

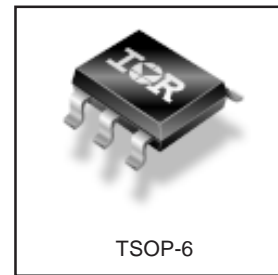
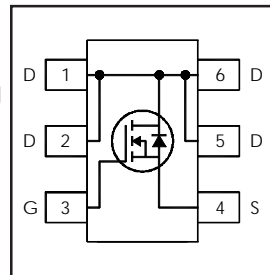
**Applications**

- High frequency DC-DC converters

<b>V<sub>DSS</sub></b>	<b>R<sub>DS(on)</sub> max</b>	<b>I<sub>D</sub></b>
<b>150V</b>	<b>1.2Ω @ V<sub>GS</sub> = 10V</b>	<b>0.9A</b>

**Benefits**

- Low Gate to Drain Charge to Reduce Switching Losses
- Fully Characterized Capacitance Including Effective C<sub>oss</sub> to Simplify Design, (See App. Note AN1001)
- Fully Characterized Avalanche Voltage and Current



**Absolute Maximum Ratings**

	<b>Parameter</b>	<b>Max.</b>	<b>Units</b>
I <sub>D</sub> @ T <sub>A</sub> = 25°C	Continuous Drain Current, V <sub>GS</sub> @ 10V	0.9	A
I <sub>D</sub> @ T <sub>A</sub> = 70°C	Continuous Drain Current, V <sub>GS</sub> @ 10V	0.7	
I <sub>DM</sub>	Pulsed Drain Current ①	7.0	
P <sub>D</sub> @ T <sub>A</sub> = 25°C	Power Dissipation②	2.0	W
	Linear Derating Factor	0.02	W/°C
V <sub>GS</sub>	Gate-to-Source Voltage	± 30	V
dv/dt	Peak Diode Recovery dv/dt ③	7.1	V/ns
T <sub>J</sub>	Operating Junction and	-55 to + 150	°C
T <sub>STG</sub>	Storage Temperature Range		
	Soldering Temperature, for 10 seconds	300 (1.6mm from case )	

**Thermal Resistance**

	<b>Parameter</b>	<b>Max.</b>	<b>Units</b>
R <sub>θJA</sub>	Maximum Junction-to-Ambient④	62.5	°C/W

Notes ① through ④ are on page 8  
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# IRF5802

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## Static @ 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	150	—	—	V	V <sub>GS</sub> = 0V, I <sub>D</sub> = 250μA
ΔV <sub>(BR)DSS/ΔT<sub>J</sub></sub>	Breakdown Voltage Temp. Coefficient	—	0.19	—	V/°C	Reference to 25°C, I <sub>D</sub> = 1mA ③
R <sub>DS(on)</sub>	Static Drain-to-Source On-Resistance	—	—	1.2	Ω	V <sub>GS</sub> = 10V, I <sub>D</sub> = 0.54A ③
V <sub>GS(th)</sub>	Gate Threshold Voltage	3.0	—	5.5	V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA
I <sub>DSS</sub>	Drain-to-Source Leakage Current	—	—	25	μA	V <sub>DS</sub> = 150V, V <sub>GS</sub> = 0V
		—	—	250		V <sub>DS</sub> = 120V, V <sub>GS</sub> = 0V, T <sub>J</sub> = 125°C
I <sub>GSS</sub>	Gate-to-Source Forward Leakage	—	—	100	nA	V <sub>GS</sub> = 30V
	Gate-to-Source Reverse Leakage	—	—	-100		V <sub>GS</sub> = -30V

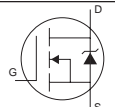
## Dynamic @ T<sub>J</sub> = 25°C (unless otherwise specified)

