

IRF7706

HEXFET® Power MOSFET

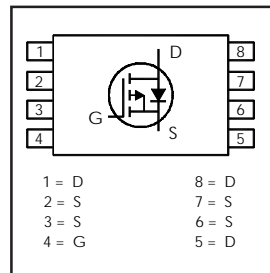
- Ultra Low On-Resistance
- P-Channel MOSFET
- Very Small SOIC Package
- Low Profile (< 1.2mm)
- Available in Tape & Reel

| V_{DS} | $R_{DS(on)}$ max | I_D |
|-------------|-------------------------|-------|
| -30V | 22mΩ @ $V_{GS} = -10V$ | -7.0A |
| | 36mΩ @ $V_{GS} = -4.5V$ | -5.6A |

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 (<1.2mm) 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 | -30 | V |
| I_D @ $T_A = 25^\circ C$ | Continuous Drain Current, V_{GS} @ -10V | -7.0 | A |
| I_D @ $T_A = 70^\circ C$ | Continuous Drain Current, V_{GS} @ -10V | -5.7 | |
| I_{DM} | Pulsed Drain Current ^① | -28 | |
| P_D @ $T_A = 25^\circ C$ | Maximum Power Dissipation ^③ | 1.51 | W |
| P_D @ $T_A = 70^\circ C$ | Maximum Power Dissipation ^③ | 0.96 | W |
| | Linear Derating Factor | 0.01 | W/°C |
| V_{GS} | Gate-to-Source Voltage | ± 20 | V |
| T_J, T_{STG} | Junction and Storage Temperature Range | -55 to + 150 | °C |

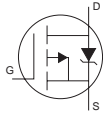
Thermal Resistance

| | Parameter | Max. | Units |
|-----------------|--|------|-------|
| $R_{\theta JA}$ | Maximum Junction-to-Ambient ^③ | 83 | °C/W |

Electrical Characteristics @ $T_J = 25^\circ\text{C}$ (unless otherwise specified)

| | Parameter | Min. | Typ. | Max. | Units | Conditions |
|---------------------------------|--------------------------------------|------|-------|------|-------|--|
| $V_{(BR)DSS}$ | Drain-to-Source Breakdown Voltage | -30 | — | — | V | $V_{GS} = 0V, I_D = -250\mu A$ |
| $\Delta V_{(BR)DSS}/\Delta T_J$ | Breakdown Voltage Temp. Coefficient | — | 0.015 | — | V/°C | Reference to $25^\circ\text{C}, I_D = -1\text{mA}$ |
| $R_{DS(on)}$ | Static Drain-to-Source On-Resistance | — | — | 22 | mΩ | $V_{GS} = -10V, I_D = -7.0A$ ② |
| | | — | — | 36 | | $V_{GS} = -4.5V, I_D = -5.6A$ ② |
| $V_{GS(th)}$ | Gate Threshold Voltage | -1.0 | — | -2.5 | V | $V_{DS} = V_{GS}, I_D = -250\mu A$ |
| g_{fs} | Forward Transconductance | 6.9 | — | — | S | $V_{DS} = -10V, I_D = -7.0A$ |
| I_{DSS} | Drain-to-Source Leakage Current | — | — | -15 | μA | $V_{DS} = -24V, V_{GS} = 0V$ |
| | | — | — | -25 | | $V_{DS} = -24V, V_{GS} = 0V, T_J = 70^\circ\text{C}$ |
| I_{GSS} | Gate-to-Source Forward Leakage | — | — | -100 | nA | $V_{GS} = -20V$ |
| | Gate-to-Source Reverse Leakage | — | — | 100 | | $V_{GS} = 20V$ |
| Q_g | Total Gate Charge | — | 48 | 72 | nC | $I_D = -7.0A$ |
| Q_{gs} | Gate-to-Source Charge | — | 8.5 | — | | $V_{DS} = -15V$ |
| Q_{gd} | Gate-to-Drain ("Miller") Charge | — | 8.4 | — | | $V_{GS} = -10V$ |
| $t_{d(on)}$ | Turn-On Delay Time | — | 17 | 25 | ns | $V_{DD} = -15V, V_{GS} = -10V$ |
| t_r | Rise Time | — | 46 | 69 | | $I_D = -1.0A$ |
| $t_{d(off)}$ | Turn-Off Delay Time | — | 244 | 366 | | $R_G = 6.0\Omega$ |
| t_f | Fall Time | — | 122 | 183 | | $R_D = 15\Omega$ ② |
| C_{iss} | Input Capacitance | — | 2211 | — | pF | $V_{GS} = 0V$ |
| C_{oss} | Output Capacitance | — | 339 | — | | $V_{DS} = -25V$ |
| C_{rss} | Reverse Transfer Capacitance | — | 207 | — | | $f = 1.0\text{MHz}$ |

