

NSR05T404MX

Product Preview

500 mA, 40 V Schottky Barrier Diode

These Schottky barrier diodes are optimized for low forward voltage drop and low leakage current that offers the most optimal power dissipation in applications. They are housed in spacing saving micro-packaging ideal for space constraint applications.

Features

- Low Forward Voltage Drop – 560 mV (Typ.) @ $I_F = 500$ mA
- Low Reverse Current – 3.0 μ A (Typ.) @ $V_R = 40$ V
- 500 mA of Continuous Forward Current
- High Switching Speed
- These Devices are Pb-Free, Halogen Free/BFR Free and are RoHS Compliant

Typical Applications

- LCD and Keypad Backlighting
- Camera Photo Flash
- Buck and Boost dc-dc Converters
- Reverse Voltage and Current Protection
- Clamping & Protection

MAXIMUM RATINGS

| Rating | Symbol | Value | Unit |
|---------------------------------------------------------------------------|-----------|------------|------|
| Reverse Voltage | V_R | 40 | V |
| Forward Current (DC) | I_F | 500 | mA |
| Forward Surge Current (60 Hz @ 1 cycle) | I_{FSM} | 2.5 | A |
| Repetitive Peak Forward Current (Pulse Wave = 1 sec, Duty Cycle = 66%) | I_{FRM} | 0.6 | A |
| ESD Rating: Human Body Model Charged Device Model | ESD | > 8 > 1 | kV |

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.



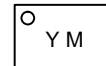
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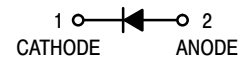


X2DFN2
CASE 714AB

MARKING DIAGRAM



Y = Specific Device Code
M = Date Code



ORDERING INFORMATION

| Device | Package | Shipping† |
|----------------|---------------------|-----------------------------------|
| NSR05T404MXT5G | X2DFN2 (Pb-Free) | 2 mm Pitch 8000/Tape & Reel |

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

This document contains information on a product under development. ON Semiconductor reserves the right to change or discontinue this product without notice.

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THERMAL CHARACTERISTICS

| Characteristic | Symbol | Min | Typ | Max | Unit |
|----------------------------------------------------------------------------------------------------------|--------------------------|-------------|-----|-------------|--------------------------|
| Thermal Resistance Junction-to-Ambient (Note 1) Total Power Dissipation @ $T_A = 25^\circ\text{C}$ | $R_{\theta JA}$ P_D | | | 310 480 | $^\circ\text{C/W}$ mW |
| Thermal Resistance Junction-to-Ambient (Note 2) Total Power Dissipation @ $T_A = 25^\circ\text{C}$ | $R_{\theta JA}$ P_D | | | 150 1000 | $^\circ\text{C/W}$ mW |
| Junction and Storage Temperature Range | T_J, T_{stg} | -55 to +150 | | | $^\circ\text{C}$ |

- Mounted onto a 4 in square FR-4 board 50 mm sq. 1 oz. Cu 0.06" thick single sided. Operating to steady state.
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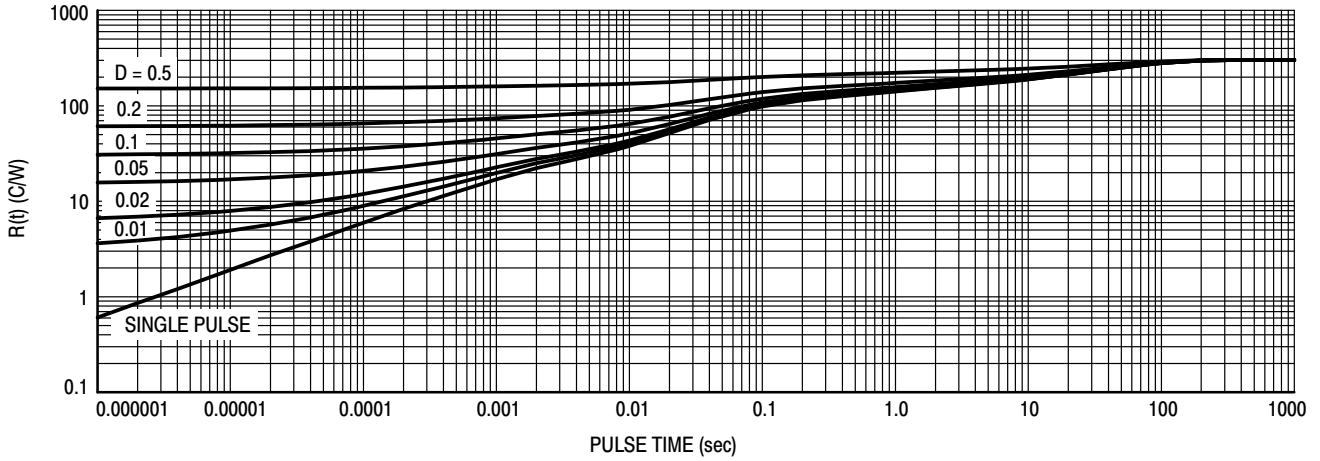


