

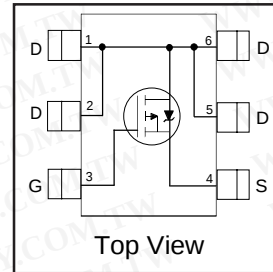
International **IR** Rectifier

PD - 93850A

IRF5800

HEXFET® Power MOSFET

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



$$V_{DS} = -30V$$

$$R_{DS(on)} = 0.085\Omega$$

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® 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	-30	V
$I_D @ T_A = 25^\circ C$	Continuous Drain Current, $V_{GS} @ -4.5V$	-4.0	A
$I_D @ T_A = 70^\circ C$	Continuous Drain Current, $V_{GS} @ -4.5V$	-3.2	
I_{DM}	Pulsed Drain Current ①	-32	
$P_D @ T_A = 25^\circ C$	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 Energy④	20.6	mJ
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

IRF5800

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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	-30	—	—	V	$V_{GS} = 0V, I_D = -250\mu A$
$\Delta V_{(BR)DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient	—	0.02	—	V/ $^\circ\text{C}$	Reference to 25°C , $I_D = 1mA$
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	—	—	0.085 0.150	Ω	$V_{GS} = -10V, I_D = -4.0A$ ② $V_{GS} = -4.5V, I_D = -3.0A$ ②
$V_{GS(th)}$	Gate Threshold Voltage	-1.0	—	—	V	$V_{DS} = V_{GS}, I_D = -250\mu A$
g_{fs}	Forward Transconductance	3.5	—	—	S	$V_{DS} = -10V, I_D = -4.0A$
I_{DSS}	Drain-to-Source Leakage Current	—	—	-1.0 -5.0	μA	$V_{DS} = -24V, V_{GS} = 0V$ $V_{DS} = -24V, V_{GS} = 0V, T_J = 70^\circ\text{C}$
I_{GSS}	Gate-to-Source Forward Leakage Gate-to-Source Reverse Leakage	—	—	-100 100	nA	$V_{GS} = -20V$ $V_{GS} = 20V$
Q_g	Total Gate Charge	—	11.4	17	nC	$I_D = -4.0A$
Q_{gs}	Gate-to-Source Charge	—	2.3	—	nC	$V_{DS} = -16V$
Q_{gd}	Gate-to-Drain ("Miller") Charge	—	2.2	—	nC	$V_{GS} = -10V$ ②
$t_{d(on)}$	Turn-On Delay Time	—	11.4	17	ns	$V_{DD} = -15V, V_{GS} = -10V$
t_r	Rise Time	—	11	17	ns	$I_D = -1.0A$
$t_{d(off)}$	Turn-Off Delay Time	—	24	36	ns	$R_G = 6.0\Omega$
t_f	Fall Time	—	14	20	ns	$R_D = 15\Omega$, ②
C_{iss}	Input Capacitance	—	535	—	pF	$V_{GS} = 0V$
C_{oss}	Output Capacitance	—	94	—	pF	$V_{DS} = -25V$
C_{rss}	Reverse Transfer Capacitance	—	68	—	pF	$f = 1.0MHz$

Source-Drain Ratings and Characteristics

	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current (Body Diode)	—	—	-2.0	A	MOSFET symbol showing the integral reverse p-n junction diode.
I_{SM}	Pulsed Source Current (Body Diode) ①	—	—	-32	A	
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	—	19	28	ns	$T_J = 25^\circ\text{C}, I_F = -2.0A$
Q_{rr}	Reverse Recovery Charge	—	16	24	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, $t \leq 5sec$.
- ④ Starting $T_J = 25^\circ\text{C}$, $L = 2.5mH$
 $R_G = 25\Omega$, $I_{AS} = -4.0A$. (See Fig 10)

