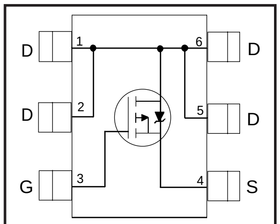
PD - 93850A

International
IOR Rectifier

IRF5800

HEXFET® Power MOSFET

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



Top View

V_{DSS} = -30V

$R_{DS(on)}$ = 0.085Ω

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.


TSOP-6

Absolute Maximum Ratings

	Parameter	Max.	Units
V_{DS}	Drain- Source Voltage	-30	V
I_D @ T_A = 25°C	Continuous Drain Current, V_{GS} @ -4.5V	-4.0	A
I_D @ T_A= 70°C	Continuous Drain Current, V_{GS} @ -4.5V	-3.2	
I_{DM}	Pulsed Drain Current ①	-32	
P_D @T_A = 25°C	Power Dissipation	2.0	W
P_D @T_A = 70°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

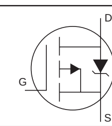
	Parameter	Max.	Units
$R_{\theta JA}$	Maximum Junction-to-Ambient③	62.5	°C/W

01/13/03

Electrical Characteristics @ T_J = 25°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 = -250µA
$\Delta V_{(BR)DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient	—–	0.02	—–	V/°C	Reference to 25°C, I_D = 1mA
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	—–	—–	0.085	Ω	V_{GS} = -10V, I_D = -4.0A ②
		—–	—–	0.150		V_{GS} = -4.5V, I_D = -3.0A ②
$V_{GS(th)}$	Gate Threshold Voltage	-1.0	—–	—–	V	V_{DS} = V_{GS}, I_D = -250µA
g_{fs}	Forward Transconductance	3.5	—–	—–	S	V_{DS} = -10V, I_D = -4.0A
I_{DSS}	Drain-to-Source Leakage Current	—–	—–	-1.0	µA	V_{DS} = -24V, V_{GS} = 0V
		—–	—–	-5.0		V_{DS} = -24V, V_{GS} = 0V, T_J = 70°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	—–	11.4	17	nC	I_D = -4.0A
Q_{gs}	Gate-to-Source Charge	—–	2.3	—–		V_{DS} = -16V
Q_{gd}	Gate-to-Drain ("Miller") Charge	—–	2.2	—–		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		I_D = -1.0A
$t_{d(off)}$	Turn-Off Delay Time	—–	24	36		R_G = 6.0Ω
t_f	Fall Time	—–	14	20		R_D = 15Ω, ②
C_{iss}	Input Capacitance	—–	535	—–	pF	V_{GS} = 0V
C_{oss}	Output Capacitance	—–	94	—–		V_{DS} = -25V
C_{rss}	Reverse Transfer Capacitance	—–	68	—–		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		
V_{SD}	Diode Forward Voltage	—–	—–	-1.2	V	T_J = 25°C, I_S = -2.0A, V_{GS} = 0V ②
t_{rr}	Reverse Recovery Time	—–	19	28	ns	T_J = 25°C, I_F = -2.0A
Q_{rr}	Reverse Recovery Charge	—–	16	24	nC	di/dt = -100A/µs ②

Notes:

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

② Pulse width ≤ 300µs; duty cycle ≤ 2%.

③ Surface mounted on FR-4 board, t ≤ 5sec.

④ Starting T_J = 25°C, L = 2.5mH R_G = 25Ω, I_{AS} = -4.0A. (See Fig 10)

