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International
IOR Rectifier

IR25606SPBF

Half-Bridge Driver

Features

- Floating channel designed for bootstrap operation
- Fully operational to +600V
- Tolerant to negative transient voltage
- dV/dt immune
- Gate drive supply range from 10 to 20V
- Undervoltage lockout for both channels
- 3.3V, 5V and 15V input logic compatible
- Cross-conduction prevention logic
- Matched propagation delay for both channels
- Outputs in phase with inputs
- Logic and power ground +/-5V offset
- Internal 540ns dead-time
- Lower di/dt gate driver for better noise immunity

Product Summary

V_{OFFSET}	600V max.
$I_{O+/-}$	200 mA / 350 mA
V_{OUT}	10 – 20V
Ton/off (typ.)	220 & 200 ns
Dead time (typ.)	540 ns

Description

The IR25606 is a high voltage, high speed power MOSFET and IGBT driver with independent high and low side referenced output channels. Proprietary HVIC and latch immune CMOS technologies enable ruggedized monolithic construction. The logic input is compatible with standard CMOS or LSTTL output, down to 3.3V logic. The output drivers feature a high pulse current buffer stage designed for minimum driver cross-conduction. The floating channel can be used to drive an N-channel power MOSFET or IGBT in the high side configuration which operates up to 600 V.

Package Options



8 Lead SOIC

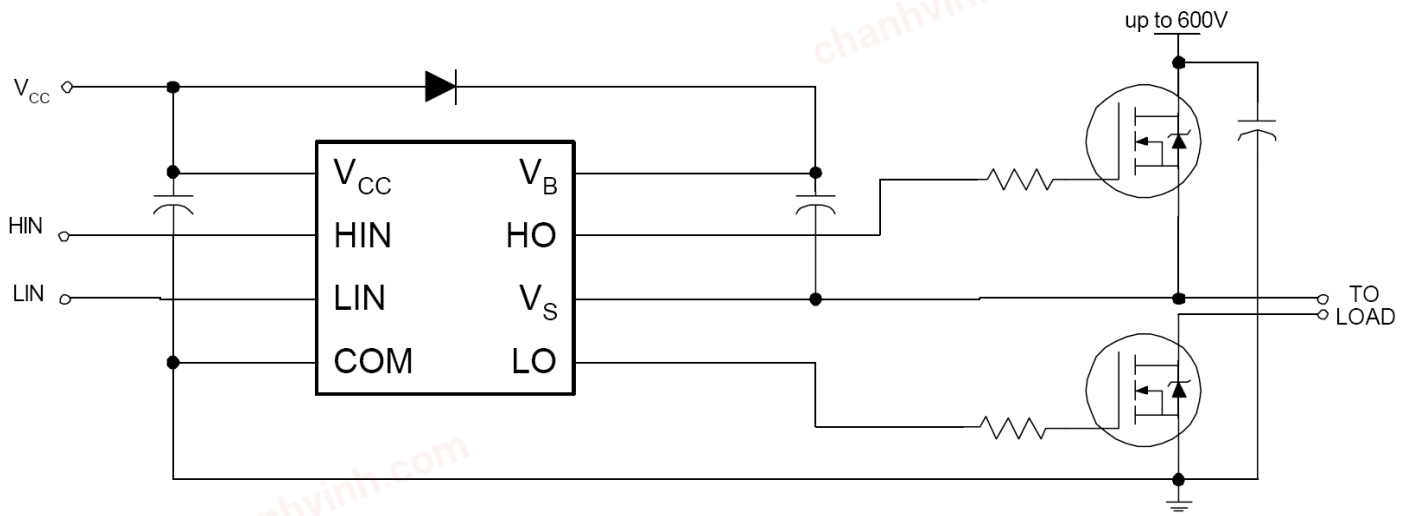
Ordering Information

Base Part Number	Package Type	Standard Pack		Orderable Part Number
		Form	Quantity	
IR25606SPBF	SO8N	Tube	95	IR25606SPBF
IR25606SPBF	SO8N	Tape and Reel	2500	IR25606STRPBF

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Typical Connection Diagram



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Absolute Maximum Ratings

Absolute maximum ratings indicate sustained limits beyond which damage to the device may occur. All voltage parameters are absolute voltages referenced to COM. The thermal resistance and power dissipation ratings are measured under board mounted and still air conditions.