	Parameter	Min.	Typ.	Max.	Units	Conditions
g <sub>fs</sub>	Forward Transconductance	0.55	—	—	S	V <sub>DS</sub> = 50V, I <sub>D</sub> = 0.54A
Q <sub>g</sub>	Total Gate Charge	—	4.5	6.8	nC	I <sub>D</sub> = 0.54A
Q <sub>gs</sub>	Gate-to-Source Charge	—	1.0	1.5		V <sub>DS</sub> = 120V
Q <sub>gd</sub>	Gate-to-Drain ("Miller") Charge	—	2.4	3.6		V <sub>GS</sub> = 10V,
t <sub>d(on)</sub>	Turn-On Delay Time	—	6.0	—	ns	V <sub>DD</sub> = 75V
t <sub>r</sub>	Rise Time	—	1.6	—		I <sub>D</sub> = 0.54A
t <sub>d(off)</sub>	Turn-Off Delay Time	—	7.5	—		R <sub>G</sub> = 6.0Ω
t <sub>f</sub>	Fall Time	—	9.2	—		V <sub>GS</sub> = 10V ③
C <sub>iss</sub>	Input Capacitance	—	88	—	pF	V <sub>GS</sub> = 0V
C <sub>oss</sub>	Output Capacitance	—	26	—		V <sub>DS</sub> = 25V
C <sub>riss</sub>	Reverse Transfer Capacitance	—	7.7	—		f = 1.0MHz
C <sub>oss</sub>	Output Capacitance	—	110	—		V <sub>GS</sub> = 0V, V <sub>DS</sub> = 1.0V, f = 1.0MHz
C <sub>oss</sub>	Output Capacitance	—	14	—		V <sub>GS</sub> = 0V, V <sub>DS</sub> = 120V, f = 1.0MHz
C <sub>oss eff.</sub>	Effective Output Capacitance	—	3.0	—		V <sub>GS</sub> = 0V, V <sub>DS</sub> = 0V to 120V ⑤

## Avalanche Characteristics

	Parameter	Typ.	Max.	Units
E <sub>AS</sub>	Single Pulse Avalanche Energy②	—	9.5	mJ
I <sub>AR</sub>	Avalanche Current①	—	0.9	A

## Diode Characteristics

	Parameter	Min.	Typ.	Max.	Units	Conditions
I <sub>S</sub>	Continuous Source Current (Body Diode)	—	—	1.8	A	MOSFET symbol showing the integral reverse p-n junction diode. 
I <sub>SM</sub>	Pulsed Source Current (Body Diode) ①	—	—	18		
V <sub>SD</sub>	Diode Forward Voltage	—	—	1.3	V	T <sub>J</sub> = 25°C, I <sub>S</sub> = 0.54A, V <sub>GS</sub> = 0V ③
t <sub>rr</sub>	Reverse Recovery Time	—	46	69	ns	T <sub>J</sub> = 25°C, I <sub>F</sub> = 0.54A
Q <sub>rr</sub>	Reverse Recovery Charge	—	55	83	nC	di/dt = 100A/μs ③

