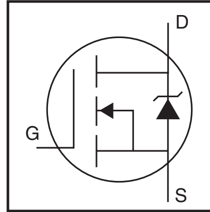
International
IOR Rectifier

PD - 97308A

IRFB3607PbF
IRFS3607PbF
IRFSL3607PbF

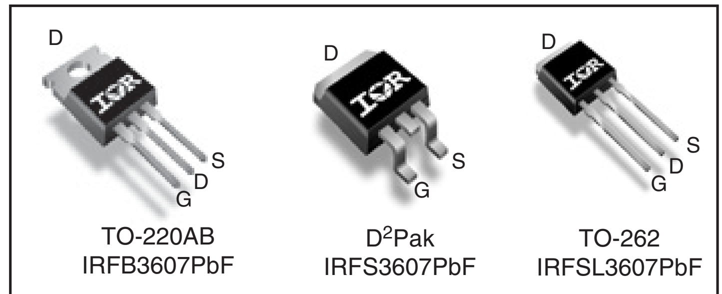
HEXFET® Power MOSFET

Applications
- High Efficiency Synchronous Rectification in SMPS
- Uninterruptible Power Supply
- High Speed Power Switching
- Hard Switched and High Frequency Circuits



V_{DSS}		75V
$R_{DS(on)}$	typ.	7.34mΩ
	max.	9.0mΩ
I_D		80A

Benefits
- Improved Gate, Avalanche and Dynamic dv/dt Ruggedness
- Fully Characterized Capacitance and Avalanche SOA
- Enhanced body diode dV/dt and dI/dt Capability



TO-220AB IRFB3607PbF
D^2Pak IRFS3607PbF
TO-262 IRFSL3607PbF

G	D	S
Gate	Drain	Source

Absolute Maximum Ratings

Symbol	Parameter	Max.	Units
I_D @ T_C = 25°C	Continuous Drain Current, VGS @ 10V	80①	A
I_D @ T_C = 100°C	Continuous Drain Current, V_{GS} @ 10V	56①	
I_{DM}	Pulsed Drain Current ②	310	
P_D @T_C = 25°C	Maximum Power Dissipation	140	W
	Linear Derating Factor	0.96	W/°C
V_{GS}	Gate-to-Source Voltage	± 20	V
dv/dt	Peak Diode Recovery ④	27	V/ns
T_J T_{STG}	Operating Junction and Storage Temperature Range	-55 to + 175	°C
	Soldering Temperature, for 10 seconds (1.6mm from case)	300	
	Mounting torque, 6-32 or M3 screw	10lb·in (1.1N·m)	

Avalanche Characteristics

Symbol	Parameter	Max.	Units
$E_{AS\ (Thermally\ limited)}$	Single Pulse Avalanche Energy ③	120	mJ
I_{AR}	Avalanche Current ①	46	A
E_{AR}	Repetitive Avalanche Energy ⑤	14	mJ

Thermal Resistance

Symbol	Parameter	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-Case ⑨	——	1.045	°C/W
$R_{\theta CS}$	Case-to-Sink, Flat Greased Surface, TO-220	0.50	——	
$R_{\theta JA}$	Junction-to-Ambient, TO-220 ⑧	——	62	
$R_{\theta JA}$	Junction-to-Ambient (PCB Mount) , D^2Pak ⑧⑨	——	40	

