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[International Rectifier \(Infineon Technologies Americas Corp.\)
IRF5804TRPBF](#)

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sales@integrated-circuit.com

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PD - 95503B

IRF5804PbF

HEXFET® Power MOSFET

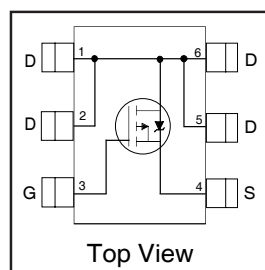
- Ultra Low On-Resistance
- P-Channel MOSFET
- Surface Mount
- Available in Tape & Reel
- Low Gate Charge
- Lead-Free
- Halogen-Free

V_{DS}	$R_{DS(on)}$ max (m Ω)	I_D
-40V	198 @ $V_{GS} = -10V$	-2.5A
	334 @ $V_{GS} = -4.5V$	-2.0A

Description

These P-channel HEXFET® Power 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® 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. Its 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	-40	V
I_D @ $T_A = 25^\circ C$	Continuous Drain Current, V_{GS} @ -10V	-2.5	A
I_D @ $T_A = 70^\circ C$	Continuous Drain Current, V_{GS} @ -10V	-2.0	
I_{DM}	Pulsed Drain Current ①	-10	
P_D @ $T_A = 25^\circ C$	Power Dissipation ③	2.0	W
P_D @ $T_A = 70^\circ C$	Power Dissipation ③	1.3	
	Linear Derating Factor	0.016	mW/°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-Ambient③	62.5	°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	-40	—	—	V	$V_{GS} = 0V, I_D = -250\mu A$
$\Delta V_{(BR)DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient	—	0.03	—	V/ $^\circ\text{C}$	Reference to 25°C , $I_D = -1\text{mA}$
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	—	—	198	$\text{m}\Omega$	$V_{GS} = -10V, I_D = -2.5 \text{ ②}$
		—	—	334		$V_{GS} = -4.5V, I_D = -2.0A \text{ ②}$
$V_{GS(th)}$	Gate Threshold Voltage	-1.0	—	-3.0	V	$V_{DS} = V_{GS}, I_D = -250\mu A$
g_{fs}	Forward Transconductance	2.5	—	—	S	$V_{DS} = -10V, I_D = -2.5A$
I_{DSS}	Drain-to-Source Leakage Current	—	—	-10	μA	$V_{DS} = -32V, V_{GS} = 0V$
		—	—	-25		$V_{DS} = -32V, V_{GS} = 0V, T_J = 70^\circ\text{C}$
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	—	5.7	8.5	nC	$I_D = -2.5A$
Q_{gs}	Gate-to-Source Charge	—	2.8	4.2		$V_{DS} = -20V$
Q_{gd}	Gate-to-Drain ("Miller") Charge	—	2.1	3.2		$V_{GS} = -10V$
$t_{d(on)}$	Turn-On Delay Time	—	19	—	ns	$V_{DD} = -20V \text{ ②}$
t_r	Rise Time	—	430	—		$I_D = -1.0A$
$t_{d(off)}$	Turn-Off Delay Time	—	100	—		$R_G = 6.0\Omega$
t_f	Fall Time	—	64	—		$V_{GS} = -10V$
C_{iss}	Input Capacitance	—	680	—	pF	$V_{GS} = 0V$
C_{oss}	Output Capacitance	—	60	—		$V_{DS} = -25V$
C_{rss}	Reverse Transfer Capacitance	—	44	—		$f = 1\text{kHz}$

Source-Drain Ratings and Characteristics

	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current (Body Diode)	—	—	-2.5	A	MOSFET symbol showing the integral reverse p-n junction diode.
I_{SM}	Pulsed Source Current (Body Diode) ①	—	—	-10		
V_{SD}	Diode Forward Voltage	—	—	-1.2	V	$T_J = 25^\circ\text{C}, I_S = -2.0A, V_{GS} = 0V \text{ ②}$
t_{rr}	Reverse Recovery Time	—	24	36	ns	$T_J = 25^\circ\text{C}, I_F = -2.0A$
Q_{rr}	Reverse Recovery Charge	—	32	49	nC	$di/dt = -100A/\mu s \text{ ②}$

Notes:

- ① Repetitive rating; pulse width limited by max. junction temperature. ③ Surface mounted on 1 in square Cu board
- ② Pulse width $\leq 400\mu s$; duty cycle $\leq 2\%$.

