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IRF7750TR](#)

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# International **IR** Rectifier

PD - 93848A

## IRF7750

HEXFET® Power MOSFET

- Ultra Low On-Resistance
- Dual P-Channel MOSFET
- Very Small SOIC Package
- Low Profile ( < 1.1mm)
- Available in Tape & Reel



$$V_{DS} = -20V$$

$$R_{DS(on)} = 0.030\Omega$$

### Description

HEXFET® power MOSFETs from International Rectifier utilize advanced processing techniques to achieve extremely low on-resistance per silicon area. This benefit, combined with the ruggedized device design, that International Rectifier is well known for, provides the designer with an extremely efficient and reliable device for battery and load management.

The TSSOP-8 package has 45% less footprint area than the standard SO-8. This makes the TSSOP-8 an ideal device for applications where printed circuit board space is at a premium. The low profile (<1.1mm) allows it to fit easily into extremely thin environments such as portable electronics and PCMCIA cards.

### Absolute Maximum Ratings

|                          | Parameter                                  | Max.         | Units |
|--------------------------|--------------------------------------------|--------------|-------|
| $V_{DS}$                 | Drain- Source Voltage                      | -20          | V     |
| $I_D @ T_C = 25^\circ C$ | Continuous Drain Current, $V_{GS} @ -4.5V$ | $\pm 4.7$    | A     |
| $I_D @ T_C = 70^\circ C$ | Continuous Drain Current, $V_{GS} @ -4.5V$ | $\pm 3.8$    |       |
| $I_{DM}$                 | Pulsed Drain Current ①                     | $\pm 38$     |       |
| $P_D @ T_C = 25^\circ C$ | Power Dissipation                          | 1.0          | W     |
| $P_D @ T_C = 70^\circ C$ | Power Dissipation                          | 0.64         |       |
|                          | Linear Derating Factor                     | 0.008        | W/°C  |
| $V_{GS}$                 | Gate-to-Source Voltage                     | $\pm 12$     | V     |
| $T_J, T_{STG}$           | Junction and Storage Temperature Range     | -55 to + 150 | °C    |

### Thermal Resistance

|                 | Parameter                    | Max. | Units |
|-----------------|------------------------------|------|-------|
| $R_{\theta JA}$ | Maximum Junction-to-Ambient③ | 125  | °C/W  |

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## Electrical Characteristics @ T<sub>J</sub> = 25°C (unless otherwise specified)

