

MOSFET – Dual, N-Channel, Small Signal

20 V, 540 mA

NTZD3154N

Features

- Low $R_{DS(on)}$ Improving System Efficiency
- Low Threshold Voltage
- Small Footprint 1.6 x 1.6 mm
- ESD Protected Gate
- These Devices are Pb-Free, Halogen Free/BFR Free and are RoHS Compliant

Applications

- Load/Power Switches
- Power Supply Converter Circuits
- Battery Management
- Cell Phones, Digital Cameras, PDAs, Pagers, etc.

MAXIMUM RATINGS ($T_J = 25^\circ\text{C}$ unless otherwise noted.)

| Parameter | | | Symbol | Value | Unit |
|--|------------------------|----------------------------|----------------|------------|--------------------|
| Drain-to-Source Voltage | | | V_{DSS} | 20 | V |
| Gate-to-Source Voltage | | | V_{GS} | ± 7.0 | V |
| Continuous Drain Current (Note 1) | Steady State | $T_A = 25^{\circ}\text{C}$ | I_D | 540 | mA |
| | | $T_A = 85^{\circ}\text{C}$ | | 390 | |
| Power Dissipation (Note 1) | Steady State | | P_D | 250 | mW |
| Continuous Drain Current (Note 1) | $t \leq 5 \text{ s}$ | $T_A = 25^{\circ}\text{C}$ | I_D | 570 | mA |
| | | $T_A = 85^{\circ}\text{C}$ | | 410 | |
| Power Dissipation (Note 1) | $t \leq 5 \text{ s}$ | | P_D | 280 | mW |
| Pulsed Drain Current | $t_p = 10 \mu\text{s}$ | | I_{DM} | 1.5 | A |
| Operating Junction and Storage Temperature | | | T_J, T_{STG} | -55 to 150 | $^{\circ}\text{C}$ |
| Source Current (Body Diode) | | | I_S | 350 | mA |
| Lead Temperature for Soldering Purposes (1/8" from case for 10 s) | | | T_L | 260 | $^{\circ}\text{C}$ |

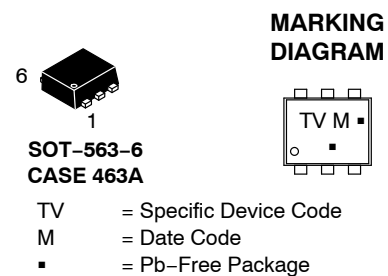
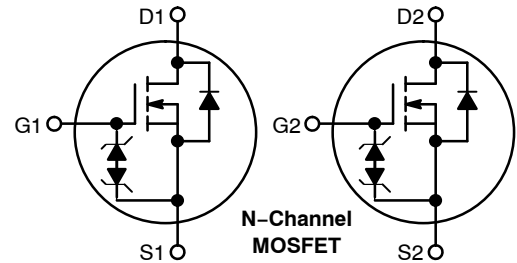
THERMAL RESISTANCE RATINGS

| Parameter | Symbol | Max | Unit |
|---|-----------------|-----|--------------------|
| Junction-to-Ambient – Steady State (Note 1) | $R_{\theta JA}$ | 500 | $^\circ\text{C/W}$ |
| Junction-to-Ambient – $t \leq 5 \text{ s}$ (Note 1) | | 447 | |

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.

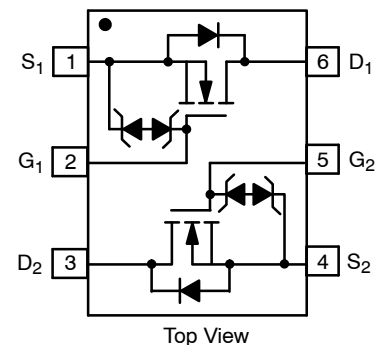
1. Surface mounted on FR4 board using 1 in sq pad size (Cu. area = 1.127 in sq [1 oz] including traces).

| $V_{(BR)DSS}$ | $R_{DS(on)}$ Typ | I_D Max (Note 1) |
|---------------|------------------------|--------------------|
| 20 | 400 m Ω @ 4.5 V | 540 mA |
| | 500 m Ω @ 2.5 V | |
| | 700 m Ω @ 1.8 V | |



(Note: Microdot may be in either location)

PINOUT: SOT-563



ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 4 of this data sheet.

