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FDD26AN06A0_F085

N-Channel PowerTrench® MOSFET 60V, 36A, 26mΩ

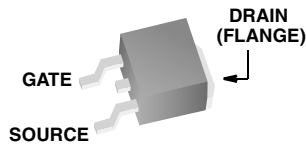
Features

- $r_{DS(ON)} = 20m\Omega$ (Typ.), $V_{GS} = 10V$, $I_D = 36A$
- $Q_g(tot) = 13nC$ (Typ.), $V_{GS} = 10V$
- Low Miller Charge
- Low Q_{RR} Body Diode
- UIS Capability (Single Pulse and Repetitive Pulse)
- Qualified to AEC Q101
- RoHS Compliant

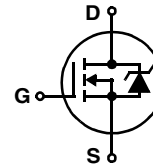


Applications

- Motor / Body Load Control
- ABS Systems
- Powertrain Management
- Injection Systems
- DC-DC converters and Off-line UPS
- Distributed Power Architectures and VRMs
- Primary Switch for 12V and 24V systems



TO-252AA
FDD SERIES



MOSFET Maximum Ratings $T_C = 25^\circ C$ unless otherwise noted

| Symbol | Parameter | Ratings | Units |
|----------------|---|------------|---------------|
| V_{DSS} | Drain to Source Voltage | 60 | V |
| V_{GS} | Gate to Source Voltage | ± 20 | V |
| I_D | Drain Current | | |
| | Continuous ($T_C = 25^\circ C$, $V_{GS} = 10V$) | 36 | A |
| | Continuous ($T_C = 100^\circ C$, $V_{GS} = 10V$) | 25 | A |
| | Continuous ($T_{amb} = 25^\circ C$, $V_{GS} = 10V$, $R_{\theta JA} = 52^\circ C/W$) | 7 | A |
| | Pulsed | Figure 4 | A |
| E_{AS} | Single Pulse Avalanche Energy (Note 1) | 35 | mJ |
| P_D | Power dissipation | 75 | W |
| | Derate above $25^\circ C$ | 0.5 | W/ $^\circ C$ |
| T_J, T_{STG} | Operating and Storage Temperature | -55 to 175 | $^\circ C$ |

Thermal Characteristics

| | | | |
|-----------------|---|-----|--------------|
| $R_{\theta JC}$ | Thermal Resistance Junction to Case TO-252 | 2.0 | $^\circ C/W$ |
| $R_{\theta JA}$ | Thermal Resistance Junction to Ambient TO-252 | 100 | $^\circ C/W$ |
| $R_{\theta JA}$ | Thermal Resistance Junction to Ambient TO-252, 1in ² copper pad area | 52 | $^\circ C/W$ |

This product has been designed to meet the extreme test conditions and environment demanded by the automotive industry. For a copy of the requirements, see AEC Q101 at: <http://www.aecouncil.com/>

All Fairchild Semiconductor products are manufactured, assembled and tested under ISO9000 and QS9000 quality systems certification.

Package Marking and Ordering Information

| Device Marking | Device | Package | Reel Size | Tape Width | Quantity |
|----------------|------------------|----------|-----------|------------|------------|
| FDD26AN06A0 | FDD26AN06A0_F085 | TO-252AA | 330mm | 16mm | 2500 units |

Electrical Characteristics $T_C = 25^\circ\text{C}$ unless otherwise noted

| Symbol | Parameter | Test Conditions | Min | Typ | Max | Units |
|--------|-----------|-----------------|-----|-----|-----|-------|
|--------|-----------|-----------------|-----|-----|-----|-------|

Off Characteristics

| | | | | | | |
|------------|-----------------------------------|---|----|---|-----------|---------------|
| B_{VDSS} | Drain to Source Breakdown Voltage | $I_D = 250\mu\text{A}, V_{GS} = 0\text{V}$ | 60 | - | - | V |
| I_{DSS} | Zero Gate Voltage Drain Current | $V_{DS} = 50\text{V}$ $V_{GS} = 0\text{V}$ $T_C = 150^\circ\text{C}$ | - | - | 1 | μA |
| I_{GSS} | Gate to Source Leakage Current | $V_{GS} = \pm 20\text{V}$ | - | - | ± 100 | nA |

