µHVIC™ SOT-23 High-Side Gate Driver IC

Features

- Floating gate driver designed for bootstrap operation
- Fully operational to +200 V
- Excellent dv/dt immunity
- Excellent negative V_S transient immunity
- Wide V_{CC} range
- UVLO on low-side and high-side
- Schmitt-trigger input with internal pull-down
- Output in phase with input
- Excellent latch immunity on all inputs & outputs
- RoHS compliant
- 6-pin SOT-23 package

Applications

- High-side gate driver control
- Pulse transformer replacement
- General purpose switched mode power electronics

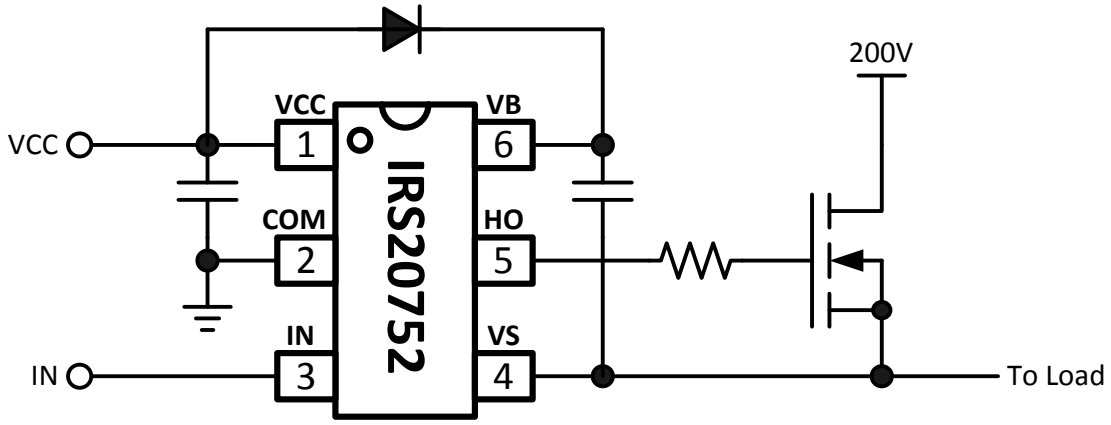
Description

The IRS20752 is a high-side, single-channel gate driver IC with 200V blocking and level-shifting capability. This allows for the gate driver to be connected directly to the gate of a high-side power MOSFET, while being controlled by the low-side, ground potential circuitry. The IRS20752 includes a wide V_{CC} supply range, UVLO protection, and excellent immunity to harsh dv/dt or $-V_S$ switching environments. IR's HVIC technology allows for these functions and features to be realized in a 6-pin SOT-23 package.

Package Options

SOT23-6L

Typical Connection Diagram



Ordering Information

Base Part Number	Package Type	Standard Pack		Orderable Part Number
		Form	Quantity	
IRS20752LPBF	SOT-23-6L	Tape and Reel	3000	IRS20752LTRPBF

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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, all currents are defined positive into any pin. 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	220	V
V_S	High side floating supply offset voltage		V_B - 20	V_B + 0.3	
V_{HO}	High side floating gate drive output voltage		V_S - 0.3	V_B + 0.3	
V_{CC}	Low side and logic fixed supply voltage		-0.3	20	
V_{IN}	Logic input voltage		COM - 0.3	V_{CC} + 0.3	
COM	Logic ground		V_{CC} - 20	V_{CC} + 0.3	
dVS/dt	High side floating supply offset voltage slew rate		---	50	V/ns
$R\Theta_{JA}$	Thermal resistance, junction to ambient	6L-SOT-23	---	151	ºC/W
T_J	Junction temperature		-55	150	ºC
T_S	Storage temperature				
T_L	IC Pin temperature (soldering, 10 seconds)		---	300	

Recommended Operating Conditions

For proper operation the device should be used within the recommended conditions.

Symbol	Definition	Min	Max	Units
V_B	High side floating absolute voltage	V_S + 10	V_S + 18	V
V_S	High side floating supply offset voltage	COM - 8 †	200	
V_{HO}	High side floating gate drive output voltage	V_S	V_B	
V_{CC}	Low side and logic fixed supply voltage	10	18	
V_{IN}	Logic input voltage	COM	V_{CC}	
T_J	Junction temperature	-40	125	ºC

† Logic operational for V_S of -8V to +200V. Logic state held for V_S of -8V to $-V_{BS}$.