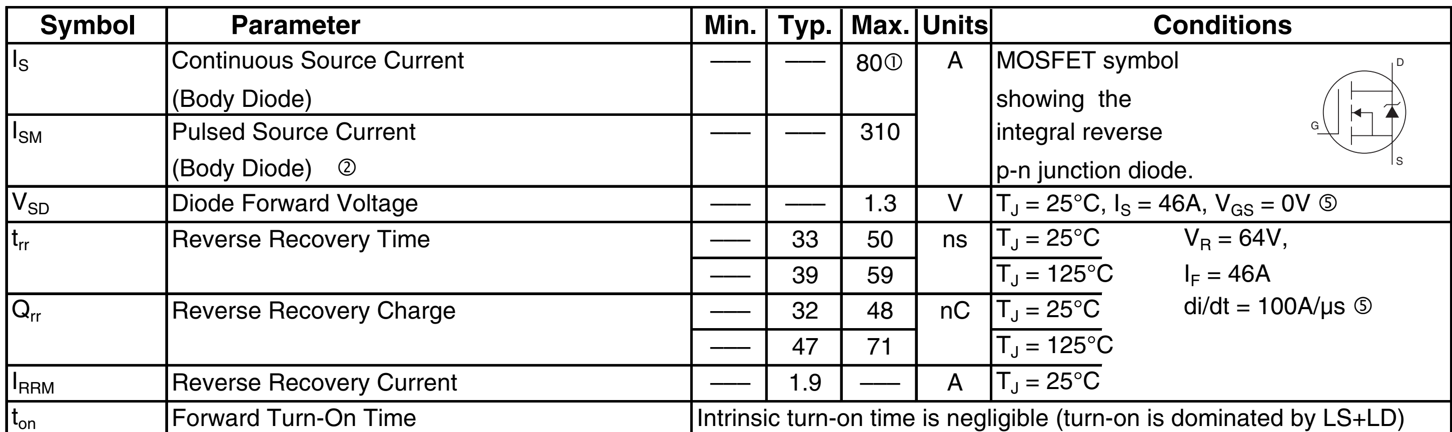
Static @ T_J = 25°C (unless otherwise specified)

Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(BR)DSS}$	Drain-to-Source Breakdown Voltage	75	——	——	V	V_{GS} = 0V, I_D = 250μA
$\Delta V_{(BR)DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient	——	0.096	——	V/°C	Reference to 25°C, I_D = 5mA②
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	——	7.34	9.0	mΩ	V_{GS} = 10V, I_D = 46A ⑤
$V_{GS(th)}$	Gate Threshold Voltage	2.0	——	4.0	V	V_{DS} = V_{GS}, I_D = 100μA
I_{DSS}	Drain-to-Source Leakage Current	——	——	20	μA	V_{DS} = 75V, V_{GS} = 0V
		——	——	250		V_{DS} = 60V, V_{GS} = 0V, T_J = 125°C
I_{GSS}	Gate-to-Source Forward Leakage	——	——	100	nA	V_{GS} = 20V
	Gate-to-Source Reverse Leakage	——	——	-100		V_{GS} = -20V

Dynamic @ T_J = 25°C (unless otherwise specified)

Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
gfs	Forward Transconductance	170	——	——	S	V_{DS} = 50V, I_D = 46A
Q_g	Total Gate Charge	——	56	84	nC	I_D = 46A
Q_{gs}	Gate-to-Source Charge	——	13	——		V_{DS} = 38V
Q_{gd}	Gate-to-Drain ("Miller") Charge	——	16	——		V_{GS} = 10V ⑤
Q_{sync}	Total Gate Charge Sync. (Q_g - Q_{gd})	——	40	——		I_D = 46A, V_{DS} =0V, V_{GS} = 10V
$R_{G(int)}$	Internal Gate Resistance	——	0.55	——	Ω	
$t_{d(on)}$	Turn-On Delay Time	——	16	——	ns	V_{DD} = 49V
t_r	Rise Time	——	110	——		I_D = 46A
$t_{d(off)}$	Turn-Off Delay Time	——	43	——		R_G = 6.8Ω
t_f	Fall Time	——	96	——		V_{GS} = 10V ⑤
C_{iss}	Input Capacitance	——	3070	——	pF	V_{GS} = 0V
C_{oss}	Output Capacitance	——	280	——		V_{DS} = 50V
C_{rss}	Reverse Transfer Capacitance	——	130	——		f = 1.0MHz
C_{oss} eff. (ER)	Effective Output Capacitance (Energy Related)⑧	——	380	——		V_{GS} = 0V, V_{DS} = 0V to 60V ⑧
C_{oss} eff. (TR)	Effective Output Capacitance (Time Related)⑥	——	610	——		V_{GS} = 0V, V_{DS} = 0V to 60V ⑥

