

# NVD6824NL

## Power MOSFET

100 V, 20 mΩ, 41 A, Single N-Channel

### Features

- Low  $R_{DS(on)}$  to Minimize Conduction Losses
- High Current Capability
- Avalanche Energy Specified
- AEC-Q101 Qualified
- These Devices are Pb-Free, Halogen Free/BFR Free and are RoHS Compliant

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

| Parameter                                                                                                                                                   |                                               |                        | Symbol                            | Value       | Unit |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------|------------------------|-----------------------------------|-------------|------|
| Drain-to-Source Voltage                                                                                                                                     |                                               |                        | V <sub>DSS</sub>                  | 100         | V    |
| Gate-to-Source Voltage                                                                                                                                      |                                               |                        | V <sub>GS</sub>                   | ± 20        | V    |
| Continuous Drain Current R <sub>θJC</sub> (Note 1)                                                                                                          | Steady State                                  | T <sub>C</sub> = 25°C  | I <sub>D</sub>                    | 41          | A    |
|                                                                                                                                                             |                                               | T <sub>C</sub> = 100°C |                                   | 29          |      |
| Power Dissipation R <sub>θJC</sub> (Note 1)                                                                                                                 |                                               | T <sub>C</sub> = 25°C  | P <sub>D</sub>                    | 90          | W    |
|                                                                                                                                                             |                                               | T <sub>C</sub> = 100°C |                                   | 45          |      |
| Continuous Drain Current R <sub>θJA</sub> (Notes 1 & 2)                                                                                                     | Steady State                                  | T <sub>A</sub> = 25°C  | I <sub>D</sub>                    | 8.5         | A    |
|                                                                                                                                                             |                                               | T <sub>A</sub> = 100°C |                                   | 6.0         |      |
| Power Dissipation R <sub>θJA</sub> (Notes 1 & 2)                                                                                                            |                                               | T <sub>A</sub> = 25°C  | P <sub>D</sub>                    | 3.9         | W    |
|                                                                                                                                                             |                                               | T <sub>A</sub> = 100°C |                                   | 1.9         |      |
| Pulsed Drain Current                                                                                                                                        | T <sub>A</sub> = 25°C, t <sub>p</sub> = 10 μs |                        | I <sub>DM</sub>                   | 238         | A    |
| Current Limited by Package (Note 3)                                                                                                                         | T <sub>A</sub> = 25°C                         |                        | I <sub>Dmaxpkg</sub>              | 60          | A    |
| Operating Junction and Storage Temperature                                                                                                                  |                                               |                        | T <sub>J</sub> , T <sub>stg</sub> | – 55 to 175 | °C   |
| Source Current (Body Diode)                                                                                                                                 |                                               |                        | I <sub>S</sub>                    | 41          | A    |
| Single Pulse Drain-to-Source Avalanche Energy (T <sub>J</sub> = 25°C, V <sub>GS</sub> = 10 V, I <sub>L(pk)</sub> = 40 A, L = 0.1 mH, R <sub>G</sub> = 25 Ω) |                                               |                        | E <sub>AS</sub>                   | 80          | mJ   |
| 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.

### THERMAL RESISTANCE MAXIMUM RATINGS

| Parameter                                   | Symbol          | Value | Unit                      |
|---------------------------------------------|-----------------|-------|---------------------------|
| Junction-to-Case – Steady State (Drain)     | $R_{\theta JC}$ | 1.7   | $^\circ\text{C}/\text{W}$ |
| Junction-to-Ambient – Steady State (Note 2) | $R_{\theta JA}$ | 39    |                           |

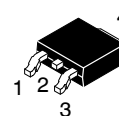
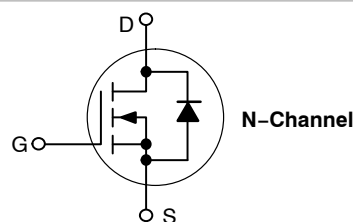
1. The entire application environment impacts the thermal resistance values shown, they are not constants and are only valid for the particular conditions noted.
2. Surface-mounted on FR4 board using a 650 mm<sup>2</sup>, 2 oz. Cu pad.
3. Continuous DC current rating. Maximum current for pulses as long as 1 second is higher but is dependent on pulse duration and duty cycle.