Source-Drain Ratings and Characteristics

| | Parameter | Min. | Typ. | Max. | Units | Conditions |
|----------|---|------|------|------|-------|--|
| I_S | Continuous Source Current (Body Diode) | — | — | -1.5 | A | MOSFET symbol showing the integral reverse p-n junction diode.  |
| I_{SM} | Pulsed Source Current (Body Diode) ① | — | — | -28 | | |
| V_{SD} | Diode Forward Voltage | — | — | -1.2 | V | $T_J = 25^\circ\text{C}, I_S = -1.5A, V_{GS} = 0V$ ② |
| t_{rr} | Reverse Recovery Time | — | 34 | 51 | ns | $T_J = 25^\circ\text{C}, I_F = -1.5A$ |
| Q_{rr} | Reverse Recovery Charge | — | 32 | 48 | nC | $di/dt = -100A/\mu s$ ② |

Notes:

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

② Pulse width $\leq 300\mu s$; duty cycle $\leq 2\%$.

③ When mounted on 1 inch square copper board, $t < 10\text{sec}$.

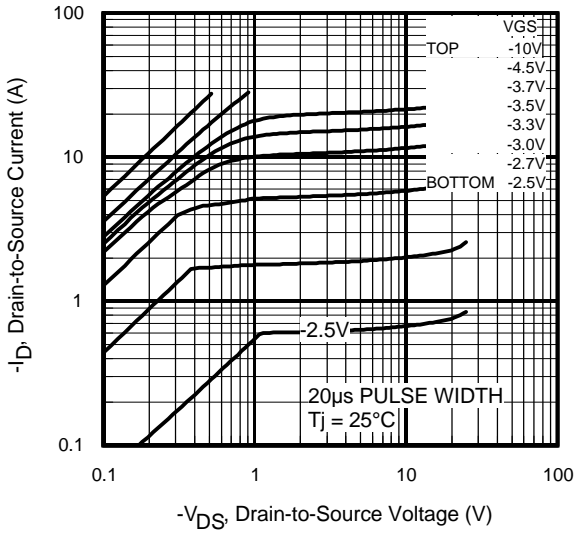


Fig 1. Typical Output Characteristics

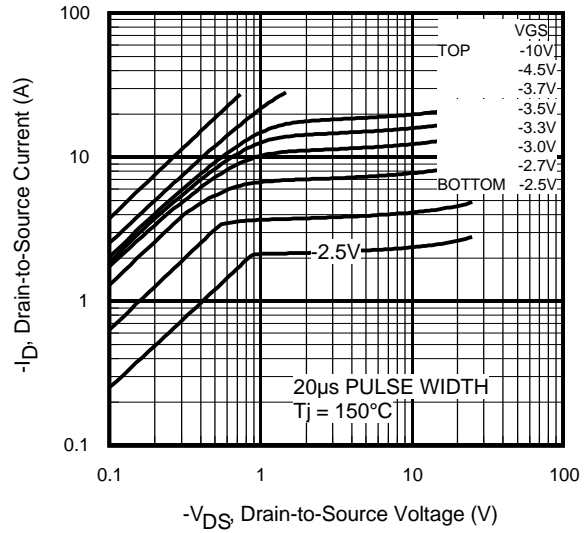


Fig 2. Typical Output Characteristics

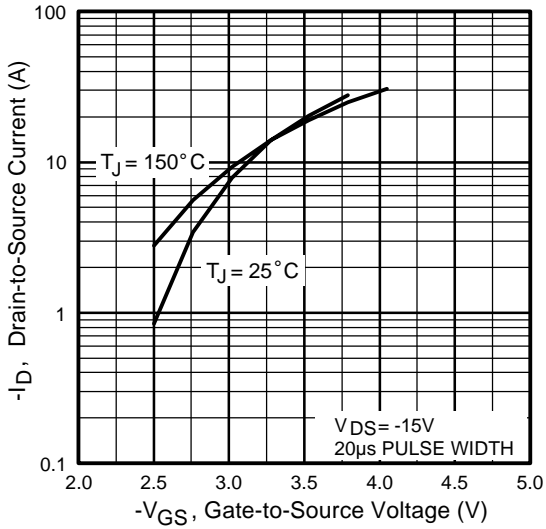


Fig 3. Typical Transfer Characteristics

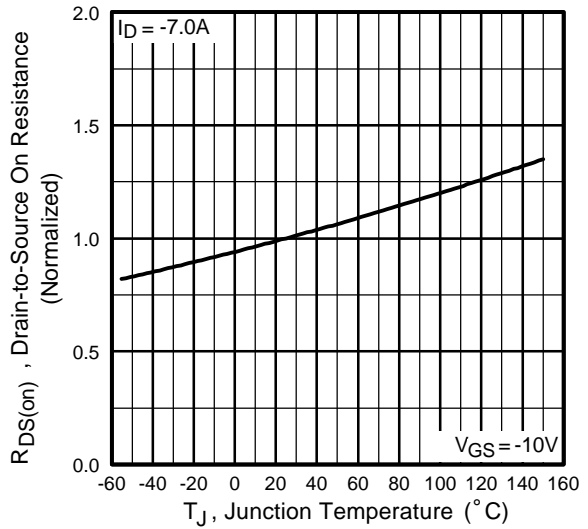


Fig 4. Normalized On-Resistance Vs. Temperature

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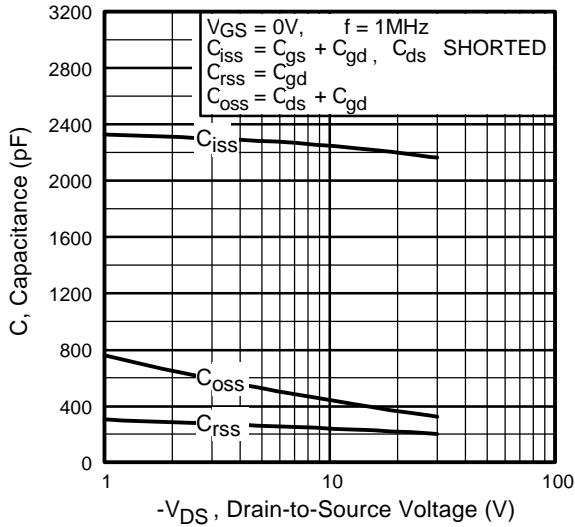


