

International IR Rectifier

PD - 94333

IRF5804

HEXFET® Power MOSFET

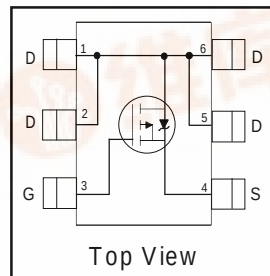
- Ultra Low On-Resistance
- P-Channel MOSFET
- Surface Mount
- Available in Tape & Reel
- Low Gate Charge

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. 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	-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	W
P_D @ $T_A = 25^\circ C$	Power Dissipation ③	2.0	
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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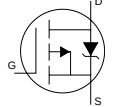
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Electrical Characteristics @ $T_J = 25^\circ\text{C}$ (unless otherwise specified)

	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 , $I_D = -1mA$
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	—	—	198	$m\Omega$	$V_{GS} = -10V$, $I_D = -2.5$ ②
		—	—	334		$V_{GS} = -4.5V$, $I_D = -2.0A$ 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	$V_{DD} = -20V$ 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	—		$f = 1kHz$

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	$T_J = 25^\circ\text{C}$, $I_S = -2.0A$, $V_{GS} = 0V$ 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	$di/dt = -100A/\mu s$ 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 $\leq 2\%$.

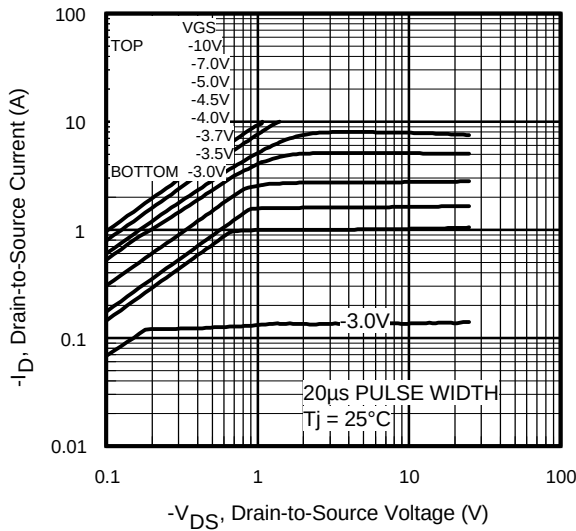


Fig 1. Typical Output Characteristics

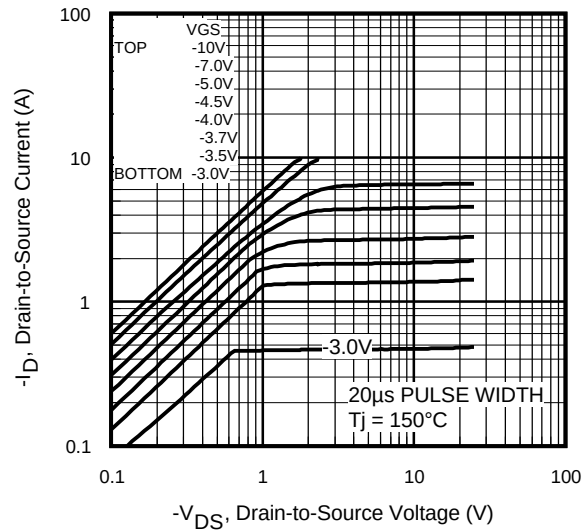


Fig 2. Typical Output Characteristics

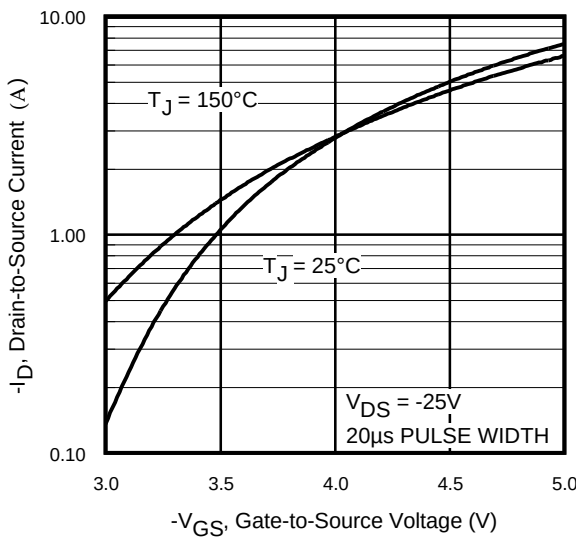


Fig 3. Typical Transfer Characteristics

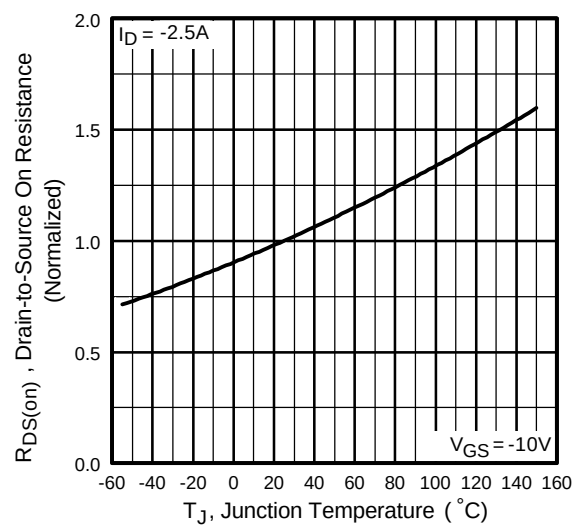
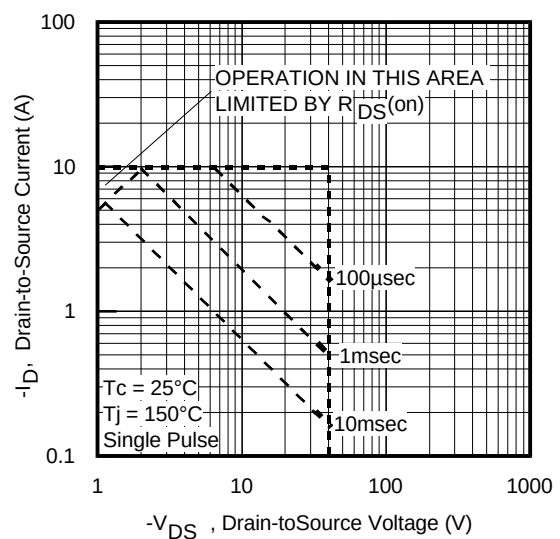
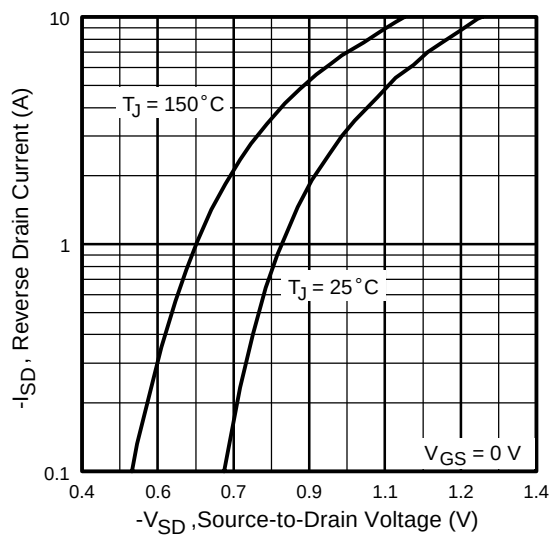
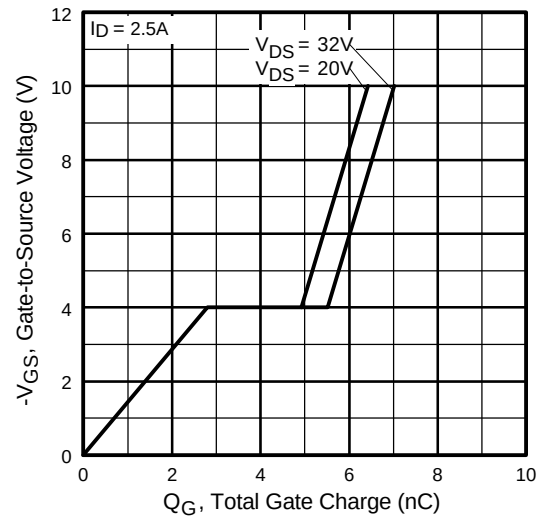
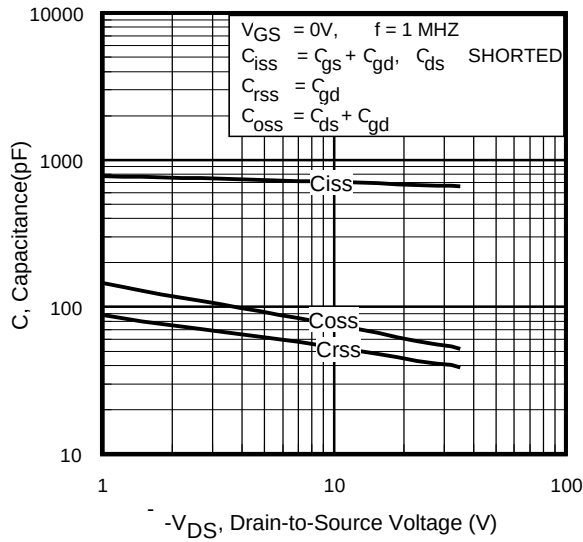