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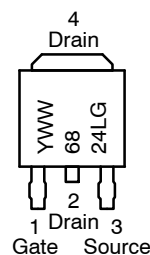
<http://onsemi.com>

| $V_{(BR)DSS}$ | $R_{DS(on)}$  | $I_D$ |
|---------------|---------------|-------|
| 100 V         | 20 mΩ @ 10 V  | 41 A  |
|               | 23 mΩ @ 4.5 V |       |



DPAK  
CASE 369C  
STYLE 2

### MARKING DIAGRAMS & PIN ASSIGNMENT



Y = Year  
WW = Work Week  
6824L = Device Code  
G = Pb-Free Package

### ORDERING INFORMATION

| Device       | Package        | Shipping†        |
|--------------|----------------|------------------|
| NVD6824NLT4G | DPAK (Pb-Free) | 2500/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.

# NVD6824NL

## ELECTRICAL CHARACTERISTICS (T<sub>J</sub> = 25°C unless otherwise noted)

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

### OFF CHARACTERISTICS

|                                                           |                                      |                                                   |                        |    |       |       |
|-----------------------------------------------------------|--------------------------------------|---------------------------------------------------|------------------------|----|-------|-------|
| Drain-to-Source Breakdown Voltage                         | V <sub>(BR)DSS</sub>                 | V <sub>GS</sub> = 0 V, I <sub>D</sub> = 250 μA    | 100                    |    |       | V     |
| Drain-to-Source Breakdown Voltage Temperature Coefficient | V <sub>(BR)DSS</sub> /T <sub>J</sub> |                                                   |                        | 92 |       | mV/°C |
| Zero Gate Voltage Drain Current                           | I <sub>DSS</sub>                     | V <sub>GS</sub> = 0 V,<br>V <sub>DS</sub> = 100 V | T <sub>J</sub> = 25°C  |    | 1.0   | μA    |
|                                                           |                                      |                                                   | T <sub>J</sub> = 125°C |    | 100   |       |
| Gate-to-Source Leakage Current                            | I <sub>GSS</sub>                     | V <sub>DS</sub> = 0 V, V <sub>GS</sub> = ± 20 V   |                        |    | ± 100 | nA    |

### ON CHARACTERISTICS (Note 4)

|                                            |                                     |                                                             |     |      |     |       |
|--------------------------------------------|-------------------------------------|-------------------------------------------------------------|-----|------|-----|-------|
| Gate Threshold Voltage                     | V <sub>GS(TH)</sub>                 | V <sub>GS</sub> = V <sub>DS</sub> , I <sub>D</sub> = 250 μA | 1.5 |      | 2.5 | V     |
| Negative Threshold Temperature Coefficient | V <sub>GS(TH)</sub> /T <sub>J</sub> |                                                             |     | -6.5 |     | mV/°C |
| Drain-to-Source On Resistance              | R <sub>DS(on)</sub>                 | V <sub>GS</sub> = 10 V, I <sub>D</sub> = 20 A               |     | 16.5 | 20  | mΩ    |
|                                            |                                     | V <sub>GS</sub> = 4.5 V, I <sub>D</sub> = 20 A              |     | 18.5 | 23  |       |
| Forward Transconductance                   | g <sub>FS</sub>                     | V <sub>DS</sub> = 15 V, I <sub>D</sub> = 20 A               |     | 18   |     | S     |

### CHARGES, CAPACITANCES AND GATE RESISTANCES

|                              |                     |                                                                           |  |      |  |    |
|------------------------------|---------------------|---------------------------------------------------------------------------|--|------|--|----|
| Input Capacitance            | C <sub>iss</sub>    | V <sub>GS</sub> = 0 V, f = 1.0 MHz,<br>V <sub>DS</sub> = 25 V             |  | 3468 |  | pF |
| Output Capacitance           | C <sub>oss</sub>    |                                                                           |  | 187  |  |    |
| Reverse Transfer Capacitance | C <sub>rss</sub>    |                                                                           |  | 133  |  |    |
| Total Gate Charge            | Q <sub>G(TOT)</sub> | V <sub>GS</sub> = 4.5 V, V <sub>DS</sub> = 80 V,<br>I <sub>D</sub> = 20 A |  | 34   |  | nC |
|                              |                     | V <sub>GS</sub> = 10 V, V <sub>DS</sub> = 80 V,<br>I <sub>D</sub> = 20 A  |  | 66   |  |    |
| Threshold Gate Charge        | Q <sub>G(TH)</sub>  | V <sub>GS</sub> = 10 V, V <sub>DS</sub> = 80 V,<br>I <sub>D</sub> = 20 A  |  | 3.5  |  |    |
| Gate-to-Source Charge        | Q <sub>GS</sub>     |                                                                           |  | 9.0  |  |    |
| Gate-to-Drain Charge         | Q <sub>GD</sub>     |                                                                           |  | 18   |  |    |

