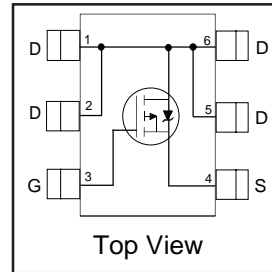


# Si3443DV

HEXFET<sup>®</sup> Power MOSFET

- Ultra Low On-Resistance
- P-Channel MOSFET
- Surface Mount
- Available in Tape & Reel
- -2.5V Rated

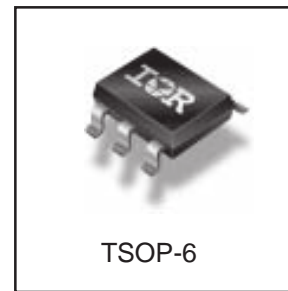


|                            |
|----------------------------|
| $V_{DSS} = -20V$           |
| $R_{DS(on)} = 0.065\Omega$ |

## Description

These P-channel MOSFETs from International Rectifier utilize advanced processing techniques to achieve the extremely low on-resistance per silicon area. This benefit provides the designer with an extremely efficient device for use in battery and load management applications.

The TSOP-6 package with its customized leadframe produces a HEXFET<sup>®</sup> power MOSFET with  $R_{DS(on)}$  60% less than a similar size SOT-23. This package is ideal for applications where printed circuit board space is at a premium. It's unique thermal design and  $R_{DS(on)}$  reduction enables a current-handling increase of nearly 300% compared to the SOT-23.



## Absolute Maximum Ratings

|                          | Parameter                                  | Max.         | Units |
|--------------------------|--|--------------|-------|
| $V_{DS}$                 | Drain- Source Voltage                      | -20          | V     |
| $I_D @ T_A = 25^\circ C$ | Continuous Drain Current, $V_{GS} @ -4.5V$ | -4.4         | A     |
| $I_D @ T_A = 70^\circ C$ | Continuous Drain Current, $V_{GS} @ -4.5V$ | -3.5         |       |
| $I_{DM}$                 | Pulsed Drain Current ①                     | -20          |       |
| $P_D @ T_A = 25^\circ C$ | Power Dissipation                          | 2.0          | W     |
| $P_D @ T_A = 70^\circ C$ | Power Dissipation                          | 1.3          |       |
|                          | Linear Derating Factor                     | 0.016        | W/°C  |
| $E_{AS}$                 | Single Pulse Avalanche Energy②             | 31           | mJ    |
| $V_{GS}$                 | Gate-to-Source Voltage                     | $\pm 12$     | V     |
| $T_J, T_{STG}$           | Junction and Storage Temperature Range     | -55 to + 150 | °C    |