NOTE: Some of the devices on this data sheet have been **DISCONTINUED**. Please refer to the table on page 4.

NTZD3154N

ELECTRICAL CHARACTERISTICS (T_J = 25°C unless otherwise noted.)

| Parameter | Symbol | Test Condition | Min | Typ | Max | Unit | |
|---|-------------------|---|---------------------------|-----|-----------|---------------|---------------|
| OFF CHARACTERISTICS | | | | | | | |
| Drain-to-Source Breakdown Voltage | $V_{(BR)DSS}$ | $V_{GS} = 0\text{ V}, I_D = 250\text{ }\mu\text{A}$ | 20 | – | – | V | |
| Drain-to-Source Breakdown Voltage Temperature Coefficient | $V_{(BR)DSS}/T_J$ | – | – | 14 | – | mV/°C | |
| Zero Gate Voltage Drain Current | I_{DSS} | $V_{GS} = 0\text{ V}$ $V_{DS} = 16\text{ V}$ | $T_J = 25^\circ\text{C}$ | – | – | 1.0 | μA |
| | | | $T_J = 125^\circ\text{C}$ | – | – | 5.0 | |
| Gate-to-Source Leakage Current | I_{GSS} | $V_{DS} = 0\text{ V}, V_{GS} = \pm 4.5\text{ V}$ | – | – | ± 5.0 | μA | |

ON CHARACTERISTICS (Note 3)

| | | | | | | |
|--|-------------------------------------|---|------|-----|------|-------|
| Gate Threshold Voltage | V _{GS(TH)} | V _{GS} = V _{DS} , I _D = 250 μA | 0.45 | – | 1.0 | V |
| Negative Threshold Temperature Coefficient | V _{GS(TH)} /T _J | – | – | 2.0 | – | mV/°C |
| Drain-to-Source On Resistance | R _{DS(on)} | V _{GS} = 4.5 V, I _D = 540 mA | – | 0.4 | 0.55 | Ω |
| | | V _{GS} = 2.5 V, I _D = 500 mA | – | 0.5 | 0.7 | |
| | | V _{GS} = 1.8 V, I _D = 350 mA | – | 0.7 | 0.9 | |
| Forward Transconductance | g _{FS} | V _{DS} = 10 V, I _D = 540 mA | – | 1.0 | – | S |

CHARGES AND CAPACITANCES

| | | | | | | |
|------------------------------|---------------------|--|---|------|-----|----|
| Input Capacitance | C _{ISS} | V _{GS} = 0 V, f = 1.0 MHz, V _{DS} = 16 V | – | 80 | 150 | pF |
| Output Capacitance | C _{OSS} | | – | 13 | 25 | |
| Reverse Transfer Capacitance | C _{RSS} | | – | 10 | 20 | |
| Total Gate Charge | Q _{G(TOT)} | V _{GS} = 4.5 V, V _{DS} = 10 V; I _D = 540 mA | – | 1.5 | 2.5 | nC |
| Threshold Gate Charge | Q _{G(TH)} | | – | 0.1 | – | |
| Gate-to-Source Charge | Q _{GS} | | – | 0.2 | – | |
| Gate-to-Drain Charge | Q _{GD} | | – | 0.35 | – | |

SWITCHING CHARACTERISTICS, V_{GS} = V (Note 4)

| | | | | | | |
|---------------------|---------------------|--|---|-----|---|----|
| Turn-On Delay Time | t _{d(ON)} | V _{GS} = 4.5 V, V _{DD} = 10 V, I _D = 540 mA, R _G = 10 Ω | – | 6.0 | – | ns |
| Rise Time | t _r | | – | 4.0 | – | |
| Turn-Off Delay Time | t _{d(OFF)} | | – | 16 | – | |
| Fall Time | t _f | | – | 8.0 | – | |

DRAIN-SOURCE DIODE CHARACTERISTICS

| | | | | | | | |
|-----------------------|-----------------|---|------------------------|-----|-----|-----|---|
| Forward Diode Voltage | V _{SD} | V _{GS} = 0 V, I _S = 350 mA | T _J = 25°C | – | 0.7 | 1.2 | V |
| | | | T _J = 125°C | – | 0.6 | – | |
| Reverse Recovery Time | t _{RR} | V _{GS} = 0 V, dI _{SD} /dt = 100 A/μs, I _S = 350 mA | – | 6.5 | – | ns | |

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.