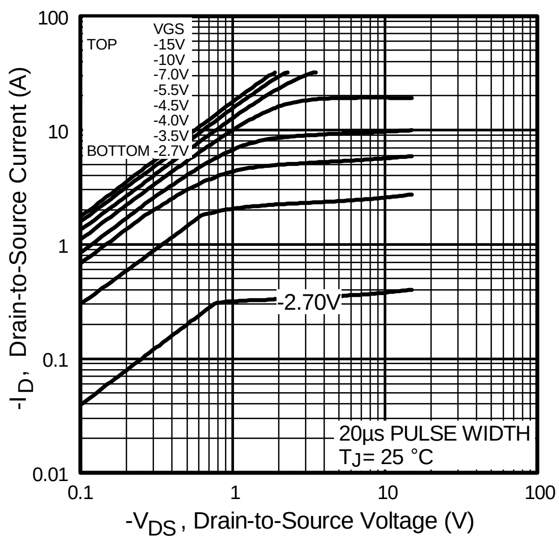


Fig 1. Typical Output Characteristics

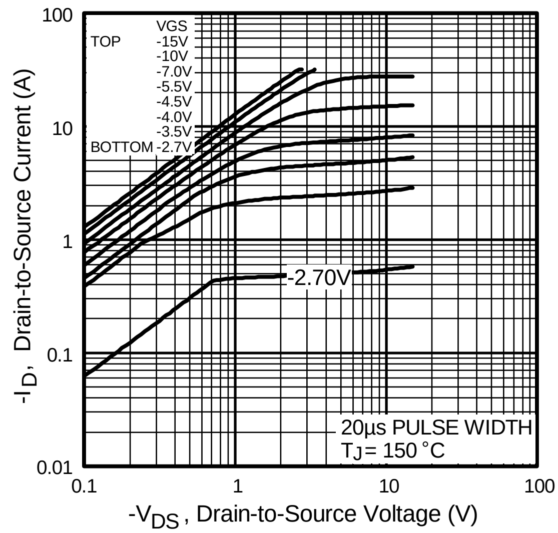


Fig 2. Typical Output Characteristics

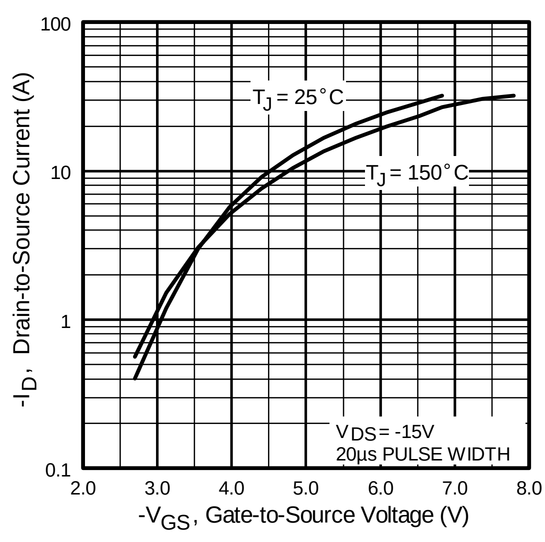


Fig 3. Typical Transfer Characteristics

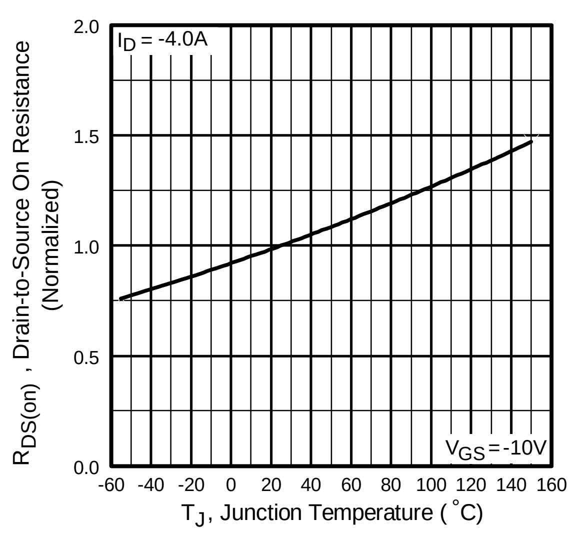


Fig 4. Normalized On-Resistance Vs. Temperature