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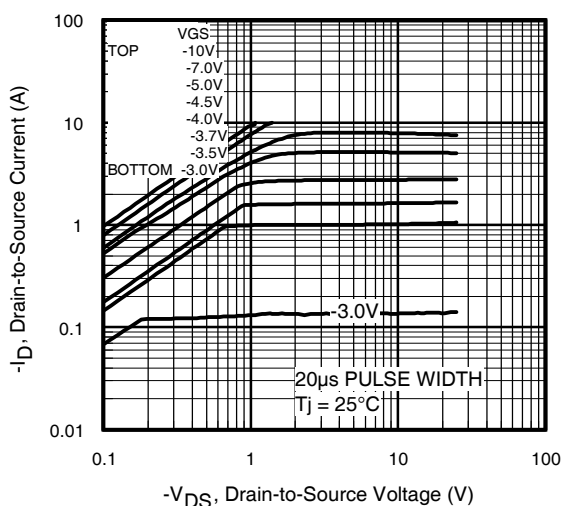


Fig 1. Typical Output Characteristics

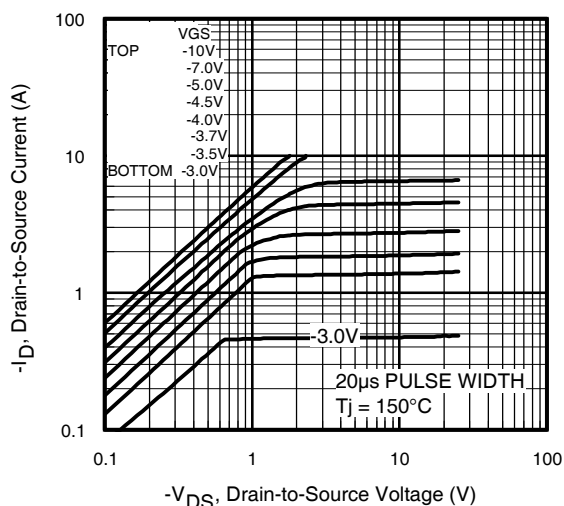


Fig 2. Typical Output Characteristics

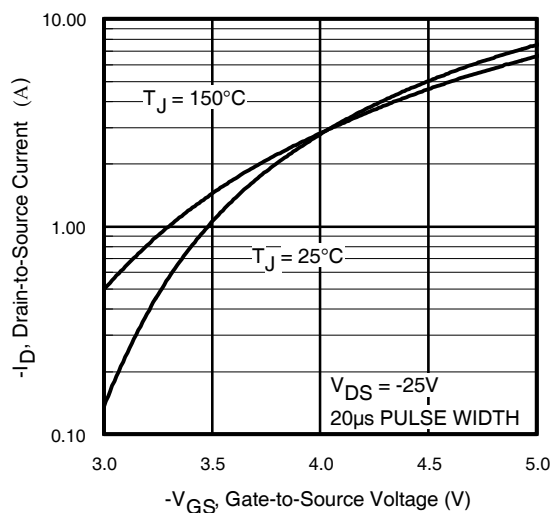


Fig 3. Typical Transfer Characteristics

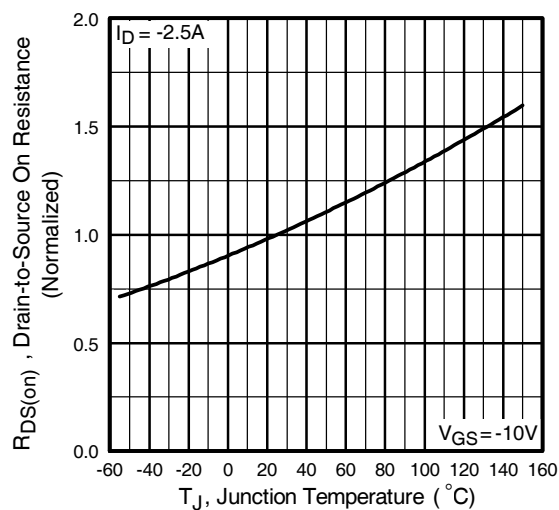


Fig 4. Normalized On-Resistance
Vs. Temperature

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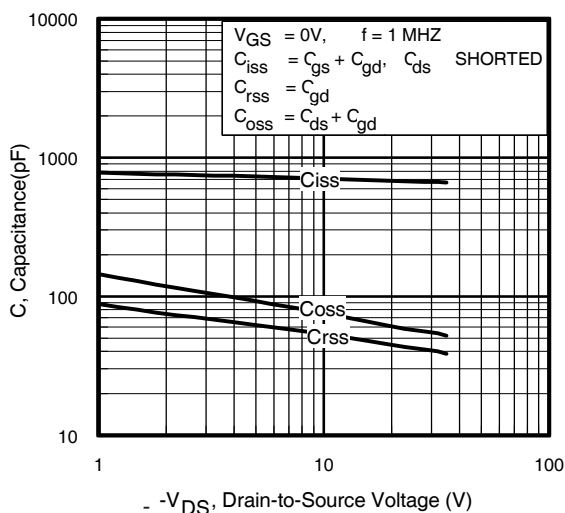