|                                        | Parameter                            | Min.  | Typ.  | Max.  | Units | Conditions                                                          |
|----------------------------------------|--------------------------------------|-------|-------|-------|-------|---------------------------------------------------------------------|
| V <sub>(BR)DSS</sub>                   | Drain-to-Source Breakdown Voltage    | -20   | —     | —     | V     | V <sub>GS</sub> = 0V, I <sub>D</sub> = -250μA                       |
| ΔV <sub>(BR)DSS</sub> /ΔT <sub>J</sub> | Breakdown Voltage Temp. Coefficient  | —     | 0.012 | —     | V/°C  | Reference to 25°C, I <sub>D</sub> = -1mA                            |
| R <sub>DS(on)</sub>                    | Static Drain-to-Source On-Resistance | —     | —     | 0.030 | Ω     | V <sub>GS</sub> = -4.5V, I <sub>D</sub> = -4.7A ②                   |
|                                        |                                      | —     | —     | 0.055 |       | V <sub>GS</sub> = -2.5V, I <sub>D</sub> = -3.8A ②                   |
| V <sub>GS(th)</sub>                    | Gate Threshold Voltage               | -0.45 | —     | -1.2  | V     | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = -250μA         |
| g <sub>fs</sub>                        | Forward Transconductance             | 11    | —     | —     | S     | V <sub>DS</sub> = -10V, I <sub>D</sub> = -4.7A                      |
| I <sub>DSS</sub>                       | Drain-to-Source Leakage Current      | —     | —     | -1.0  | μA    | V <sub>DS</sub> = -20V, V <sub>GS</sub> = 0V                        |
|                                        |                                      | —     | —     | -25   |       | V <sub>DS</sub> = -16V, V <sub>GS</sub> = 0V, T <sub>J</sub> = 70°C |
| I <sub>GSS</sub>                       | Gate-to-Source Forward Leakage       | —     | —     | -100  | nA    | V <sub>GS</sub> = -12V                                              |
|                                        | Gate-to-Source Reverse Leakage       | —     | —     | 100   |       | V <sub>GS</sub> = 12V                                               |
| Q <sub>g</sub>                         | Total Gate Charge                    | —     | 26    | 39    | nC    | I <sub>D</sub> = -4.7A                                              |
| Q <sub>gs</sub>                        | Gate-to-Source Charge                | —     | 3.9   | 5.8   |       | V <sub>DS</sub> = -16V                                              |
| Q <sub>gd</sub>                        | Gate-to-Drain ("Miller") Charge      | —     | 8.0   | 12    |       | V <sub>GS</sub> = -5.0V ②                                           |
| t <sub>d(on)</sub>                     | Turn-On Delay Time                   | —     | 15    | —     | ns    | V <sub>DD</sub> = -10V                                              |
| t <sub>r</sub>                         | Rise Time                            | —     | 54    | —     |       | I <sub>D</sub> = -1.0A                                              |
| t <sub>d(off)</sub>                    | Turn-Off Delay Time                  | —     | 180   | —     |       | R <sub>D</sub> = 10Ω                                                |
| t <sub>f</sub>                         | Fall Time                            | —     | 210   | —     |       | R <sub>G</sub> = 24Ω ②                                              |
| C <sub>iss</sub>                       | Input Capacitance                    | —     | 1700  | —     | pF    | V <sub>GS</sub> = 0V                                                |
| C <sub>oss</sub>                       | Output Capacitance                   | —     | 380   | —     |       | V <sub>DS</sub> = -15V                                              |
| C <sub>rss</sub>                       | Reverse Transfer Capacitance         | —     | 270   | —     |       | f = 1.0MHz                                                          |

## Source-Drain Ratings and Characteristics

|                 | Parameter                              | Min. | Typ. | Max. | Units | Conditions                                                            |
|-----------------|----------------------------------------|------|------|------|-------|-----------------------------------------------------------------------|
| I <sub>S</sub>  | Continuous Source Current (Body Diode) | —    | —    | -1.0 | A     | MOSFET symbol showing the integral reverse p-n junction diode.        |
| I <sub>SM</sub> | Pulsed Source Current (Body Diode) ①   | —    | —    | -38  |       |                                                                       |
| V <sub>SD</sub> | Diode Forward Voltage                  | —    | —    | -1.2 | V     | T <sub>J</sub> = 25°C, I <sub>S</sub> = -1.0A, V <sub>GS</sub> = 0V ② |
| t <sub>rr</sub> | Reverse Recovery Time                  | —    | 26   | 39   | ns    | T <sub>J</sub> = 25°C, I <sub>F</sub> = -1.0A                         |
| Q <sub>rr</sub> | Reverse Recovery Charge                | —    | 16   | 24   | nC    | di/dt = 100A/μs ②                                                     |

### Notes:

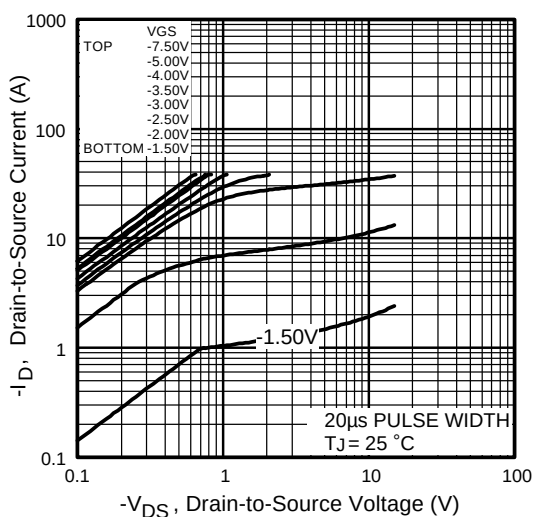
① Repetitive rating; pulse width limited by max. junction temperature.