Diode Characteristics



Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current (Body Diode)	——	——	80①	A	MOSFET symbol showing the integral reverse p-n junction diode.
I_{SM}	Pulsed Source Current (Body Diode) ②	——	——	310		
V_{SD}	Diode Forward Voltage	——	——	1.3	V	T_J = 25°C, I_S = 46A, V_{GS} = 0V ⑤
t_{rr}	Reverse Recovery Time	——	33	50	ns	T_J = 25°C V_R = 64V,
		——	39	59		T_J = 125°C I_F = 46A
Q_{rr}	Reverse Recovery Charge	——	32	48	nC	T_J = 25°C di/dt = 100A/μs ⑤
		——	47	71		T_J = 125°C
I_{RRM}	Reverse Recovery Current	——	1.9	——	A	T_J = 25°C
t_{on}	Forward Turn-On Time	Intrinsic turn-on time is negligible (turn-on is dominated by LS+LD)				

Notes:

① Calculated continuous current based on maximum allowable junction temperature. Note that current limitations arising from heating of the device leads may occur with some lead mounting arrangements.

② Repetitive rating; pulse width limited by max. junction temperature.

③ Limited by T_{Jmax}, starting T_J = 25°C, L = 0.12mH R_G = 25Ω, I_{AS} = 46A, V_{GS} =10V. Part not recommended for use above this value.

④ $I_{SD} \leq$ 46A, di/dt ≤ 1920A/μs, $V_{DD} \leq V_{(BR)DSS}$, $T_J \leq$ 175°C.

⑤ Pulse width ≤ 400μs; duty cycle ≤ 2%.

⑥ C_{oss} eff. (TR) is a fixed capacitance that gives the same charging time as C_{oss} while V_{DS} is rising from 0 to 80% V_{DSS}.

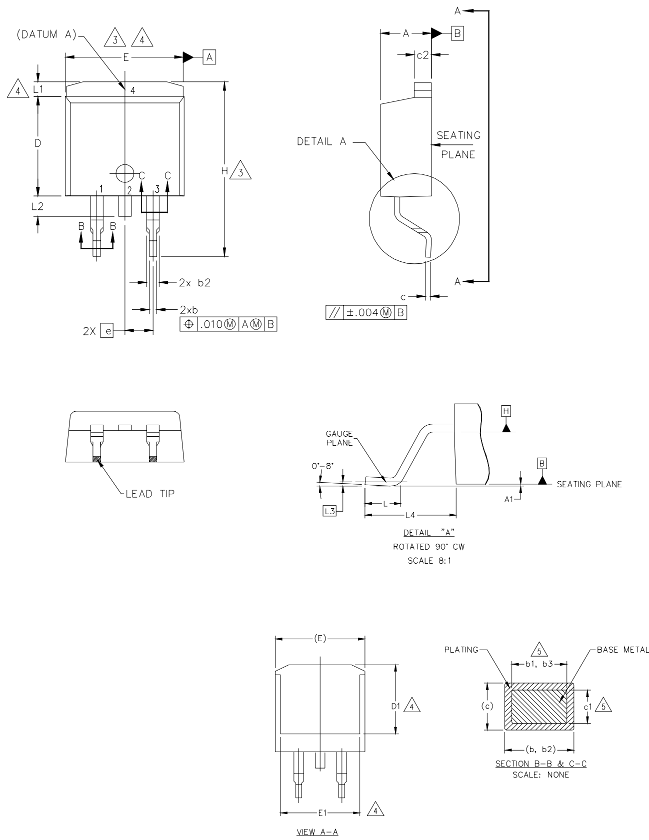
⑦ C_{oss} eff. (ER) is a fixed capacitance that gives the same energy as C_{oss} while V_{DS} is rising from 0 to 80% V_{DSS}.