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IRF5800

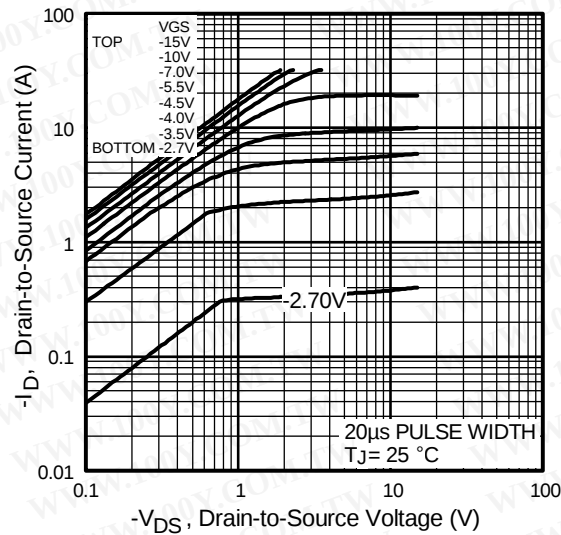


Fig 1. Typical Output Characteristics

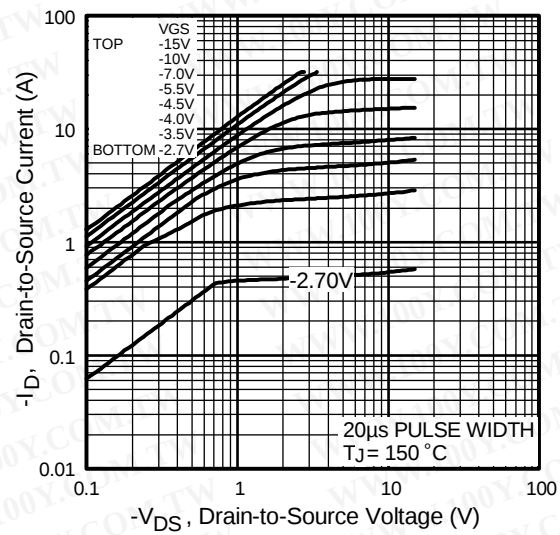


Fig 2. Typical Output Characteristics

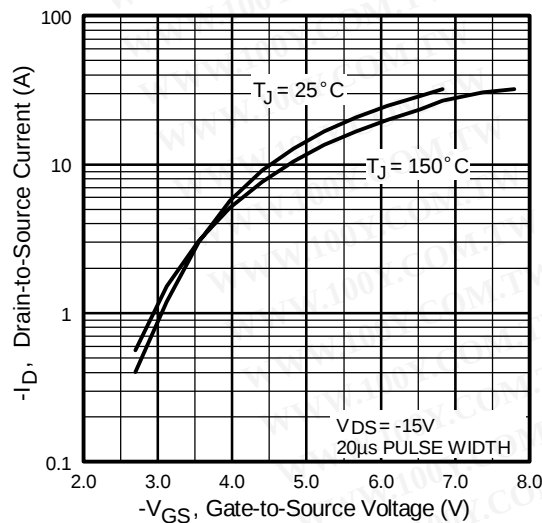


Fig 3. Typical Transfer Characteristics

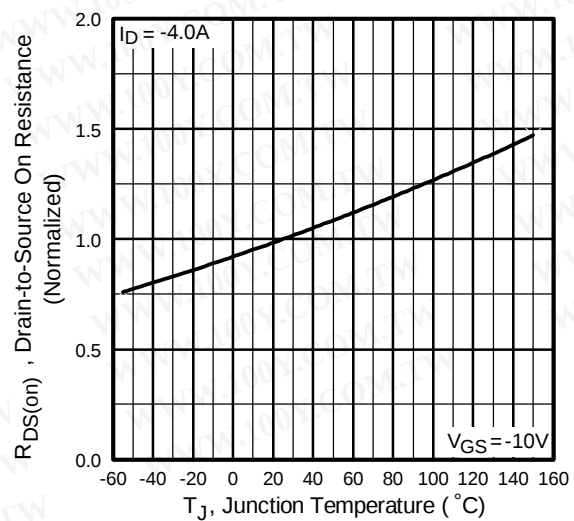


Fig 4. Normalized On-Resistance Vs. Temperature

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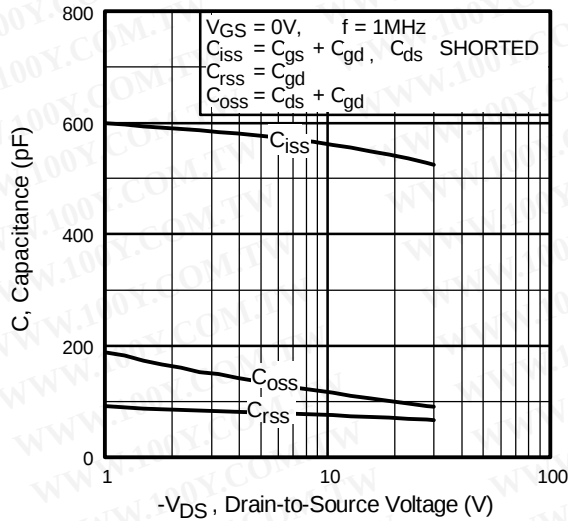