② Pulse width ≤ 300μs; duty cycle ≤ 2%.

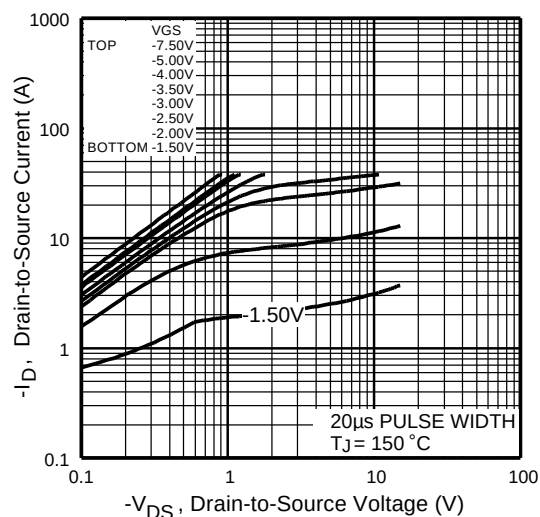
③ When mounted on 1 inch square copper board, t<10 sec

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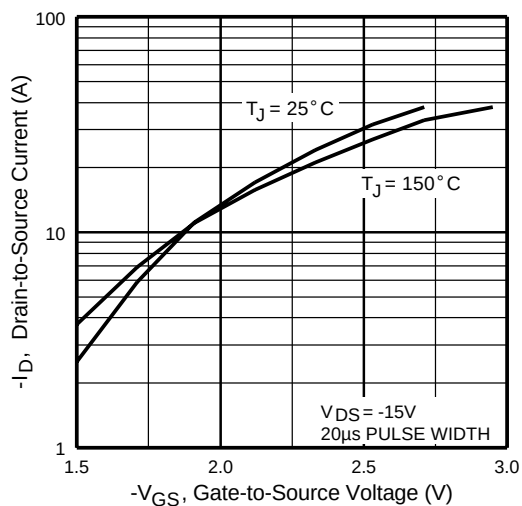
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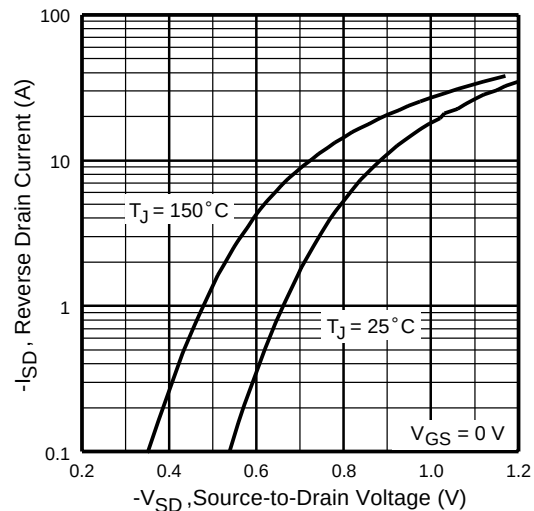
**Fig 1.** Typical Output Characteristics