On Characteristics

| | | | | | | |
|--------------|----------------------------------|--|---|-------|-------|----------|
| $V_{GS(TH)}$ | Gate to Source Threshold Voltage | $V_{GS} = V_{DS}, I_D = 250\mu\text{A}$ | 2 | - | 4 | V |
| $r_{DS(ON)}$ | Drain to Source On Resistance | $I_D = 36\text{A}, V_{GS} = 10\text{V}$ $I_D = 36\text{A}, V_{GS} = 10\text{V},$ $T_J = 175^\circ\text{C}$ | - | 0.020 | 0.026 | Ω |
| | | | - | 0.045 | 0.058 | |

Dynamic Characteristics

| | | | | | | |
|--------------|----------------------------------|---|---|-----|-----|----|
| C_{ISS} | Input Capacitance | $V_{DS} = 25\text{V}, V_{GS} = 0\text{V},$ $f = 1\text{MHz}$ | - | 800 | - | pF |
| C_{OSS} | Output Capacitance | | - | 155 | - | pF |
| C_{RSS} | Reverse Transfer Capacitance | | - | 55 | - | pF |
| $Q_{g(TOT)}$ | Total Gate Charge at 10V | $V_{GS} = 0\text{V to } 10\text{V}$ | - | 13 | 17 | nC |
| $Q_{g(TH)}$ | Threshold Gate Charge | $V_{GS} = 0\text{V to } 2\text{V}$ | - | 1.7 | 2.2 | nC |
| Q_{gs} | Gate to Source Gate Charge | $V_{DD} = 30\text{V}$ $I_D = 36\text{A}$ $I_g = 1.0\text{mA}$ | - | 4.3 | - | nC |
| Q_{gs2} | Gate Charge Threshold to Plateau | | - | 2.6 | - | nC |
| Q_{gd} | Gate to Drain "Miller" Charge | | - | 4.6 | - | nC |

Switching Characteristics ($V_{GS} = 10\text{V}$)

| | | | | | | |
|--------------|---------------------|---|---|----|-----|----|
| t_{ON} | Turn-On Time | $V_{DD} = 30\text{V}, I_D = 36\text{A}$ $V_{GS} = 10\text{V}, R_{GS} = 25\Omega$ | - | - | 123 | ns |
| $t_{d(ON)}$ | Turn-On Delay Time | | - | 9 | - | ns |
| t_r | Rise Time | | - | 72 | - | ns |
| $t_{d(OFF)}$ | Turn-Off Delay Time | | - | 23 | - | ns |
| t_f | Fall Time | | - | 35 | - | ns |
| t_{OFF} | Turn-Off Time | | - | - | 88 | ns |

Drain-Source Diode Characteristics

| | | | | | | |
|----------|-------------------------------|---|---|---|------|----|
| V_{SD} | Source to Drain Diode Voltage | $I_{SD} = 36\text{A}$ | - | - | 1.25 | V |
| | | $I_{SD} = 18\text{A}$ | - | - | 1.0 | V |
| t_{rr} | Reverse Recovery Time | $I_{SD} = 36\text{A}, dI_{SD}/dt = 100\text{A}/\mu\text{s}$ | - | - | 43 | ns |
| Q_{RR} | Reverse Recovered Charge | $I_{SD} = 36\text{A}, dI_{SD}/dt = 100\text{A}/\mu\text{s}$ | - | - | 50 | nC |

Notes:

1: Starting $T_J = 25^\circ\text{C}$, $L = 83\mu\text{H}$, $I_{AS} = 29\text{A}$, $V_{DD} = 54\text{V}$, $V_{GS} = 10\text{V}$.