Fig 5. Typical Capacitance Vs.
Drain-to-Source Voltage

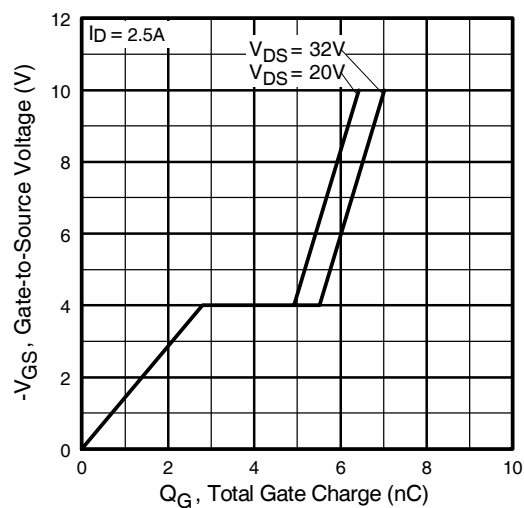


Fig 6. Typical Gate Charge Vs.
Gate-to-Source Voltage

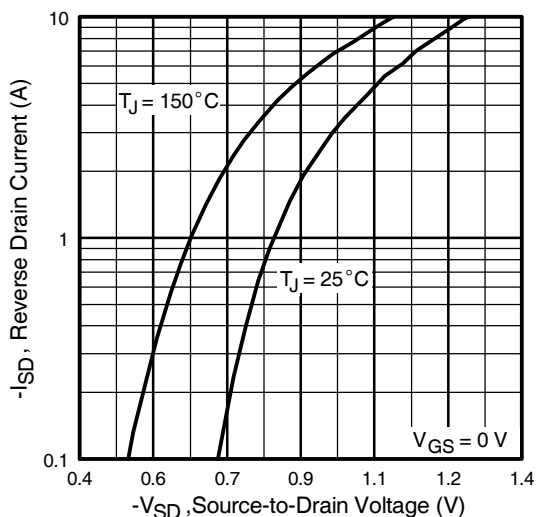


Fig 7. Typical Source-Drain Diode
Forward Voltage

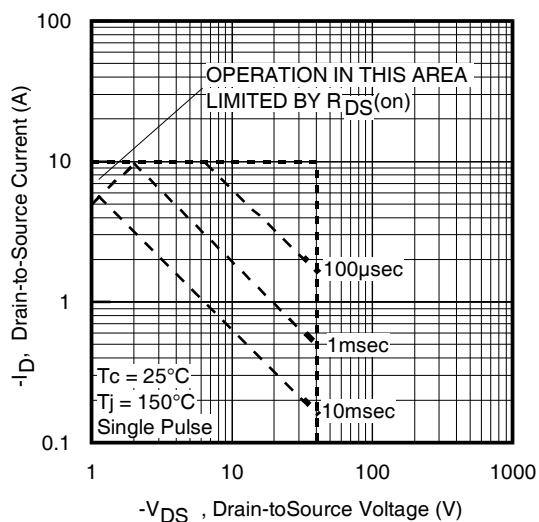


Fig 8. Maximum Safe Operating Area

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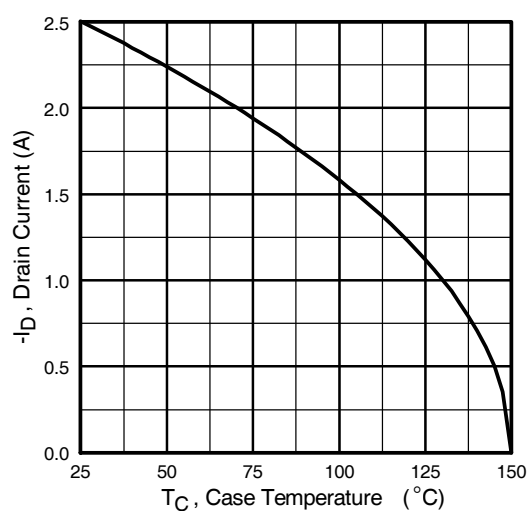


