03528—Rev. F, 19-Jan-04 DWG: 5547 | | | | | | |

RECOMMENDED MINIMUM PADS FOR DFN3x2



Recommended Minimum Pads
Dimensions in Inches/(mm)

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