Symbol	Definition	Min.	Max.	Units
V_B	High side floating absolute voltage	-0.3	625	V
V_S	High side floating supply offset voltage	V_B - 25	V_B + 0.3	
V_{HO}	High side floating output voltage	V_S - 0.3	V_B + 0.3	
V_{CC}	Low side and logic fixed supply voltage	-0.3	25	
V_{LO}	Low side output voltage	-0.3	V_{CC} + 0.3	
V_{IN}	Logic input voltage (HIN & LIN)	-0.3	V_{CC} + 0.3	
dVs/dt	Allowable offset supply voltage transient	—	50	V/ns
P_D	Package power dissipation @ $T_A \leq +25°C$	—	0.625	W
Rth_{JA}	Thermal resistance, junction to ambient	—	200	°C/W
T_J	Junction temperature	—	150	°C
T_S	Storage temperature	-55	150	
T_L	Lead temperature (soldering, 10 seconds)	—	300	

Recommended Operating Conditions

For proper operation the device should be used within the recommended conditions. The V_S offset rating is tested with all supplies biased at 15V differential.

Symbol	Definition	Min.	Max.	Units
V_B	High side floating supply absolute voltage	V_S + 10	V_S + 20	V
V_S	High side floating supply offset voltage	†	600	
V_{HO}	High side floating output voltage	V_S	V_B	
V_{CC}	Low side and logic fixed supply voltage	10	20	
V_{LO}	Low side output voltage	0	V_{CC}	
V_{IN}	Logic input voltage	0	V_{CC}	
T_A	Ambient temperature	-40	125	°C

† Logic operational for V_S of -5 to +600V. Logic state held for V_S of -5V to -V_{BS}. (Please refer to Design Tip DT97-3 for more details).

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Dynamic Electrical Characteristics

V_{BIAS} (V_{CC}, V_{BS}) = 15V, CL = 1000 pF and T_A = 25°C unless otherwise specified.

Symbol	Definition	Min.	Typ.	Max.	Units	Test Conditions
ton	Turn-on propagation delay	—	220	300	ns	V_S = 0V
toff	Turn-off propagation delay	—	200	280		V_S = 0V or 600V
tr	Turn-on rise time	—	150	220		V_S = 0V
tf	Turn-off fall time	—	50	80		V_S = 0V
DT	Deadtime	400	540	680		
MT	Delay matching, HS & LS turn-on/off	—	0	46		

