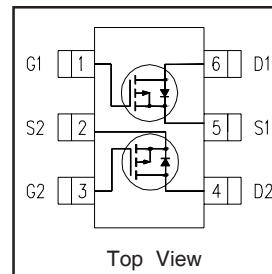


IRF5850PbF

HEXFET® Power MOSFET

- Ultra Low On-Resistance
- Dual P-Channel MOSFET
- Surface Mount
- Available in Tape & Reel
- Low Gate Charge
- Lead-Free
- Halogen-Free



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

$$R_{DS(on)} = 0.135\Omega$$

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.

This Dual TSOP-6 package is ideal for applications where printed circuit board space is at a premium and where maximum functionality is required. With two die per package, the IRF5850 can provide the functionality of two SOT-23 packages in a smaller footprint. Its unique thermal design and $R_{DS(on)}$ reduction enables an increase in current-handling capability.



Absolute Maximum Ratings

	Parameter	Max.	Units
V_{DS}	Drain- Source Voltage	-20	V
$I_D @ T_A = 25^\circ C$	Continuous Drain Current, $V_{GS} @ -4.5V$	-2.2	A
$I_D @ T_A = 70^\circ C$	Continuous Drain Current, $V_{GS} @ -4.5V$	-1.8	
I_{DM}	Pulsed Drain Current ①	-9.0	
$P_D @ T_A = 25^\circ C$	Power Dissipation	0.96	W
$P_D @ T_A = 70^\circ C$	Power Dissipation	0.62	
	Linear Derating Factor	7.7	mW/°C
V_{GS}	Gate-to-Source Voltage	± 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	130	°C/W

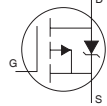
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Electrical Characteristics @ $T_J = 25^\circ\text{C}$ (unless otherwise specified)

	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	—	0.011	—	V/ $^\circ\text{C}$	Reference to 25°C , $I_D = -1mA$
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	—	—	0.135	Ω	$V_{GS} = -4.5V$, $I_D = -2.2A$ ②
		—	—	0.220		$V_{GS} = -2.5V$, $I_D = -1.9A$ ②
$V_{GS(th)}$	Gate Threshold Voltage	-0.45	—	-1.2	V	$V_{DS} = V_{GS}$, $I_D = -250\mu A$
g_{fs}	Forward Transconductance	3.5	—	—	S	$V_{DS} = -10V$, $I_D = -2.2A$
I_{DSS}	Drain-to-Source Leakage Current	—	—	-1.0	μA	$V_{DS} = -16V$, $V_{GS} = 0V$
		—	—	-25		$V_{DS} = -16V$, $V_{GS} = 0V$, $T_J = 125^\circ\text{C}$
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	—	3.6	5.4	nC	$I_D = -2.2A$
Q_{gs}	Gate-to-Source Charge	—	0.66	—		$V_{DS} = -10V$
Q_{gd}	Gate-to-Drain ("Miller") Charge	—	0.83	—		$V_{GS} = -4.5V$ ②
$t_{d(on)}$	Turn-On Delay Time	—	8.3	—	ns	$V_{DD} = -10V$ ②
t_r	Rise Time	—	14	—		$I_D = -1.0A$
$t_{d(off)}$	Turn-Off Delay Time	—	31	—		$R_G = 6.0\Omega$
t_f	Fall Time	—	28	—		$V_{GS} = -4.5V$
C_{iss}	Input Capacitance	—	320	—	pF	$V_{GS} = 0V$
C_{oss}	Output Capacitance	—	56	—		$V_{DS} = -15V$
C_{rss}	Reverse Transfer Capacitance	—	40	—		$f = 1.0kHz$

Source-Drain Ratings and Characteristics

	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current (Body Diode)	—	—	-0.96	A	MOSFET symbol showing the integral reverse p-n junction diode. 
I_{SM}	Pulsed Source Current (Body Diode) ①	—	—	-9.0		
V_{SD}	Diode Forward Voltage	—	—	-1.2	V	$T_J = 25^\circ\text{C}$, $I_S = -0.96A$, $V_{GS} = 0V$ ②
t_{rr}	Reverse Recovery Time	—	23	35	ns	$T_J = 25^\circ\text{C}$, $I_F = -0.96A$
Q_{rr}	Reverse Recovery Charge	—	7.7	12	nC	$di/dt = -100A/\mu s$ ②

Notes:

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

② Pulse width $\leq 400\mu s$; duty cycle $\leq 2\%$.

