

# NTLLD4901NF

## **MOSFET** – Power, Dual, N-Channel with Integrated Schottky WDFN, (3 mm x 3 mm)

**30 V, High Side 11 A / Low Side 13 A**

### Features

- Co-Packaged Power Stage Solution to Minimize Board Space
- Low Side MOSFET with Integrated Schottky
- Minimized Parasitic Inductances
- Optimized Devices to Reduce Power Losses
- These Devices are Pb-Free, Halogen Free/BFR Free and are RoHS Compliant

### Applications

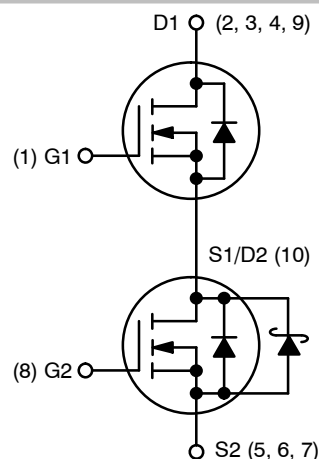
- DC-DC Converters
- System Voltage Rails
- Point of Load



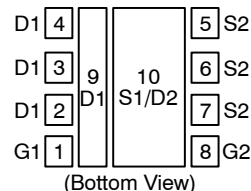
**ON Semiconductor®**

<http://onsemi.com>

| $V_{(BR)DSS}$         | $R_{DS(ON)} \text{ MAX}$ | $I_D \text{ MAX}$ |
|-----------------------|--------------------------|-------------------|
| Q1 Top FET<br>30 V    | 17.4 m $\Omega$ @ 10 V   | 11 A              |
|                       | 25 m $\Omega$ @ 4.5 V    |                   |
| Q2 Bottom<br>FET 30 V | 13.3 m $\Omega$ @ 10 V   | 13 A              |
|                       | 20 m $\Omega$ @ 4.5 V    |                   |



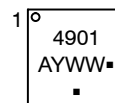
### PIN CONNECTIONS



### MARKING DIAGRAM



**WDFN8  
CASE 511BP**



4901 = Specific Device Code  
A = Assembly Location  
Y = Year  
WW = Work Week  
■ = Pb-Free Package

(Note: Microdot may be in either location)

### ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 5 of this data sheet.

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

| Parameter                                                                                                                                                                                      |              |                         |    | Symbol                            | Value       | Unit |  |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|-------------------------|----|-----------------------------------|-------------|------|--|
| Drain-to-Source Voltage                                                                                                                                                                        |              |                         | Q1 | V <sub>DSS</sub>                  | 30          | V    |  |
| Drain-to-Source Voltage                                                                                                                                                                        |              |                         | Q2 |                                   |             |      |  |
| Gate-to-Source Voltage                                                                                                                                                                         |              |                         | Q1 | V <sub>GS</sub>                   | ±20         | V    |  |
| Gate-to-Source Voltage                                                                                                                                                                         |              |                         | Q2 |                                   |             |      |  |
| Continuous Drain Current R <sub>θJA</sub> (Note 1)                                                                                                                                             | Steady State | T <sub>A</sub> = 25°C   | Q1 | I <sub>D</sub>                    | 8.3         | A    |  |
|                                                                                                                                                                                                |              | T <sub>A</sub> = 85°C   |    |                                   | 6.0         |      |  |
|                                                                                                                                                                                                |              | T <sub>A</sub> = 25°C   | Q2 |                                   | 9.6         |      |  |
|                                                                                                                                                                                                |              | T <sub>A</sub> = 85°C   |    |                                   | 6.9         |      |  |
| Power Dissipation R <sub>θJA</sub> (Note 1)                                                                                                                                                    |              | T <sub>A</sub> = 25°C   | Q1 | P <sub>D</sub>                    | 1.82        | W    |  |
|                                                                                                                                                                                                |              |                         | Q2 |                                   | 1.88        |      |  |
| Continuous Drain Current R <sub>θJA</sub> ≤ 10 s (Note 1)                                                                                                                                      |              | T <sub>A</sub> = 25°C   | Q1 | I <sub>D</sub>                    | 11          | A    |  |
|                                                                                                                                                                                                |              | T <sub>A</sub> = 85°C   |    |                                   | 8           |      |  |
|                                                                                                                                                                                                |              | T <sub>A</sub> = 25°C   | Q2 |                                   | 13          |      |  |
|                                                                                                                                                                                                |              | T <sub>A</sub> = 85°C   |    |                                   | 9.1         |      |  |
| Power Dissipation R <sub>θJA</sub> ≤ 10 s (Note 1)                                                                                                                                             |              | T <sub>A</sub> = 25°C   | Q1 | P <sub>D</sub>                    | 3.23        | W    |  |
|                                                                                                                                                                                                |              |                         | Q2 |                                   | 3.27        |      |  |
| Continuous Drain Current R <sub>θJA</sub> (Note 2)                                                                                                                                             |              | T <sub>A</sub> = 25°C   | Q1 | I <sub>D</sub>                    | 5.5         | A    |  |
|                                                                                                                                                                                                |              | T <sub>A</sub> = 85°C   |    |                                   | 4.0         |      |  |
|                                                                                                                                                                                                |              | T <sub>A</sub> = 25°C   | Q2 |                                   | 6.3         |      |  |
|                                                                                                                                                                                                |              | T <sub>A</sub> = 85°C   |    |                                   | 4.5         |      |  |
| Power Dissipation R <sub>θJA</sub> (Note 2)                                                                                                                                                    |              | T <sub>A</sub> = 25 °C  | Q1 | P <sub>D</sub>                    | 0.80        | W    |  |
|                                                                                                                                                                                                |              |                         | Q2 |                                   | 0.81        |      |  |
| Pulsed Drain Current                                                                                                                                                                           |              | TA = 25°C<br>tp = 10 μs | Q1 | I <sub>DM</sub>                   | 65          | A    |  |
|                                                                                                                                                                                                |              |                         | Q2 |                                   | 70          |      |  |
| Operating Junction and Storage Temperature                                                                                                                                                     |              |                         | Q1 | T <sub>J</sub> , T <sub>STG</sub> | -55 to +150 | °C   |  |
|                                                                                                                                                                                                |              |                         | Q2 |                                   |             |      |  |
| Source Current (Body Diode)                                                                                                                                                                    |              |                         | Q1 | I <sub>S</sub>                    | 4.2         | A    |  |
|                                                                                                                                                                                                |              |                         | Q2 |                                   | 6.0         |      |  |
| Drain to Source DV/DT                                                                                                                                                                          |              |                         |    | dV/dt                             | 6           | V/ns |  |
| Single Pulse Drain-to-Source Avalanche Energy (T <sub>J</sub> = 25C, V <sub>DD</sub> = 50 V, V <sub>GS</sub> = 10 V, I <sub>L</sub> = 9.0 A <sub>pk</sub> , L = 0.3 mH, R <sub>G</sub> = 25 Ω) |              |                         | Q1 | EAS                               | 12          | mJ   |  |
| Single Pulse Drain-to-Source Avalanche Energy (T <sub>J</sub> = 25C, V <sub>DD</sub> = 50 V, V <sub>GS</sub> = 10 V, I <sub>L</sub> = 9.5 A <sub>pk</sub> , L = 0.3 mH, R <sub>G</sub> = 25 Ω) |              |                         | Q2 | EAS                               | 13.5        |      |  |
| Lead Temperature for Soldering Purposes (1/8" from case for 10 s)                                                                                                                              |              |                         |    | T <sub>L</sub>                    | 260         | °C   |  |