- Surface-mounted on FR4 board using 1 in. sq. pad size (Cu. area = 1.127 in sq [1 oz] including traces).
- Pulse Test: pulse width ≤ 300 μs, duty cycle ≤ 2%.
- Switching characteristics are independent of operating junction temperatures.

TYPICAL PERFORMANCE CURVES ($T_J = 25^\circ\text{C}$ unless otherwise noted)

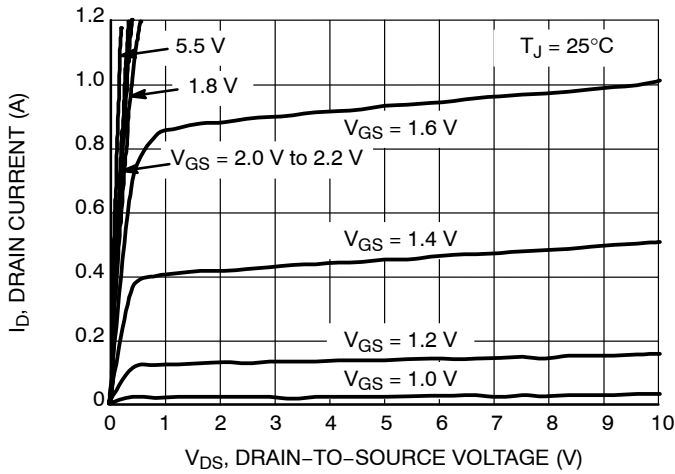


Figure 1. On-Region Characteristics

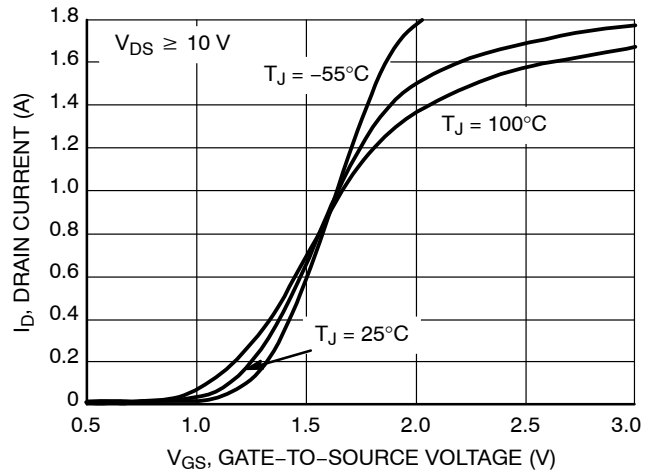


Figure 2. Transfer Characteristics