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Electrical Characteristics

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

Symbol	Definition	Min	Typ	Max	Units	Test Conditions
Low Side Characteristics						
V_{CCUV+}	V_{CC} supply UVLO positive-going	8.0	9.0	10.0	V	
V_{CCUV-}	V_{CC} supply UVLO negative-going	7.0	8.0	9.0		
I_{QCC}	Quiescent V_{CC} supply current	---	100	---	µA	
V_{CC_CLAMP}	V_{CC} internal Zener clamp voltage	---	20.4	---	V	I_{CC} = 5mA
V_{IH}	Logic “1” input voltage	---	---	2.2		
V_{IL}	Logic “0” input voltage	0.8	---	---		
I_{IN+}	Logic “1” input bias current	---	20	40	µA	V_{IN} = V_{CC}
I_{IN-}	Logic “0” input bias current	---	---	5		V_{IN} = COM
High Side Characteristics						
V_{BSUV+}	V_{BS} supply UVLO positive-going	8.0	9.0	10.0	V	
V_{BSUV-}	V_{BS} supply UVLO negative-going	7.0	8.0	9.0		
V_{BS_CLAMP}	V_{BS} internal Zener clamp voltage	---	20.4	---		I_{BS} = 5mA
V_{OH}	High level output voltage (V_B – HO)	---	0.8	1.4		I_O = 2mA
V_{OL}	Low level output voltage (HO – V_S)	---	0.3	0.6		
I_{LK}	Offset supply leakage current	---	---	50	µA	V_B = V_S = 200V
I_{QBS}	Quiescent V_{BS} supply current	---	80	---		V_{IN} = V_{CC} or COM
Gate Drive Characteristics						
t_{ON}	Turn-on propagation delay	---	140	---	ns	V_S = 0V
t_{OFF}	Turn-off propagation delay	---	215	---		V_S = 200V
t_{RISE}	Turn-on rise time	---	85	---		V_S = 0V
t_{FALL}	Turn-off fall time	---	40	---		
I_{O+}	HO gate drive output source current	---	160	---	mA	
I_{O-}	HO gate drive output sink current	---	240	---		

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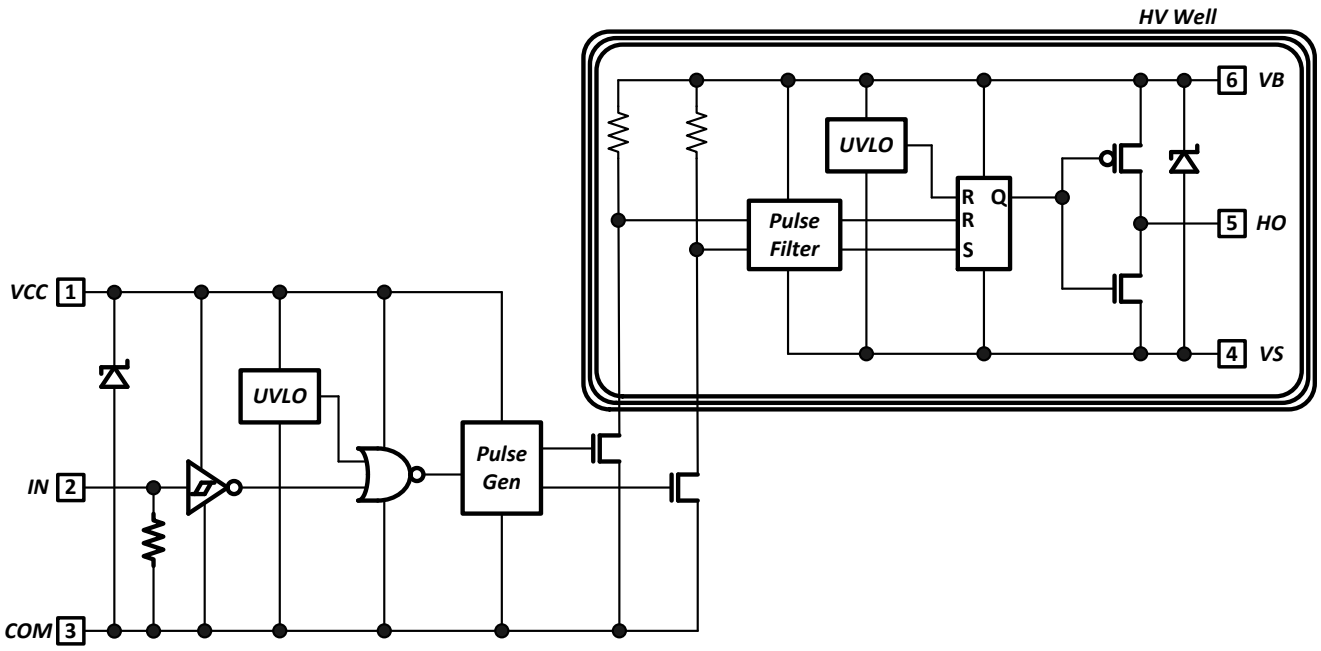
Functional Block Diagram