Fig 5. Typical Capacitance Vs. Drain-to-Source Voltage

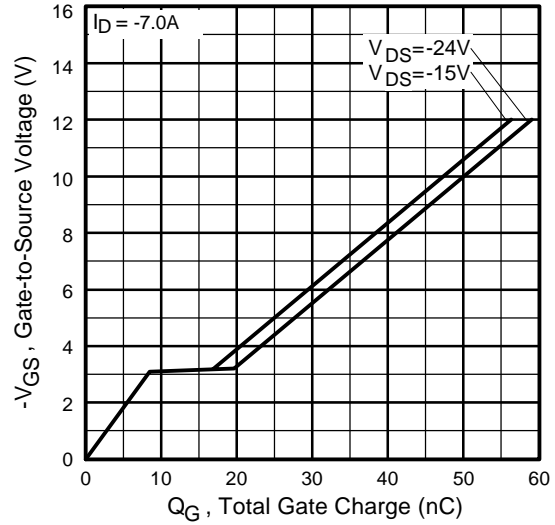


Fig 6. Typical Gate Charge Vs. Gate-to-Source Voltage

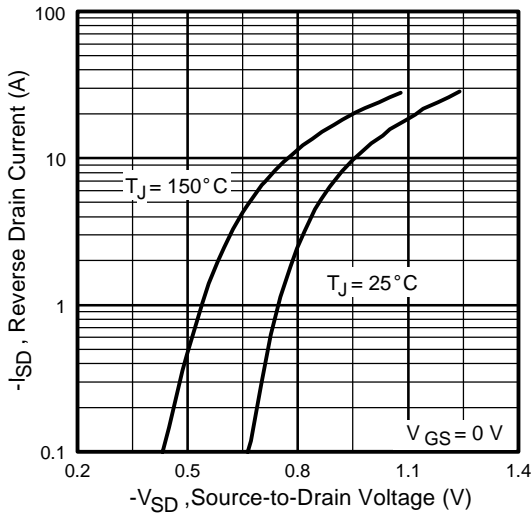


Fig 7. Typical Source-Drain Diode Forward Voltage

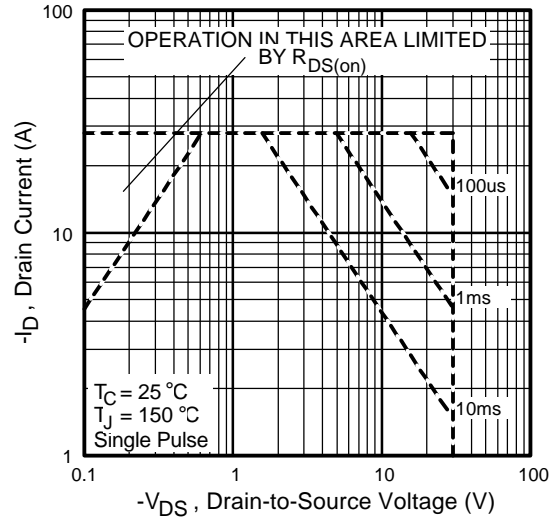


Fig 8. Maximum Safe Operating Area

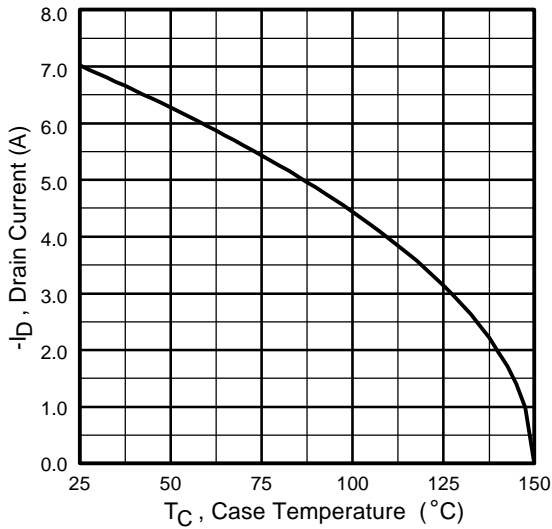


Fig 9. Maximum Drain Current Vs. Case Temperature

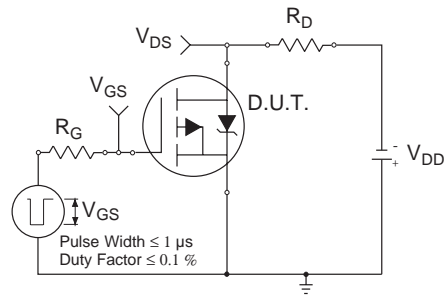


Fig 10a. Switching Time Test Circuit