Fig 9. Maximum Drain Current Vs. Case Temperature

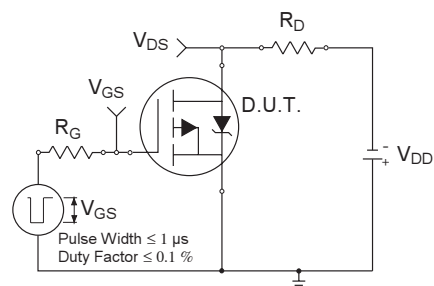


Fig 10a. Switching Time Test Circuit

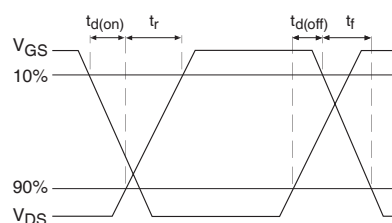


Fig 10b. Switching Time Waveforms

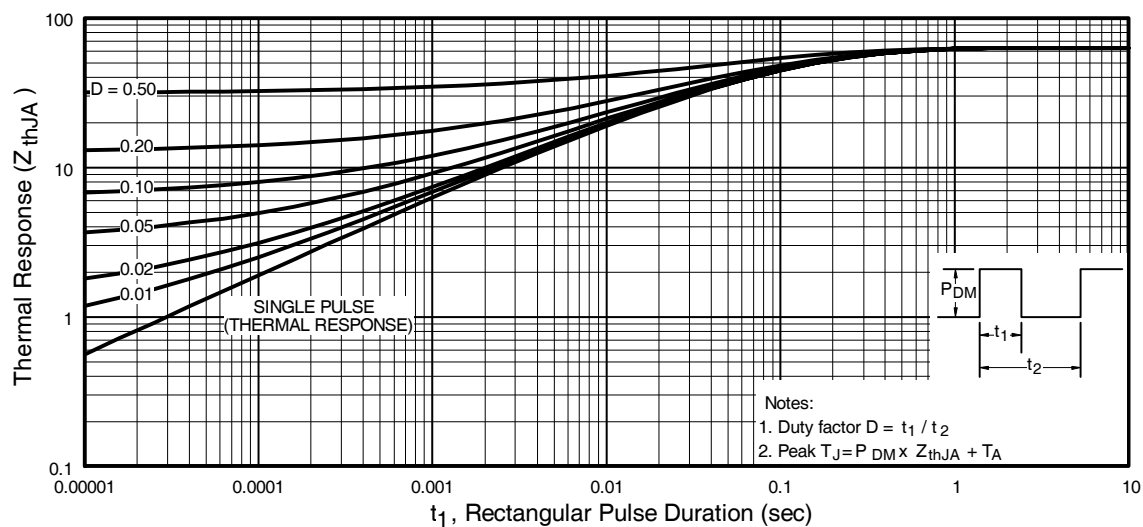


Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

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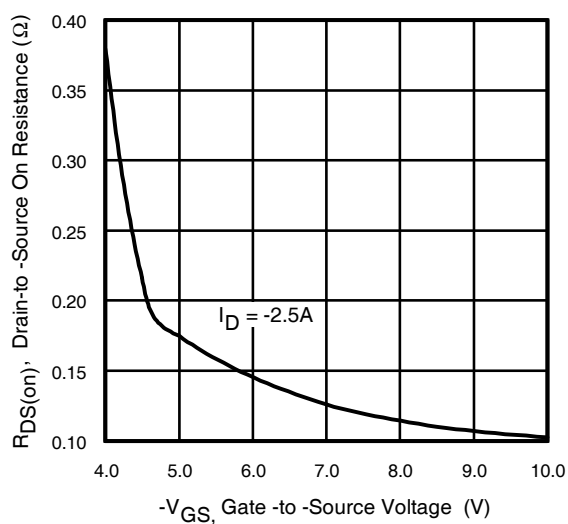