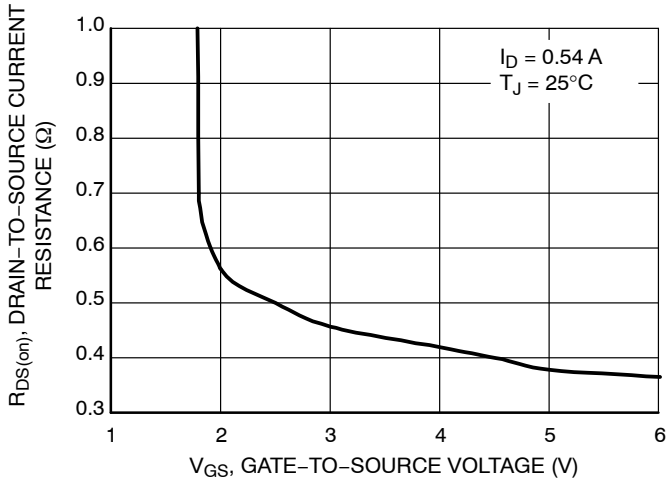


Figure 3. On-Resistance versus Gate-to-Source Voltage

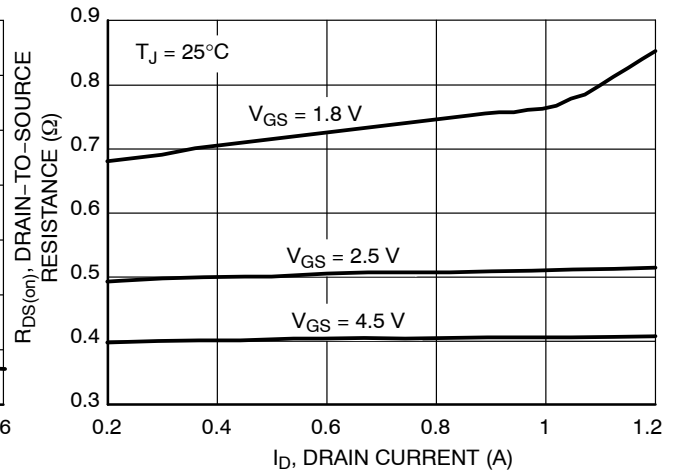


Figure 4. On-Resistance versus Drain Current and Gate Voltage

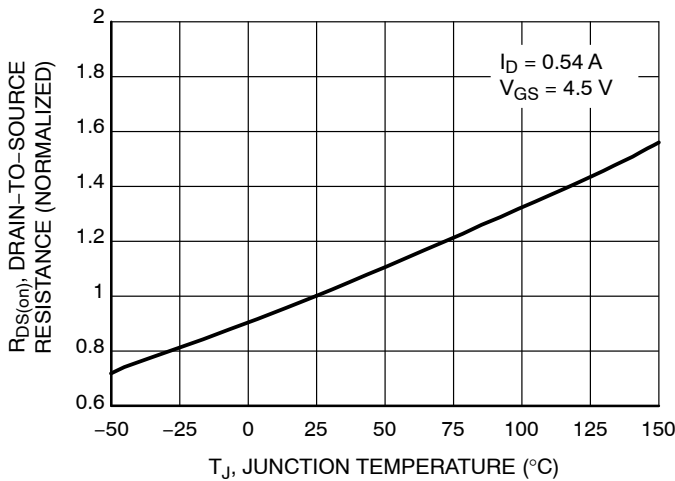


Figure 5. On-Resistance Variation with Temperature

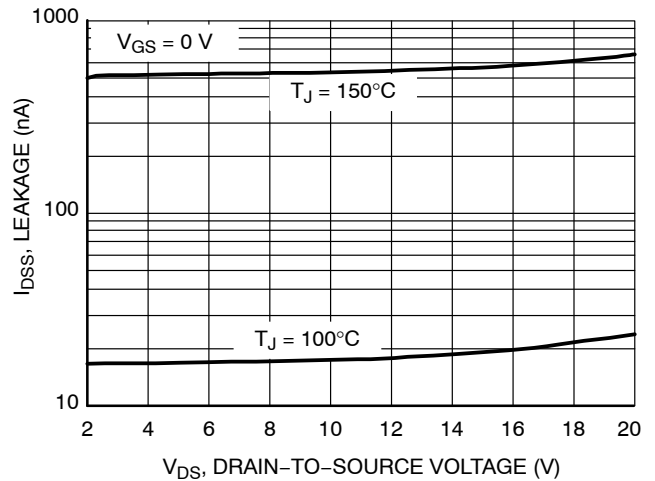


Figure 6. Drain-to-Source Leakage Current versus Voltage

NTZD3154N

TYPICAL PERFORMANCE CURVES ($T_J = 25^\circ\text{C}$ unless otherwise noted)