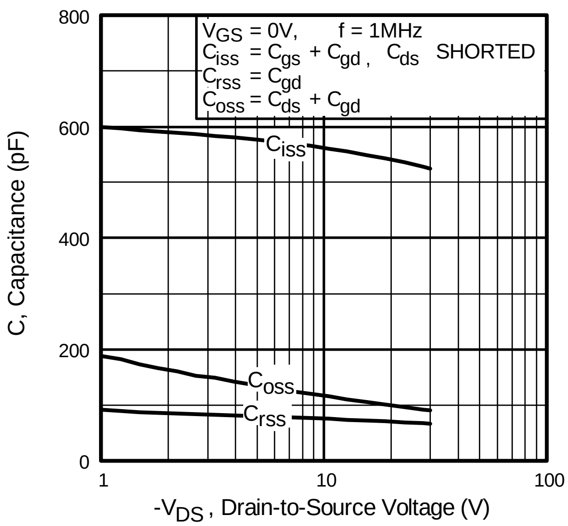


Fig 5. Typical Capacitance Vs. Drain-to-Source Voltage

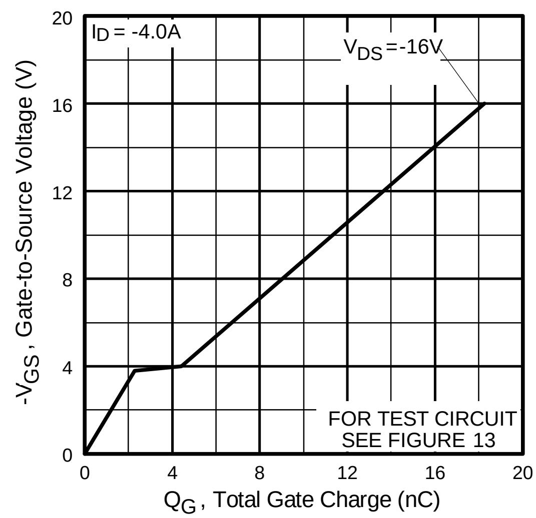


Fig 6. Typical Gate Charge Vs. Gate-to-Source Voltage

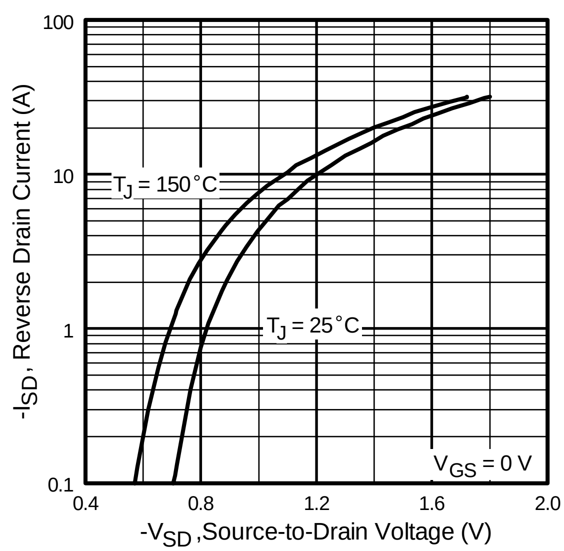


Fig 7. Typical Source-Drain Diode Forward Voltage

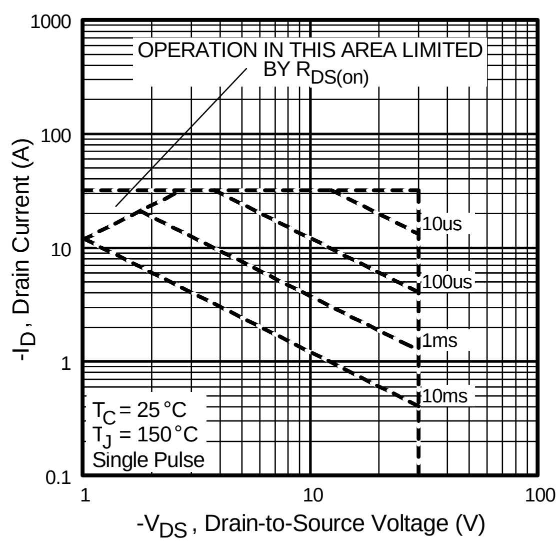
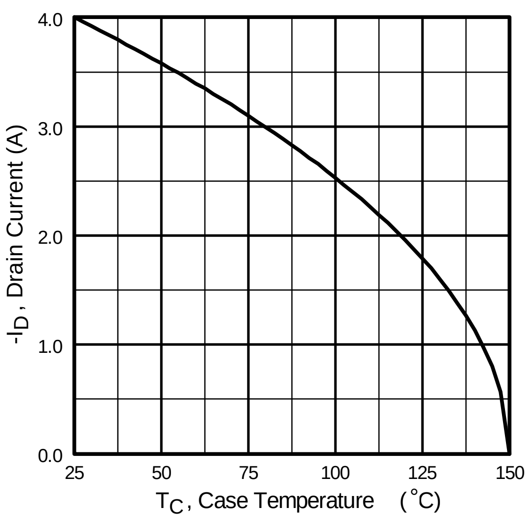