Figure 1. Thermal Response (Note 1)

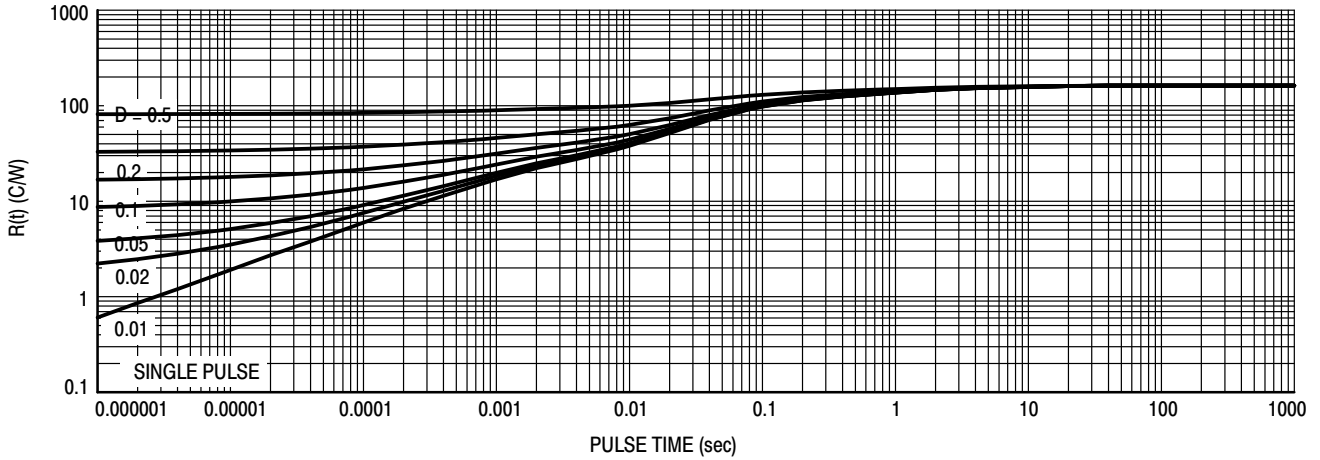


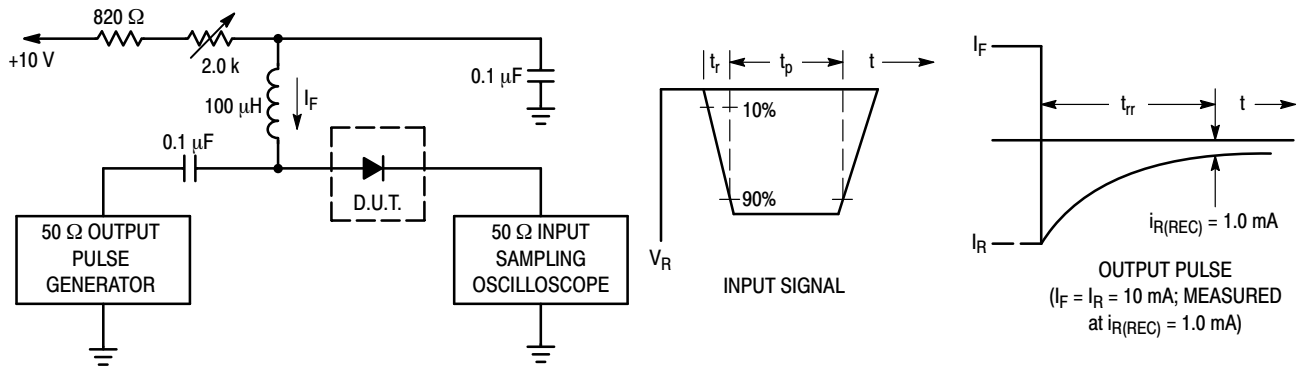
Figure 2. Thermal Response (Note 2)

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

| Characteristic | Symbol | Min | Typ | Max | Unit |
|------------------------------------------------------------------------------------------------------------------------------------|-----------|-----|--------------------------|--------------------------|---------------|
| Reverse Leakage ($V_R = 10\text{ V}$) ($V_R = 40\text{ V}$) | I_R | | 0.2 3.0 | 3.1 85 | μA |
| Forward Voltage ($I_F = 10\text{ mA}$) ($I_F = 100\text{ mA}$) ($I_F = 200\text{ mA}$) ($I_F = 500\text{ mA}$) | V_F | | 370 450 490 560 | 400 480 530 630 | mV |
| Total Capacitance ($V_R = 1.0\text{ V}$, $f = 1.0\text{ MHz}$) | C_T | | 50 | | pF |
| Reverse Recovery Time ($I_F = I_R = 10\text{ mA}$, $I_{R(\text{REC})} = 1.0\text{ mA}$, Figure 3) | t_{rr} | | 13 | | ns |
| Peak Forward Recovery Voltage ($I_F = 100\text{ mA}$, $t_r = 20\text{ ns}$, Figure 4) | V_{FRM} | | 600 | | mV |

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.



- Notes: 1. A 2.0 k Ω variable resistor adjusted for a Forward Current (I_F) of 10 mA.
2. Input pulse is adjusted so $I_{R(\text{peak})}$ is equal to 10 mA.
3. $t_p \gg t_{rr}$