### SWITCHING CHARACTERISTICS (Note 5)

|                     |                     |                                                                                                  |  |    |  |    |
|---------------------|---------------------|--------------------------------------------------------------------------------------------------|--|----|--|----|
| Turn-On Delay Time  | t <sub>d(on)</sub>  | V <sub>GS</sub> = 10 V, V <sub>DD</sub> = 80 V,<br>I <sub>D</sub> = 20 A, R <sub>G</sub> = 2.5 Ω |  | 15 |  | ns |
| Rise Time           | t <sub>r</sub>      |                                                                                                  |  | 55 |  |    |
| Turn-Off Delay Time | t <sub>d(off)</sub> |                                                                                                  |  | 31 |  |    |
| Fall Time           | t <sub>f</sub>      |                                                                                                  |  | 42 |  |    |

### DRAIN-SOURCE DIODE CHARACTERISTICS

|                         |                 |                                                                                 |                        |    |      |     |   |
|-------------------------|-----------------|---------------------------------------------------------------------------------|------------------------|----|------|-----|---|
| Forward Diode Voltage   | V <sub>SD</sub> | V <sub>GS</sub> = 0 V,<br>I <sub>S</sub> = 20 A                                 | T <sub>J</sub> = 25°C  |    | 0.84 | 1.2 | V |
|                         |                 |                                                                                 | T <sub>J</sub> = 125°C |    | 0.71 |     |   |
| Reverse Recovery Time   | t <sub>RR</sub> | V <sub>GS</sub> = 0 V, dI <sub>S</sub> /dt = 100 A/μs,<br>I <sub>S</sub> = 20 A |                        | 38 |      | ns  |   |
| Charge Time             | t <sub>a</sub>  |                                                                                 |                        | 28 |      |     |   |
| Discharge Time          | t <sub>b</sub>  |                                                                                 |                        | 10 |      |     |   |
| Reverse Recovery Charge | Q <sub>RR</sub> |                                                                                 |                        | 59 |      | nC  |   |

4. Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2%.