Fig 8. Maximum Safe Operating Area



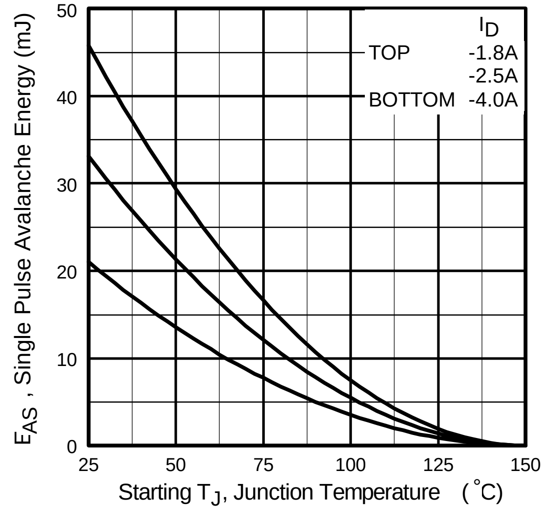


Fig 9. Maximum Drain Current Vs. Case Temperature

Fig 10. Maximum Avalanche Energy Vs. Drain Current

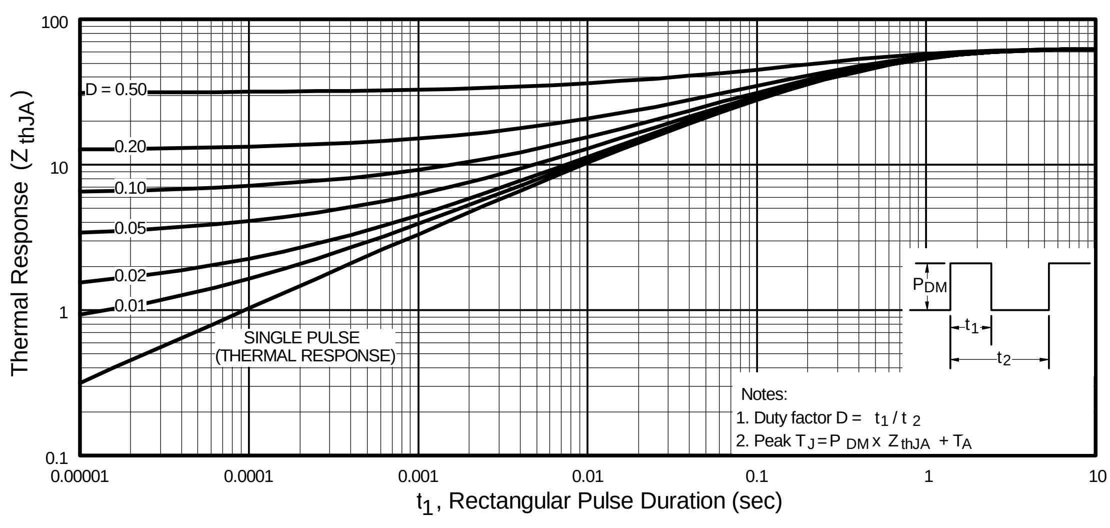


Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

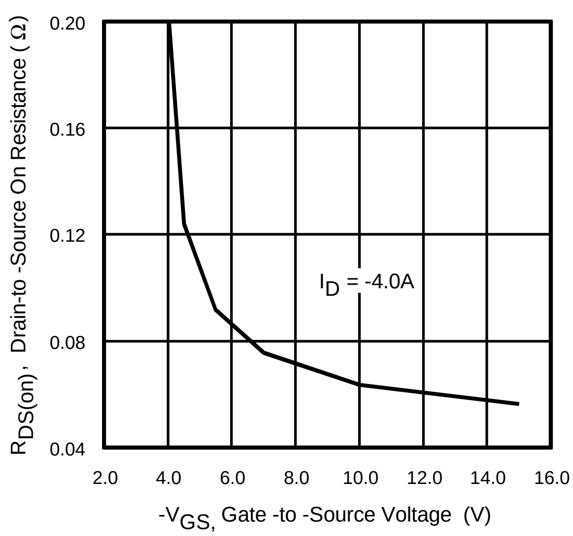


Fig 12. Typical On-Resistance Vs. Gate Voltage

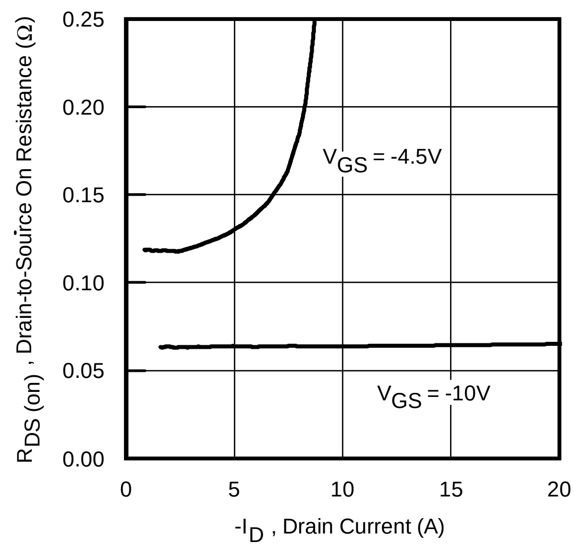
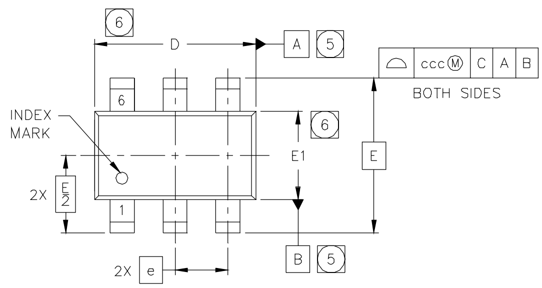
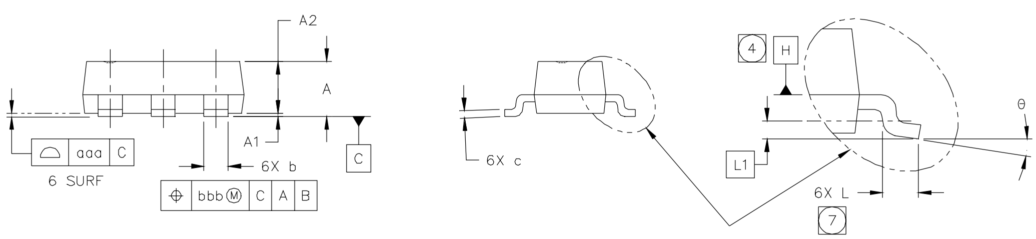


Fig 13. Typical On-Resistance Vs. Drain Current

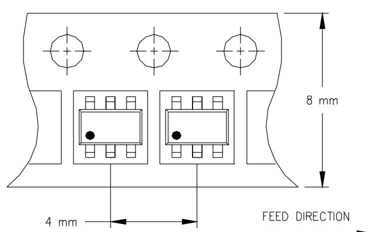
TSOP-6 Package Outline



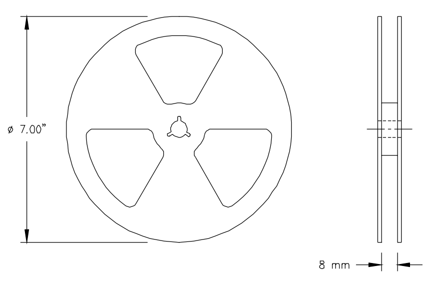
S Y M B O L	MO-193AA DIMENSIONS					
	MILLIMETERS			INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	---	---	1.10	---	---	.0433
A1	0.01	---	0.10	.0004	---	.0039
A2	0.80	0.90	1.00	.0315	.0354	.0393
b	0.25	---	0.50	.0099	---	.0196
c	0.10	---	0.26	.004	---	.010
D	2.90	3.00	3.10	.115	.118	.122
E	2.75 BSC			.108 BSC	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



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

