

MOSFET - Power, N-Channel, SOT-223

3.0 A, 60 V NTF3055-100, NVF3055-100

Designed for low voltage, high speed switching applications in power supplies, converters and power motor controls and bridge circuits.

Features

- NVF Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q101 Qualified and PPAP Capable
- These Devices are Pb-Free and are RoHS Compliant

Applications

- Power Supplies
- Converters
- Power Motor Controls
- Bridge Circuits

MAXIMUM RATINGS (T_C = 25°C unless otherwise noted)

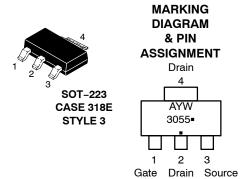
| Rating | Symbol | Value | Unit |
|---|--|---------------------|----------------|
| Drain-to-Source Voltage | V_{DSS} | 60 | Vdc |
| Drain-to-Gate Voltage (R _{GS} = 10 MΩ) | V_{DGR} | 60 | Vdc |
| Gate-to-Source Voltage - Continuous - Non-repetitive (t _p ≤ 10 ms) | V _{GS} | ± 20 ± 30 | Vdc Vpk |
| | I _D I _D I _{DM} | 3.0 1.4 9.0 | Adc Apk |
| Total Power Dissipation @ T _A = 25°C (Note 1) Total Power Dissipation @ T _A = 25°C (Note 2) Derate above 25°C | P _D | 2.1 1.3 0.014 | W W W/°C |
| Operating and Storage Temperature Range | T _J , T _{stg} | -55 to 175 | °C |
| $\label{eq:single-pulse-prain-to-Source Avalanche} Single Pulse Drain-to-Source Avalanche $ | E _{AS} | 74 | mJ |
| Thermal Resistance - Junction-to-Ambient (Note 1) - Junction-to-Ambient (Note 2) | $egin{array}{c} R_{	hetaJA} \ R_{	hetaJA} \end{array}$ | 72.3 114 | °C/W |
| Maximum Lead Temperature for Soldering Purposes, 1/8" from case for 10 seconds | TL | 260 | °C |

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.

- 1. When surface mounted to an FR4 board using 1" pad size, 1 oz. (Cu. Area 1.127 sq in).
- When surface mounted to an FR4 board using minimum recommended pad size, 2-2.4 oz. (Cu. Area 0.272 sq in).

3.0 A, 60 V $R_{DS(on)} = 110 \text{ m}\Omega$

N-Channel



A = Assembly Location

Y = Year

W = Work Week

3055 = Specific Device Code ■ Pb-Free Package

(Note: Microdot may be in either location)

ORDERING INFORMATION

| Device | Package | Shipping [†] |
|----------------|----------------------|-----------------------|
| NTF3055-100T1G | SOT-223 (Pb-Free) | 1000 / Tape & Reel |
| NTF3055-100T3G | SOT-223 (Pb-Free) | 4000 / Tape & Reel |
| NVF3055-100T1G | SOT-223 (Pb-Free) | 1000 / 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.

ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted)