Typical Characteristics $T_C = 25^\circ\text{C}$ unless otherwise noted

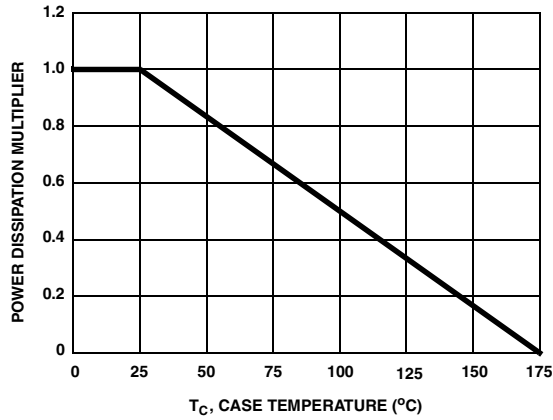


Figure 1. Normalized Power Dissipation vs Case Temperature

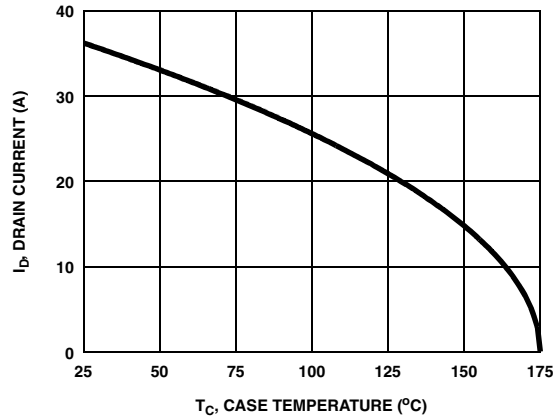


Figure 2. Maximum Continuous Drain Current vs Case Temperature

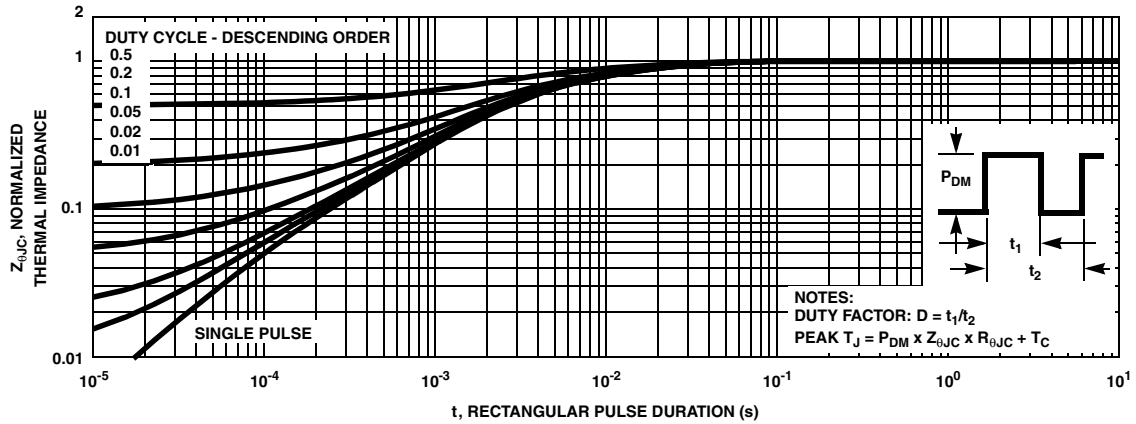


Figure 3. Normalized Maximum Transient Thermal Impedance