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

1. Surface-mounted on FR4 board using 1 sq-in pad, 2 oz Cu
2. Surface-mounted on FR4 board using the minimum recommended pad size of 90 mm<sup>2</sup>

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## THERMAL RESISTANCE MAXIMUM RATINGS

| Parameter                                       | FET | Symbol          | Value | Unit |
|-------------------------------------------------|-----|-----------------|-------|------|
| Junction-to-Ambient – Steady State (Note 3)     | Q1  | $R_{\theta JA}$ | 68.8  | °C/W |
|                                                 | Q2  |                 | 66.4  |      |
| Junction-to-Ambient – Steady State (Note 4)     | Q1  | $R_{\theta JA}$ | 156.4 |      |
|                                                 | Q2  |                 | 153.9 |      |
| Junction-to-Ambient – ( $t \leq 10$ s) (Note 3) | Q1  | $R_{\theta JA}$ | 38.7  |      |
|                                                 | Q2  |                 | 38.2  |      |

3. Surface-mounted on FR4 board using 1 sq-in pad, 2 oz Cu

4. Surface-mounted on FR4 board using the minimum recommended pad size of 90 mm<sup>2</sup>

## ELECTRICAL CHARACTERISTICS ( $T_J = 25^\circ\text{C}$ unless otherwise specified)

| Parameter                                                  | FET | Symbol              | Test Condition                                      | Min                       | Typ | Max       | Unit          |
|------------------------------------------------------------|-----|---------------------|-----------------------------------------------------|---------------------------|-----|-----------|---------------|
| <b>OFF CHARACTERISTICS</b>                                 |     |                     |                                                     |                           |     |           |               |
| Drain-to-Source Break-down Voltage                         | Q1  | $V_{(BR)DSS}$       | $V_{GS} = 0\text{ V}, I_D = 250\text{ }\mu\text{A}$ | 30                        |     |           | V             |
|                                                            | Q2  |                     |                                                     | 30                        |     |           |               |
| Drain-to-Source Break-down Voltage Temperature Coefficient | Q1  | $V_{(BR)DSS} / T_J$ |                                                     |                           | 18  |           | mV / °C       |
|                                                            | Q2  |                     |                                                     |                           | 15  |           |               |
| Zero Gate Voltage Drain Current                            | Q1  | $I_{DSS}$           | $V_{GS} = 0\text{ V}, V_{DS} = 24\text{ V}$         | $T_J = 25^\circ\text{C}$  |     | 1         | $\mu\text{A}$ |
|                                                            |     |                     |                                                     | $T_J = 125^\circ\text{C}$ |     | 10        |               |
|                                                            | Q2  | $I_{DSS}$           | $V_{GS} = 0\text{ V}, V_{DS} = 24\text{ V}$         | $T_J = 25^\circ\text{C}$  |     | 500       |               |
|                                                            |     |                     |                                                     | $T_J = 125^\circ\text{C}$ |     | 500       |               |
| Gate-to-Source Leakage Current                             | Q1  | $I_{GSS}$           | $V_{GS} = 0\text{ V}, V_{DS} = \pm 20\text{ V}$     |                           |     | $\pm 100$ | nA            |
|                                                            | Q2  |                     |                                                     |                           |     | $\pm 100$ |               |

## ON CHARACTERISTICS (Note 5)

|                                            |    |                    |                                                 |                     |     |     |      |         |
|--------------------------------------------|----|--------------------|-------------------------------------------------|---------------------|-----|-----|------|---------|
| Gate Threshold Voltage                     | Q1 | $V_{GS(TH)}$       | $V_{GS} = V_{DS}, I_D = 250\text{ }\mu\text{A}$ |                     | 1.2 |     | 2.2  | V       |
|                                            | Q2 |                    |                                                 |                     | 1.2 |     | 2.2  |         |
| Negative Threshold Temperature Coefficient | Q1 | $V_{GS(TH)} / T_J$ |                                                 |                     |     | 4.5 |      | mV / °C |
|                                            | Q2 |                    |                                                 |                     |     | 4.0 |      |         |
| Drain-to-Source On Resistance              | Q1 | $R_{DS(on)}$       | $V_{GS} = 10\text{ V}$                          | $I_D = 9\text{ A}$  |     | 14  | 17.4 | mΩ      |
|                                            |    |                    | $V_{GS} = 4.5\text{ V}$                         | $I_D = 9\text{ A}$  |     | 20  | 25   |         |
|                                            | Q2 |                    | $V_{GS} = 10\text{ V}$                          | $I_D = 11\text{ A}$ |     | 11  | 13.3 |         |
|                                            |    |                    | $V_{GS} = 4.5\text{ V}$                         | $I_D = 11\text{ A}$ |     | 16  | 20   |         |
| Forward Transconductance                   | Q1 | $g_{FS}$           | $V_{DS} = 1.5\text{ V}, I_D = 9\text{ A}$       |                     |     | 16  |      | S       |
|                                            | Q2 |                    |                                                 |                     |     | 18  |      |         |

## CHARGES, CAPACITANCES & GATE RESISTANCE

|                     |    |                  |                                                          |  |      |  |    |
|---------------------|----|------------------|----------------------------------------------------------|--|------|--|----|
| Input Capacitance   | Q1 | C <sub>ISS</sub> | V <sub>GS</sub> = 0 V, f = 1 MHz, V <sub>DS</sub> = 15 V |  | 605  |  | pF |
|                     | Q2 |                  |                                                          |  | 660  |  |    |
| Output Capacitance  | Q1 | C <sub>OSS</sub> |                                                          |  | 190  |  |    |
|                     | Q2 |                  |                                                          |  | 325  |  |    |
| Reverse Capacitance | Q1 | C <sub>RSS</sub> |                                                          |  | 102  |  |    |
|                     | Q2 |                  |                                                          |  | 17.5 |  |    |

5. Pulse Test: pulse width  $\leq 300\text{ }\mu\text{s}$ , duty cycle  $\leq 2\%$

6. Switching characteristics are independent of operating junction temperatures.

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## ELECTRICAL CHARACTERISTICS ( $T_J = 25^\circ\text{C}$ unless otherwise specified)

| Parameter | FET | Symbol | Test Condition | Min | Typ | Max | Unit |
|-----------|-----|--------|----------------|-----|-----|-----|------|
|-----------|-----|--------|----------------|-----|-----|-----|------|