| Charac | cteristic | Symbol | Min | Тур | Max | Unit |
|--|---|----------------------|---------|--------------|-----------|--------------|
| OFF CHARACTERISTICS | | | • | • | • | • |
| $\begin{array}{l} \text{Drain-to-Source Breakdown Voltage} \\ \text{(V}_{GS} = 0 \text{ Vdc, I}_D = 250 \ \mu\text{Adc)} \\ \text{Temperature Coefficient (Positive)} \end{array}$ | (Note 3) | V _{(BR)DSS} | 60 - | 68 66 | - - | Vdc mV/°C |
| Zero Gate Voltage Drain Current $(V_{DS} = 60 \text{ Vdc}, V_{GS} = 0 \text{ Vdc})$ $(V_{DS} = 60 \text{ Vdc}, V_{GS} = 0 \text{ Vdc}, T_J = 150^{\circ}\text{C})$ | | I _{DSS} | _ _ | - - | 1.0 10 | μAdc |
| Gate-Body Leakage Current (V _{GS} = ± 20 Vdc, V _{DS} = 0 Vdc) | | I _{GSS} | - | _ | ± 100 | nAdc |
| ON CHARACTERISTICS (Note 3) | | | | | | |
| Gate Threshold Voltage (Note 3) $(V_{DS} = V_{GS}, I_D = 250 \mu Adc)$ Threshold Temperature Coefficient (N | legative) | V _{GS(th)} | 2.0 | 3.0 6.6 | 4.0 - | Vdc mV/°C |
| Static Drain-to-Source On-Resistance (Note 3) (V _{GS} = 10 Vdc, I _D = 1.5 Adc) | | R _{DS(on)} | - | 88 | 110 | mΩ |
| Static Drain-to-Source On-Resistance (Note 3) (V_{GS} = 10 Vdc, I_D = 3.0 Adc) (V_{GS} = 10 Vdc, I_D = 1.5 Adc, T_J = 150°C) | | V _{DS(on)} | - | 0.27 0.24 | 0.40 - | Vdc |
| Forward Transconductance (Note 3) (V _{DS} = 8.0 Vdc, I _D = 1.7 Adc) | | 9 _{fs} | - | 3.2 | - | Mhos |
| DYNAMIC CHARACTERISTICS | | • | | • | • | • |
| Input Capacitance | | C _{iss} | - | 324 | 455 | pF |
| Output Capacitance | (V _{DS} = 25 Vdc, V _{GS} = 0 V, f = 1.0 MHz) | C _{oss} | - | 35 | 50 | |
| Transfer Capacitance | 1 | C _{rss} | - | 110 | 155 | |
| SWITCHING CHARACTERISTIC | S (Note 4) | | | | | |
| Turn-On Delay Time | | t _{d(on)} | - | 9.4 | 20 | ns |
| Rise Time | $(V_{DD} = 30 \text{ Vdc}, I_D = 3.0 \text{ Adc},$ | t _r | - | 14 | 30 | |
| Turn-Off Delay Time | V_{GS} = 10 Vdc, R_G = 9.1 Ω) (Note 3) | t _{d(off)} | - | 21 | 45 | |
| Fall Time | | t _f | - | 13 | 30 | |
| Gate Charge | (V _{DS} = 48 Vdc, I _D = 3.0 Adc, V _{GS} = 10 Vdc) (Note 3) | Q _T | - | 10.6 | 22 | nC |
| | | Q ₁ | - | 1.9 | - | |
| | | Q_2 | - | 4.2 | _ | |
| SOURCE-DRAIN DIODE CHARA | ACTERISTICS | | | | | |
| Forward On-Voltage | $(I_S = 3.0 \text{ Adc}, V_{GS} = 0 \text{ Vdc})$ $(I_S = 3.0 \text{ Adc}, V_{GS} = 0 \text{ Vdc},$ $T_J = 150^{\circ}\text{C}) \text{ (Note 3)}$ | V _{SD} | - | 0.89 0.74 | 1.0 | Vdc |
| Reverse Recovery Time | (I _S = 3.0 Adc, V _{GS} = 0 Vdc, dI _S /dt = 100 A/μs) (Note 3) | t _{rr} | - | 30 | _ | ns |
| | | t _a | - | 22 | - | |
| | | t _b | - | 8.6 | _ | |
| Reverse Recovery Stored Charge | 1 | Q _{RR} | i e | 0.04 | 1 | μC |

Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2.0%.
 Switching characteristics are independent of operating junction temperatures.