Figure 3. Recovery Time Equivalent Test Circuit

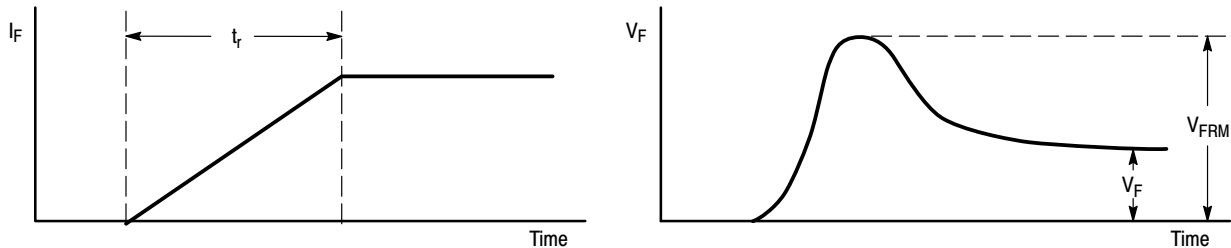


Figure 4. Peak Forward Recovery Voltage Definition

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TYPICAL CHARACTERISTICS

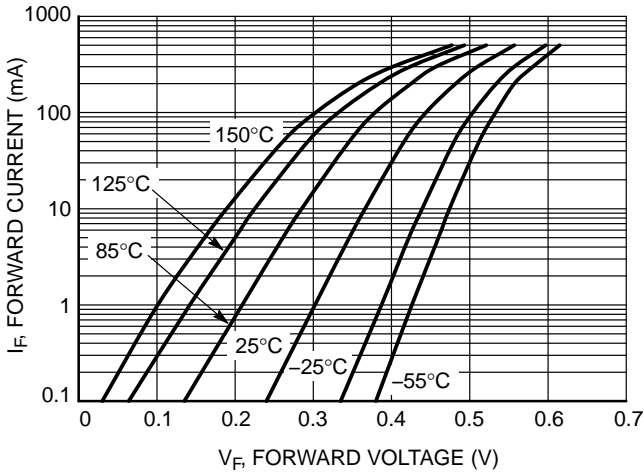


Figure 5. Forward Voltage

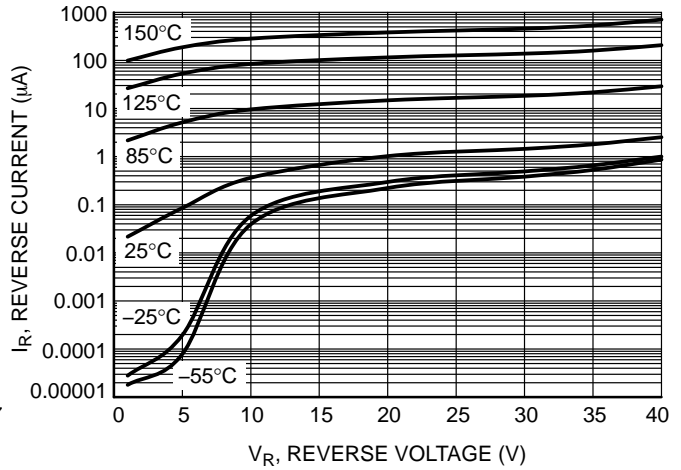


Figure 6. Reverse Voltage

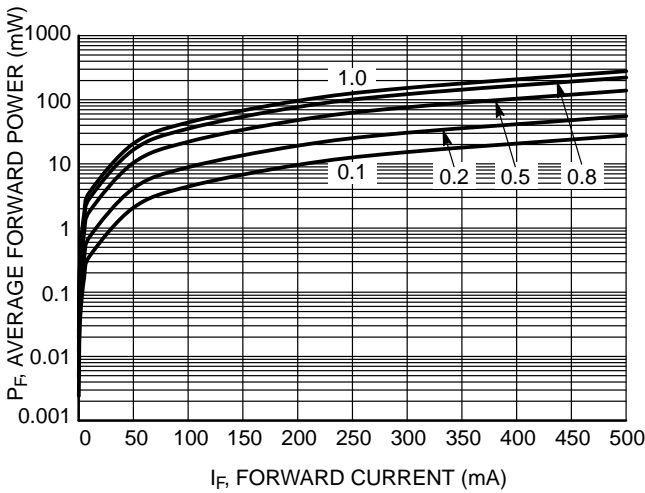


Figure 7. Average Forward Power Dissipation