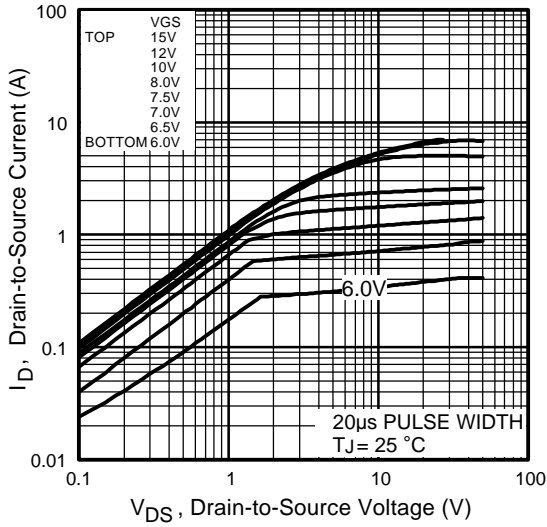


Fig 1. Typical Output Characteristics

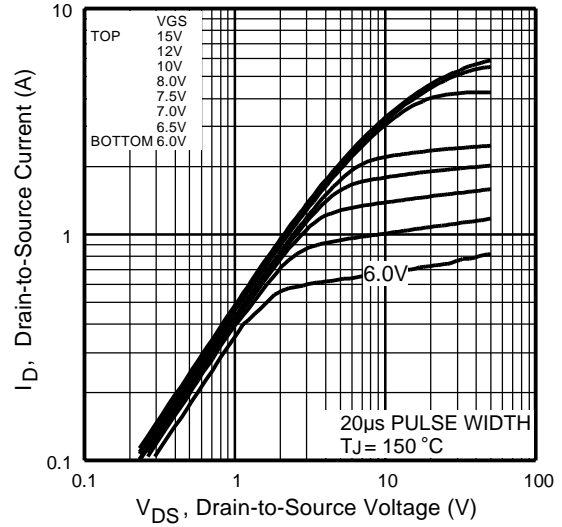


Fig 2. Typical Output Characteristics

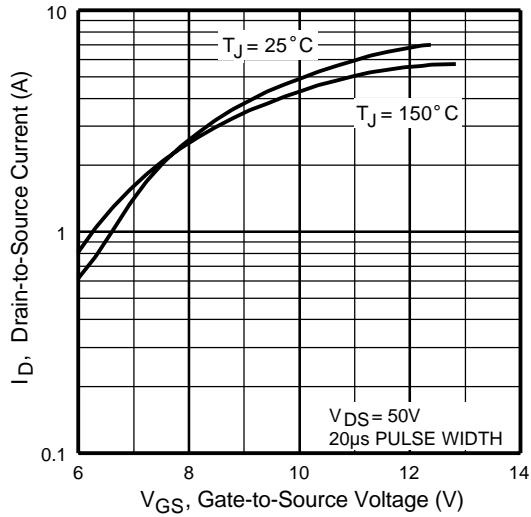


Fig 3. Typical Transfer Characteristics

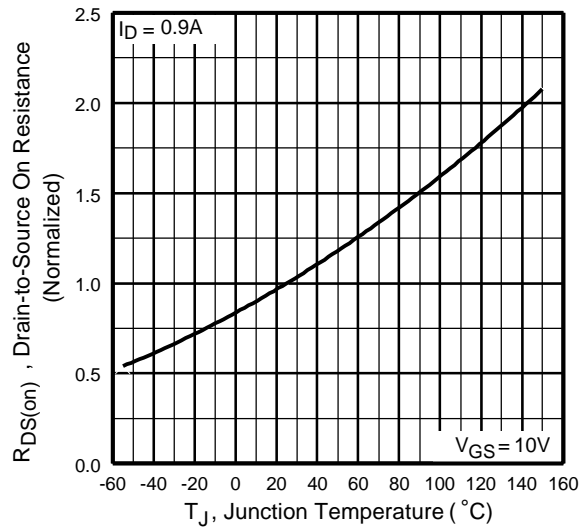
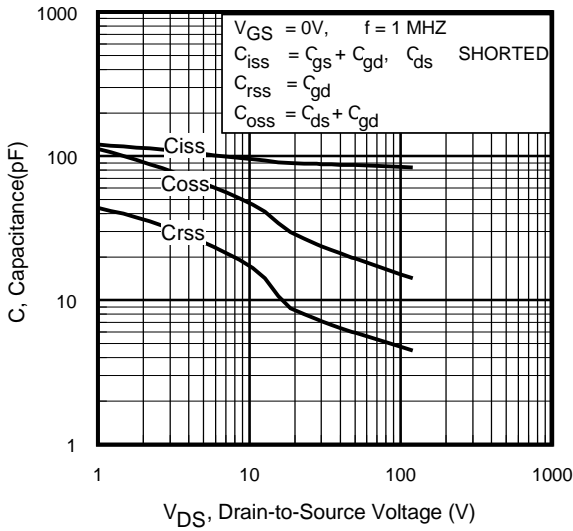
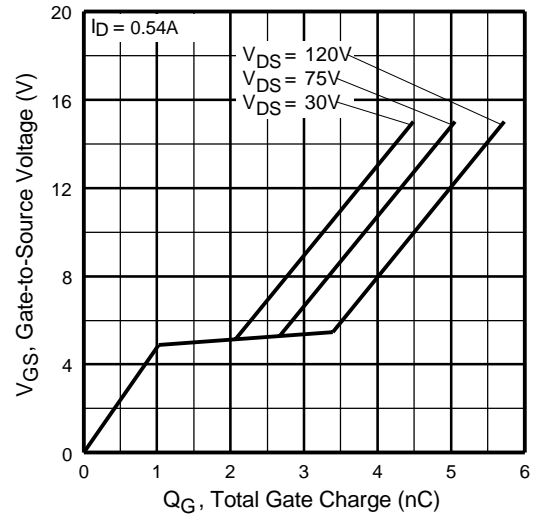