**Fig 2.** Typical Output Characteristics



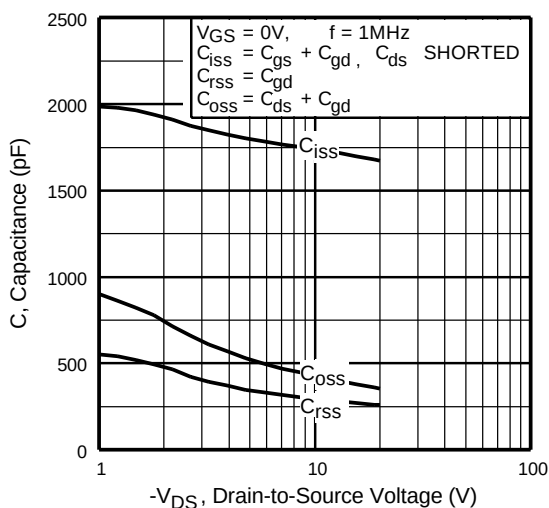
**Fig 3.** Typical Transfer Characteristics



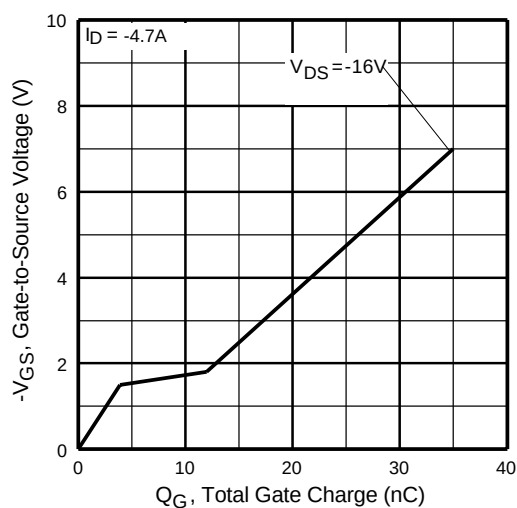
**Fig 4.** Typical Source-Drain Diode Forward Voltage

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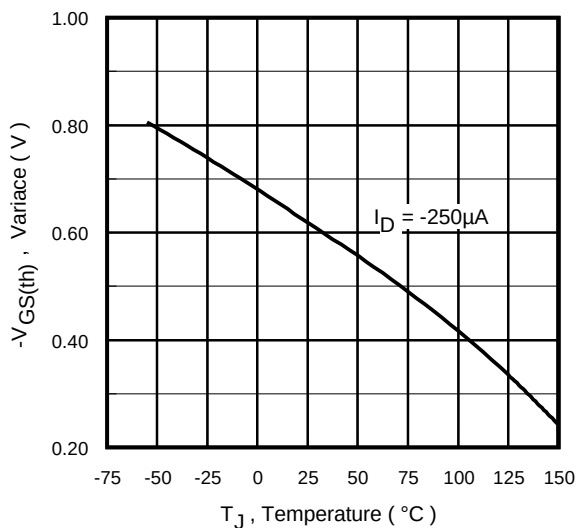
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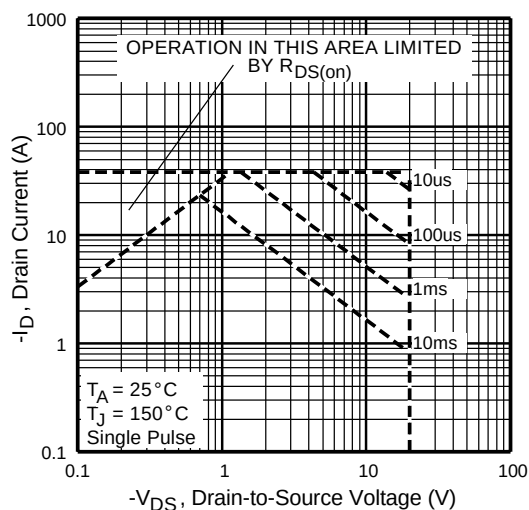
**Fig 5.** Typical Capacitance Vs. Drain-to-Source Voltage