Fig 4. Normalized On-Resistance Vs. Temperature



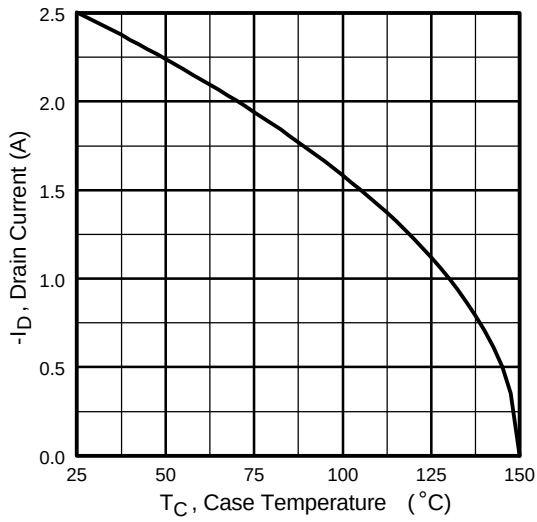


Fig 9. Maximum Drain Current Vs. Case Temperature

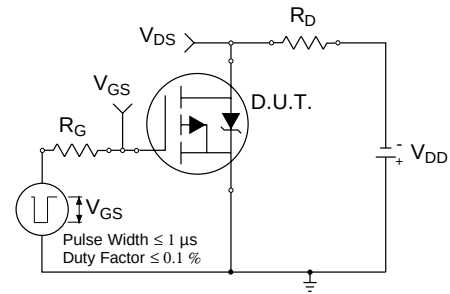


Fig 10a. Switching Time Test Circuit

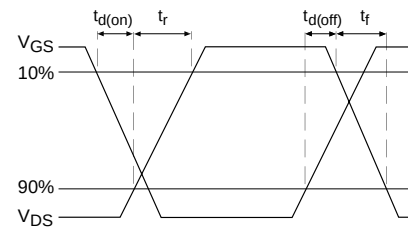


Fig 10b. Switching Time Waveforms

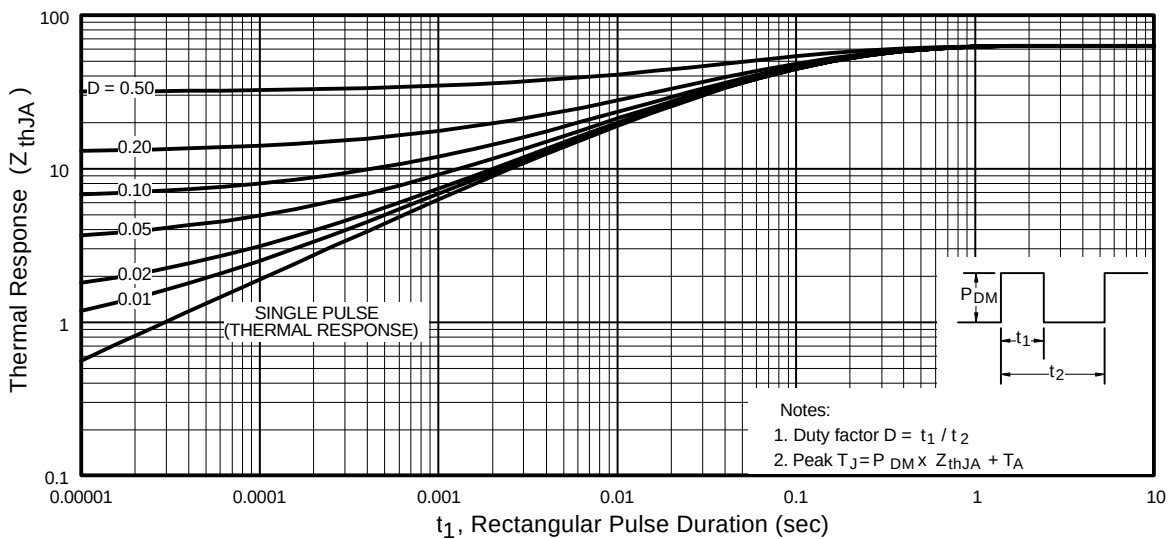


Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

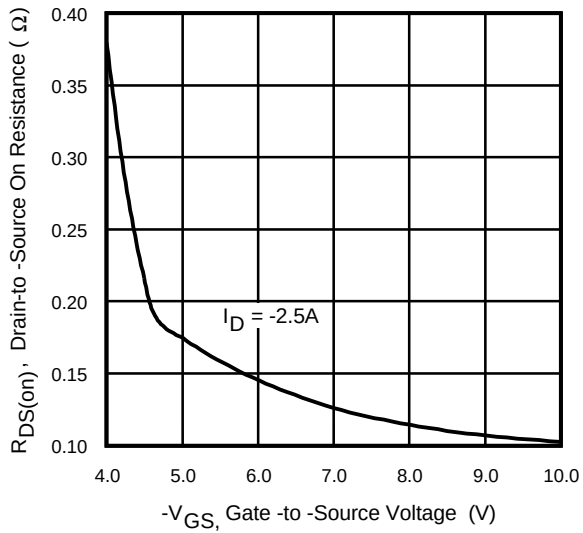


Fig 12. Typical On-Resistance Vs. Gate Voltage

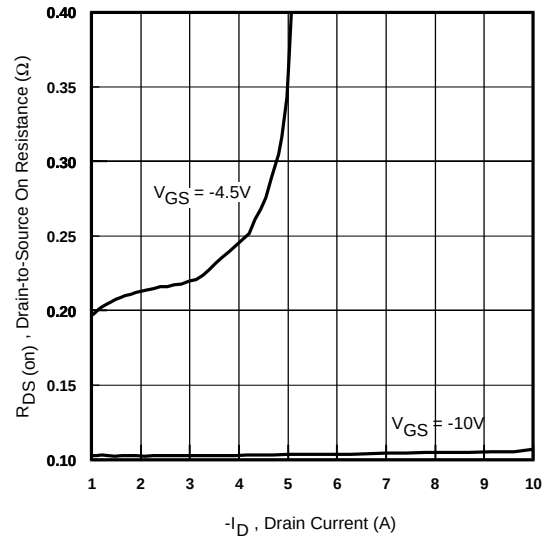


Fig 13. Typical On-Resistance Vs. Drain Current

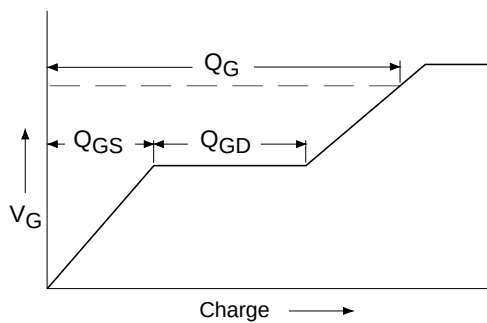


Fig 14a. Basic Gate Charge Waveform

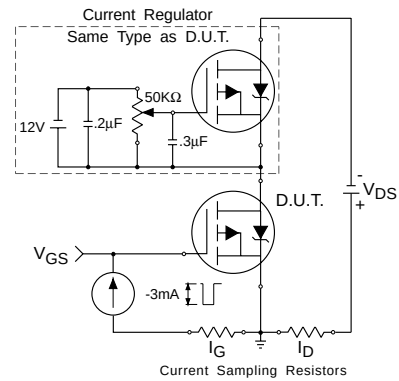


Fig 14b. Gate Charge Test Circuit