⑧ When mounted on 1" square PCB (FR-4 or G-10 Material). For recommended footprint and soldering techniques refer to application note #AN-994.

⑨ R_θ is measured at T_J approximately 90°C.

D^2Pak (TO-263AB) Package Outline

Dimensions are shown in millimeters (inches)



NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M-1994
2. DIMENSIONS ARE SHOWN IN MILLIMETERS [INCHES].
3. DIMENSION D & E DO NOT INCLUDE MOLD FLASH. MOLD FLASH SHALL NOT EXCEED 0.127 [.005"] PER SIDE. THESE DIMENSIONS ARE MEASURED AT THE OUTMOST EXTREMES OF THE PLASTIC BODY AT DATUM H.
4. THERMAL PAD CONTOUR OPTIONAL WITHIN DIMENSION E, L1, D1 & E1.
5. DIMENSION b1 AND c1 APPLY TO BASE METAL ONLY.
6. DATUM A & B TO BE DETERMINED AT DATUM PLANE H.
7. CONTROLLING DIMENSION: INCH.
8. OUTLINE CONFORMS TO JEDEC OUTLINE TO-263AB.

SYMBOL	DIMENSIONS				NOTES
	MILLIMETERS		INCHES		
	MIN.	MAX.	MIN.	MAX.	
A	4.06	4.83	.160	.190	
A1	0.00	0.254	.000	.010	
b	0.51	0.99	.020	.039	
b1	0.51	0.89	.020	.035	5
b2	1.14	1.78	.045	.070	
b3	1.14	1.73	.045	.068	5
c	0.38	0.74	.015	.029	
c1	0.38	0.58	.015	.023	5
c2	1.14	1.65	.045	.065	
D	8.38	9.65	.330	.380	3
D1	6.86	–	.270		4
E	9.65	10.67	.380	.420	3,4
E1	6.22	–	.245		4
e	2.54 BSC		.100 BSC		
H	14.61	15.88	.575	.625	
L	1.78	2.79	.070	.110	
L1	–	1.65	–	.066	4
L2	1.27	1.78	–	.070	
L3	0.25 BSC		.010 BSC		
L4	4.78	5.28	.188	.208	

LEAD ASSIGNMENTS

HEXFET

1.– GATE
2, 4.– DRAIN
3.– SOURCE

IGBTs, CoPACK

1.– GATE
2, 4.– COLLECTOR
3.– EMITTER

DIODES

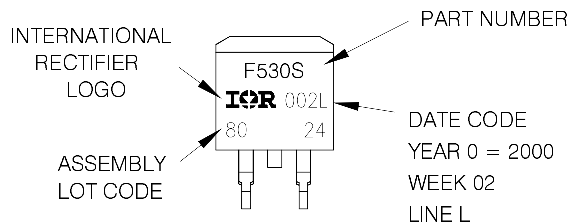
1.– ANODE *
2, 4.– CATHODE
3.– ANODE

* PART DEPENDENT.

D^2Pak (TO-263AB) Part Marking Information

EXAMPLE: THIS IS AN IRF530S WITH LOT CODE 8024
ASSEMBLED ON WW 02, 2000
IN THE ASSEMBLY LINE "L"

Note: "P" in assembly line position indicates "Lead - Free"