Fig 5. Typical Capacitance Vs. Drain-to-Source Voltage

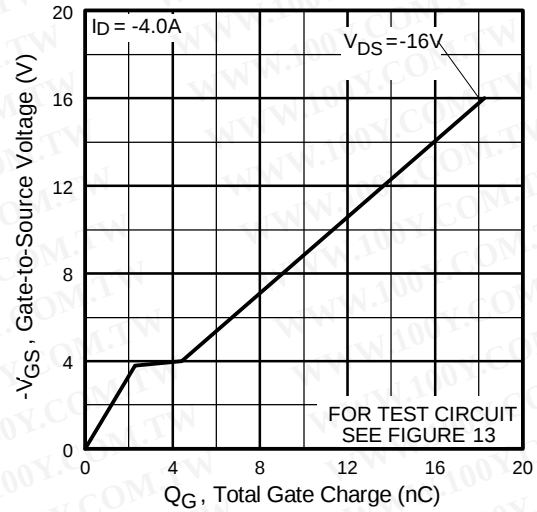


Fig 6. Typical Gate Charge Vs. Gate-to-Source Voltage

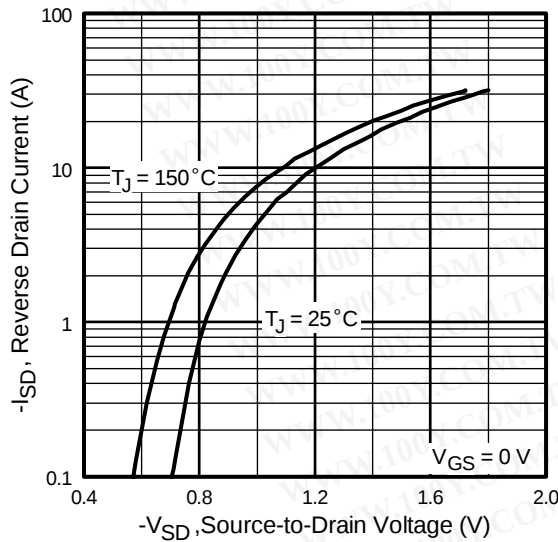


Fig 7. Typical Source-Drain Diode Forward Voltage

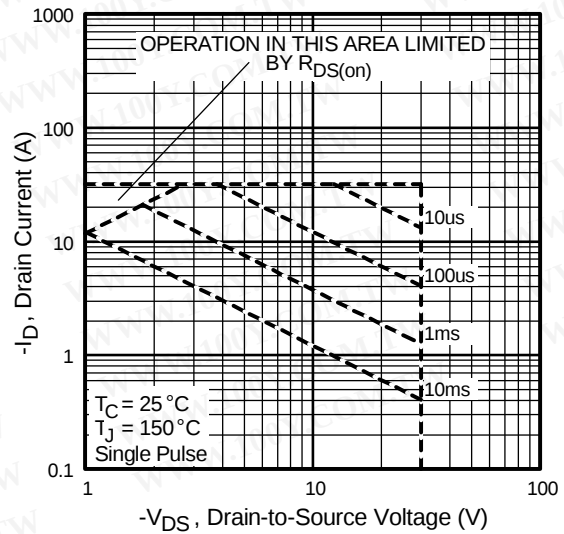


Fig 8. Maximum Safe Operating Area

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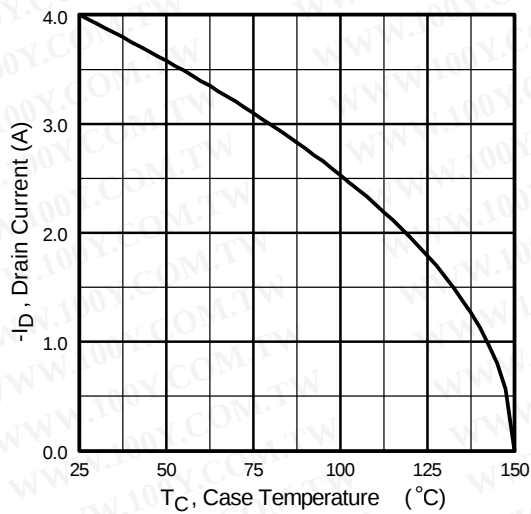