**Fig 6.** Typical Gate Charge Vs. Gate-to-Source Voltage



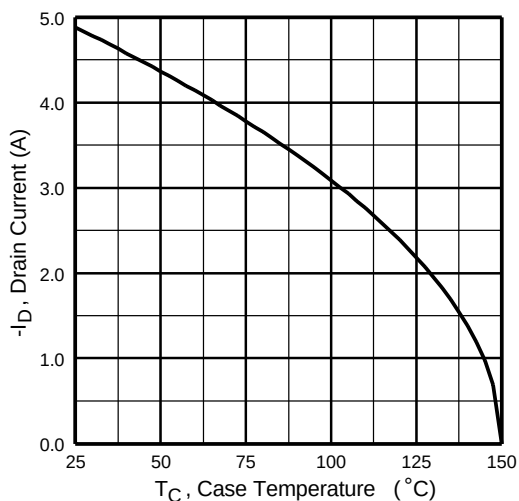
**Fig 7.** Threshold Voltage Vs. Temperature



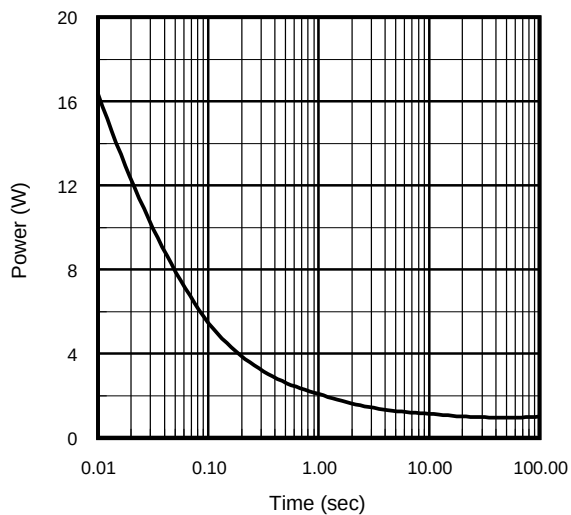
**Fig 8.** Maximum Safe Operating Area

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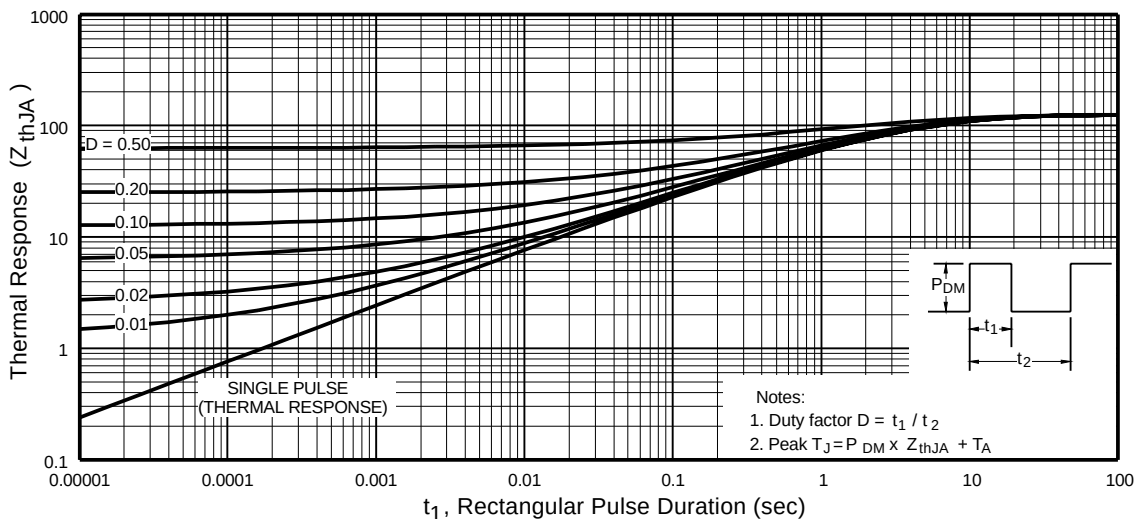
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**Fig 9.** Maximum Drain Current Vs. Case Temperature