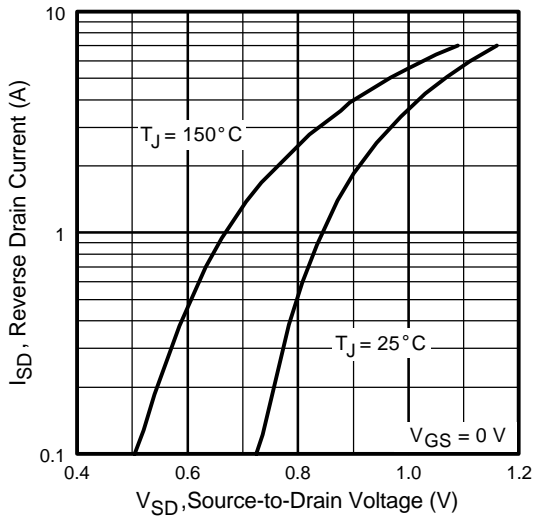
Fig 4. Normalized On-Resistance Vs. Temperature



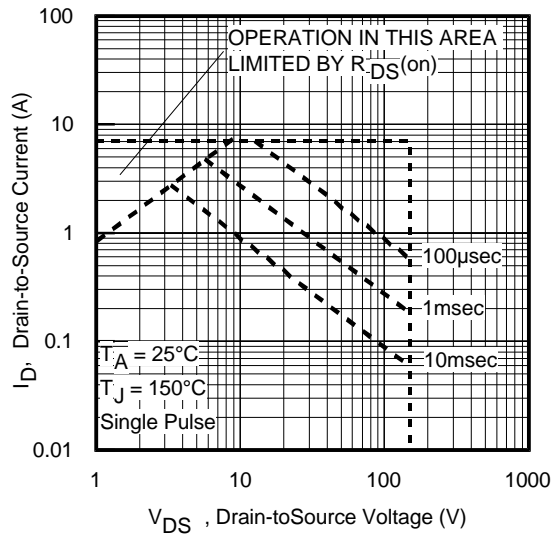
**Fig 5.** Typical Capacitance Vs. Drain-to-Source Voltage



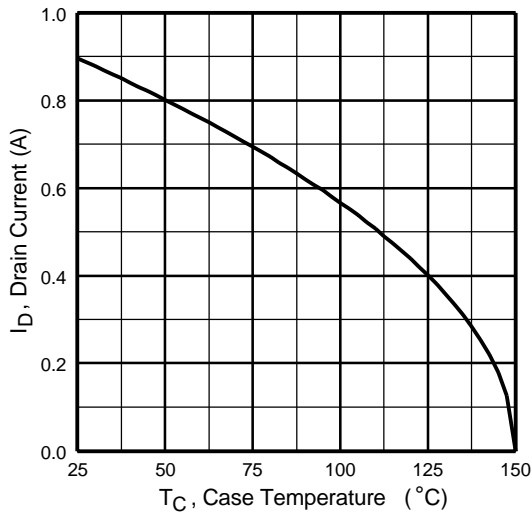
**Fig 6.** Typical Gate Charge Vs. Gate-to-Source Voltage



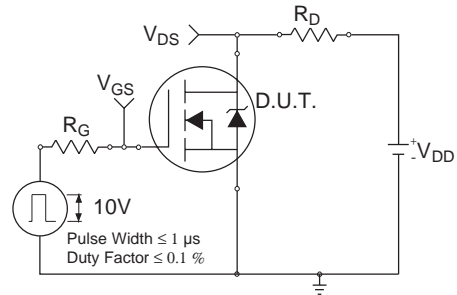
**Fig 7.** Typical Source-Drain Diode Forward Voltage