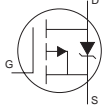
## Thermal Resistance

|                 | Parameter                    | Max. | Units |
|-----------------|------------------------------|------|-------|
| $R_{\theta JA}$ | Maximum Junction-to-Ambient③ | 62.5 | °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    | -20   | —      | —     | V                   | $V_{GS} = 0V, I_D = -250\mu A$                       |
| $\Delta V_{(BR)DSS}/\Delta T_J$ | Breakdown Voltage Temp. Coefficient  | —     | -0.005 | —     | V/ $^\circ\text{C}$ | Reference to $25^\circ\text{C}, I_D = -1\text{mA}$   |
| $R_{DS(on)}$                    | Static Drain-to-Source On-Resistance | —     | 0.034  | 0.065 | $\Omega$            | $V_{GS} = -4.5V, I_D = -4.4A$ ②                      |
|                                 |                                      | —     | 0.053  | 0.090 |                     | $V_{GS} = -2.7V, I_D = -3.7A$ ②                      |
|                                 |                                      | —     | 0.060  | 0.100 |                     | $V_{GS} = -2.5V, I_D = -3.5A$ ②                      |
| $V_{GS(th)}$                    | Gate Threshold Voltage               | -0.60 | —      | -1.2  | V                   | $V_{DS} = V_{GS}, I_D = -250\mu A$                   |
| $g_{fs}$                        | Forward Transconductance             | —     | 12     | —     | S                   | $V_{DS} = -10V, I_D = -4.4A$                         |
| $I_{DSS}$                       | Drain-to-Source Leakage Current      | —     | —      | -1.0  | $\mu A$             | $V_{DS} = -20V, V_{GS} = 0V$                         |
|                                 |                                      | —     | —      | -5.0  |                     | $V_{DS} = -20V, V_{GS} = 0V, T_J = 70^\circ\text{C}$ |
| $I_{GSS}$                       | Gate-to-Source Forward Leakage       | —     | —      | -100  | nA                  | $V_{GS} = -12V$                                      |
|                                 | Gate-to-Source Reverse Leakage       | —     | —      | 100   |                     | $V_{GS} = 12V$                                       |
| $Q_g$                           | Total Gate Charge                    | —     | 11     | 15    | nC                  | $I_D = -4.4A$  |
| $Q_{gs}$                        | Gate-to-Source Charge                | —     | 2.2    | —     |                     | $V_{DS} = -10V$                                      |
| $Q_{gd}$                        | Gate-to-Drain ("Miller") Charge      | —     | 2.9    | —     |                     | $V_{GS} = -4.5V$ ②                                   |
| $t_{d(on)}$                     | Turn-On Delay Time                   | —     | 12     | 50    | ns                  | $V_{DD} = -10V, V_{GS} = -4.5V$ ②                    |
| $t_r$                           | Rise Time                            | —     | 33     | 60    |                     | $I_D = -1.0A$  |
| $t_{d(off)}$                    | Turn-Off Delay Time                  | —     | 70     | 100   |                     | $R_G = 6.0\Omega$                                    |
| $t_f$                           | Fall Time                            | —     | 72     | 100   |                     | $R_D = 10\Omega, \text{ ②}$                          |
| $C_{iss}$                       | Input Capacitance                    | —     | 1079   | —     | pF                  | $V_{GS} = 0V$  |
| $C_{oss}$                       | Output Capacitance                   | —     | 220    | —     |                     | $V_{DS} = -10V$                                      |
| $C_{rss}$                       | Reverse Transfer Capacitance         | —     | 152    | —     |                     | $f = 1.0\text{MHz}$                                  |

## Source-Drain Ratings and Characteristics

|          | Parameter                                 | Min. | Typ. | Max. | Units | Conditions   |
|----------|---|------|------|------|-------|--|
| $I_S$    | Continuous Source Current<br>(Body Diode) | —    | —    | -2.0 | A     | MOSFET symbol showing the integral reverse p-n junction diode.  |
| $I_{SM}$ | Pulsed Source Current<br>(Body Diode) ①   | —    | —    | -20  |       |  |
| $V_{SD}$ | Diode Forward Voltage                     | —    | —    | -1.2 | V     | $T_J = 25^\circ\text{C}, I_S = -1.7A, V_{GS} = 0V$ ②   |
| $t_{rr}$ | Reverse Recovery Time                     | —    | 51   | 77   | ns    | $T_J = 25^\circ\text{C}, I_F = -1.7A$  |
| $Q_{rr}$ | Reverse Recovery Charge                   | —    | 30   | 44   | 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 Surface mounted on FR-4 board,  $t \leq 5\text{sec}$ .
- ④ Starting  $T_J = 25^\circ\text{C}, L = 6.8\text{mH}$   
 $R_G = 25\Omega, I_{AS} = -3.0A$ .