Static Electrical Characteristics

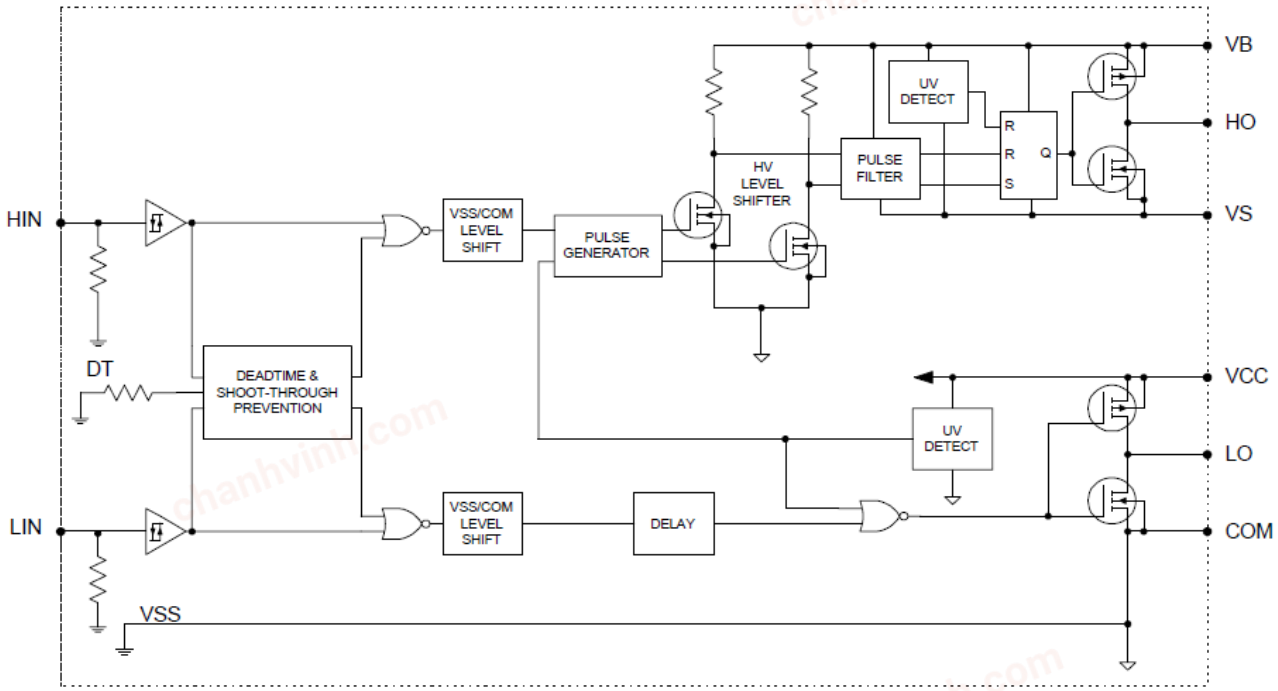
V_{BIAS} (V_{CC}, V_{BS}) = 15V and T_A = 25°C unless otherwise specified. The V_{IN}, V_{TH} and I_{IN} parameters are referenced to COM. The V_O and I_O parameters are referenced to COM and are applicable to the respective output leads: HO and LO.

Symbol	Definition	Min.	Typ.	Max.	Units	Test Conditions
V_{IH}	Logic “1” input voltage	2.9	—	—	V	V_{CC} = 10V to 20V
V_{IL}	Logic “0” input voltage	—	—	0.8		V_{CC} = 10V to 20V
V_{OH}	High level output voltage, V_{BIAS} - V_O	—	0.8	1.4		I_O = 20 mA
V_{OL}	Low level output voltage, V_O	—	0.3	0.6		I_O = 20 mA
I_{LK}	Offset supply leakage current	—	—	50	µA	V_B = V_S = 600V
I_{QBS}	Quiescent V_{BS} supply current	20	60	150		V_{IN} = 0V or 5V
I_{QCC}	Quiescent V_{CC} supply current	0.4	1.0	1.6	mA	V_{IN} = 0V or 5V
I_{IN+}	Logic “1” input bias current	—	5	20	µA	V_{IN} = 5V
I_{IN-}	Logic “0” input bias current	—	1	2		V_{IN} = 0V
V_{CCUV+} V_{BSUV+}	V_{CC} and V_{BS} supply undervoltage positive going threshold	8	8.9	10	V	
V_{CCUV-} V_{BSUV-}	V_{CC} and V_{BS} supply undervoltage negative going threshold	7.4	8.2	9		
V_{CCUVH} V_{BSUVH}	Hysteresis	0.3	0.7	—		
I_{O+}	Output high short circuit pulsed current	97	200	—	mA	V_O = 0V PW ≤ 10 µs
I_{O-}	Output low short circuit pulsed current	250	350	—		V_O = 15V PW ≤ 10 µs