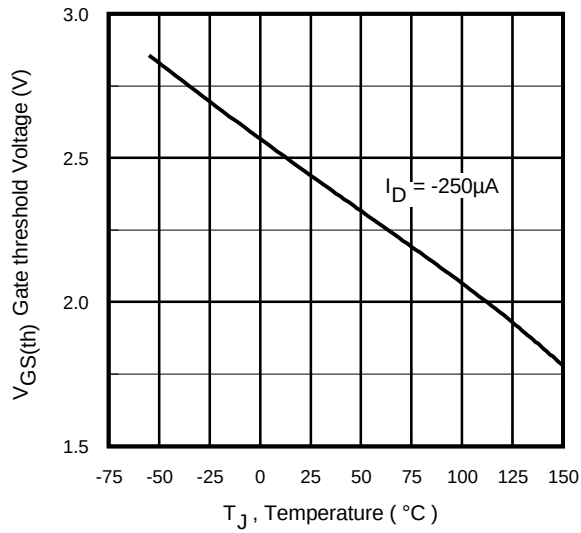


Fig 15. Typical Threshold Voltage Vs. Junction Temperature

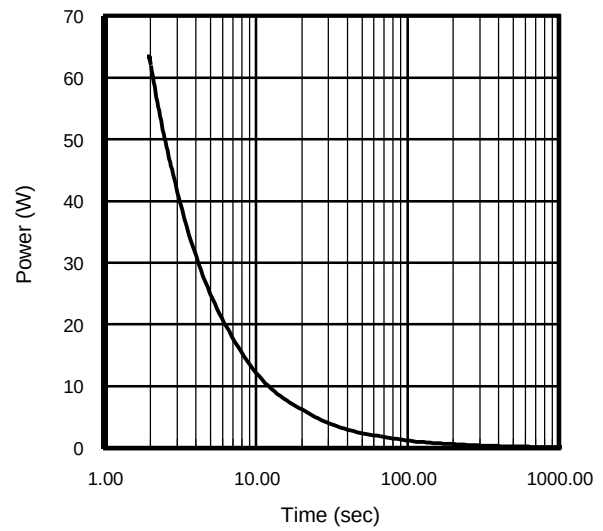


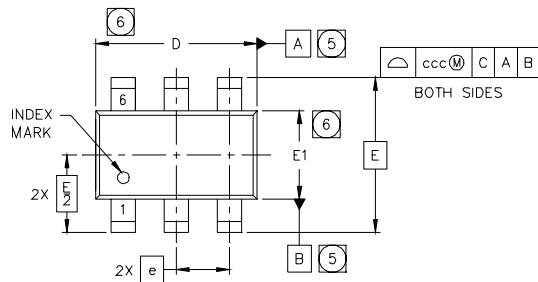
Fig 16. Typical Power Vs. Time

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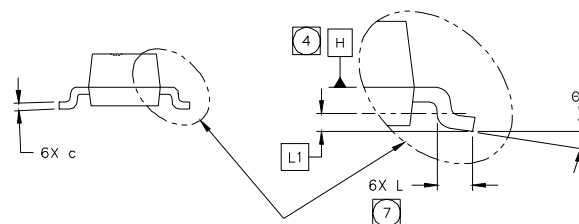
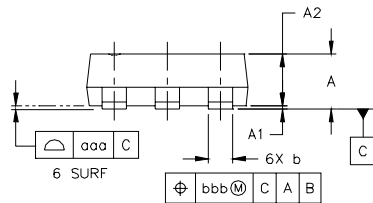
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Rectifier

TSOP-6 Package Outline

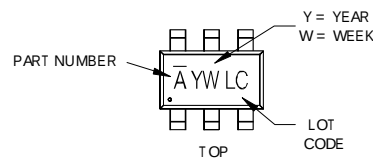


SYMBOL	MO-193AA DIMENSIONS					
	MILLIMETERS			INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	---	---	1.10	---	---	.0433
A1	0.01	---	0.10	.0004	---	.0039
A2	0.80	0.90	1.00	.0315	.0354	.0393
b	0.25	---	0.50	.0099	---	.0196
c	0.10	---	0.26	.004	---	.010