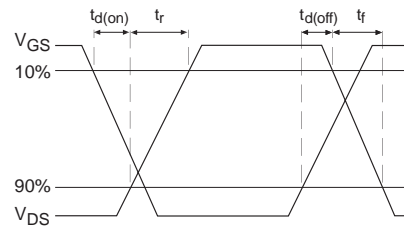


Fig 10b. Switching Time Waveforms

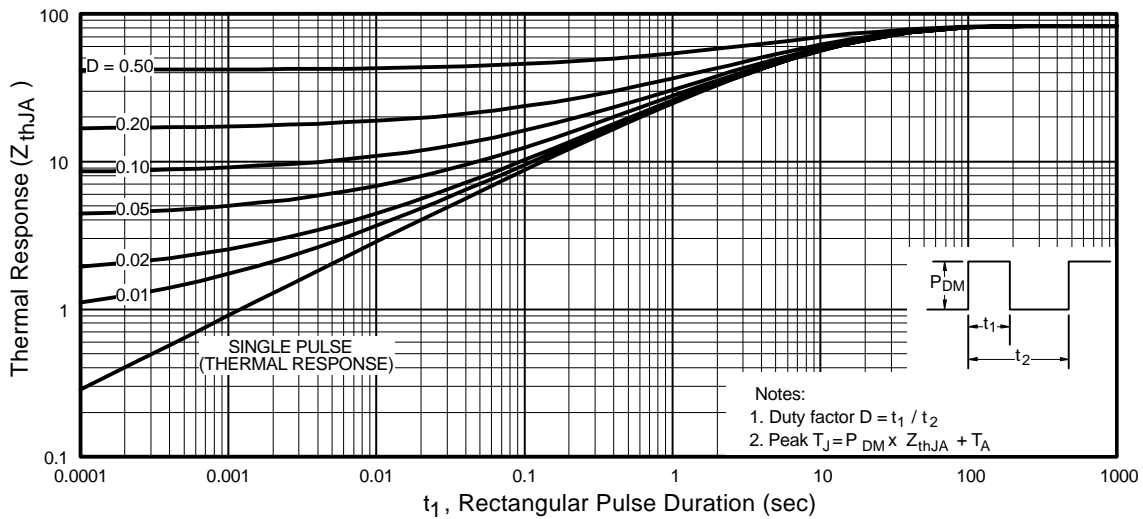


Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

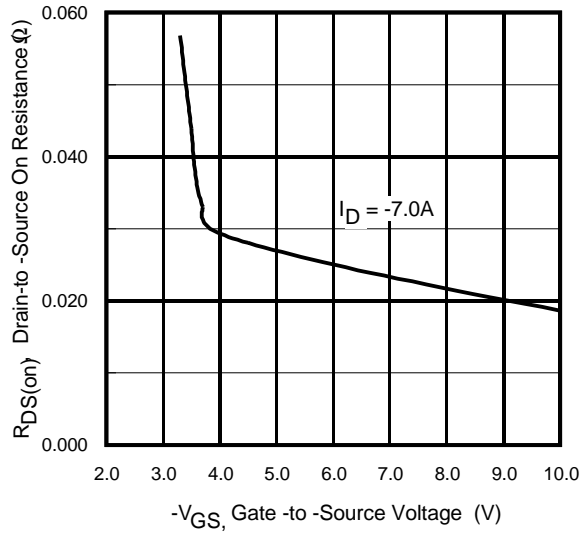


Fig 12. Typical On-Resistance Vs. Gate Voltage

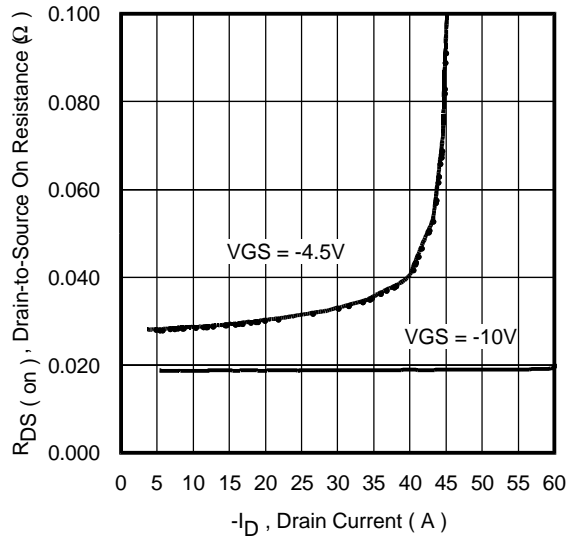


Fig 13. Typical On-Resistance Vs. Drain Current

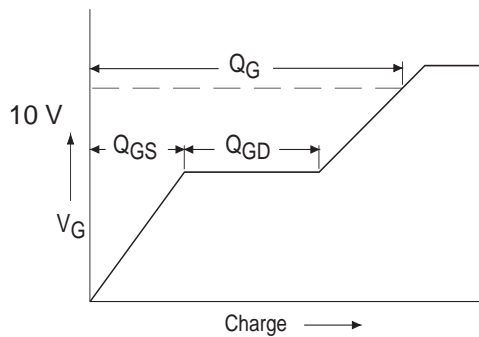


Fig 14a. Basic Gate Charge Waveform

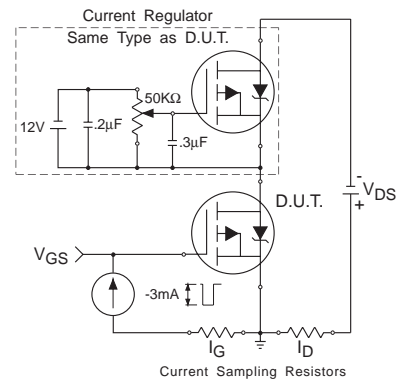
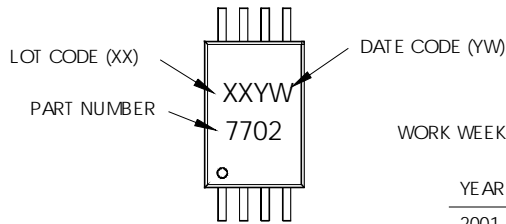