### CHARGES, CAPACITANCES & GATE RESISTANCE

|                       |    |                     |                                                                       |  |      |  |    |
|-----------------------|----|---------------------|-----------------------------------------------------------------------|--|------|--|----|
| Total Gate Charge     | Q1 | Q <sub>G(TOT)</sub> | V <sub>GS</sub> = 4.5 V, V <sub>DS</sub> = 15 V; I <sub>D</sub> = 9 A |  | 6.5  |  | nC |
|                       | Q2 |                     |                                                                       |  | 5.0  |  |    |
| Threshold Gate Charge | Q1 | Q <sub>G(TH)</sub>  |                                                                       |  | 1.1  |  |    |
|                       | Q2 |                     |                                                                       |  | 1.1  |  |    |
| Gate-to-Source Charge | Q1 | Q <sub>GS</sub>     |                                                                       |  | 1.9  |  |    |
|                       | Q2 |                     |                                                                       |  | 2.0  |  |    |
| Gate-to-Drain Charge  | Q1 | Q <sub>GD</sub>     |                                                                       |  | 3.2  |  |    |
|                       | Q2 |                     |                                                                       |  | 1.46 |  |    |
| Total Gate Charge     | Q1 | Q <sub>G(TOT)</sub> | V <sub>GS</sub> = 10 V, V <sub>DS</sub> = 15 V; I <sub>D</sub> = 9 A  |  | 12   |  | nC |
|                       | Q2 |                     |                                                                       |  | 10.6 |  |    |

### SWITCHING CHARACTERISTICS (Note 6)

|                     |    |              |                                                                                         |  |      |  |    |
|---------------------|----|--------------|-----------------------------------------------------------------------------------------|--|------|--|----|
| Turn-On Delay Time  | Q1 | $t_{d(ON)}$  | $V_{GS} = 4.5\text{ V}, V_{DS} = 15\text{ V},$<br>$I_D = 9\text{ A}, R_G = 3.0\ \Omega$ |  | 8.0  |  | ns |
|                     | Q2 |              |                                                                                         |  | 7.5  |  |    |
| Rise Time           | Q1 | $t_r$        |                                                                                         |  | 7.2  |  |    |
|                     | Q2 |              |                                                                                         |  | 11.2 |  |    |
| Turn-Off Delay Time | Q1 | $t_{d(OFF)}$ |                                                                                         |  | 11   |  |    |
|                     | Q2 |              |                                                                                         |  | 11.6 |  |    |
| Fall Time           | Q1 | $t_f$        |                                                                                         |  | 3.3  |  |    |
|                     | Q2 |              |                                                                                         |  | 1.9  |  |    |

### SWITCHING CHARACTERISTICS (Note 6)

|                     |    |              |                                                                                        |  |      |  |    |
|---------------------|----|--------------|----------------------------------------------------------------------------------------|--|------|--|----|
| Turn-On Delay Time  | Q1 | $t_{d(ON)}$  | $V_{GS} = 10\text{ V}, V_{DS} = 15\text{ V},$<br>$I_D = 9\text{ A}, R_G = 3.0\ \Omega$ |  | 4.2  |  | ns |
|                     | Q2 |              |                                                                                        |  | 4.3  |  |    |
| Rise Time           | Q1 | $t_r$        |                                                                                        |  | 11.6 |  |    |
|                     | Q2 |              |                                                                                        |  | 11.4 |  |    |
| Turn-Off Delay Time | Q1 | $t_{d(OFF)}$ |                                                                                        |  | 14.1 |  |    |
|                     | Q2 |              |                                                                                        |  | 14.3 |  |    |
| Fall Time           | Q1 | $t_f$        |                                                                                        |  | 2.0  |  |    |
|                     | Q2 |              |                                                                                        |  | 1.3  |  |    |

### DRAIN-SOURCE DIODE CHARACTERISTICS

|                 |    |                 |                                                |                        |  |      |      |   |
|-----------------|----|-----------------|------------------------------------------------|------------------------|--|------|------|---|
| Forward Voltage | Q1 | V <sub>SD</sub> | V <sub>GS</sub> = 0 V,<br>I <sub>S</sub> = 3 A | T <sub>J</sub> = 25°C  |  | 0.80 | 1.2  | V |
|                 |    |                 |                                                | T <sub>J</sub> = 125°C |  | 0.65 |      |   |
|                 | Q2 |                 | V <sub>GS</sub> = 0 V,<br>I <sub>S</sub> = 2 A | T <sub>J</sub> = 25°C  |  | 0.50 | 0.80 |   |
|                 |    |                 |                                                | T <sub>J</sub> = 125°C |  | 0.45 |      |   |

5. Pulse Test: pulse width  $\leq 300\ \mu\text{s}$ , duty cycle  $\leq 2\%$

6. Switching characteristics are independent of operating junction temperatures.

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## ELECTRICAL CHARACTERISTICS ( $T_J = 25^\circ\text{C}$ unless otherwise specified)

| Parameter | FET | Symbol | Test Condition | Min | Typ | Max | Unit |
|-----------|-----|--------|----------------|-----|-----|-----|------|
|-----------|-----|--------|----------------|-----|-----|-----|------|

### DRAIN-SOURCE DIODE CHARACTERISTICS

|                         |    |          |                                                                                |  |      |  |    |
|-------------------------|----|----------|--------------------------------------------------------------------------------|--|------|--|----|
| Reverse Recovery Time   | Q1 | $t_{RR}$ | $V_{GS} = 0\text{ V}, d_{IS}/d_t = 100\text{ A}/\mu\text{s}, I_S = 3\text{ A}$ |  | 17.9 |  | ns |
|                         | Q2 |          |                                                                                |  | 23.3 |  |    |
| Charge Time             | Q1 | $t_a$    |                                                                                |  | 9.0  |  |    |
|                         | Q2 |          |                                                                                |  | 11.3 |  |    |
| Discharge Time          | Q1 | $t_b$    |                                                                                |  | 9.0  |  |    |
|                         | Q2 |          |                                                                                |  | 12   |  |    |
| Reverse Recovery Charge | Q1 | $Q_{RR}$ |                                                                                |  | 8.0  |  | nC |
|                         | Q2 |          |                                                                                |  | 12   |  |    |

### PACKAGE PARASITIC VALUES

|                   |    |                |                       |  |       |  |    |
|-------------------|----|----------------|-----------------------|--|-------|--|----|
| Source Inductance | Q1 | L <sub>S</sub> | T <sub>A</sub> = 25°C |  | 0.36  |  | nH |
|                   | Q2 |                |                       |  | 0.36  |  |    |
| Drain Inductance  | Q1 | L <sub>D</sub> |                       |  | 0.054 |  | nH |
|                   | Q2 |                |                       |  | 0.054 |  |    |
| Gate Inductance   | Q1 | L <sub>G</sub> |                       |  | 1.3   |  | nH |
|                   | Q2 |                |                       |  | 1.3   |  |    |
| Gate Resistance   | Q1 | R <sub>G</sub> |                       |  | 0.8   |  | Ω  |
|                   | Q2 |                |                       |  | 0.8   |  |    |

5. Pulse Test: pulse width  $\leq 300\text{ }\mu\text{s}$ , duty cycle  $\leq 2\%$

6. Switching characteristics are independent of operating junction temperatures.

## ORDERING INFORMATION

| Device         | Package            | Shipping <sup>†</sup> |
|----------------|--------------------|-----------------------|
| NTLLD4901NFTWG | WDFN8<br>(Pb-Free) | 3000 / Tape & Reel    |

<sup>†</sup>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.