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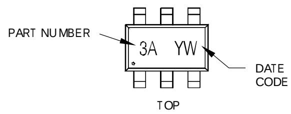
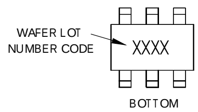
TSOP-6 Part Marking Information

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

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

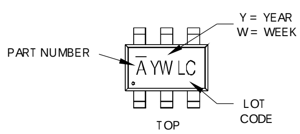
DATE CODE EXAMPLES:
YWW = 9603 = 6C
YWW = 9632 = FF

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

Notes: This part marking information applies to devices produced after 02/26/2001

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:

$\overline{A}$ = SI3443DV
$\overline{B}$ = IRF5800
$\overline{C}$ = IRF5850
$\overline{D}$ = IRF5851
$\overline{E}$ = IRF5852
$\overline{I}$ = IRF5805
$\overline{J}$ = IRF5806
$\overline{K}$ = IRF5810
$\overline{L}$ = IRF5804
$\overline{M}$ = IRF5803
$\overline{N}$ = IRF5820

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
IR JAPAN: K&H Bldg., 2F, 30-4 Nishi-Ikebukuro 3-Chome, Toshima-Ku, Tokyo Japan 171 Tel: 81 3 3983 0086
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Data and specifications subject to change without notice. 1/03