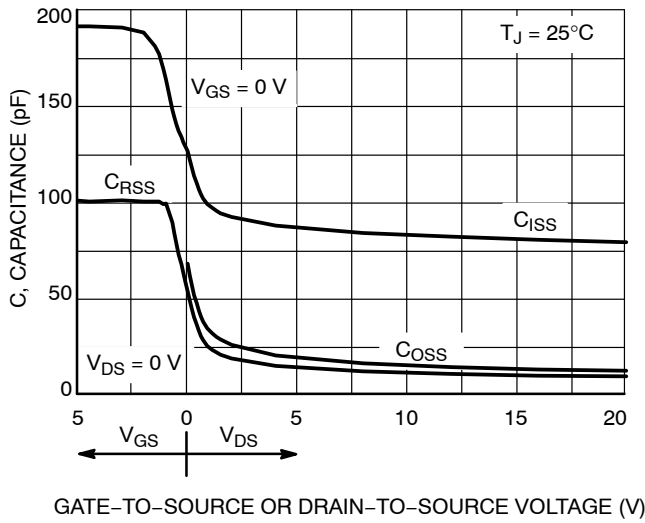


Figure 7. Capacitance Variation

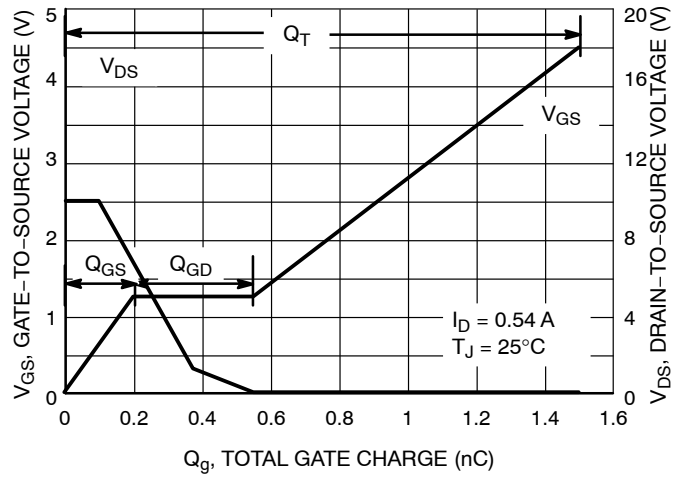


Figure 8. Gate-to-Source and Drain-to-Source Voltage versus Total Charge

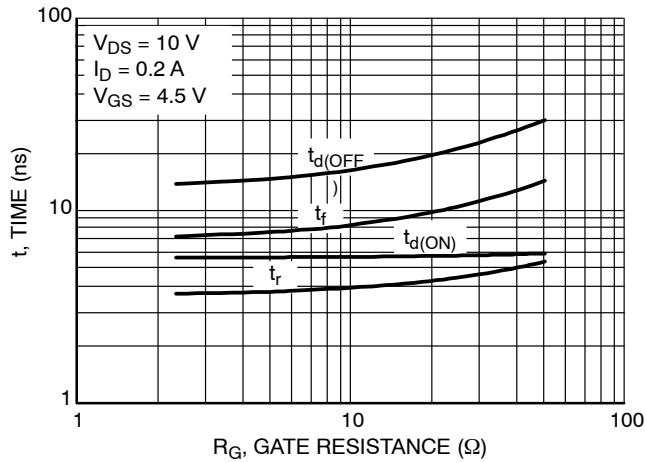


Figure 9. Resistive Switching Time Variation versus Gate Resistance

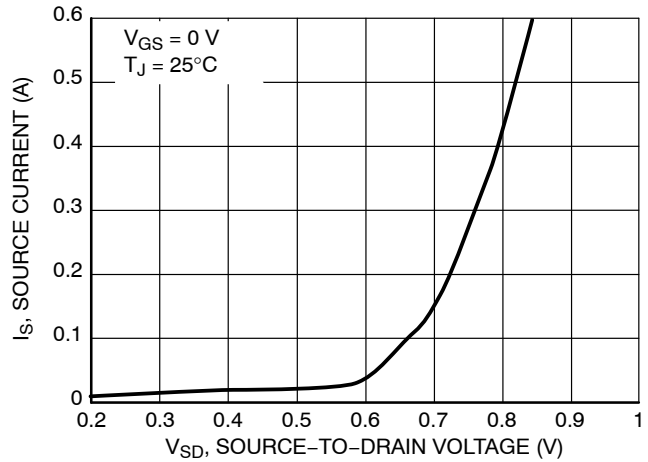


Figure 10. Diode Forward Voltage versus Current

ORDERING INFORMATION

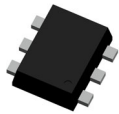
| Device | Package | Shipping |
|--------------|----------------------|--------------------|
| NTZD3154NT1G | SOT-563 (Pb-Free) | 4000 / Tape & Reel |
| NTZD3154NT1H | | |
| NTZD3154NT2G | | |
| NTZD3154NT2H | | |
| NTZD3154NT5H | | 8000 / Tape & Reel |

DISCONTINUED (Note 5)

| | | |
|--------------|----------------------|--------------------|
| NTZD3154NT5G | SOT-563 (Pb-Free) | 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.

5. **DISCONTINUED:** These devices are not recommended for new design. Please contact your **onsemi** representative for information. The most current information on these devices may be available on www.onsemi.com.