③ Surface mounted on FR-4 board, $t \leq 5sec$.

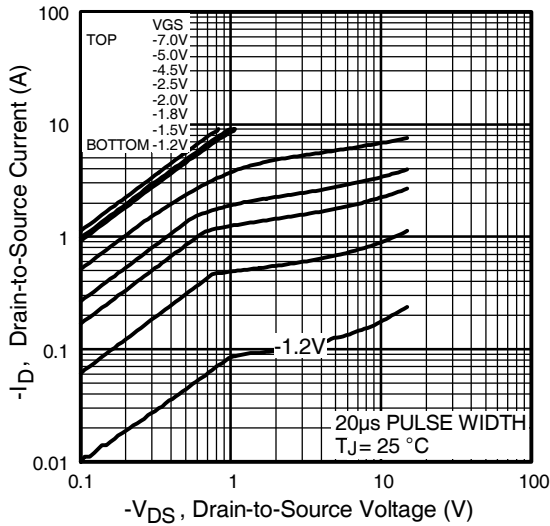


Fig 1. Typical Output Characteristics

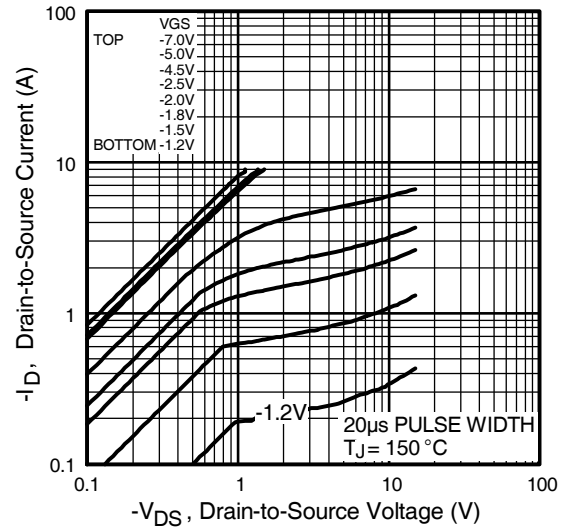


Fig 2. Typical Output Characteristics

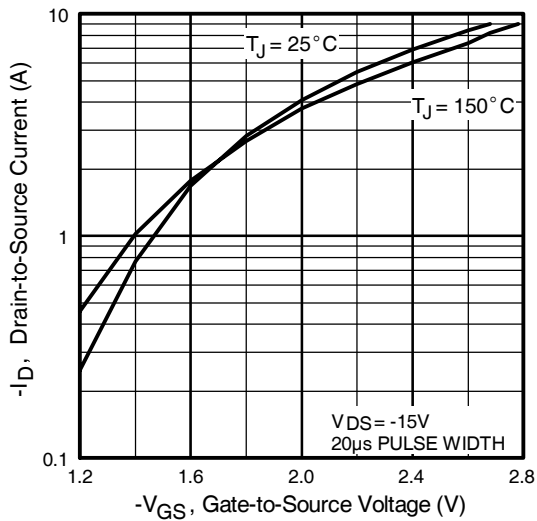


Fig 3. Typical Transfer Characteristics

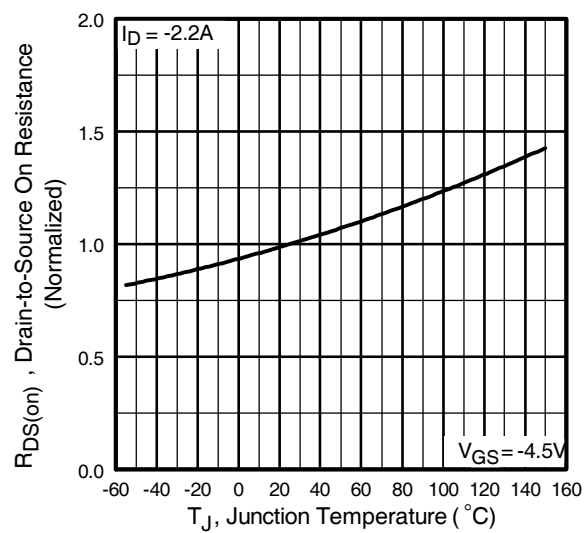