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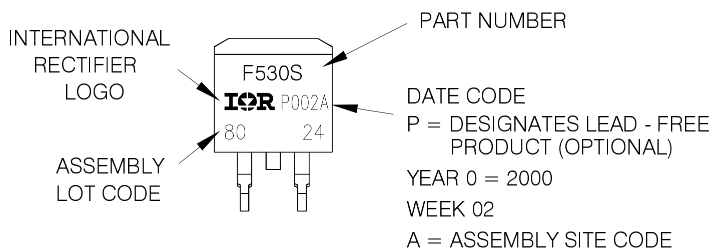
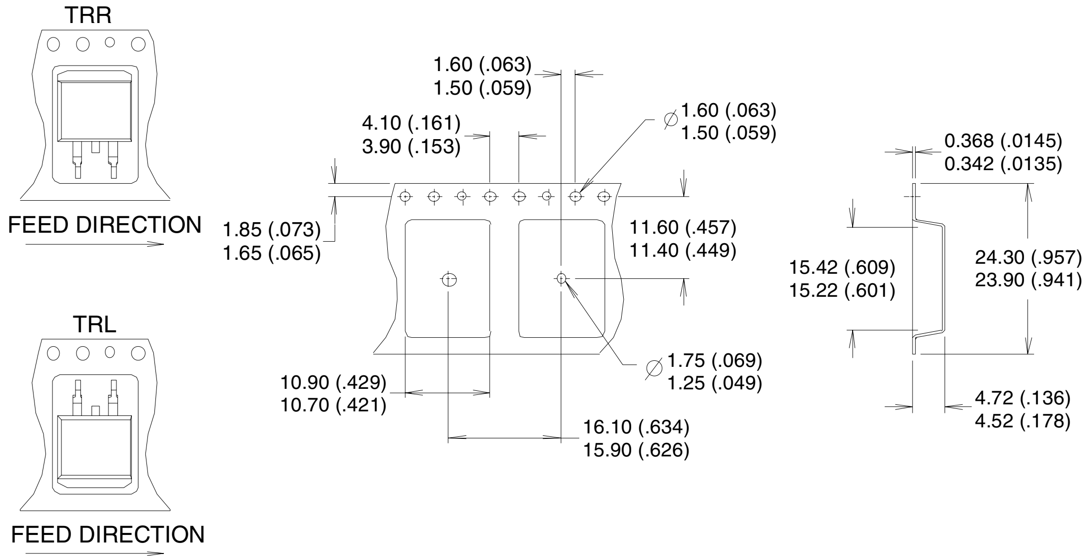
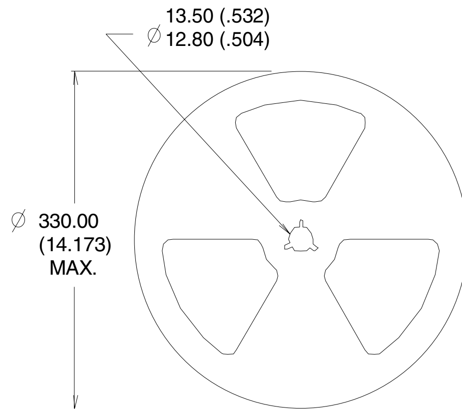
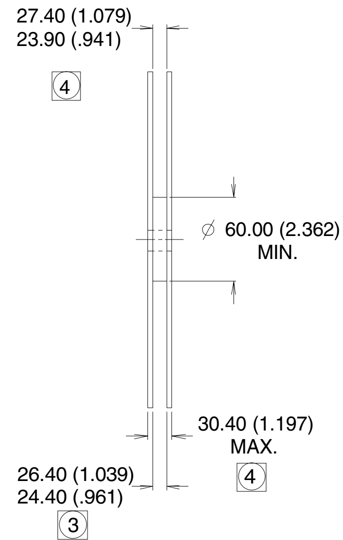


D2Pak (TO-263AB) Tape & Reel Information

Dimensions are shown in millimeters (inches)







NOTES :
1. COMFORMS TO EIA-418.
2. CONTROLLING DIMENSION: MILLIMETER.
3. DIMENSION MEASURED @ HUB.
4. INCLUDES FLANGE DISTORTION @ OUTER EDGE.

Data and specifications subject to change without notice.
This product has been designed and qualified for the Industrial market.

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