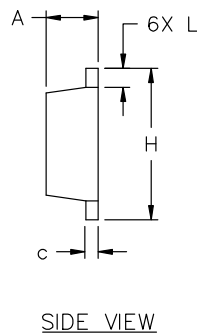
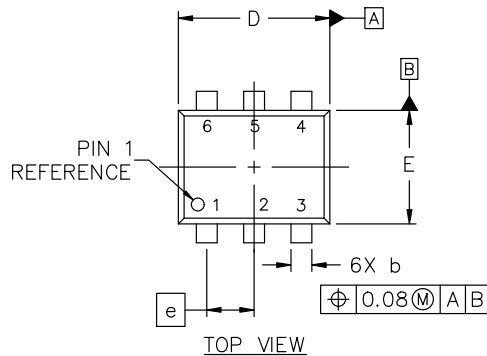


SOT-563-6 1.60x1.20x0.55, 0.50P
CASE 463A
ISSUE J

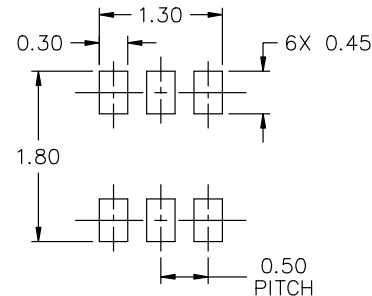
DATE 15 FEB 2024

NOTES:

1. DIMENSIONING AND TOLERANCING CONFORM TO ASME Y14.5-2018.
2. ALL DIMENSION ARE IN MILLIMETERS.
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH THICKNESS. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.



| DIM | MILLIMETERS | | |
|-----|-------------|------|------|
| | MIN. | NOM. | MAX. |
| A | 0.50 | 0.55 | 0.60 |
| b | 0.17 | 0.22 | 0.27 |
| c | 0.08 | 0.13 | 0.18 |
| D | 1.50 | 1.60 | 1.70 |
| E | 1.10 | 1.20 | 1.30 |
| e | 0.50 BSC | | |
| H | 1.50 | 1.60 | 1.70 |
| L | 0.10 | 0.20 | 0.30 |



RECOMMENDED MOUNTING FOOTPRINT*

* FOR ADDITIONAL INFORMATION ON OUR Pb-FREE STRATEGY AND SOLDERING DETAILS, PLEASE DOWNLOAD THE ON SEMICONDUCTOR SOLDERING AND MOUNTING TECHNIQUES REFERENCE MANUAL, SOLDERM/D.

STYLE 1:
PIN 1. EMITTER 1
2. BASE 1
3. COLLECTOR 2
4. EMITTER 2
5. BASE 2
6. COLLECTOR 1

STYLE 2:
PIN 1. EMITTER 1
2. EMITTER 2
3. BASE 2
4. COLLECTOR 2
5. BASE 1
6. COLLECTOR 1

STYLE 3:
PIN 1. CATHODE 1
2. CATHODE 1
3. ANODE/ANODE 2
4. CATHODE 2
5. CATHODE 2
6. ANODE/ANODE 1

STYLE 4:
PIN 1. COLLECTOR
2. COLLECTOR
3. BASE
4. EMITTER
5. COLLECTOR
6. COLLECTOR

STYLE 5:
PIN 1. CATHODE
2. CATHODE
3. ANODE
4. ANODE
5. CATHODE
6. CATHODE

STYLE 6:
PIN 1. CATHODE
2. ANODE
3. CATHODE
4. CATHODE
5. CATHODE
6. CATHODE

STYLE 7:
PIN 1. CATHODE
2. ANODE
3. CATHODE
4. CATHODE
5. ANODE
6. CATHODE

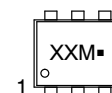
STYLE 8:
PIN 1. DRAIN
2. DRAIN
3. GATE
4. SOURCE
5. DRAIN
6. DRAIN

STYLE 9:
PIN 1. SOURCE 1
2. GATE 1
3. DRAIN 2
4. SOURCE 2
5. GATE 2
6. DRAIN 1

STYLE 10:
PIN 1. CATHODE 1
2. N/C
3. CATHODE 2
4. ANODE 2
5. N/C
6. ANODE 1

STYLE 11:
PIN 1. EMITTER 2
2. BASE 2
3. COLLECTOR 1
4. EMITTER 1
5. BASE 1
6. COLLECTOR 2

**GENERIC
MARKING DIAGRAM***



XX = Specific Device Code
M = Month Code
▪ = Pb-Free Package

*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G" or microdot "▪", may or may not be present. Some products may not follow the Generic Marking.

| | | |
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