Fig 12. Typical On-Resistance Vs. Gate Voltage

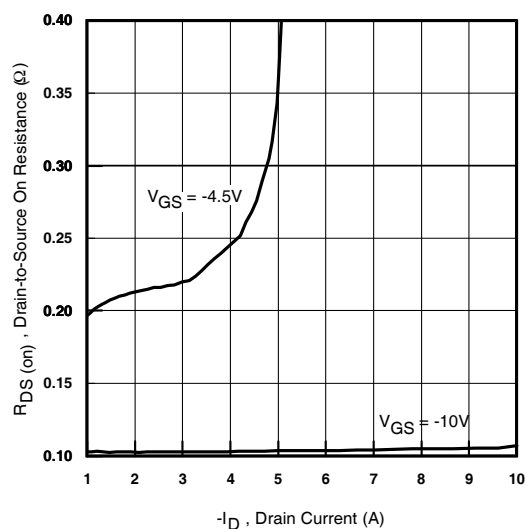


Fig 13. Typical On-Resistance Vs. Drain Current

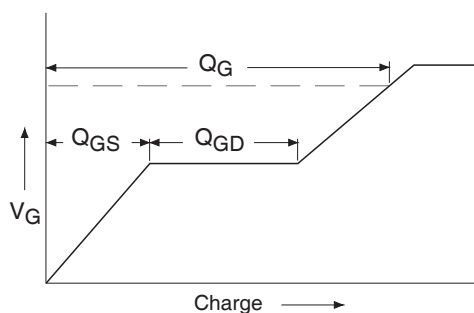


Fig 14a. Basic Gate Charge Waveform

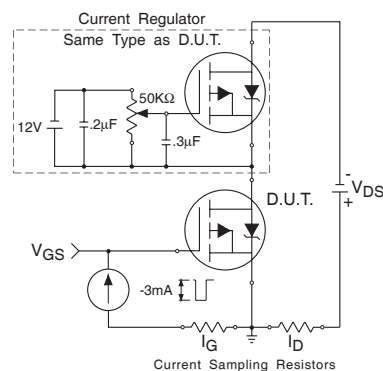


Fig 14b. Gate Charge Test Circuit

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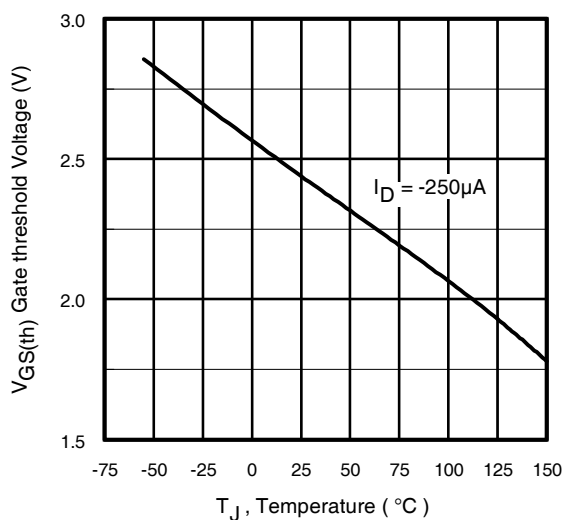