TYPICAL CHARACTERISTICS – Q1

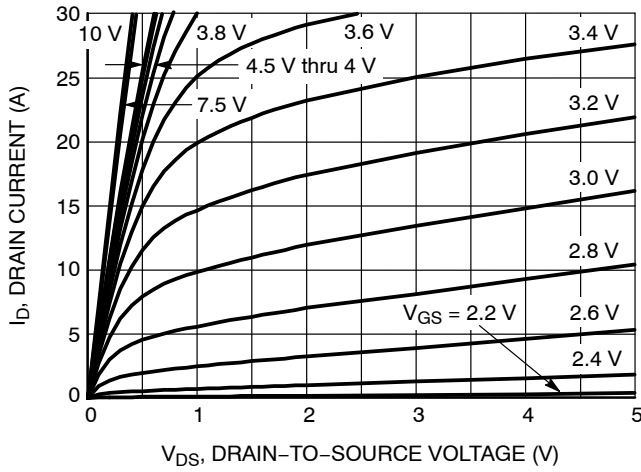


Figure 1. On-Region Characteristics

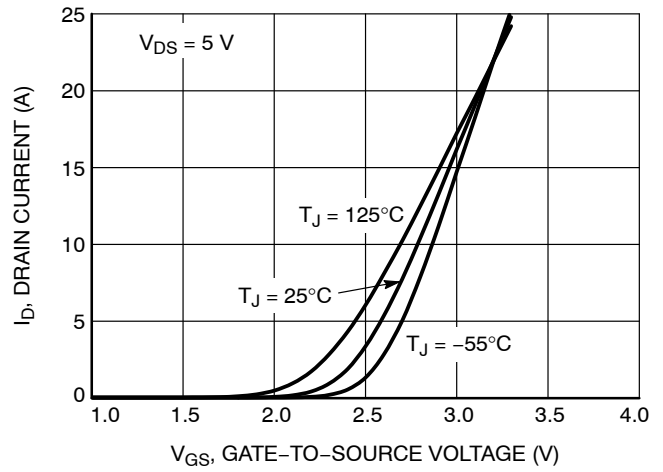


Figure 2. Transfer Characteristics

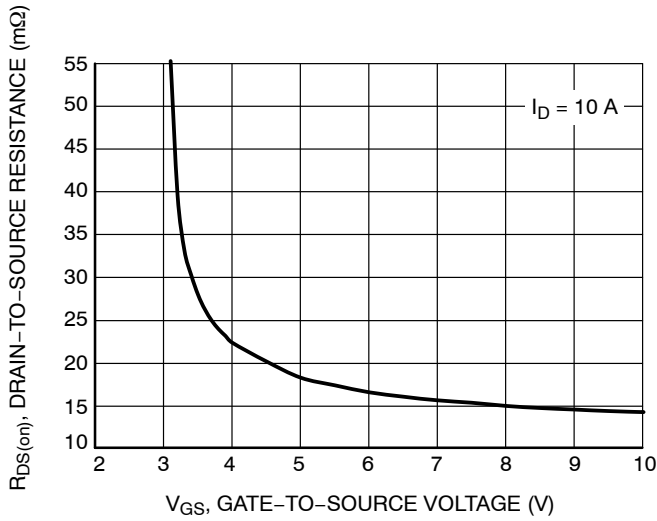


Figure 3. On-Resistance vs. Gate-to-Source Resistance

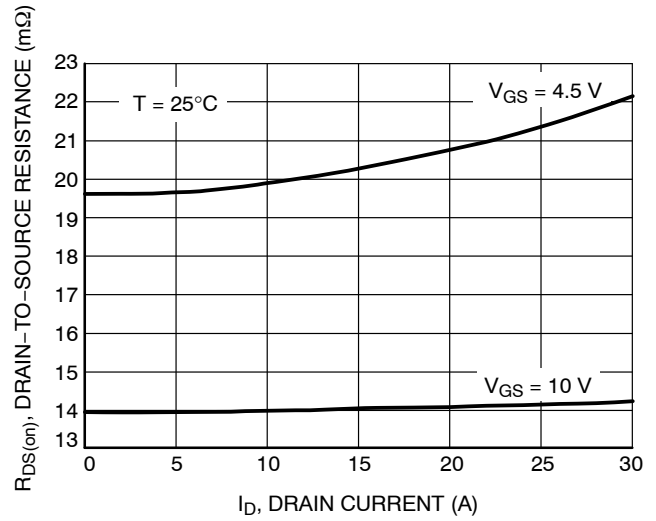


Figure 4. On-Resistance vs. Drain Current and Gate Voltage

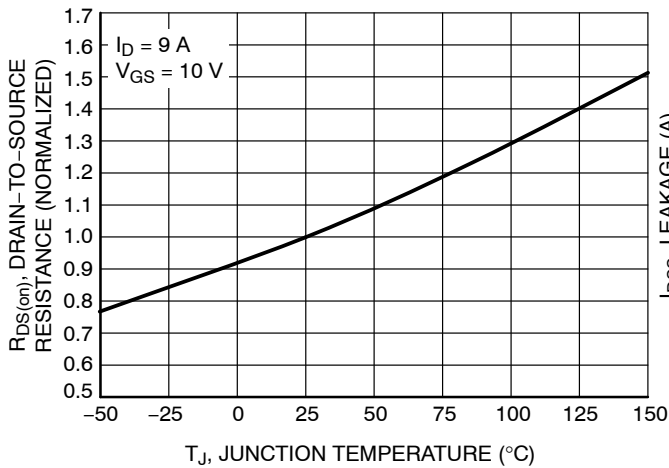


Figure 5. On-Resistance Variation with Temperature

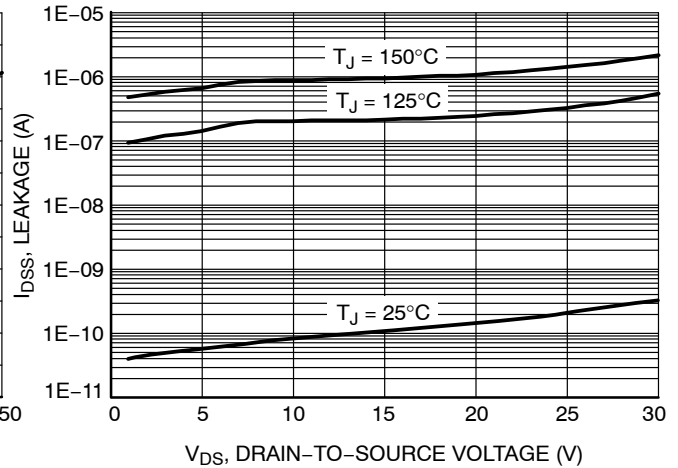


Figure 6. Drain-to-Source Leakage Current vs. Voltage

TYPICAL CHARACTERISTICS – Q1

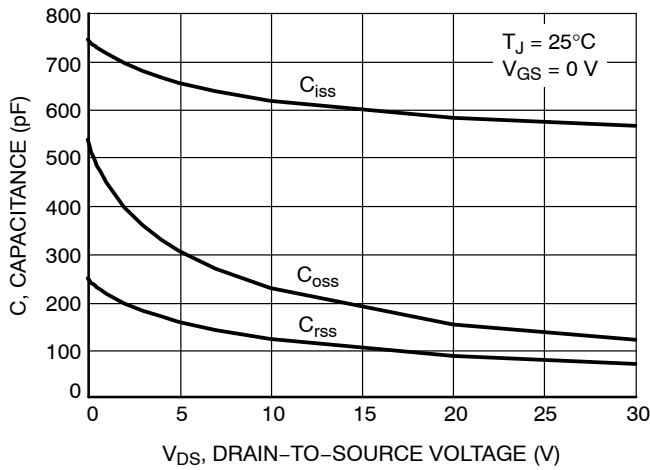