D	2.90	3.00	3.10	.115	.118	.122
E	2.75 BSC			.108 BSC		
E1	1.30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



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

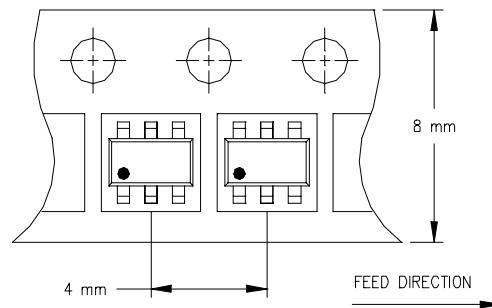
PART NUMBER CODE REFERENCE:

A = SI3443DV
B = IRF5800
C = IRF5850
D = IRF5851
E = IRF5852
I = IRF5805
J = IRF5806
K = IRF5810
L = IRF5804

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

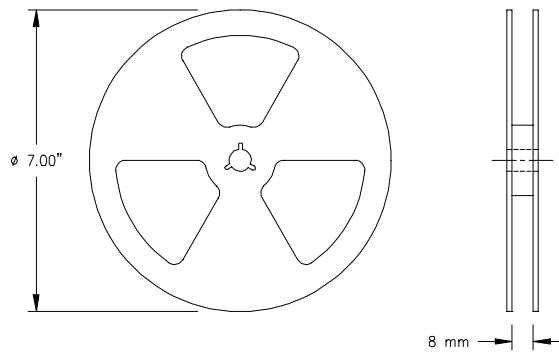
YEAR	Y	WORK WEEK	W
2001	A	27	A
2002	B	28	B
2003	C	29	C
2004	D	30	D
2005	E		
1996	F		
1997	G		
1998	H		
1999	J		
2000	K	50	X
		51	Y
		52	Z

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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IR Rectifier

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