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Functional Block Diagram



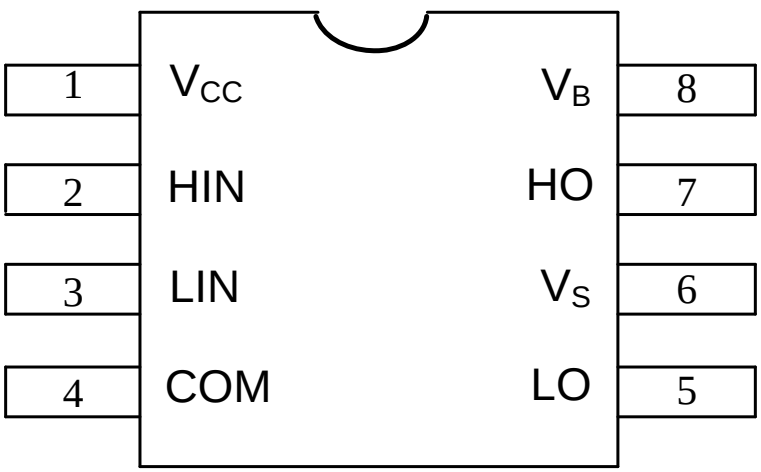
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Lead Definitions

Symbol	Description
HIN	Logic input for high side gate driver outputs (HO), in phase
LIN	Logic input for low side gate driver outputs (LO), in phase
V_B	High side floating supply
HO	High side gate drive output
V_S	High side floating supply return
V_{CC}	Low side and logic fixed supply
LO	Low side gate drive output
COM	Low side return

Lead Assignments



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Application Information and Additional Details