Figure 7. Capacitance Variation

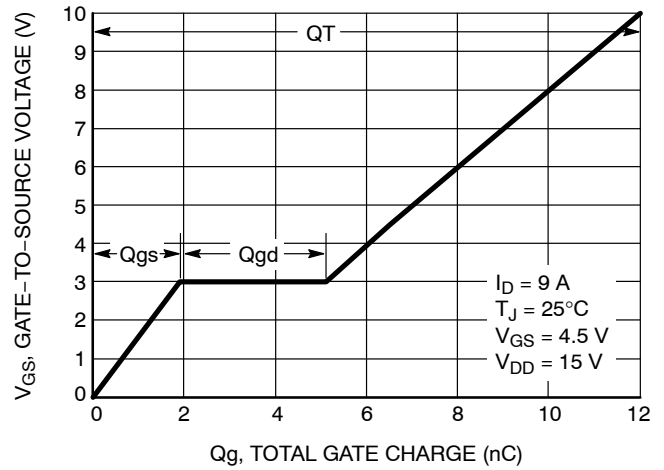


Figure 8. Gate-to-Source and Drain-to-Source Voltage vs. Total Charge

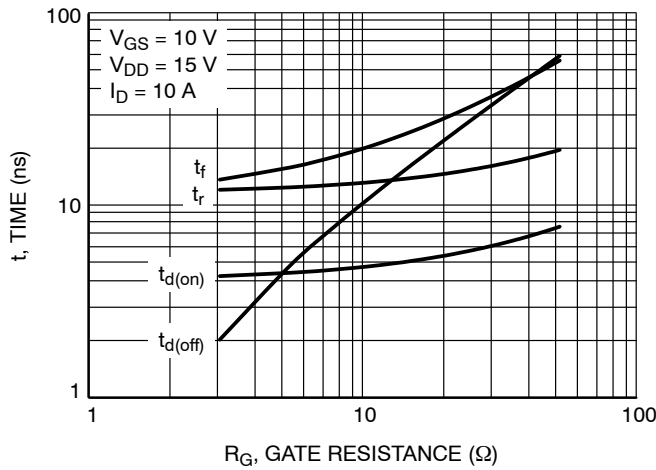


Figure 9. Resistive Switching Time Variation vs. Gate Resistance

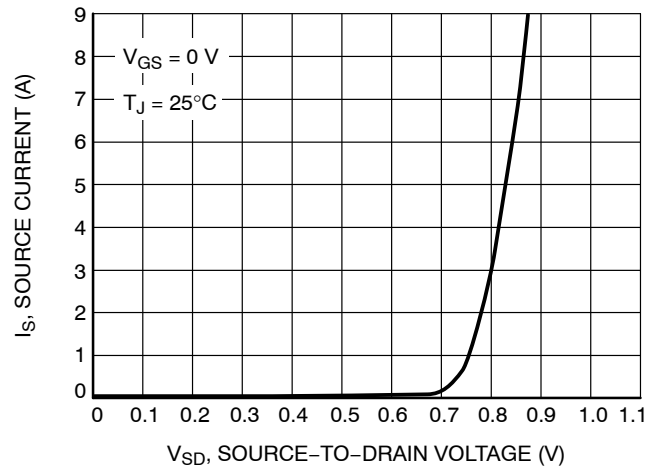


Figure 10. Diode Forward Voltage vs. Current

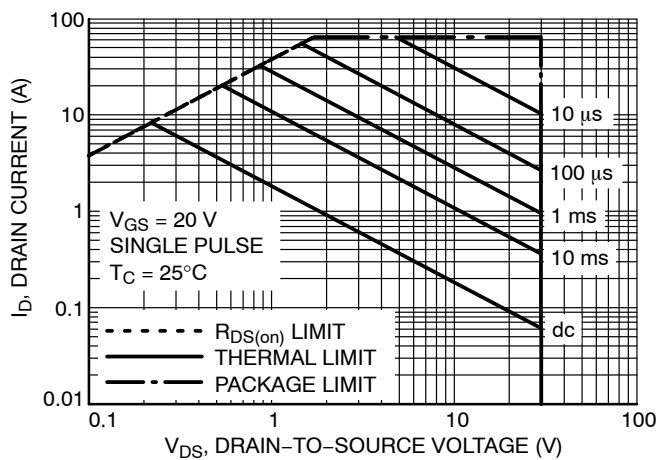


Figure 11. Maximum Rated Forward Biased Safe Operating Area

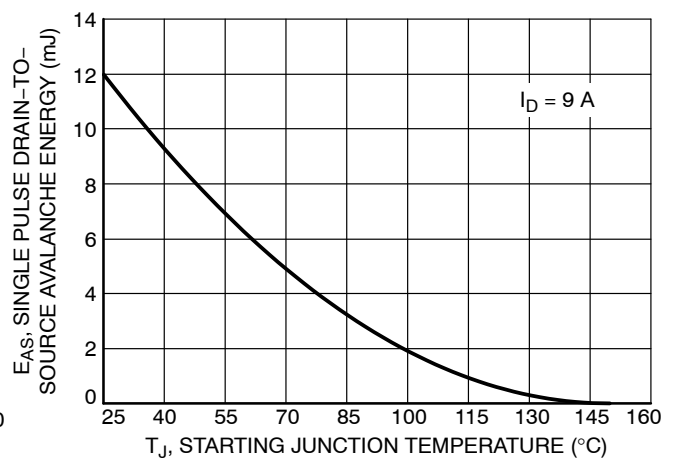


Figure 12. Maximum Avalanche Energy vs. Starting Junction Temperature

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## TYPICAL CHARACTERISTICS – Q1