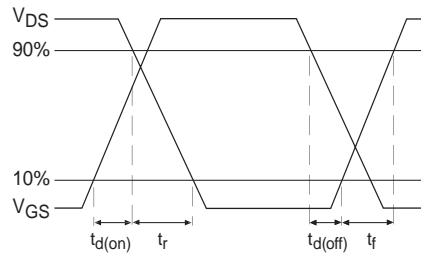
**Fig 8.** Maximum Safe Operating Area



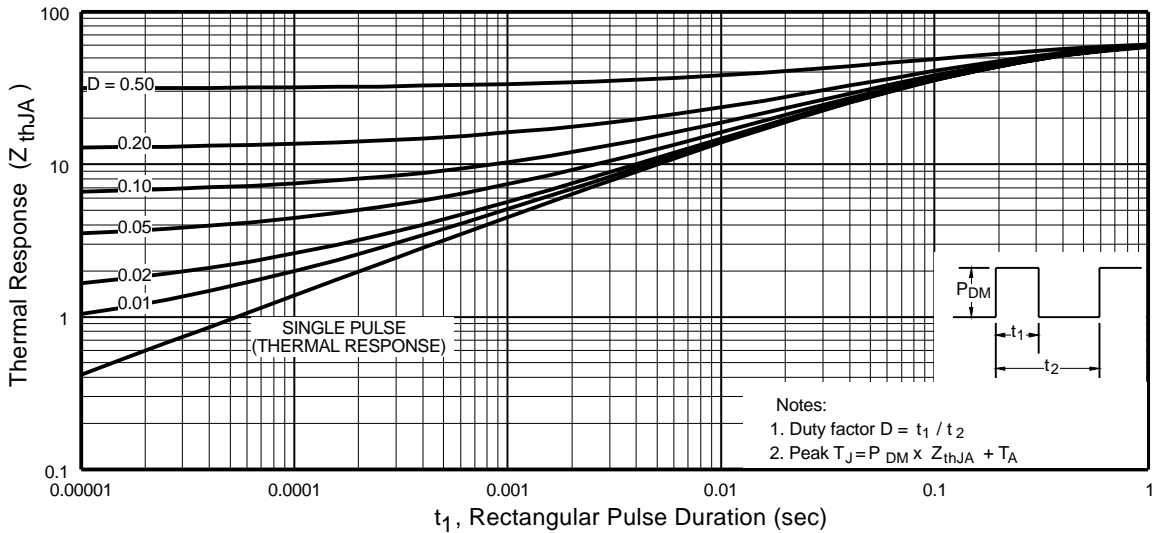
**Fig 9.** Maximum Drain Current Vs. Case Temperature



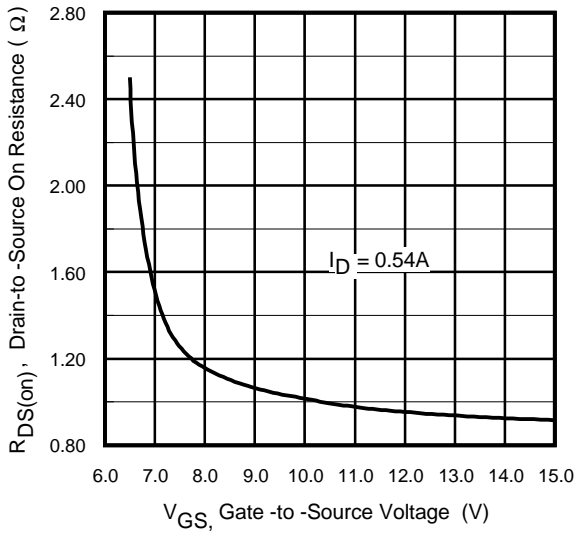
**Fig 10a.** Switching Time Test Circuit