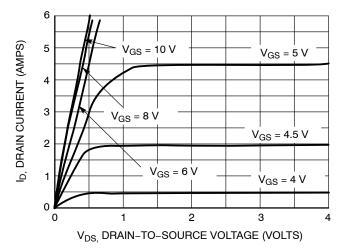


Figure 1. On-Region Characteristics

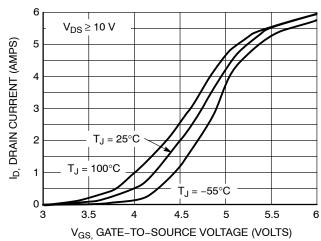


Figure 2. Transfer Characteristics

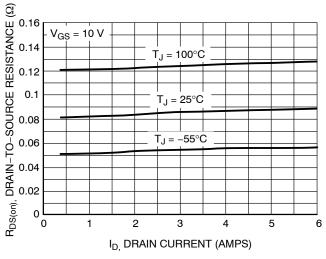


Figure 3. On-Resistance versus Gate-to-Source Voltage

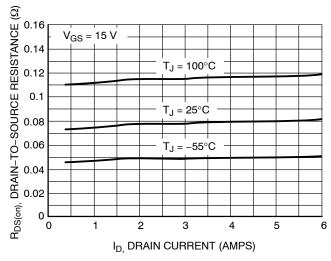
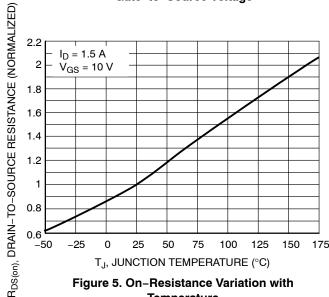


Figure 4. On-Resistance versus Drain Current and Gate Voltage



Temperature

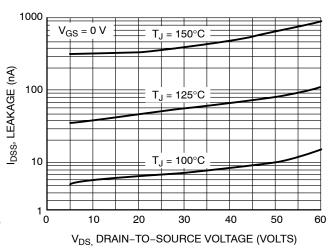


Figure 6. Drain-to-Source Leakage Current versus Voltage

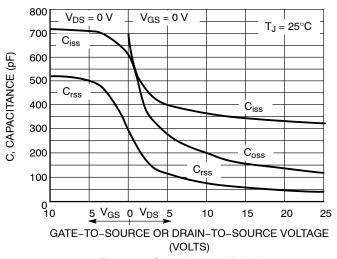


Figure 7. Capacitance Variation

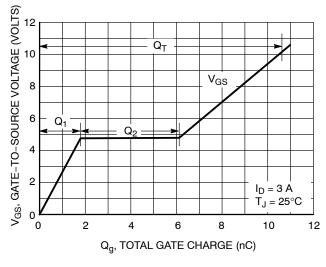


Figure 8. Gate-to-Source and Drain-to-Source Voltage versus Total Charge

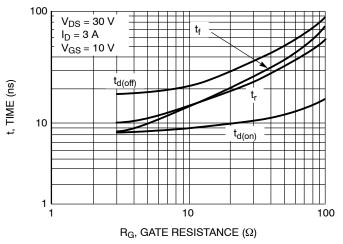


Figure 9. Resistive Switching Time Variation versus Gate Resistance

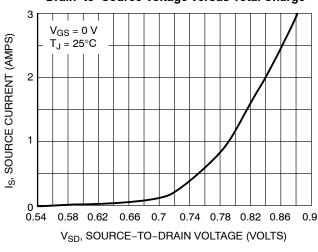


Figure 10. Diode Forward Voltage versus Current

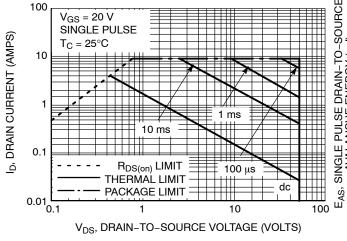


Figure 11. Maximum Rated Forward Biased Safe Operating Area

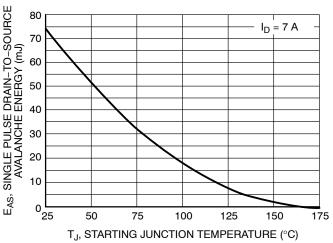


Figure 12. Maximum Avalanche Energy versus Starting Junction Temperature

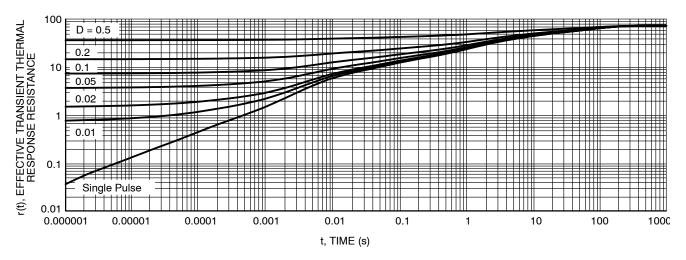


Figure 13. Thermal Response

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