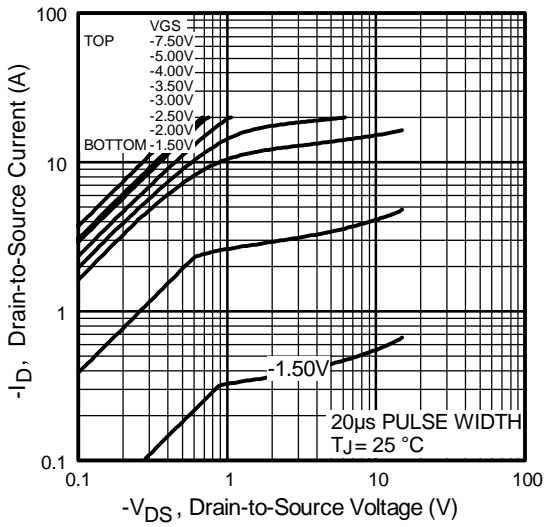


Fig 1. Typical Output Characteristics

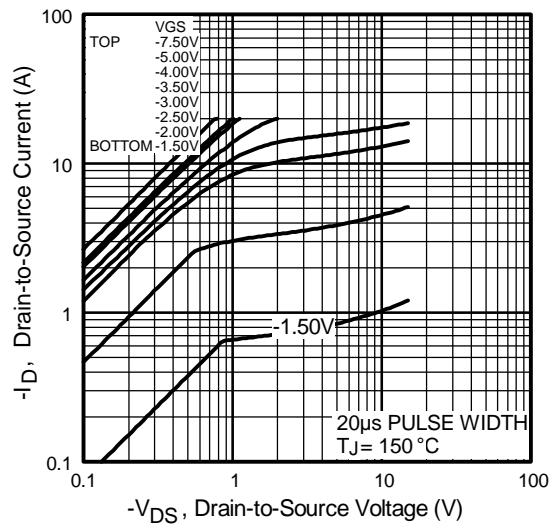


Fig 2. Typical Output Characteristics

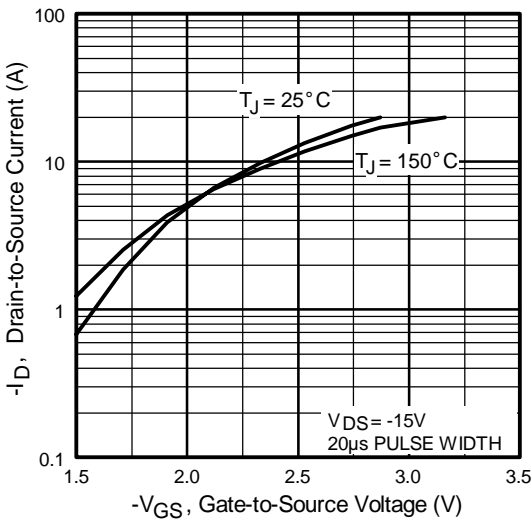


Fig 3. Typical Transfer Characteristics

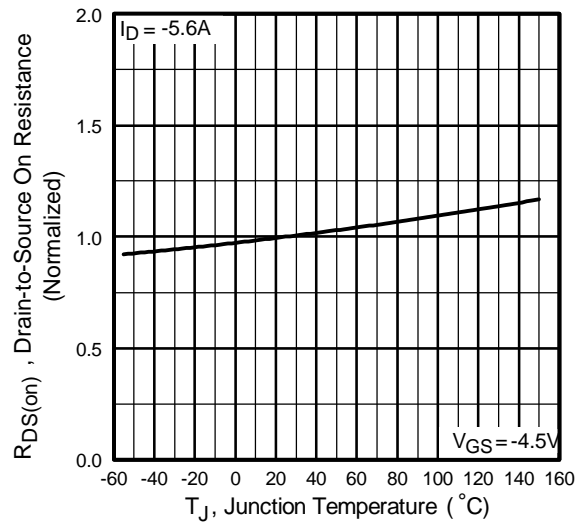