Fig 14b. Gate Charge Test Circuit

TSSOP-8 Part Marking Information

EXAMPLE: THIS IS AN IRF7702



DATE CODE EXAMPLES:

9503 = 5C
 9532 = EF

TABLE 1

WORK WEEK 1-26, NUMERIC YEAR CODE (1,2, ...ETC.)

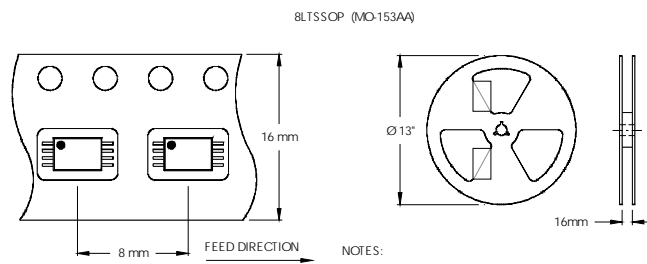
| YEAR | Y | WORK WEEK | W |
|------|---|-----------|---|
| 2001 | 1 | 01 | A |
| 2002 | 2 | 02 | B |
| 2003 | 3 | 03 | C |
| 1994 | 4 | 04 | D |
| 1995 | 5 | | |
| 1996 | 6 | | |
| 1997 | 7 | | |
| 1998 | 8 | | |
| 1999 | 9 | | |
| 2000 | 0 | 24 | X |
| | | 25 | Y |
| | | 26 | Z |