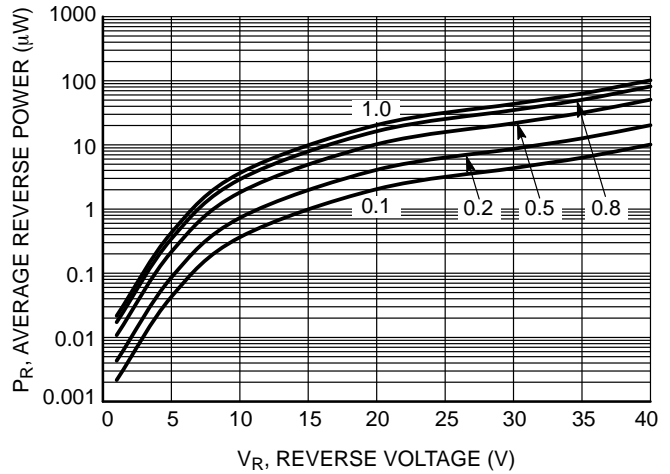


Figure 8. Average Reverse Power Dissipation

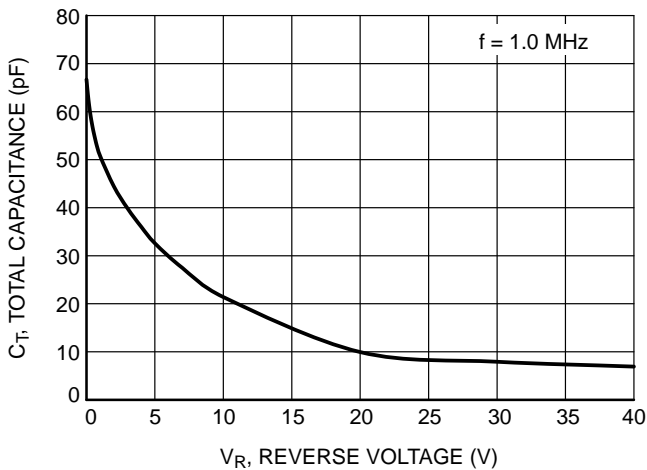


Figure 9. Total Capacitance

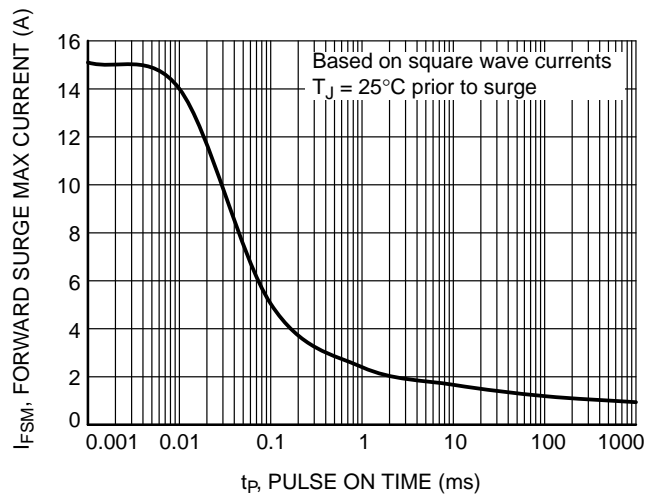
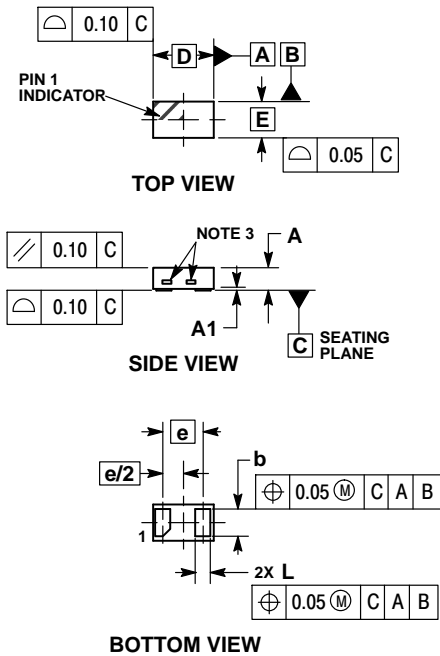


Figure 10. Forward Surge Current

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PACKAGE DIMENSIONS

X2DFN2 1.0x0.6, 0.65P
CASE 714AB
ISSUE A

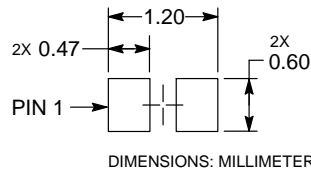


NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. EXPOSED COPPER ALLOWED AS SHOWN.

| MILLIMETERS | | |
|-------------|------|------|
| DIM | MIN | MAX |
| A | 0.34 | 0.40 |
| A1 | --- | 0.05 |
| b | 0.45 | 0.55 |
| D | 1.00 | BSC |
| E | 0.60 | BSC |
| e | 0.65 | BSC |
| L | 0.20 | 0.30 |

RECOMMENDED SOLDER FOOTPRINT*



*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

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