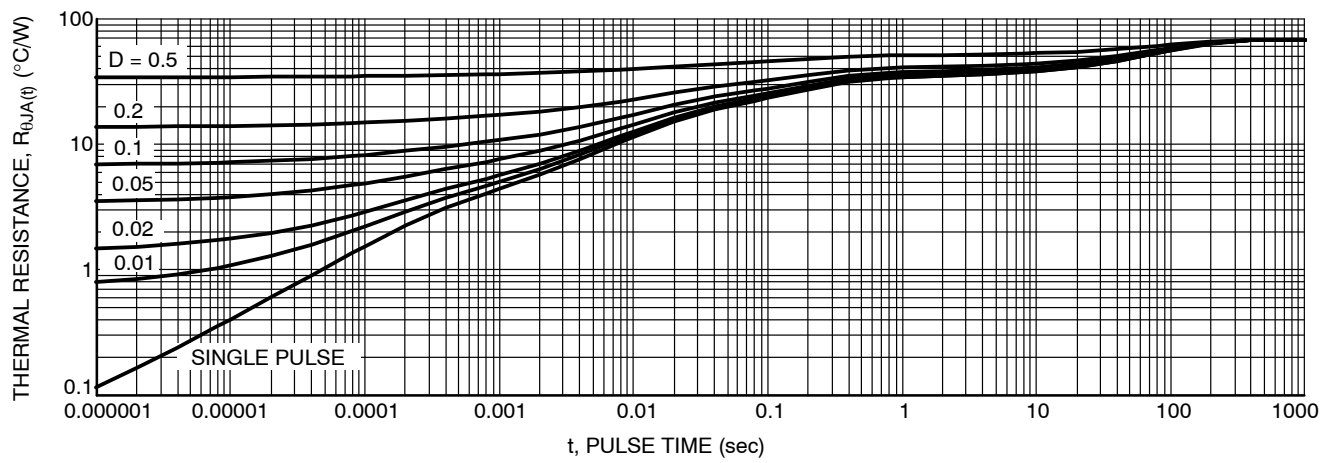


Figure 13. Thermal Response

TYPICAL CHARACTERISTICS – Q2

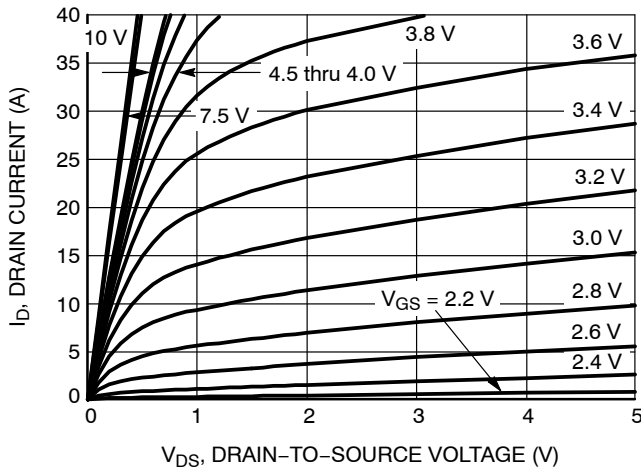


Figure 14. On-Region Characteristics

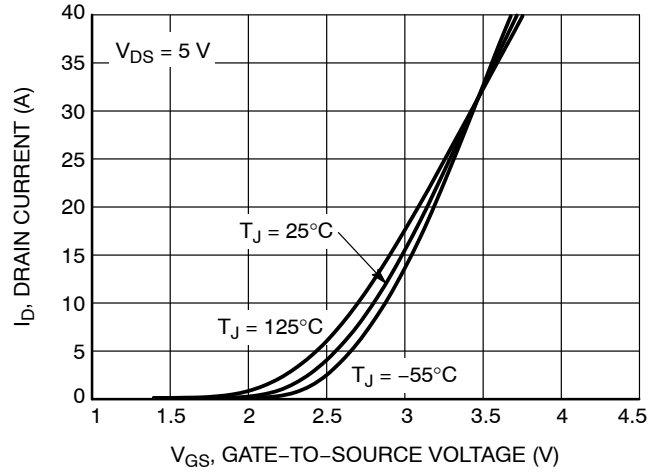


Figure 15. Transfer Characteristics

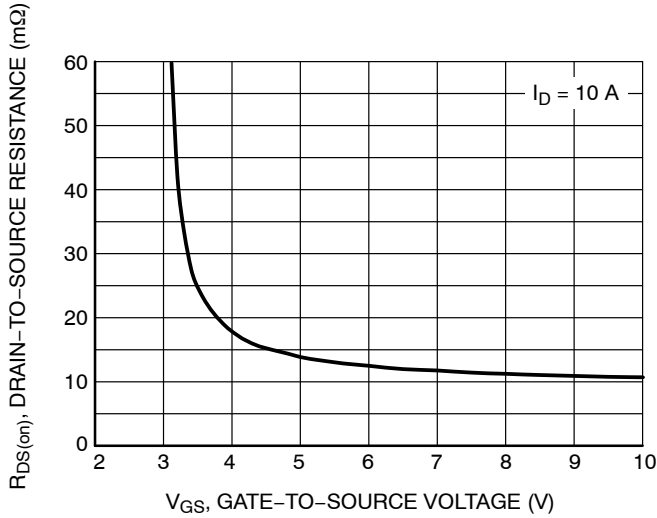


Figure 16. On-Resistance vs. Gate-to-Source Resistance

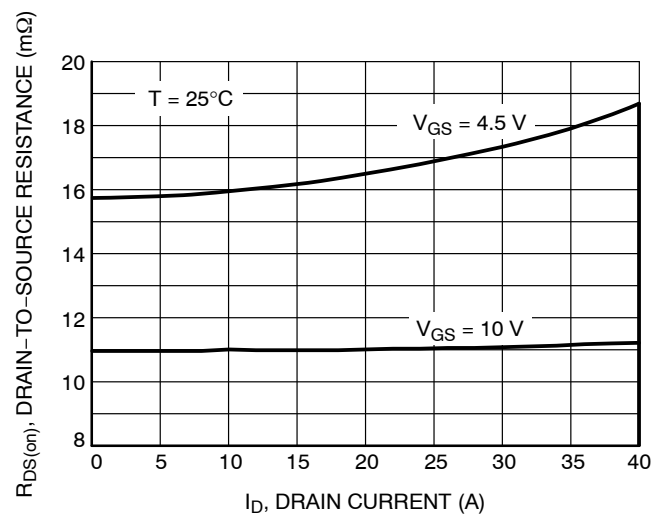


Figure 17. On-Resistance vs. Drain Current and Gate Voltage

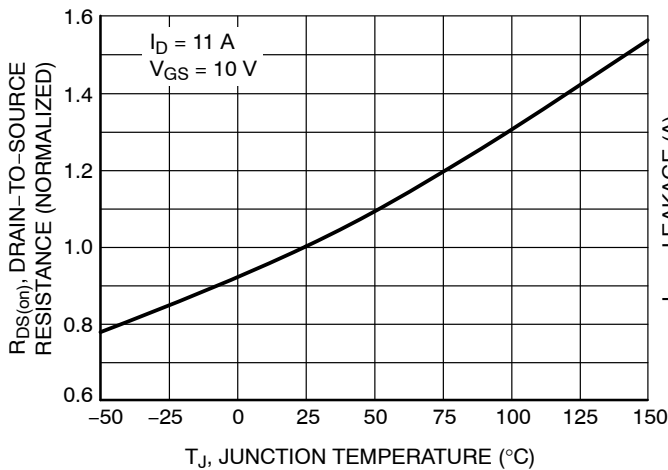


Figure 18. On-Resistance Variation with Temperature

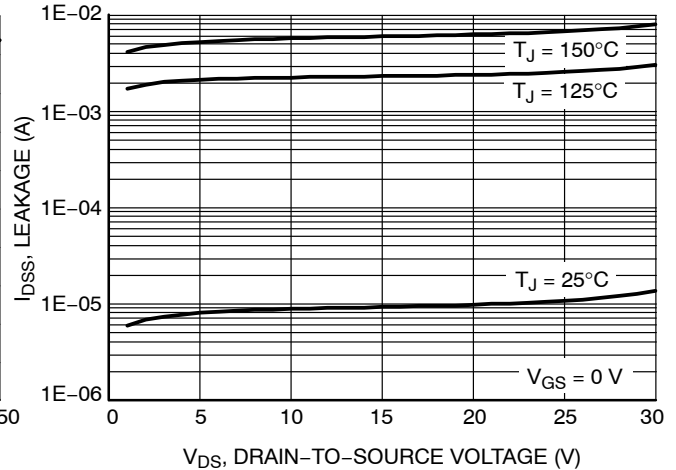


Figure 19. Drain-to-Source Leakage Current vs. Voltage

TYPICAL CHARACTERISTICS – Q2

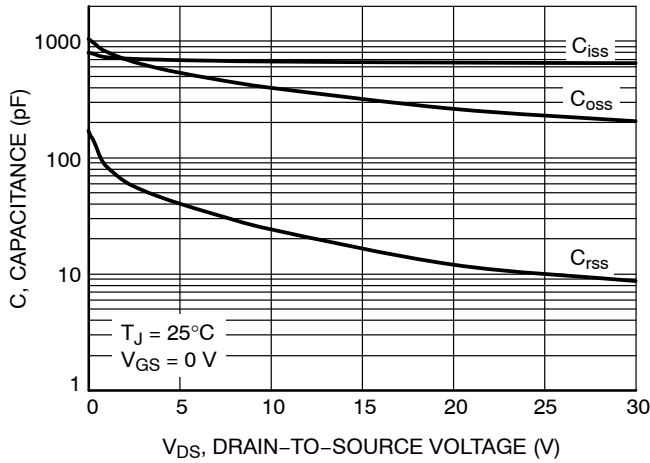


Figure 20. Capacitance Variation

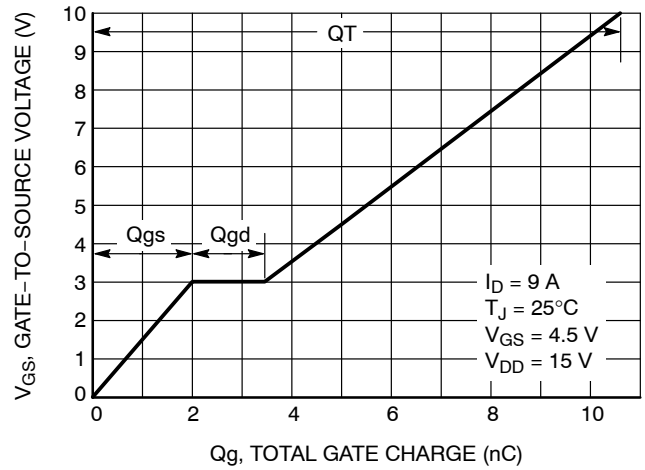


Figure 21. Gate-to-Source and Drain-to-Source Voltage vs. Total Charge

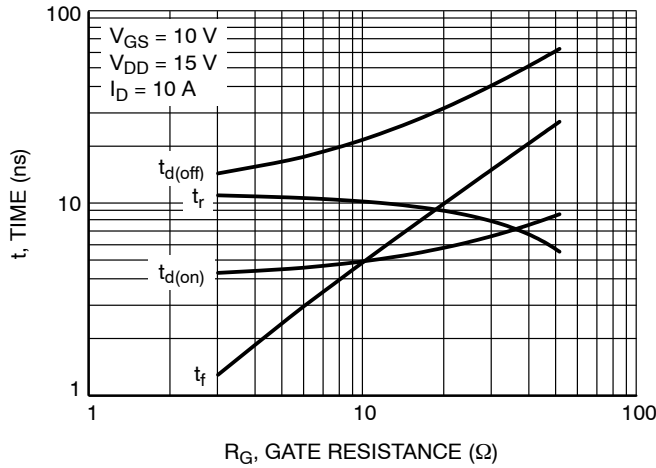


Figure 22. Resistive Switching Time Variation vs. Gate Resistance

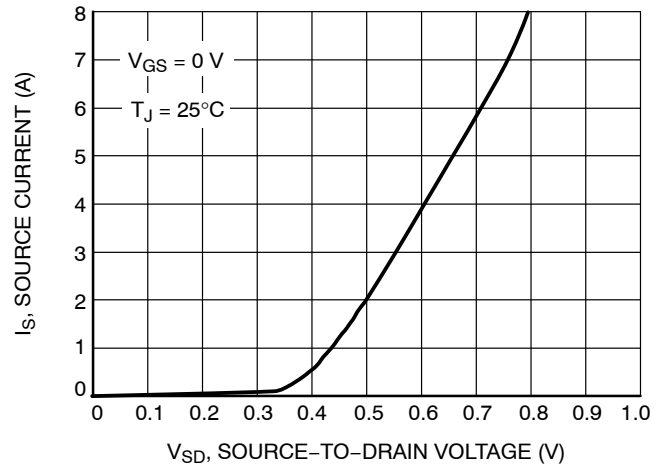


Figure 23. Diode Forward Voltage vs. Current

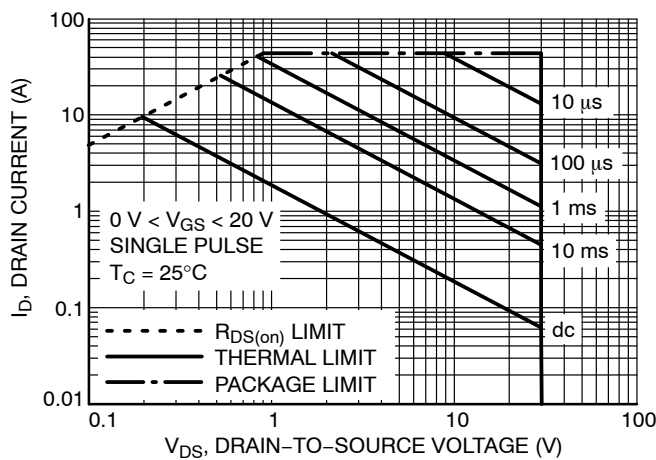