Fig 9. Maximum Drain Current Vs. Case Temperature

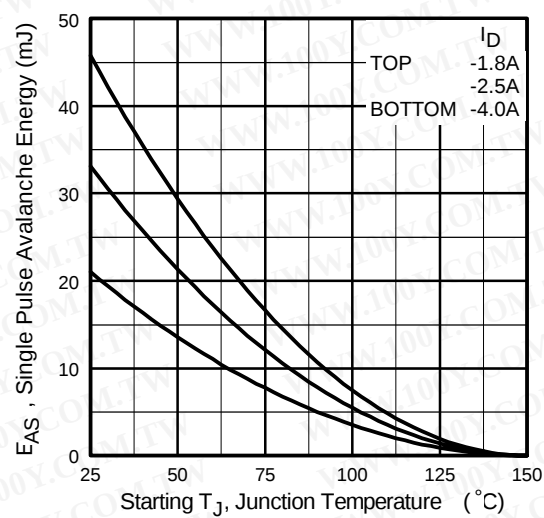


Fig 10. Maximum Avalanche Energy Vs. Drain Current

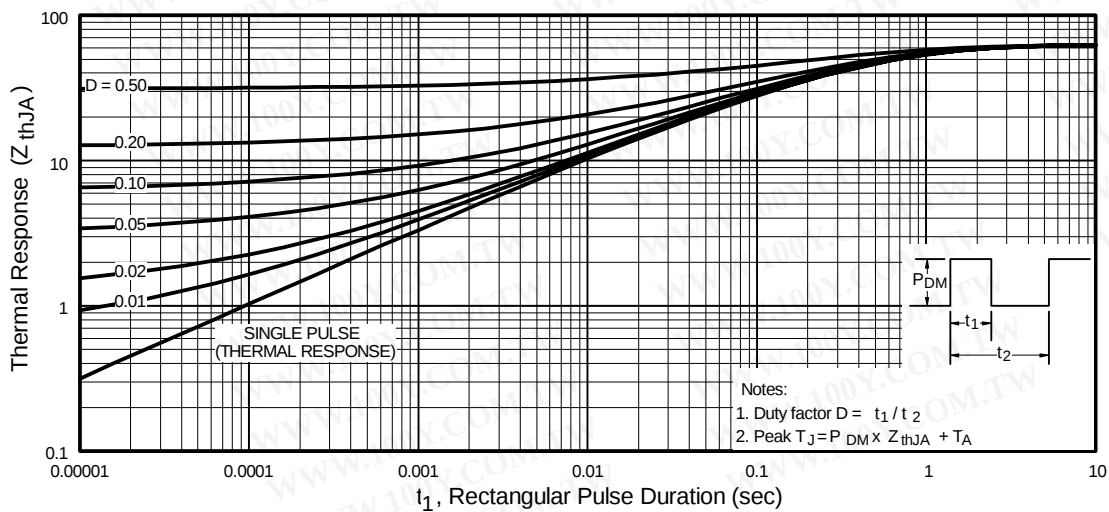


Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

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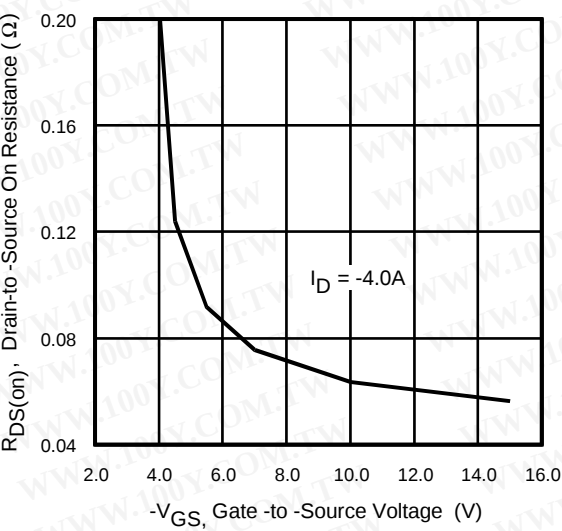