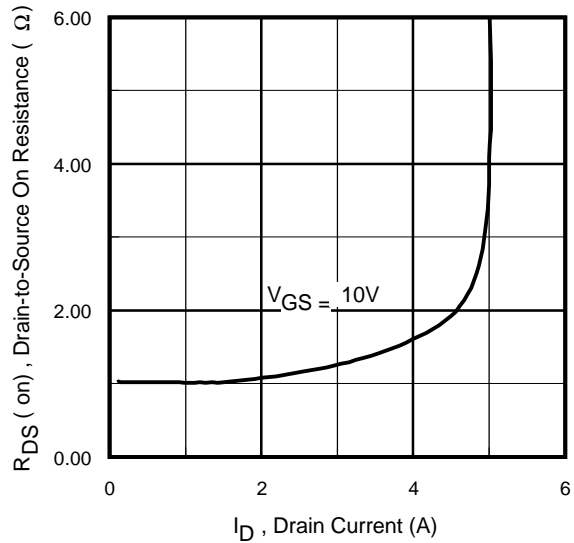
**Fig 10b.** Switching Time Waveforms



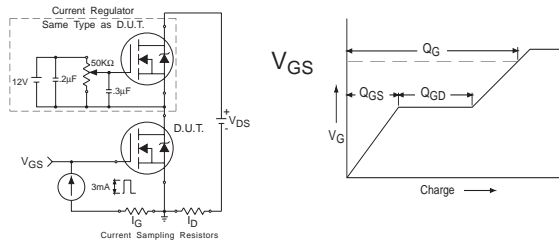
**Fig 11.** Typical Effective Transient Thermal Impedance, Junction-to-Ambient



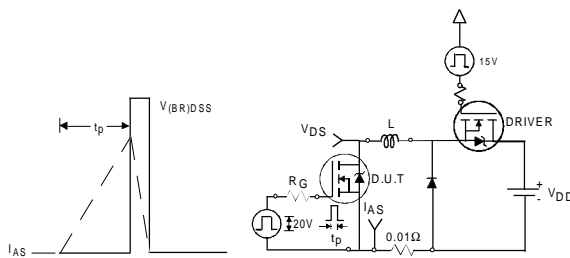
**Fig 12.** Typical On-Resistance Vs. Gate Voltage



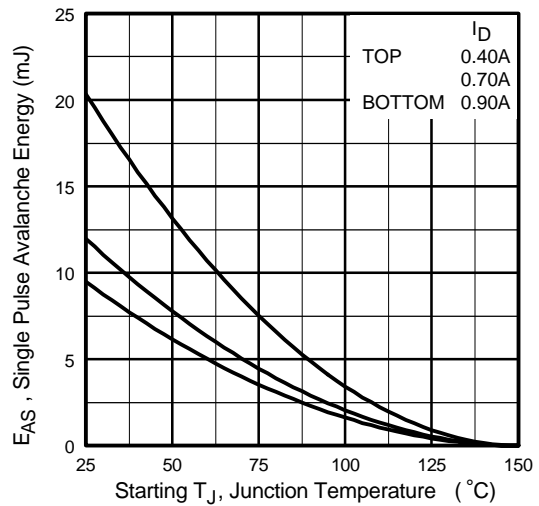
**Fig 13.** Typical On-Resistance Vs. Drain Current



**Fig 14a&b.** Basic Gate Charge Test Circuit and Waveform



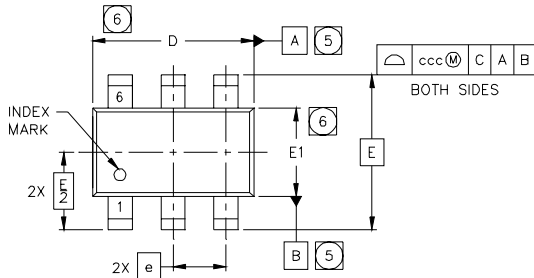
**Fig 15a&b.** Unclamped Inductive Test circuit and Waveforms