TABLE 2

WORK WEEK 27-52, ALPHANUMERIC YEAR CODE (A,B, ...ETC.)

| YEAR | Y | WORK WEEK | W |
|------|---|-----------|---|
| 2001 | A | 27 | A |
| 2002 | B | 28 | B |
| 2003 | C | 29 | C |
| 1994 | D | 30 | D |
| 1995 | E | | |
| 1996 | F | | |
| 1997 | G | | |
| 1998 | H | | |
| 1999 | J | | |
| 2000 | K | 50 | X |
| | | 51 | Y |
| | | 52 | Z |

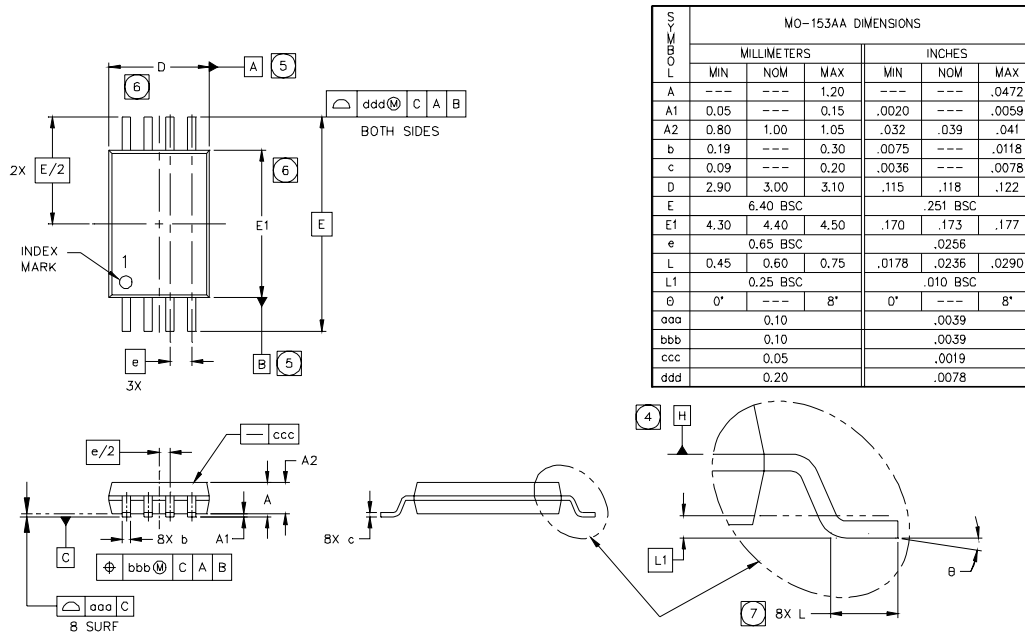
TSSOP-8 Tape and Reel



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TSSOP-8 Package Outline



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.

LEAD ASSIGNMENTS



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IR WORLD HEADQUARTERS: 233 Kansas St., El Segundo, California 90245, USA Tel: (310) 252-7105
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IR CANADA: 15 Lincoln Court, Brampton, Ontario L6T3Z2, Tel: (905) 453 2200
IR GERMANY: Saalburgstrasse 157, 61350 Bad Homburg Tel: ++ 49 (0) 6172 96590
IR ITALY: Via Liguria 49, 10071 Borgaro, Torino Tel: ++ 39 011 451 0111
IR JAPAN: K&H Bldg., 2F, 30-4 Nishi-Ikebukuro 3-Chome, Toshima-Ku, Tokyo 171 Tel: 81 (0)3 3983 0086
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Data and specifications subject to change without notice. 10/00



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