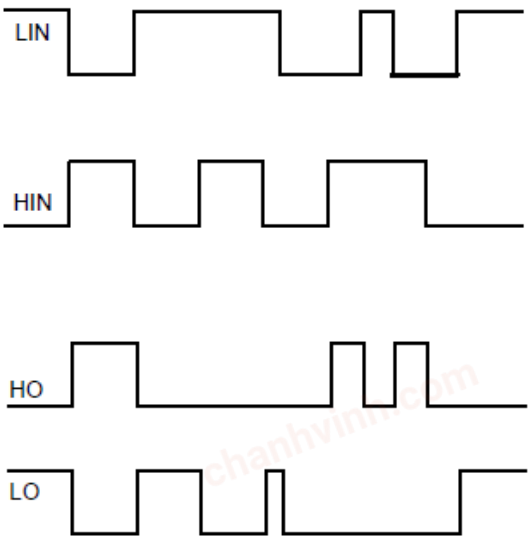


Figure 1. Input/Output Timing Diagram

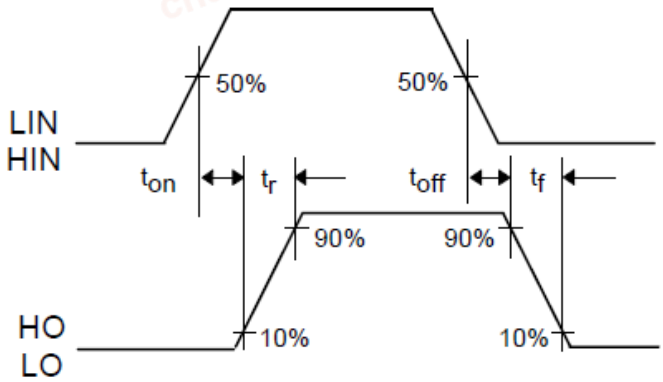


Figure 2. Switching Time Waveform Definitions

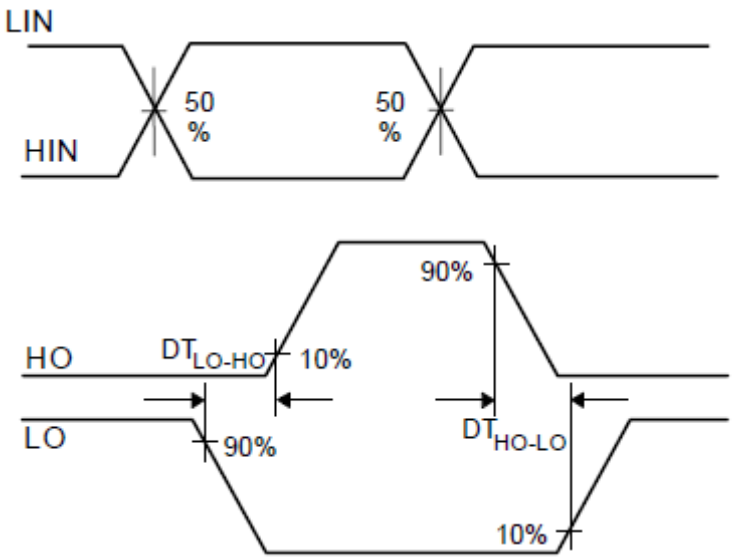
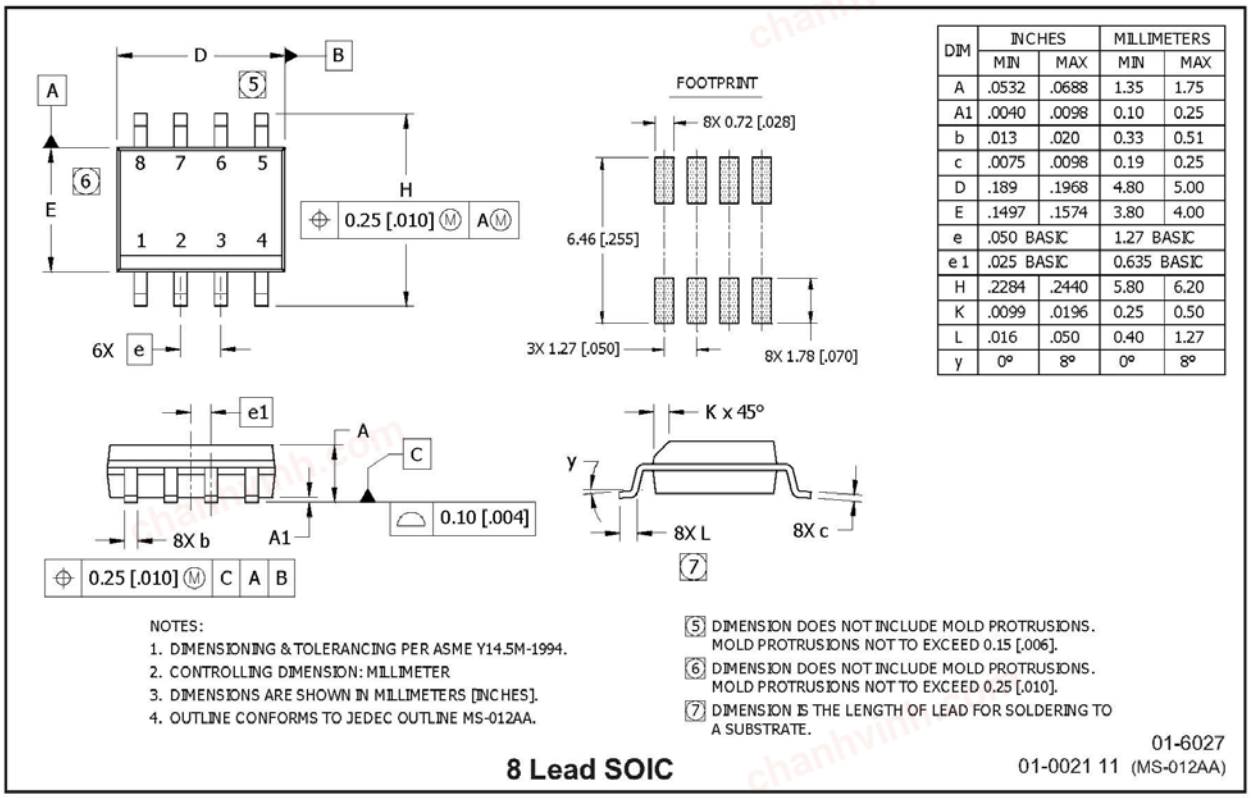