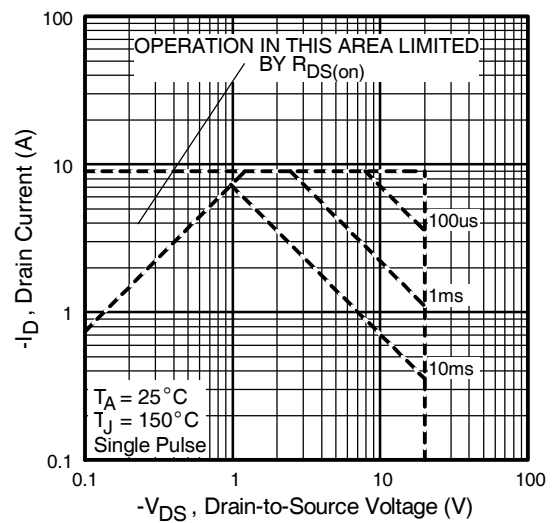
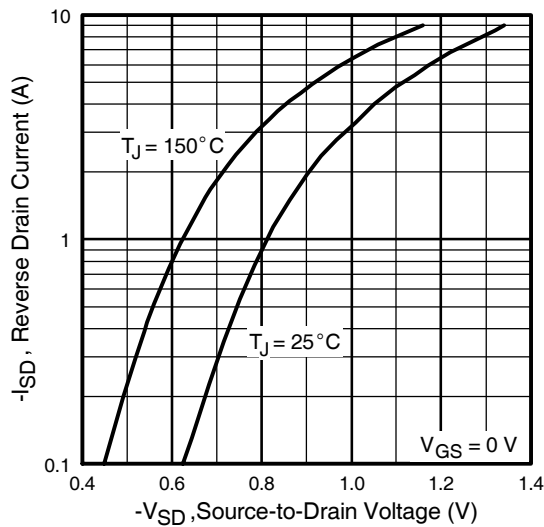
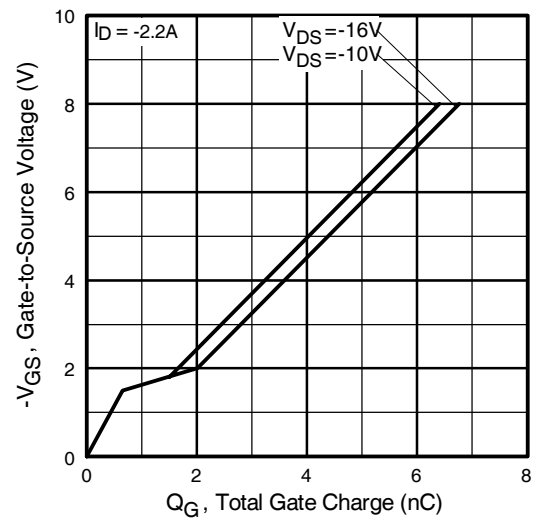
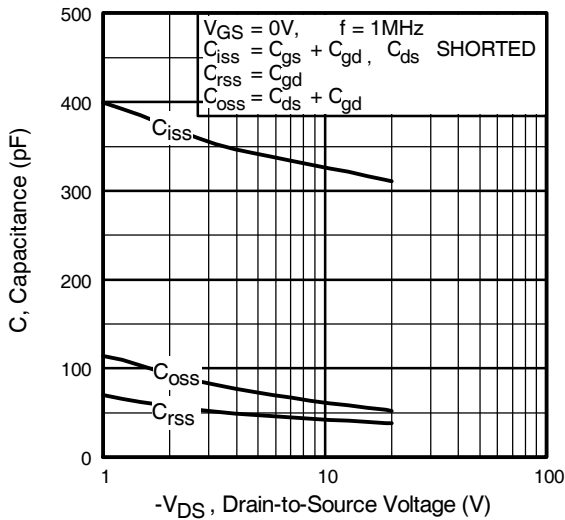


Fig 4. Normalized On-Resistance
Vs. Temperature

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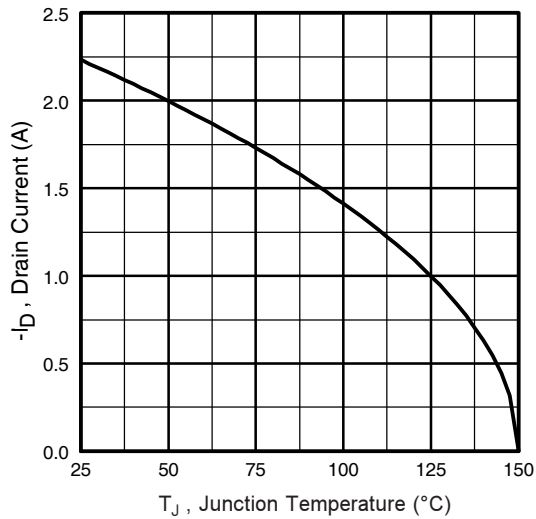