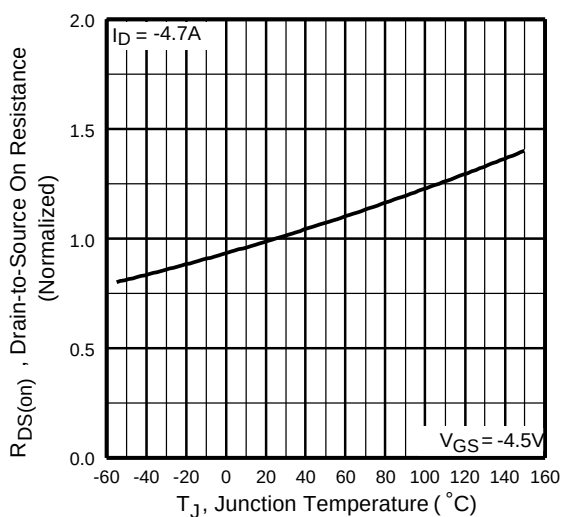
**Fig 10.** Typical Power Vs. Time



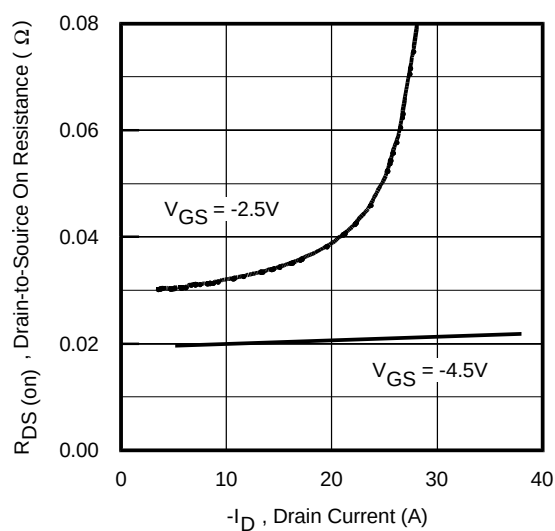
**Fig 11.** Typical Effective Transient Thermal Impedance, Junction-to-Ambient

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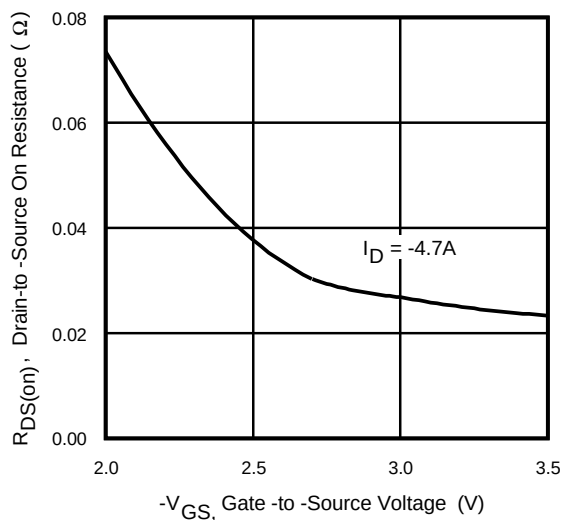
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**Fig 12.** Normalized On-Resistance Vs. Temperature