Fig 12. Typical On-Resistance Vs. Gate Voltage

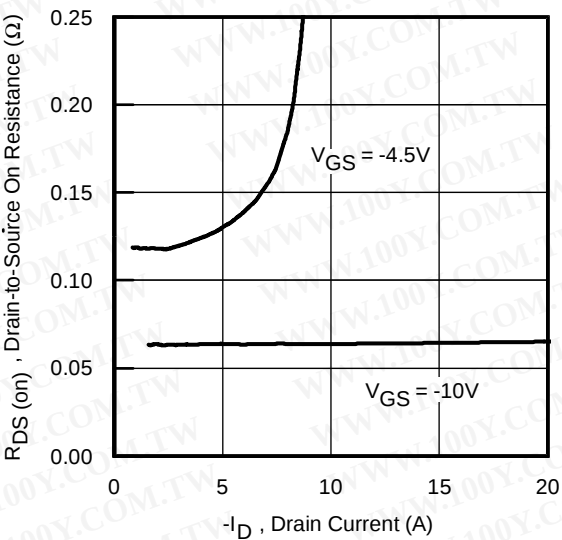
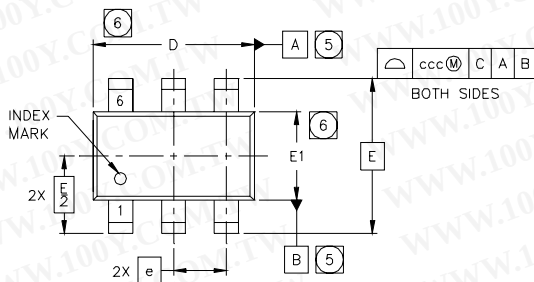


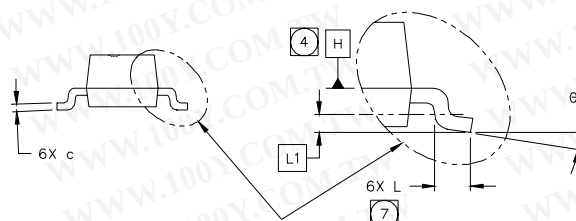
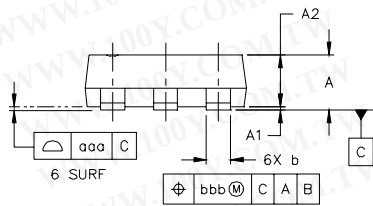
Fig 13. Typical On-Resistance Vs. Drain Current

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 TSOP-6 Package Outline

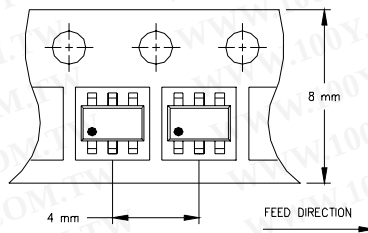
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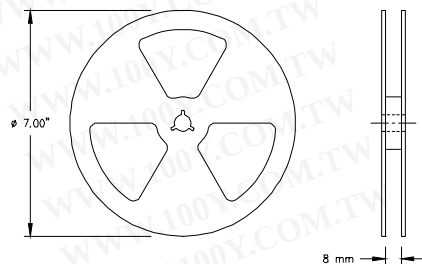
SYMBOL	MO-193AA DIMENSIONS					
	MILLIMETERS			INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	---	---	1.10	---	---	.0433
A1	0.01	---	0.10	.0004	---	.0039
A2	0.80	0.90	1.00	.0315	.0354	.0393
b	0.25	---	0.50	.0099	---	.0196
c	0.10	---	0.26	.004	---	.010
D	2.90	3.00	3.10	.115	.118	.122
E	2.75 BSC			.108 BSC		
E1	1.30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



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



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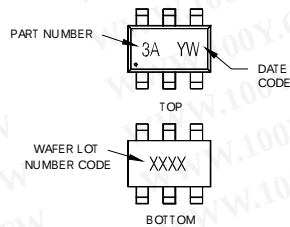
TSOP-6 Part Marking Information

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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



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

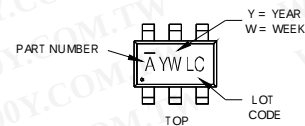
YEAR	Y	WORK WEEK	W
2001	1	01	A
2002	2	02	B
2003	3	03	C
2004	4	04	D
2005	5		
1996	6		
1997	7		
1998	8		
1999	9		
2000	0	24	X
		25	Y
		26	Z

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) IF PRECEDED BY LAST DIGIT OF CALENDAR YEAR



PART NUMBER CODE REFERENCE:

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

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

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

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IR ITALY: Via Liguria 49, 10071 Borgaro, Torino Tel: ++ 39 11 451 0111

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Data and specifications subject to change without notice. 1/03

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