Fig 9. Maximum Drain Current Vs. Junction Temperature

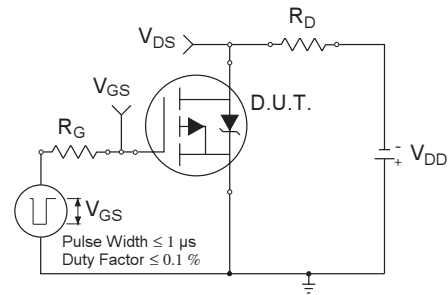


Fig 10a. Switching Time Test Circuit

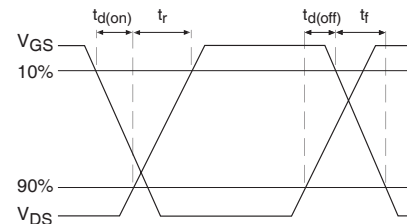


Fig 10b. Switching Time Waveforms

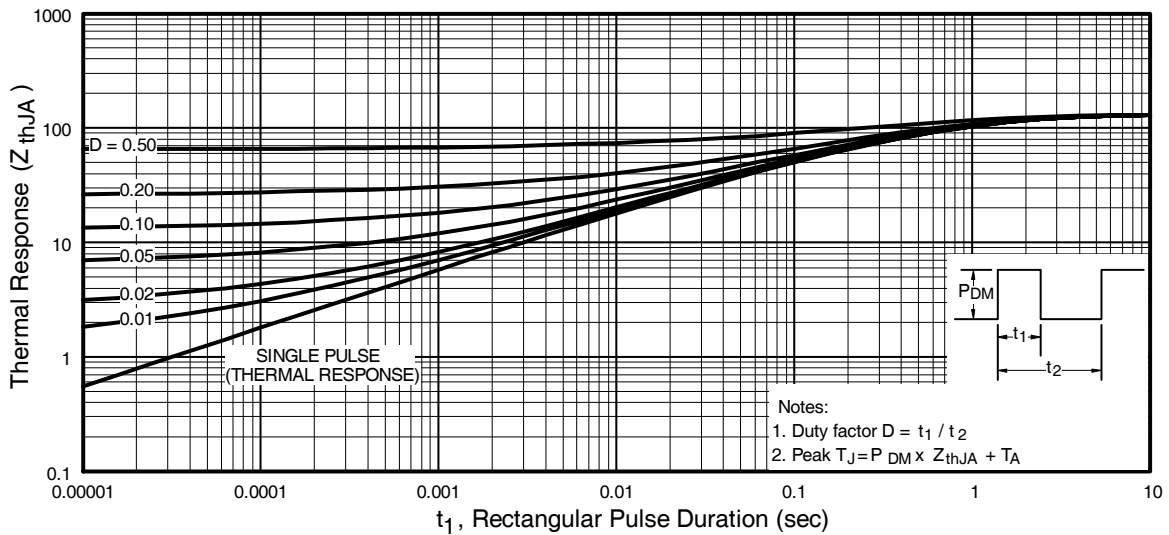


Fig 10. Typical Effective Transient Thermal Impedance, Junction-to-Ambient

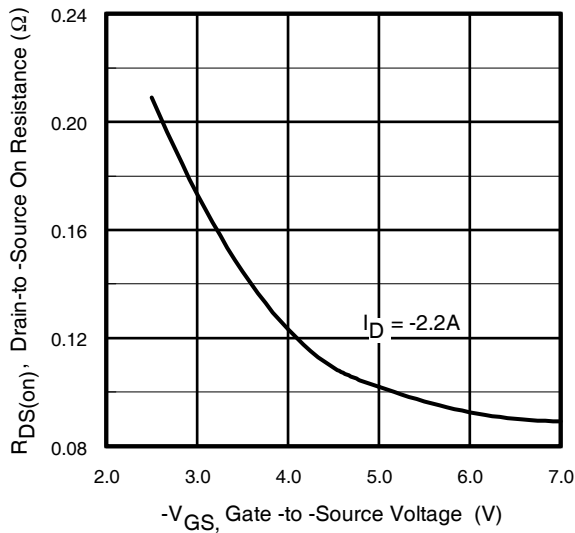


Fig 11. Typical On-Resistance Vs. Gate Voltage