**Fig 13.** Typical On-Resistance Vs. Drain Current

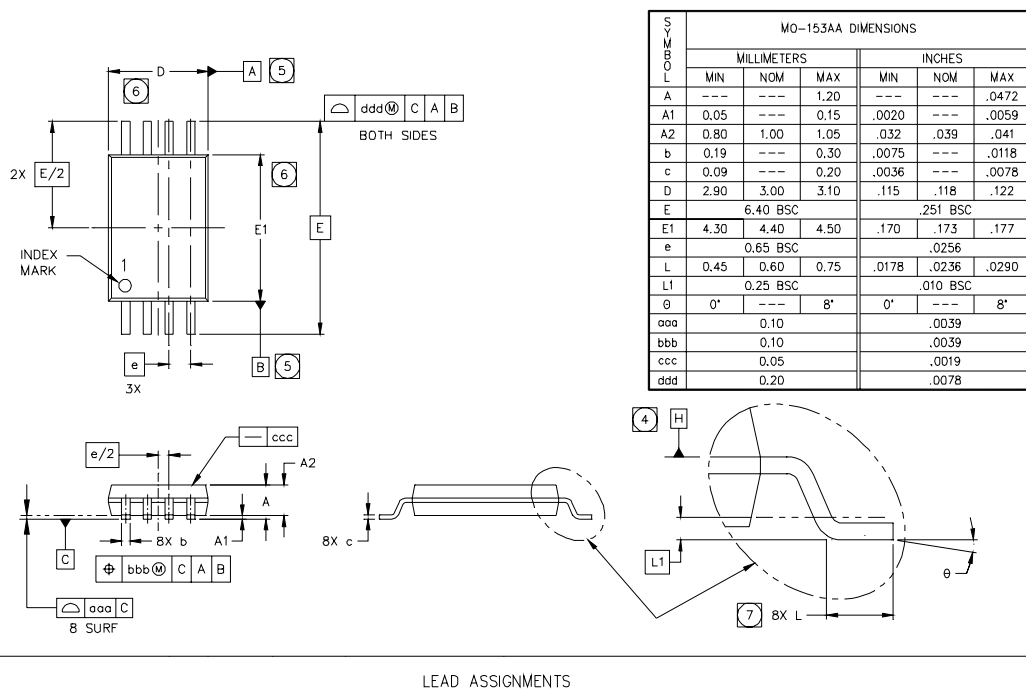


**Fig 14.** Typical On-Resistance Vs. Gate Voltage

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## TSSOP-8 Package Outline



### LEAD ASSIGNMENTS



### NOTES

- DIMENSIONING AND TOLERANCING PER ASME Y14.5M-1994.
- DIMENSIONS ARE SHOWN IN MILLIMETERS AND INCHES.
- CONTROLLING DIMENSION: MILLIMETER.
- DATUM PLANE H IS LOCATED AS SHOWN.
- DATUM A AND B TO BE DETERMINED AT DATUM PLANE H.
- DIMENSIONS D AND E1 ARE MEASURED AT DATUM PLANE H.
- DIMENSION L IS THE LEAD LENGTH FOR SOLDERING TO A SUBSTRATE.
- OUTLINE CONFORMS TO JEDEC OUTLINE MO-153AA.

**WORLD HEADQUARTERS:** 233 Kansas St., El Segundo, California 90245, Tel: (310) 252-7105

**IR GREAT BRITAIN:** Hurst Green, Oxted, Surrey RH8 9BB, UK Tel: ++ 44 1883 732020

**IR CANADA:** 15 Lincoln Court, Brampton, Ontario L6T3Z2, Tel: (905) 453 2200

**IR GERMANY:** Saalburgstrasse 157, 61350 Bad Homburg Tel: ++ 49 6172 96590

**IR ITALY:** Via Liguria 49, 10071 Borgaro, Torino Tel: ++ 39 11 451 0111

**IR JAPAN:** K&H Bldg., 2F, 30-4 Nishi-Ikebukuro 3-Chome, Toshima-Ku, Tokyo Japan 171 Tel: 81 3 3983 0086

**IR SOUTHEAST ASIA:** 1 Kim Seng Promenade, Great World City West Tower, 13-11, Singapore 237994 Tel: ++ 65 838 4630

**IR TAIWAN:** 16 Fl. Suite D. 207, Sec. 2, Tun Haw South Road, Taipei, 10673, Taiwan Tel: 886-2-2377-9936

*Data and specifications subject to change without notice. 5/2000*