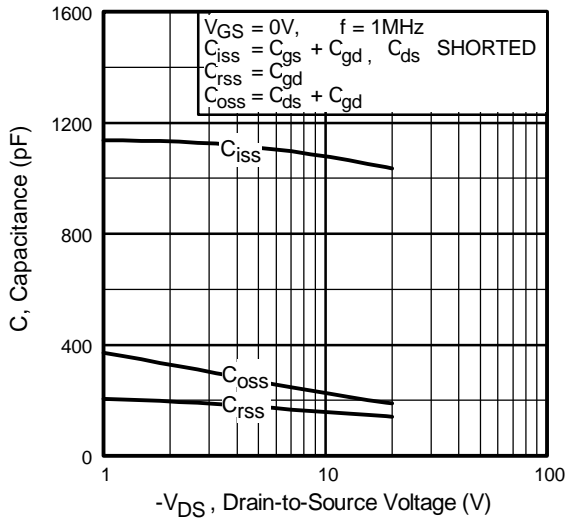
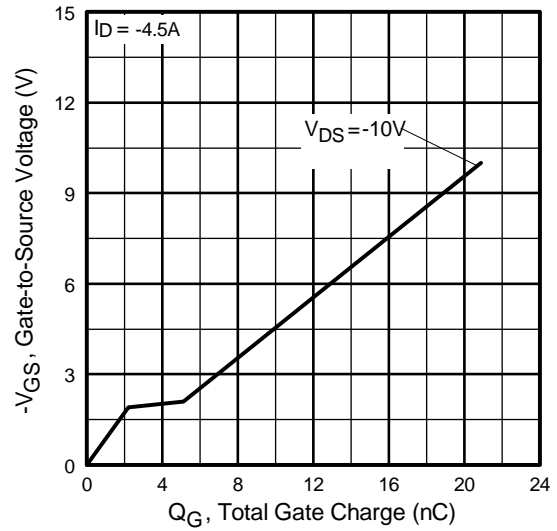


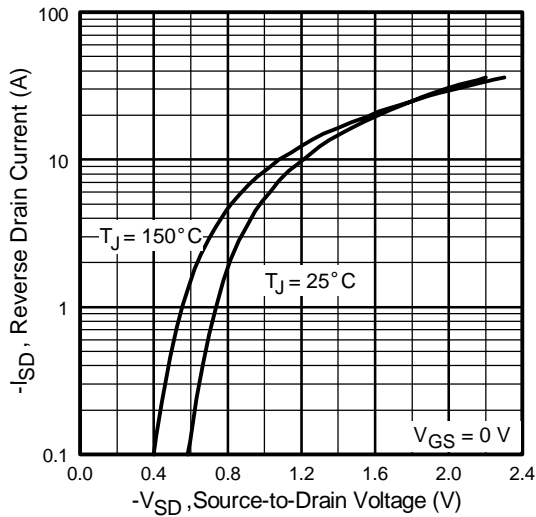
Fig 4. Normalized On-Resistance Vs. Temperature



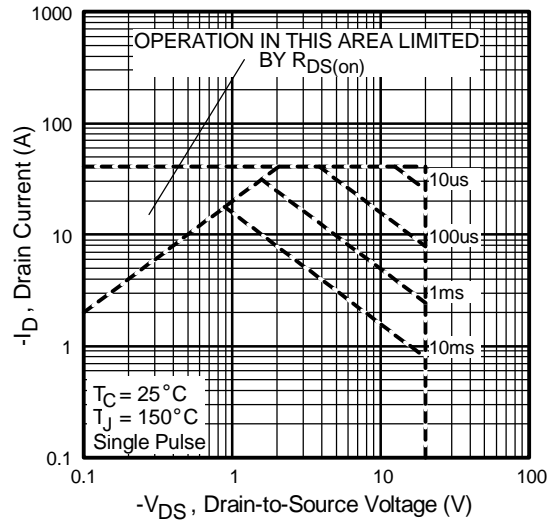
**Fig 5.** Typical Capacitance Vs. Drain-to-Source Voltage