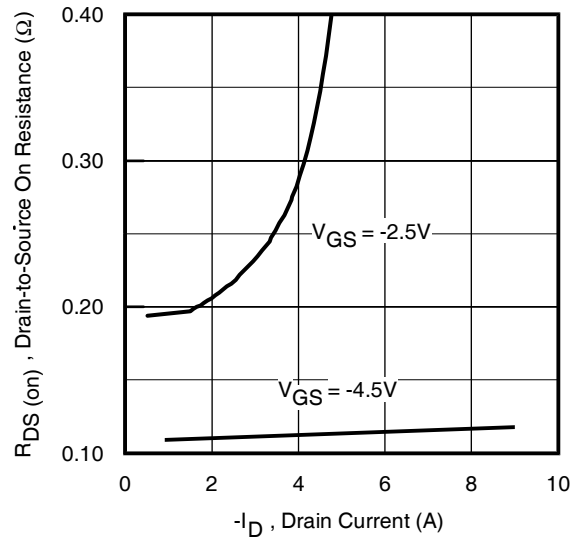


Fig 12. Typical On-Resistance Vs. Drain Current

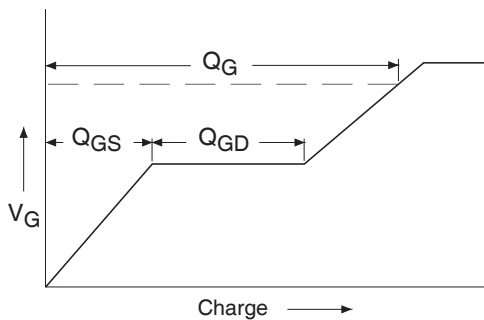


Fig 13a. Basic Gate Charge Waveform

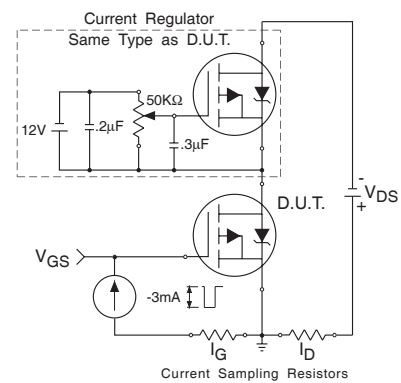


Fig 13b. Gate Charge Test Circuit

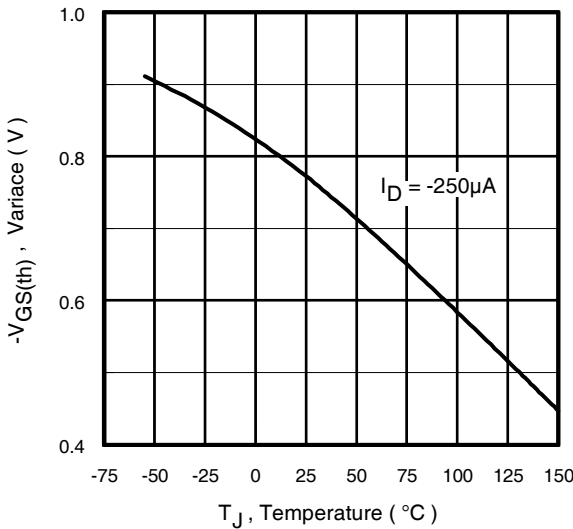


Fig 14. Threshold Voltage Vs. Temperature

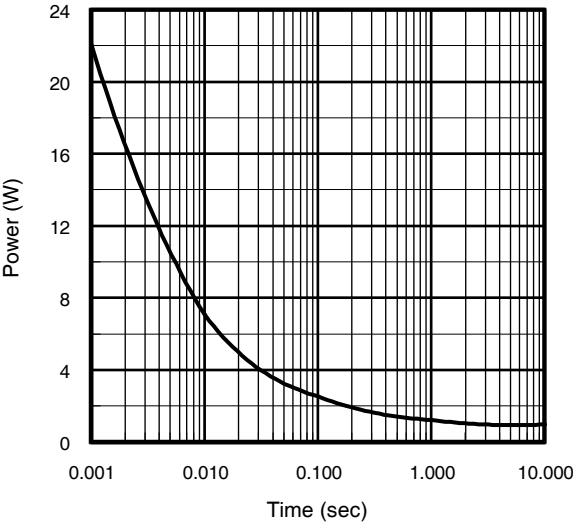
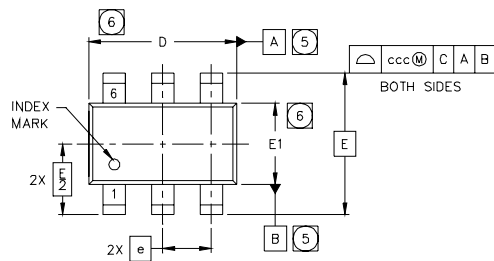