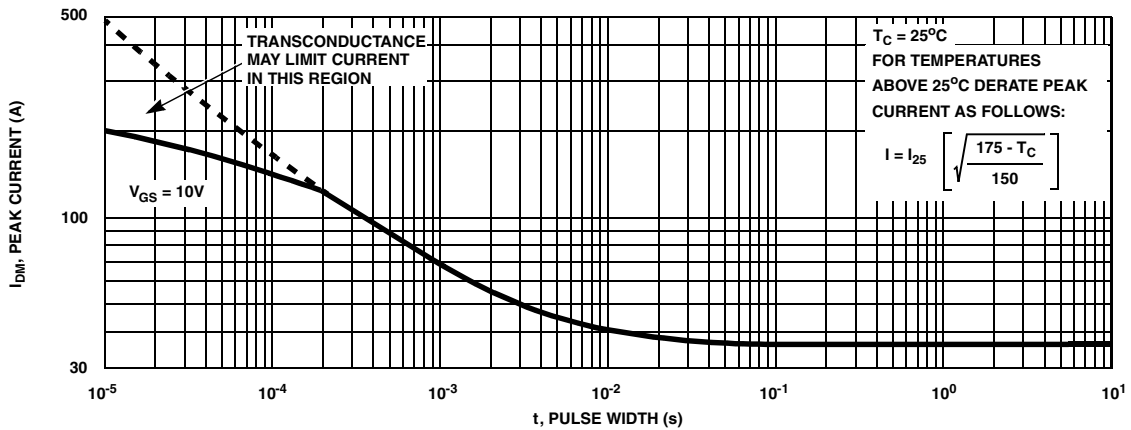


Figure 4. Peak Current Capability

Typical Characteristics $T_C = 25^\circ\text{C}$ unless otherwise noted

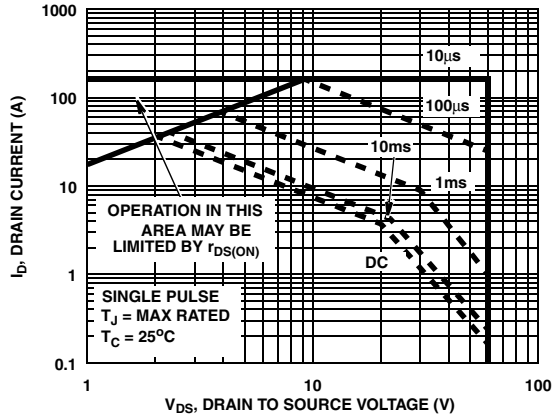
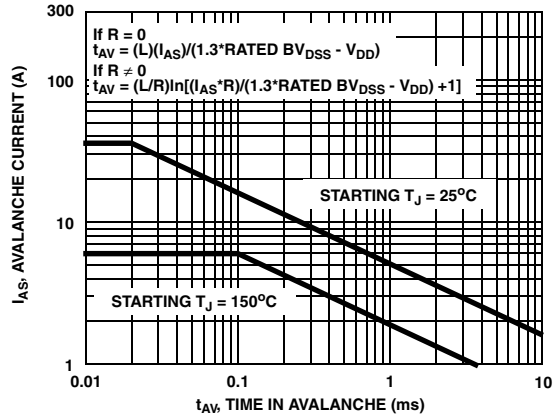


Figure 5. Forward Bias Safe Operating Area



NOTE: Refer to Fairchild Application Notes AN7514 and AN7515
Figure 6. Unclamped Inductive Switching Capability