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



**Fig 7.** Typical Source-Drain Diode Forward Voltage



**Fig 8.** Maximum Safe Operating Area

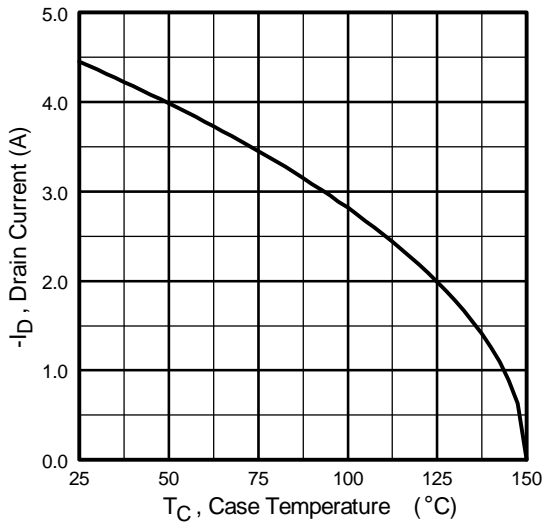


Fig 9. Maximum Drain Current Vs. Case Temperature

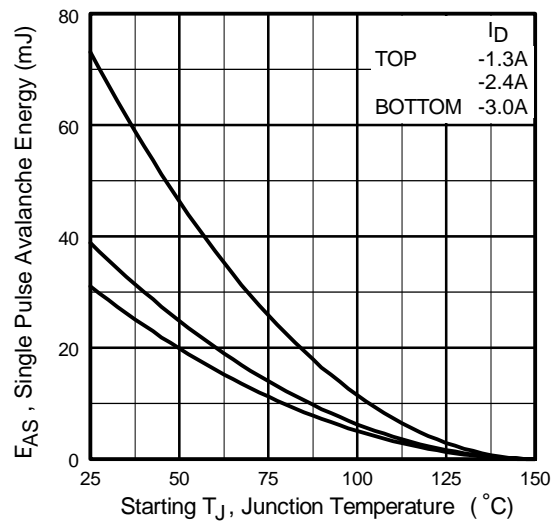


Fig 10. Maximum Avalanche Energy Vs. Drain Current

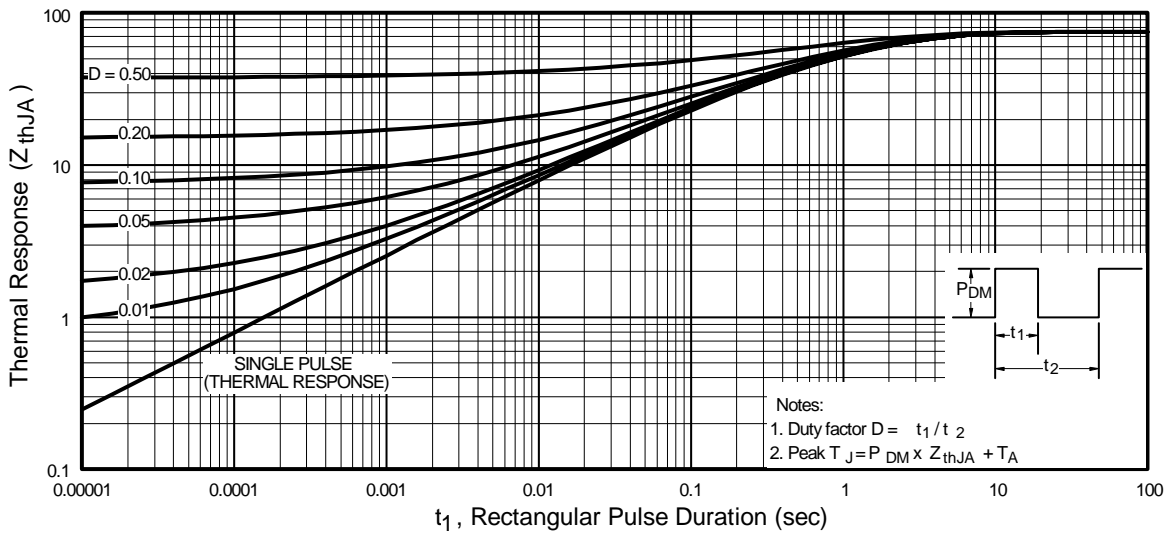


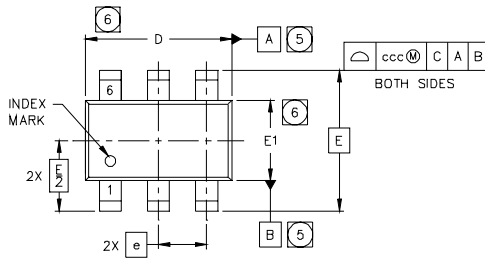
Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

# Si3443DV

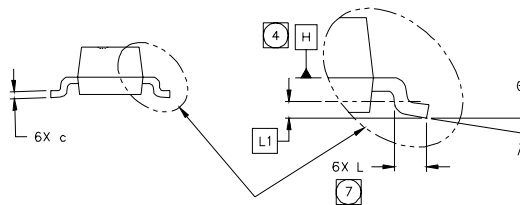
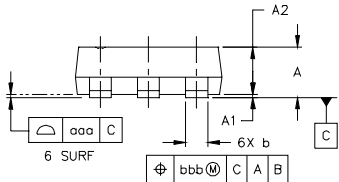
## Package Outline

### TSOP-6

International  
**IRF** Rectifier



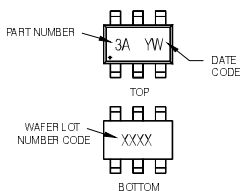
| SYMBOL | MO-193AA DIMENSIONS |      |      |           |       |       |
|--------|---------------------|------|------|-----------|-------|-------|
|        | MILLIMETERS         |      |      | INCHES    |       |       |
|        | MIN                 | NOM  | MAX  | MIN       | NOM   | MAX   |
| A      | ---                 | ---  | 1.10 | ---       | ---   | .0433 |
| A1     | 0.01                | ---  | 0.10 | .0004     | ---   | .0039 |
| A2     | 0.80                | 0.90 | 1.00 | .0315     | .0354 | .0393 |
| b      | 0.25                | ---  | 0.50 | .0099     | ---   | .0196 |
| c      | 0.10                | ---  | 0.26 | .004      | ---   | .010  |