5. Switching characteristics are independent of operating junction temperatures.

TYPICAL CHARACTERISTICS

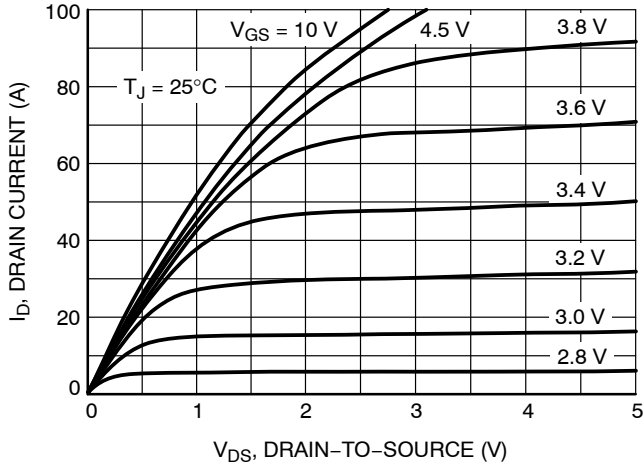


Figure 1. On-Region Characteristics

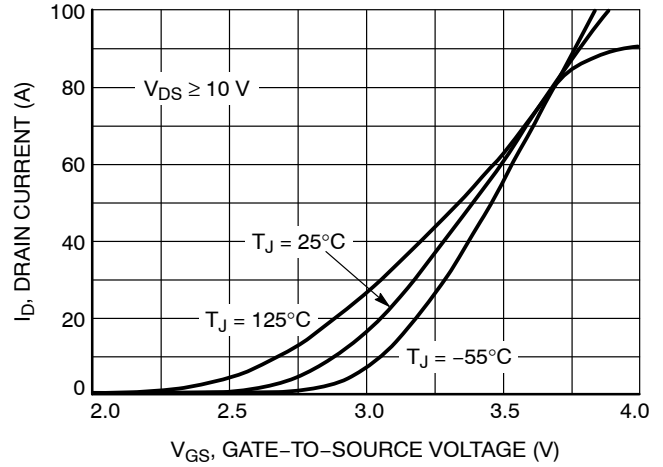


Figure 2. Transfer Characteristics

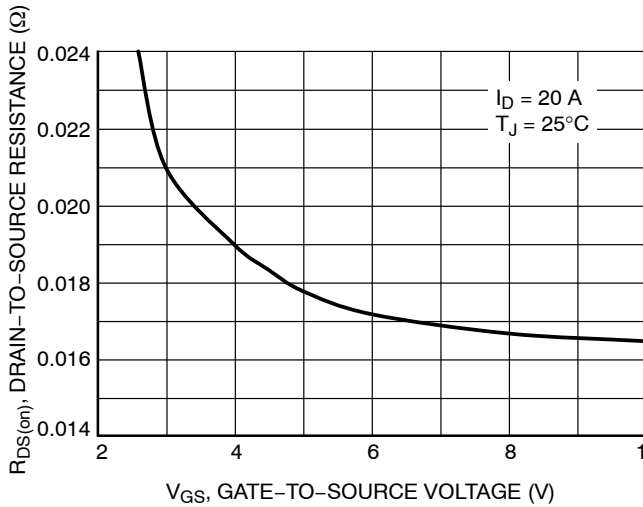


Figure 3. On-Resistance vs. Gate Voltage

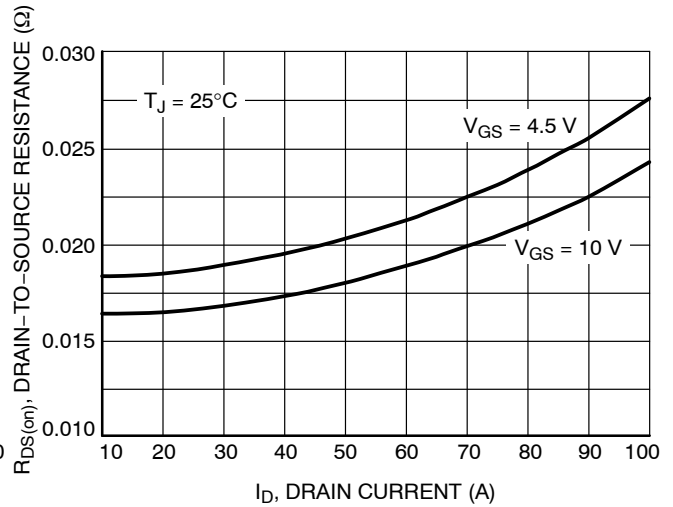


Figure 4. On-Resistance vs. Drain Current and Gate Voltage

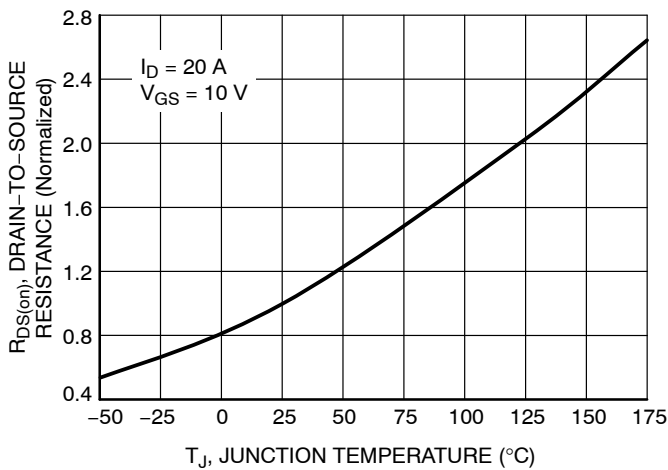


Figure 5. On-Resistance Variation with Temperature

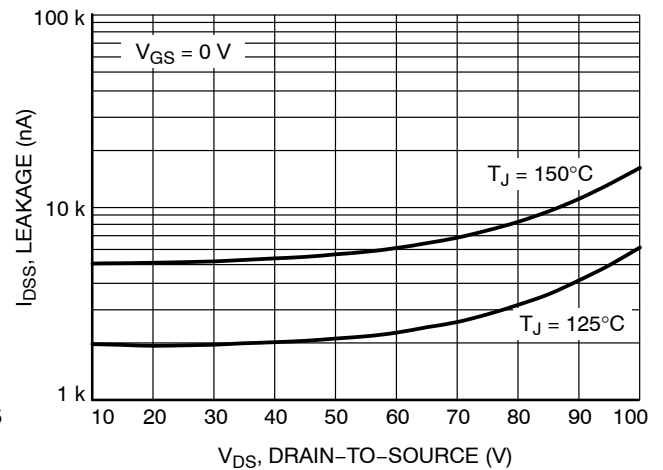


Figure 6. Drain-to-Source Leakage Current vs. Voltage

TYPICAL CHARACTERISTICS

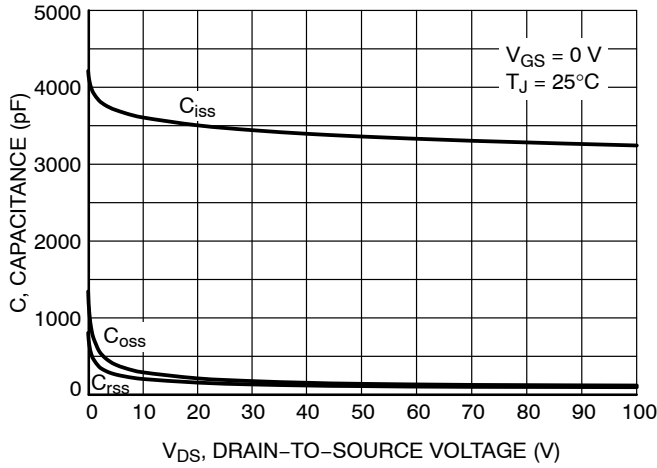


Figure 7. Capacitance Variation

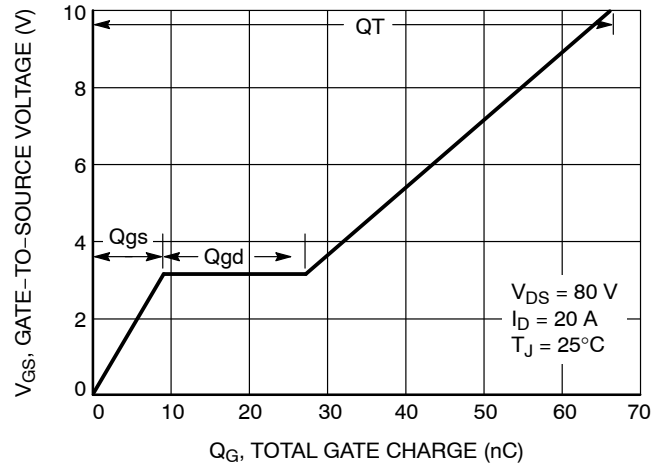


Figure 8. Gate-to-Source Voltage vs. Total Charge