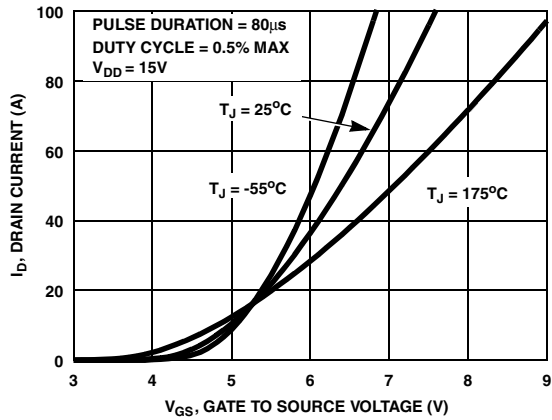


Figure 7. Transfer Characteristics

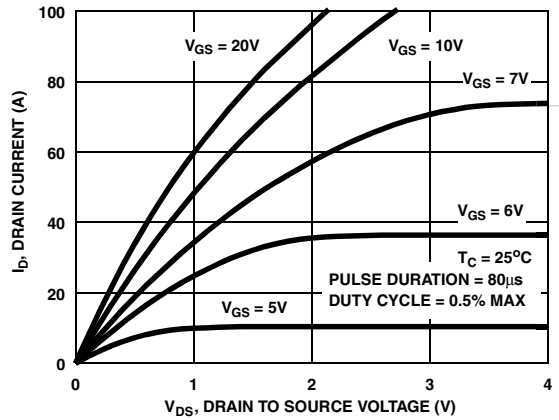


Figure 8. Saturation Characteristics

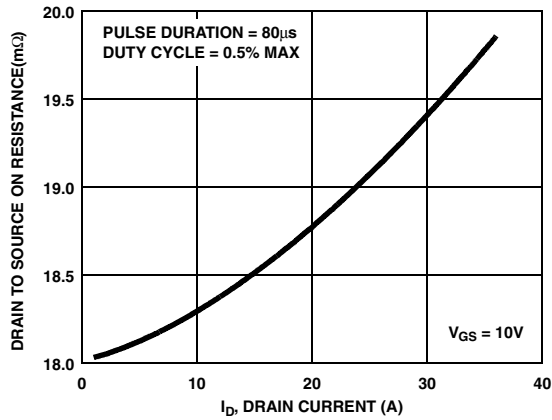


Figure 9. Drain to Source On Resistance vs Drain Current

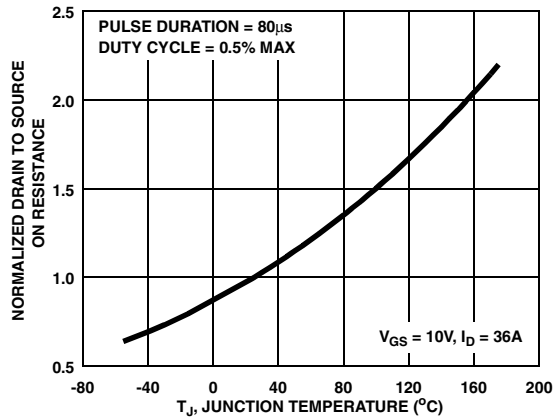


Figure 10. Normalized Drain to Source On Resistance vs Junction Temperature

Typical Characteristics $T_C = 25^\circ\text{C}$ unless otherwise noted

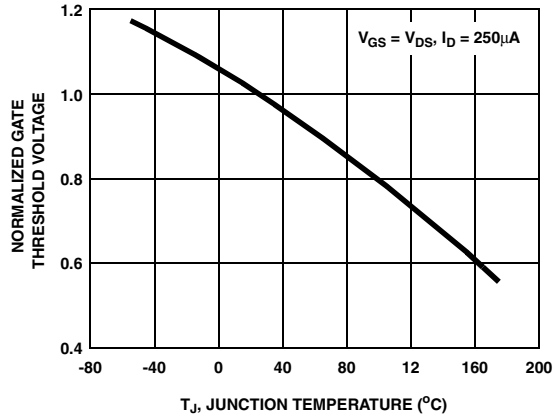


Figure 11. Normalized Gate Threshold Voltage vs Junction Temperature

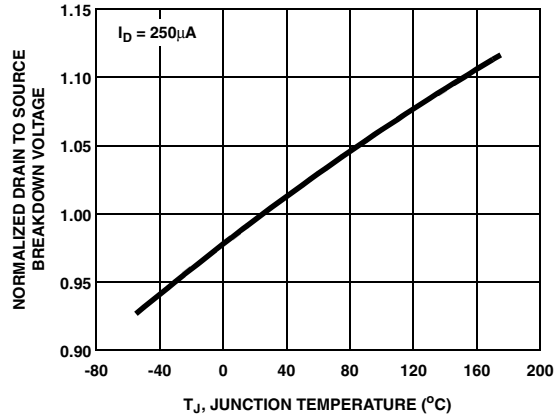


Figure 12. Normalized Drain to Source Breakdown Voltage vs Junction Temperature

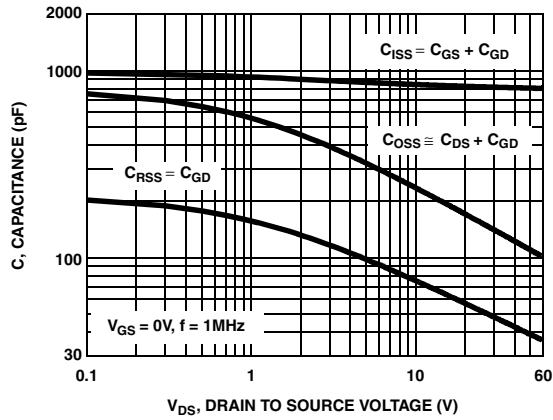


Figure 13. Capacitance vs Drain to Source Voltage

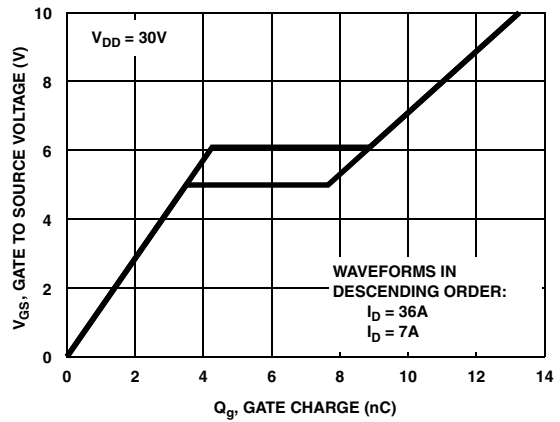


Figure 14. Gate Charge Waveforms for Constant Gate Current

Test Circuits and Waveforms

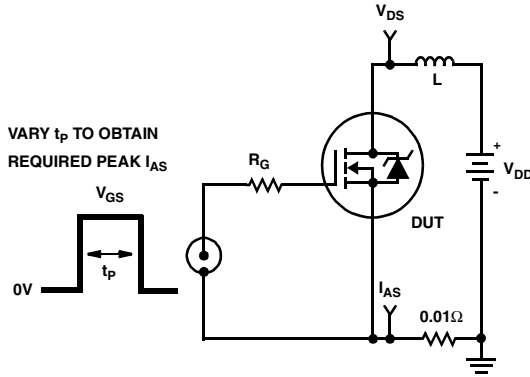


Figure 15. Unclamped Energy Test Circuit

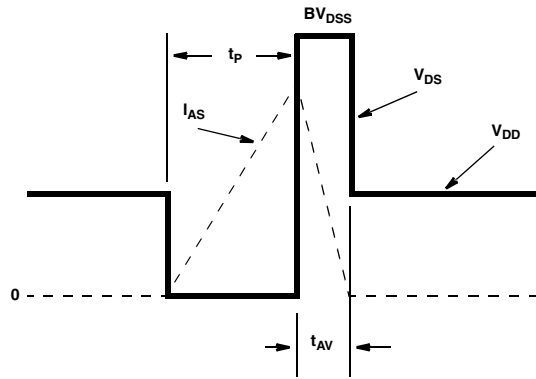


Figure 16. Unclamped Energy Waveforms

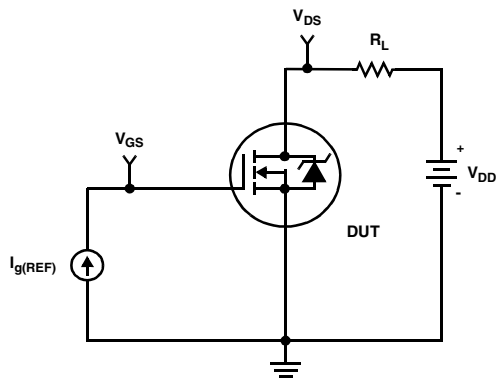


Figure 17. Gate Charge Test Circuit

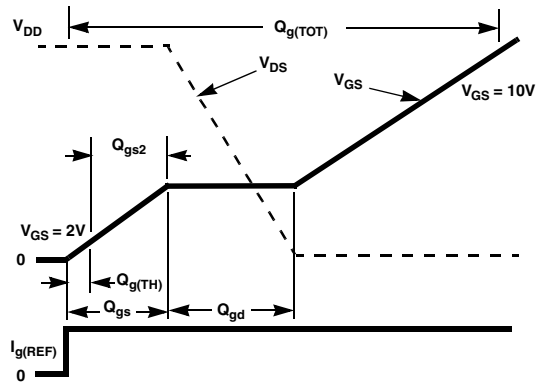


Figure 18. Gate Charge Waveforms

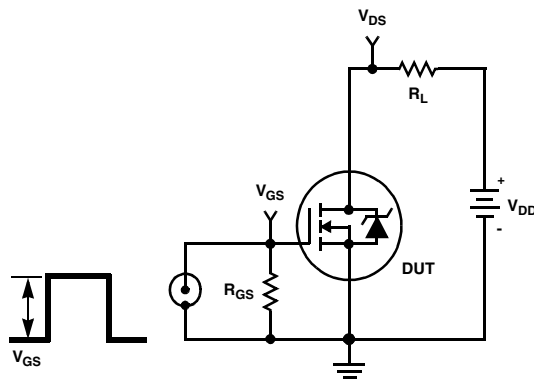


Figure 19. Switching Time Test Circuit

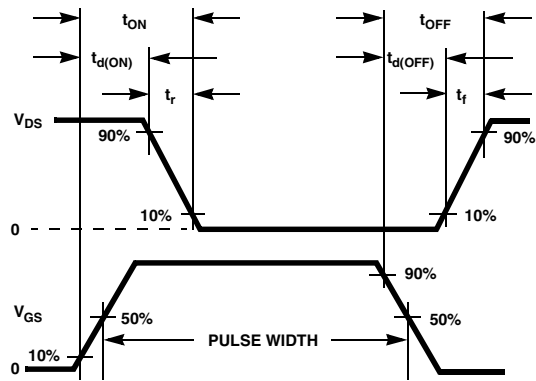


Figure 20. Switching Time Waveforms