| D      | 2.90                | 3.00 | 3.10 | .115      | .118  | .122  |
| E      | 2.75 BSC            |      |      | .108 BSC  |       |       |
| E1     | 1.30                | 1.50 | 1.70 | .052      | .059  | .066  |
| e      | 1.00 BSC            |      |      | .039 BSC  |       |       |
| L      | 0.20                | 0.40 | 0.60 | .0079     | .0157 | .0236 |
| L1     | 0.30 BSC            |      |      | .0118 BSC |       |       |
| θ      | 0°                  | ---  | 8°   | 0°        | ---   | 8°    |
| ccc    | 0.10                |      |      | .004      |       |       |
| bbb    | 0.15                |      |      | .006      |       |       |
| ccc    | 0.25                |      |      | .010      |       |       |



## Part Marking Information

### TSOP-6

Notes: This part marking information applies to devices produced before 02/26/2001  
EXAMPLE: THIS IS AN SI3443DV WW = (1-26) IF PRECEDED BY LAST DIGIT OF CALENDAR YEAR



| YEAR | Y | WORK WEEK | W |
|------|---|-----------|---|
| 2001 | 1 | 01        | A |
| 2002 | 2 | 02        | B |
| 2003 | 3 | 03        | C |
| 2004 | 4 | 04        | D |
| 2005 | 5 |           |   |
| 1996 | 6 |           |   |
| 1997 | 7 |           |   |
| 1998 | 8 |           |   |
| 1999 | 9 |           |   |
| 2000 | 0 | 24        | X |
|      |   | 25        | Y |
|      |   | 26        | Z |

PART NUMBER CODE REFERENCE:

- 3A = SI3443DV
- 3B = IRF5800
- 3C = IRF5850
- 3D = IRF5851
- 3E = IRF5852
- 3J = IRF5805
- 3J = IRF5806

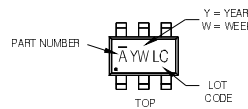
DATE CODE EXAMPLES:

- YWW = 9603 = 6C
- YWW = 9632 = FF

WW = (27-52) IF PRECEDED BY A LETTER

| YEAR | Y | WORK WEEK | W |
|------|---|-----------|---|
| 2001 | A | 27        | A |
| 2002 | B | 28        | B |
| 2003 | C | 29        | C |
| 2004 | D | 30        | D |
| 2005 | E |           |   |
| 1996 | F |           |   |
| 1997 | G |           |   |
| 1998 | H |           |   |
| 1999 | J |           |   |
| 2000 | K | 50        | X |
|      |   | 51        | Y |
|      |   | 52        | Z |

Notes: This part marking information applies to devices produced after 02/26/2001  
W = (1-26) F PRECEDED BY LAST DIGIT OF CALENDAR YEAR



| YEAR | Y | WORK WEEK | W |
|------|---|-----------|---|
| 2001 | 1 | 01        | A |
| 2002 | 2 | 02        | B |
| 2003 | 3 | 03        | C |
| 2004 | 4 | 04        | D |
| 2005 | 5 |           |   |
| 1996 | 6 |           |   |
| 1997 | 7 |           |   |
| 1998 | 8 |           |   |
| 1999 | 9 |           |   |
| 2000 | 0 | 24        | X |
|      |   | 25        | Y |
|      |   | 26        | Z |

PART NUMBER CODE REFERENCE:

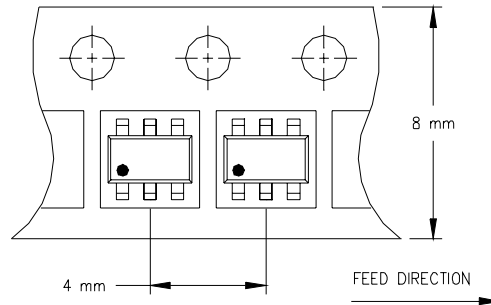
- A = SI3443DV
- B = IRF5800
- C = IRF5850
- D = IRF5851
- E = IRF5852
- J = IRF5805
- J = IRF5806
- K = IRF5810
- L = IRF5804
- N = IRF5803
- N = IRF5820

W = (27-52) IF PRECEDED BY A LETTER

| YEAR | Y | WORK WEEK | W |
|------|---|-----------|---|
| 2001 | A | 27        | A |
| 2002 | B | 28        | B |
| 2003 | C | 29        | C |
| 2004 | D | 30        | D |
| 2005 | E |           |   |
| 1996 | F |           |   |
| 1997 | G |           |   |
| 1998 | H |           |   |
| 1999 | J |           |   |
| 2000 | K | 50        | X |
|      |   | 51        | Y |
|      |   | 52        | Z |

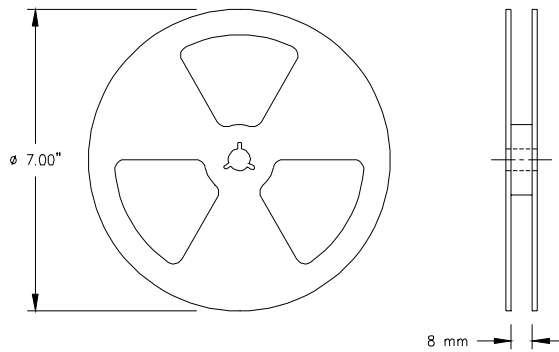
## Tape & Reel Information

TSOP-6



NOTES:

1. OUTLINE CONFORMS TO EIA-481 & EIA-541.



NOTES:

1. OUTLINE CONFORMS TO EIA-481 & EIA-541.