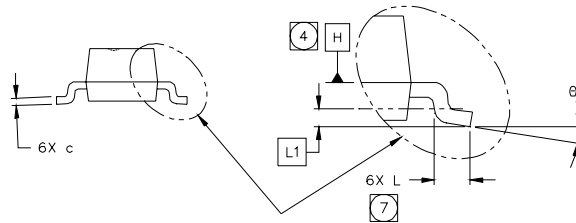
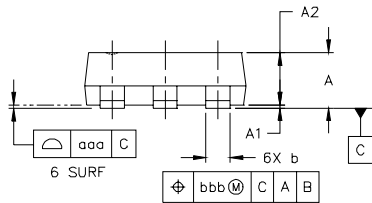
**Fig 15c.** Maximum Avalanche Energy Vs. Drain Current

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## TSOP-6 Package Outline



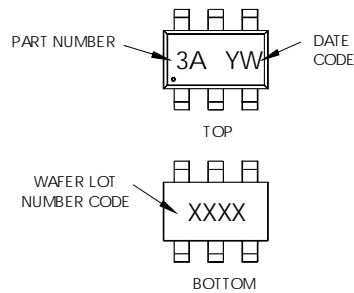
SYMBOL	MO-193AA DIMENSIONS					
	MILLIMETERS			INCHES		
	MIN	NOM	MAX	MIN	MAX	
A	---	---	1.10	---	---	.0433
A1	0.01	---	0.10	.0004	---	.0039
A2	0.80	0.90	1.00	.0315	.0354	.0393
b	0.25	---	0.50	.0099	---	.0196
c	0.10	---	0.26	.004	---	.010
D	2.90	3.00	3.10	.115	.118	.122
E	2.75 BSC			.108 BSC		
E1	1.30	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°
aaa	0.10			.004		
bbb	0.15			.006		
ccc	0.25			.010		



## TSOP-6 Part Marking Information

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
- 3I = IRF5805
- 3J = IRF5806

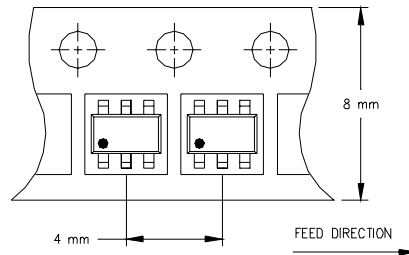
DATE CODE EXAMPLES:

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

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

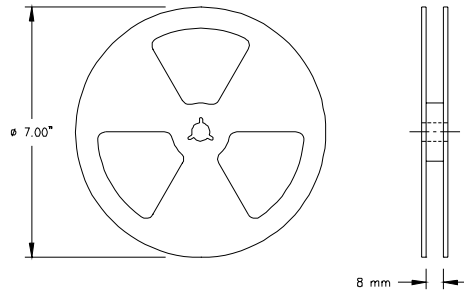
YEAR	Y	WORK WEEK	W
2001	A	27	A
2002	B	28	B
2003	C	29	C
2004	D	30	D
2005	E		
1996	F		
1997	G		
1998	H		
1999	J		
2000	K	50	X
		51	Y
		52	Z

## TSOP-6 Tape & Reel Information



**NOTES:**

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



**NOTES:**

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

**Notes:**

- ① Repetitive rating; pulse width limited by max. junction temperature.
- ② Starting  $T_J = 25^\circ\text{C}$ ,  $L = 23\text{mH}$   
 $R_G = 25\Omega$ ,  $I_{AS} = 0.54\text{A}$ .
- ③ Pulse width  $\leq 400\mu\text{s}$ ; duty cycle  $\leq 2\%$ .
- ④ When mounted on 1 inch square copper board
- ⑤  $C_{OSS}$  eff. is a fixed capacitance that gives the same charging time as  $C_{OSS}$  while  $V_{DS}$  is rising from 0 to 80%  $V_{DSS}$
- ⑥  $I_{SD} \leq 0.54\text{A}$ ,  $di/dt \leq 89\text{A}/\mu\text{s}$ ,  $V_{DD} \leq V_{(BR)DSS}$ ,  
 $T_J \leq 150^\circ\text{C}$

Data and specifications subject to change without notice.  
This product has been designed and qualified for the industrial market.  
Qualification Standards can be found on IR's Web site.

International  
**IR** Rectifier

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TAC Fax: (310) 252-7903

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