Fig 15. Typical Power Vs. Time

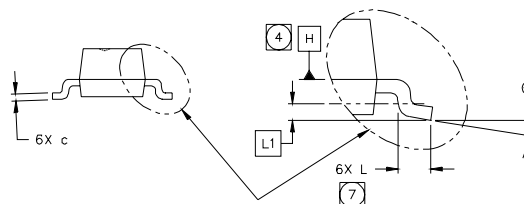
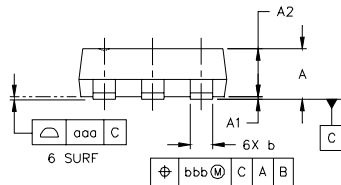
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TSOP-6 Package Outline

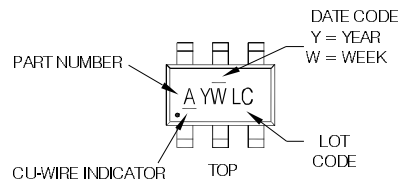


SYMBOL	MO-193AA DIMENSIONS					
	MILLIMETERS			INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	---	---	1.10	---	---	.0433
A1	0.01	---	0.10	.0004	---	.0039
A2	0.80	0.90	1.00	.0315	.0354	.0393
b	0.25	---	0.50	.0099	---	.0196
c	0.10	---	0.26	.004	---	.010
D	2.90	3.00	3.10	.115	.118	.122
E	2.75 BSC			.108 BSC		
E1	1.30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



TSOP-6 Part Marking Information

W = (1-26) IF PRECEDED BY LAST DIGIT OF CALENDAR YEAR



PART NUMBER CODE REFERENCE:

A = SI3443DV K = IRF5810
B = IRF5800 L = IRF5804
C = IRF5850 M = IRF5803
D = IRF5851 N = IRF5802
E = IRF5852
F = IRF5801
I = IRF5805
J = IRF5806

Notes:

-A line above the work week (as shown here) indicates Lead-Free
-A line below the part number (as shown here) indicates Cu-wire

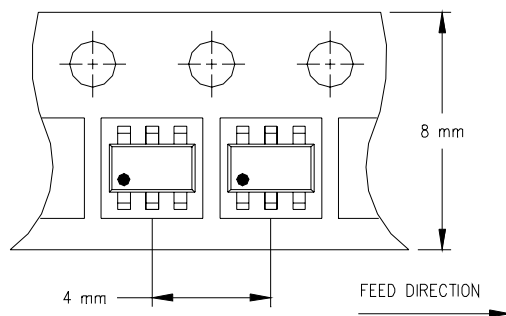
YEAR	Y	WORK WEEK	W
2001	1	01	A
2002	2	02	B
2003	3	03	C
2004	4	04	D
2005	5		
2006	6		
2007	7		
2008	8		
2009	9		
2010	0	24	X
		25	Y
		26	Z

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		
2006	F		
2007	G		
2008	H		
2009	J		
2010	K	50	X
		51	Y
		52	Z

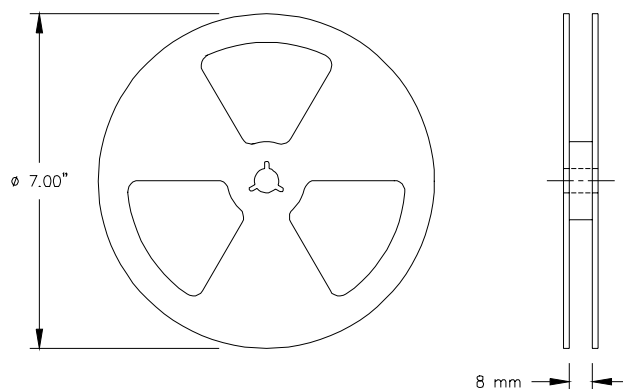
Note: For the most current drawing please refer to IR website at: <http://www.irf.com/package/>

TSOP-6 Tape & Reel Information



NOTES:

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



NOTES:

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

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

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TAC Fax: (310) 252-7903

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