Thermal Resistance vs. Mounting Pad Area

The maximum rated junction temperature, T_{JM} , and the thermal resistance of the heat dissipating path determines the maximum allowable device power dissipation, P_{DM} , in an application. Therefore the application's ambient temperature, T_A ($^{\circ}C$), and thermal resistance $R_{\theta JA}$ ($^{\circ}C/W$) must be reviewed to ensure that T_{JM} is never exceeded. Equation 1 mathematically represents the relationship and serves as the basis for establishing the rating of the part.

$$P_{DM} = \frac{(T_{JM} - T_A)}{R_{\theta JA}} \quad (\text{EQ. 1})$$

In using surface mount devices such as the TO-252 package, the environment in which it is applied will have a significant influence on the part's current and maximum power dissipation ratings. Precise determination of P_{DM} is complex and influenced by many factors:

1. Mounting pad area onto which the device is attached and whether there is copper on one side or both sides of the board.
2. The number of copper layers and the thickness of the board.
3. The use of external heat sinks.
4. The use of thermal vias.
5. Air flow and board orientation.
6. For non steady state applications, the pulse width, the duty cycle and the transient thermal response of the part, the board and the environment they are in.

Fairchild provides thermal information to assist the designer's preliminary application evaluation. Figure 21 defines the $R_{\theta JA}$ for the device as a function of the top copper (component side) area. This is for a horizontally positioned FR-4 board with 1oz copper after 1000 seconds of steady state power with no air flow. This graph provides the necessary information for calculation of the steady state junction temperature or power dissipation. Pulse applications can be evaluated using the Fairchild device Spice thermal model or manually utilizing the normalized maximum transient thermal impedance curve.

Thermal resistances corresponding to other copper areas can be obtained from Figure 21 or by calculation using Equation 2 or 3. Equation 2 is used for copper area defined in inches square and equation 3 is for area in centimeters square. The area, in square inches or square centimeters is the top copper area including the gate and source pads.

$$R_{\theta JA} = 33.32 + \frac{23.84}{(0.268 + Area)} \quad (\text{EQ. 2})$$

Area in Inches Squared

$$R_{\theta JA} = 33.32 + \frac{154}{(1.73 + Area)} \quad (\text{EQ. 3})$$

Area in Centimeters Squared

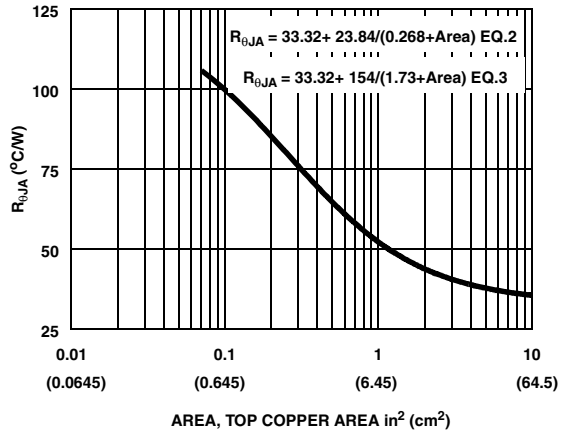






Figure 21. Thermal Resistance vs Mounting Pad Area



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- 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

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