Fig 15. Typical Threshold Voltage Vs. Junction Temperature

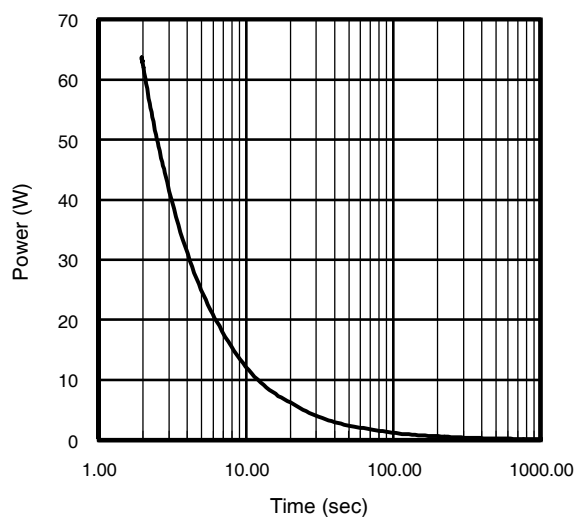
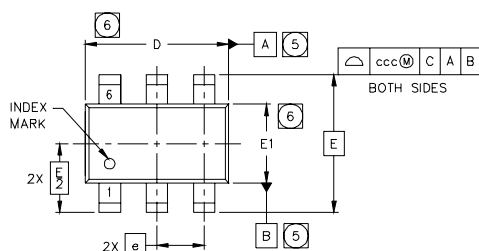


Fig 16. Typical Power Vs. Time

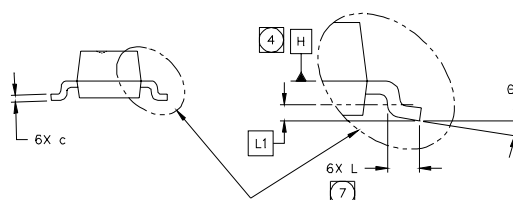
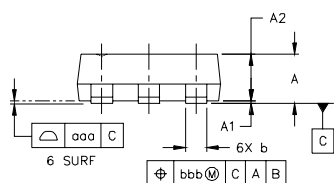
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TSOP-6 Package Outline

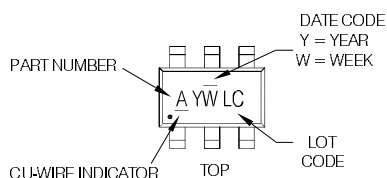
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SYMBOL	MO-193AA DIMENSIONS					
	MILLIMETERS			INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	---	---	1.10	---	---	.0433
A1	0.01	---	0.10	.0004	---	.0039
A2	0.80	0.90	1.00	.0315	.0354	.0393
b	0.25	---	0.50	.0099	---	.0196
c	0.10	---	0.26	.004	---	.010
D	2.90	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



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

W = (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		
2006	6		
2007	7		
2008	8		
2009	9		
2010	0	24	X
		25	Y
		26	Z

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

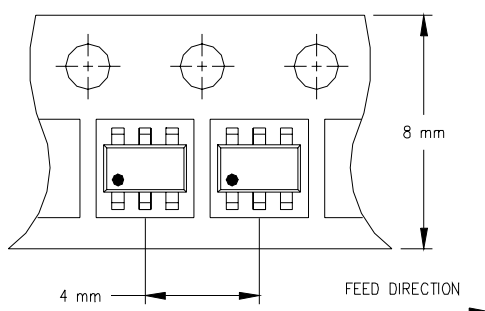
YEAR	Y	WORK WEEK	W
2001	A	27	A
2002	B	28	B
2003	C	29	C
2004	D	30	D
2005	E		
2006	F		
2007	G		
2008	H		
2009	J		
2010	K	50	X
		51	Y
		52	Z

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

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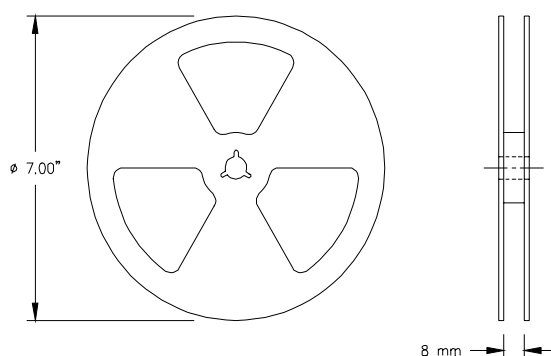
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TSOP-6 Tape & Reel Information



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.
Qualification Standards can be found on IR's Web site.

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