Figure 3. Deadtime Waveform Definitions

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Package Details



DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.0532	.0688	1.35	1.75
A1	.0040	.0098	0.10	0.25
b	.013	.020	0.33	0.51
c	.0075	.0098	0.19	0.25
D	.189	.1968	4.80	5.00
E	.1497	.1574	3.80	4.00
e	.050 BASIC		1.27 BASIC	
e 1	.025 BASIC		0.635 BASIC	
H	.2284	.2440	5.80	6.20
K	.0099	.0196	0.25	0.50
L	.016	.050	0.40	1.27
y	0°	8°	0°	8°

NOTES:
1. DIMENSIONING & TOLERANCING PER ASME Y14.5M-1994.
2. CONTROLLING DIMENSION: MILLIMETER
3. DIMENSIONS ARE SHOWN IN MILLIMETERS [INCHES].
4. OUTLINE CONFORMS TO JEDEC OUTLINE MS-012AA.

5 DIMENSION DOES NOT INCLUDE MOLD PROTRUSIONS. MOLD PROTRUSIONS NOT TO EXCEED 0.15 [.006].
6 DIMENSION DOES NOT INCLUDE MOLD PROTRUSIONS. MOLD PROTRUSIONS NOT TO EXCEED 0.25 [.010].
7 DIMENSION IS THE LENGTH OF LEAD FOR SOLDERING TO A SUBSTRATE.

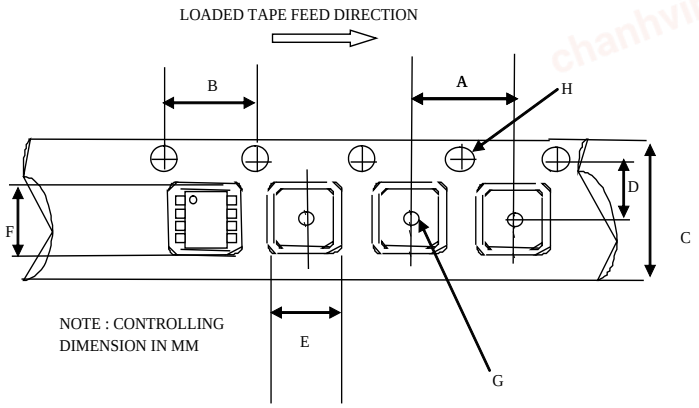
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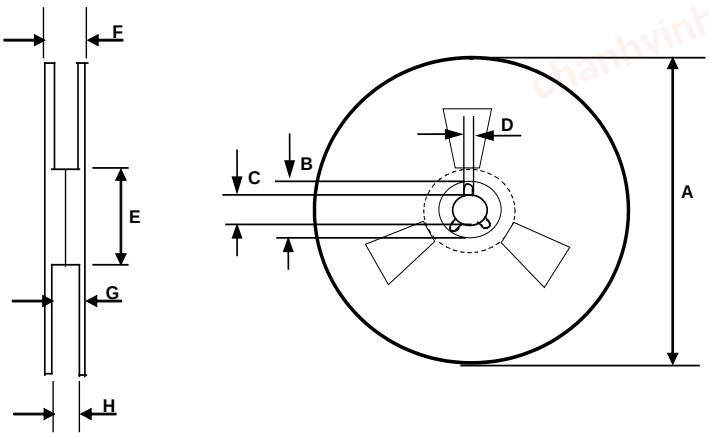
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Tape and Reel Details