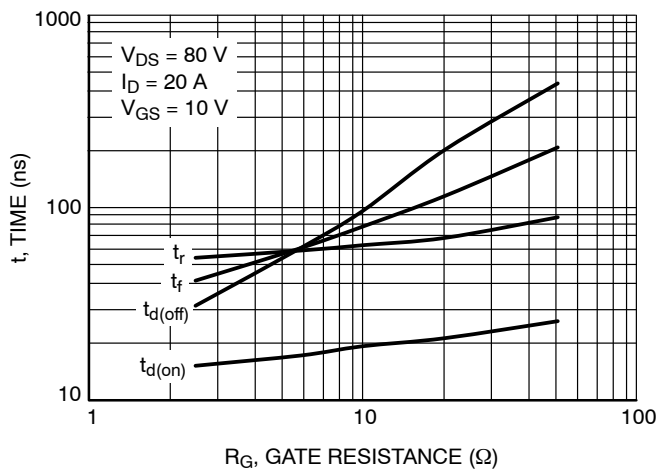


Figure 9. Resistive Switching Time Variation vs. Gate Resistance

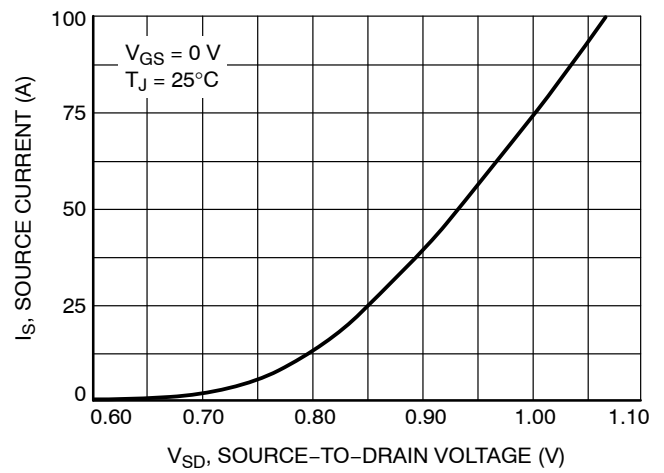


Figure 10. Diode Forward Voltage vs. Current

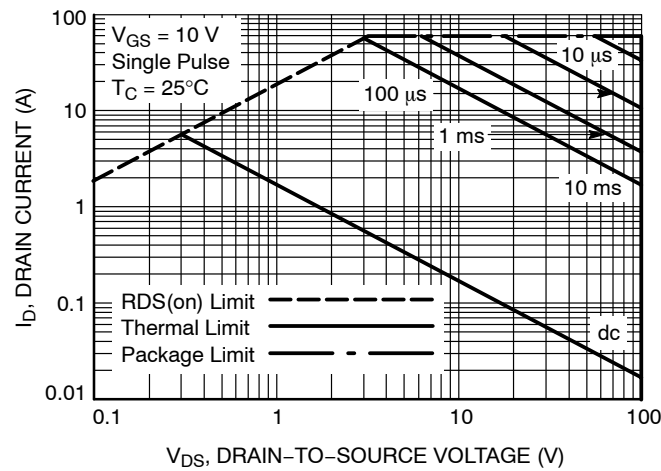


Figure 11. Maximum Rated Forward Biased Safe Operating Area

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## TYPICAL CHARACTERISTICS

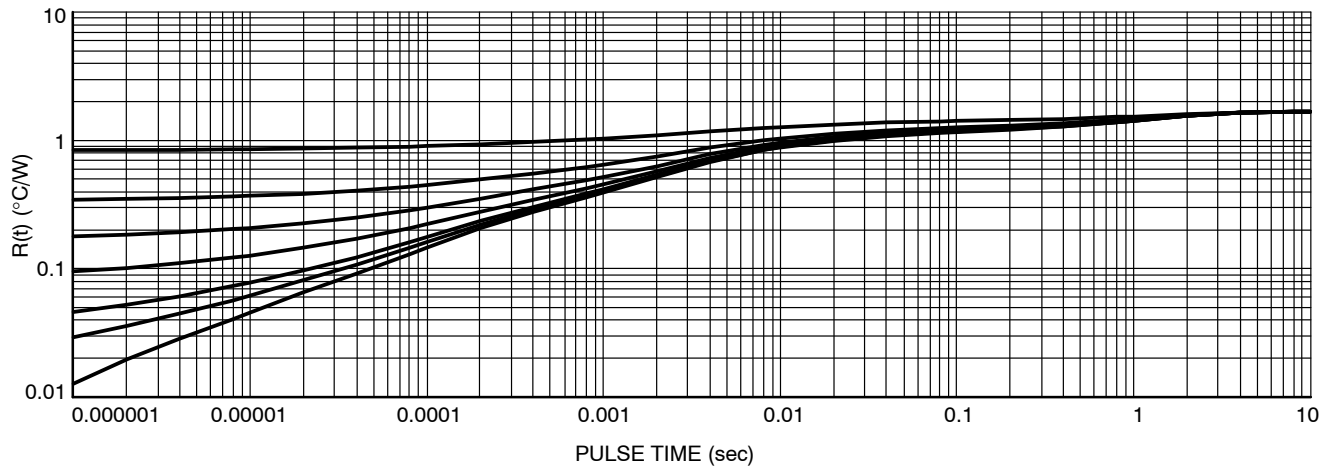


Figure 12. Thermal Response





Компания «ЭлектроПласт» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Оперативные поставки широкого спектра электронных компонентов отечественного и импортного производства напрямую от производителей и с крупнейших мировых складов;
- Поставка более 17-ти миллионов наименований электронных компонентов;
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- Лицензия ФСБ на осуществление работ с использованием сведений, составляющих государственную тайну;
- Поставка специализированных компонентов (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Aeroflex, Peregrine, Syfer, Eurofarad, Texas Instrument, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

Помимо этого, одним из направлений компании «ЭлектроПласт» является направление «Источники питания». Мы предлагаем Вам помощь Конструкторского отдела:

- Подбор оптимального решения, техническое обоснование при выборе компонента;
- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



#### Как с нами связаться

**Телефон:** 8 (812) 309 58 32 (многоканальный)

**Факс:** 8 (812) 320-02-42

**Электронная почта:** [org@eplast1.ru](mailto:org@eplast1.ru)

**Адрес:** 198099, г. Санкт-Петербург, ул. Калинина, дом 2, корпус 4, литера А.