Figure 24. Maximum Rated Forward Biased Safe Operating Area

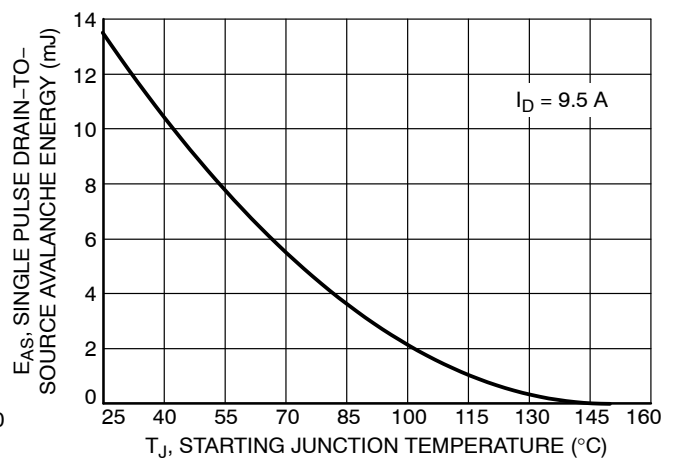


Figure 25. Maximum Avalanche Energy vs. Starting Junction Temperature

# NTLLD4901NF

## TYPICAL CHARACTERISTICS – Q2

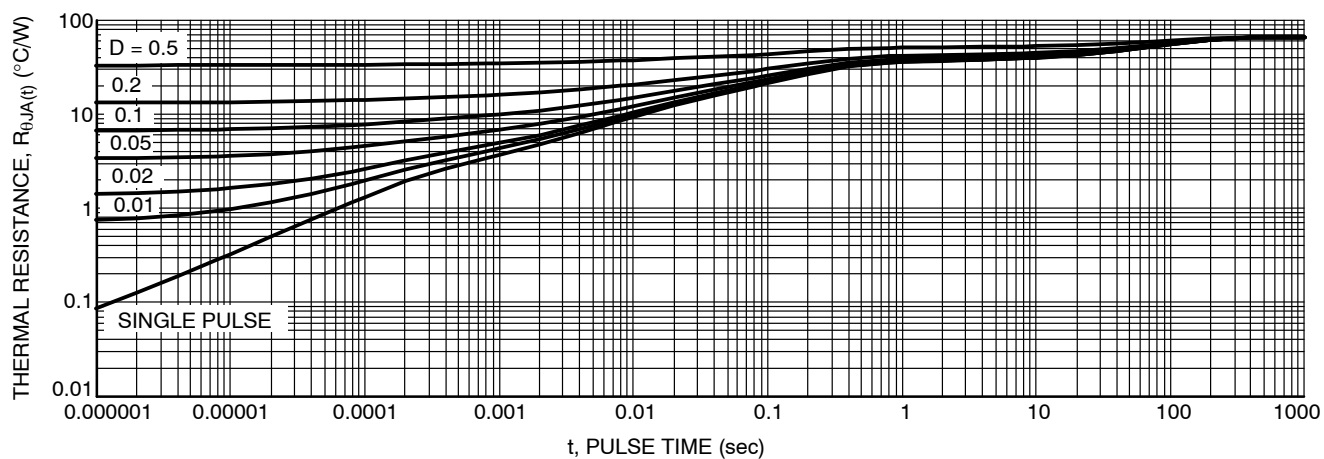
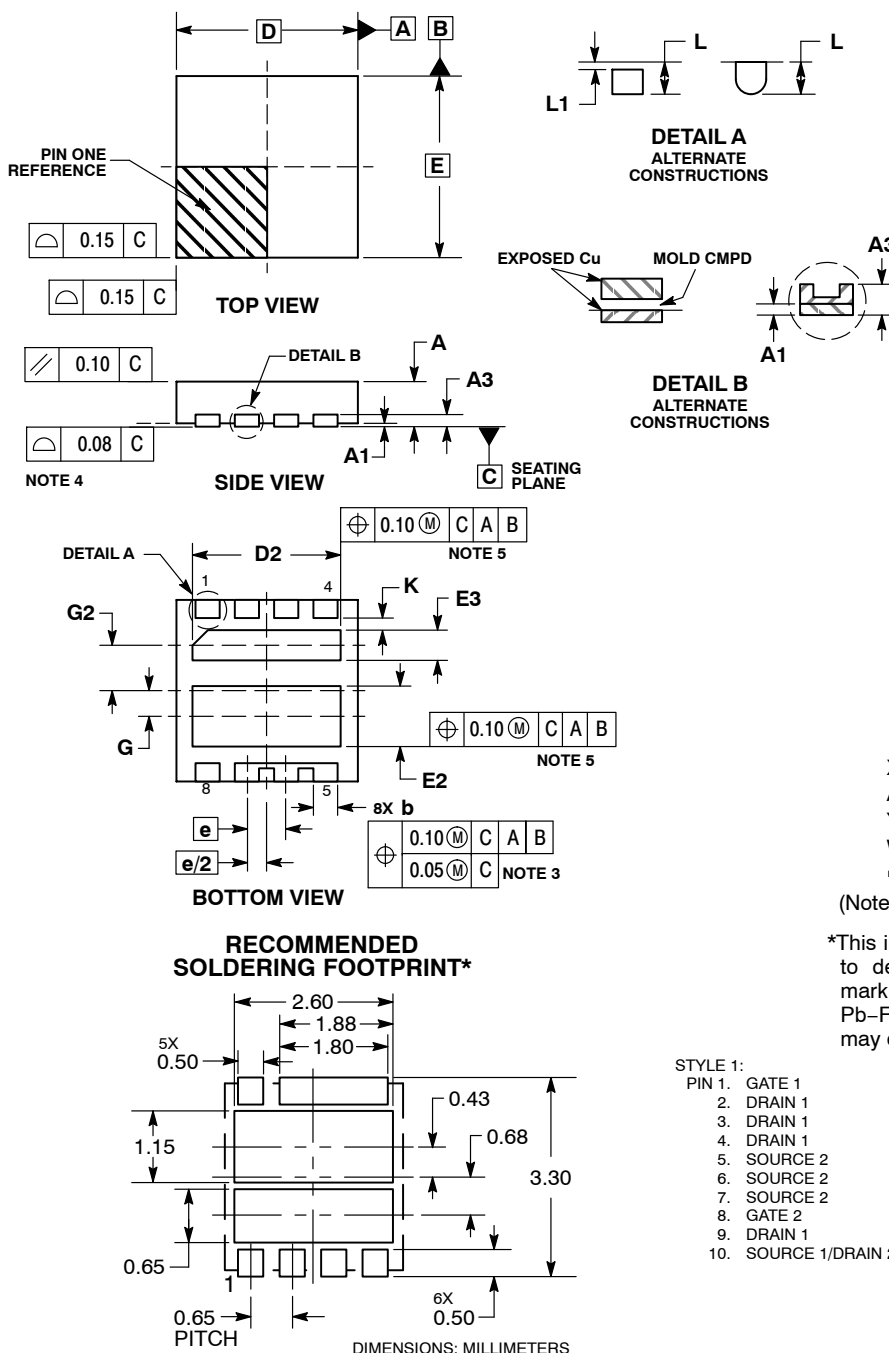


Figure 26. Thermal Response

**ON**

DATE 17 JUL 2012

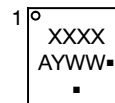


**NOTES:**

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. DIMENSION  $b$  APPLIES TO PLATED TERMINAL AND IS MEASURED BETWEEN 0.05 AND 0.15 MM FROM TERMINAL TIP.
4. COPLANARITY APPLIES TO THE EXPOSED PAD AS WELL AS THE TERMINALS.
5. POSITIONAL TOLERANCE APPLIES TO ALL OF THE EXPOSED PADS.

| DIM | MILLIMETERS |       |
|-----|-------------|-------|
|     | MIN         | MAX   |
| A   | 0.70        | 0.80  |
| A1  | 0.00        | 0.05  |
| A3  | 0.20 REF    |       |
| b   | 0.30        | 0.50  |
| D   | 3.00 BSC    |       |
| D2  | 2.35        | 2.55  |
| E   | 3.00 BSC    |       |
| E2  | 0.90        | 1.10  |
| E3  | 0.40        | 0.60  |
| e   | 0.65 BSC    |       |
| G   | 0.43 BSC    |       |
| G2  | 0.68 BSC    |       |
| K   | 0.20        | ----- |
| L   | 0.20        | 0.40  |
| L1  | 0.00        | 0.15  |

### GENERIC MARKING DIAGRAM\*



XXXX = Specific Device Code  
A = Assembly Location  
Y = Year  
WW = Work Week  
▪ = Pb-Free Package

(Note: Microdot may be in either location)

\*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.

STYLE 1:

|        |                  |
|--------|------------------|
| PIN 1. | GATE 1           |
| 2.     | DRAIN 1          |
| 3.     | DRAIN 1          |
| 4.     | DRAIN 1          |
| 5.     | SOURCE 2         |
| 6.     | SOURCE 2         |
| 7.     | SOURCE 2         |
| 8.     | GATE 2           |
| 9.     | DRAIN 1          |
| 10.    | SOURCE 1/DRAIN 2 |

\*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, [SOLDDRRM/D](#).

|                         |                          |                                                                                                                                                                                     |
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