CARRIER TAPE DIMENSION FOR 8SOICN

	Metric		Imperial	
Code	Min	Max	Min	Max
A	7.90	8.10	0.311	0.318
B	3.90	4.10	0.153	0.161
C	11.70	12.30	0.46	0.484
D	5.45	5.55	0.214	0.218
E	6.30	6.50	0.248	0.255
F	5.10	5.30	0.200	0.208
G	1.50	n/a	0.059	n/a
H	1.50	1.60	0.059	0.062



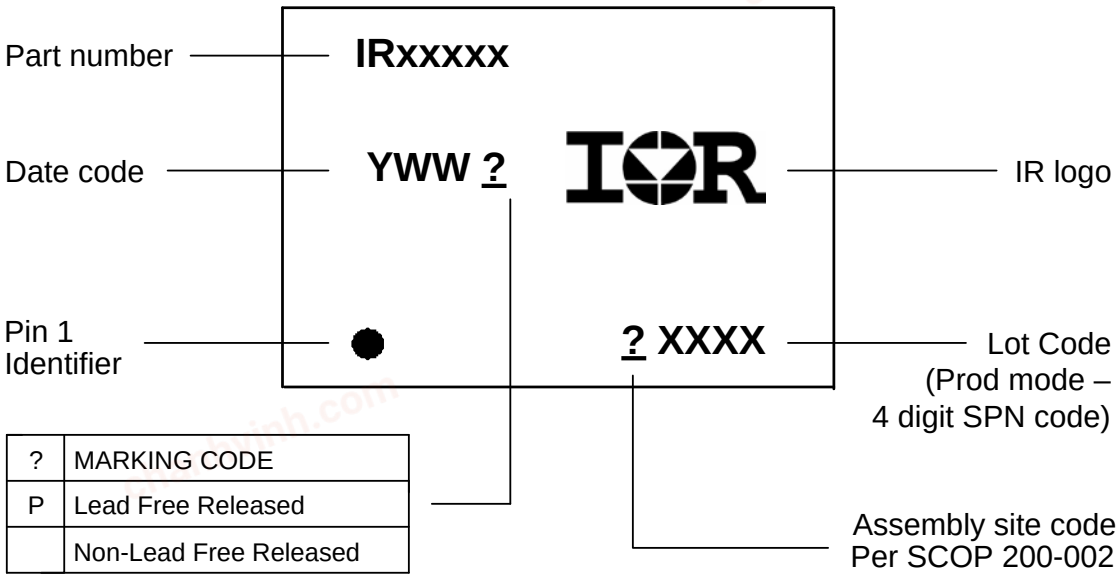
REEL DIMENSIONS FOR 8SOICN

	Metric		Imperial	
Code	Min	Max	Min	Max
A	329.60	330.25	12.976	13.001
B	20.95	21.45	0.824	0.844
C	12.80	13.20	0.503	0.519
D	1.95	2.45	0.767	0.096
E	98.00	102.00	3.858	4.015
F	n/a	18.40	n/a	0.724
G	14.50	17.10	0.570	0.673
H	12.40	14.40	0.488	0.566

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Part Marking Information



?	MARKING CODE
P	Lead Free Released
	Non-Lead Free Released

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Qualification Information†

Qualification Level	Industrial†† (per JEDEC JESD 47)
	Comments: This family of ICs has passed JEDEC's Industrial qualification. IR's Consumer qualification level is granted by extension of the higher Industrial level.
Moisture Sensitivity Level	MSL2††† (per IPC/JEDEC J-STD-020)
RoHS Compliant	Yes

† Qualification standards can be found at International Rectifier's web site http://www.irf.com/

†† Higher qualification ratings may be available should the user have such requirements. Please contact your International Rectifier sales representative for further information.

††† Higher MSL ratings may be available for the specific package types listed here. Please contact your International Rectifier sales representative for further information.

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