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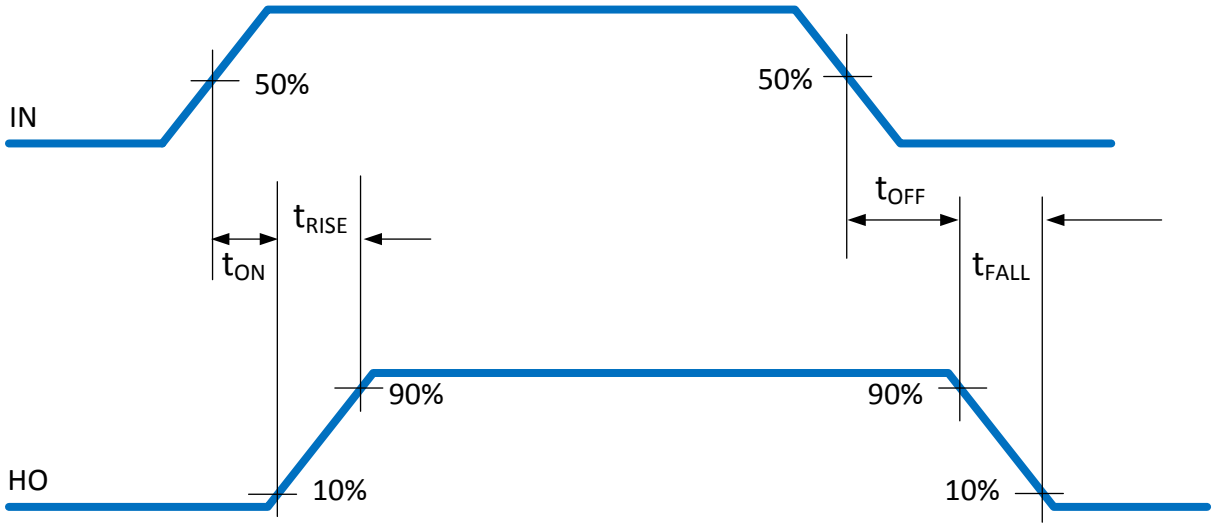
Timing Diagram



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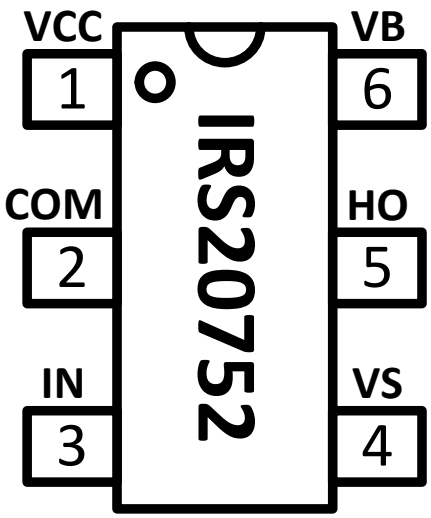
Pin Definitions

Pin	Symbol	Description
1	VCC	IC supply voltage
2	COM	IC power and signal ground
3	IN	Logic input
4	VS	High side floating supply offset voltage
5	HO	High side gate driver output
6	VB	High side floating supply voltage

Pin Assignments



6-Lead SOT 23

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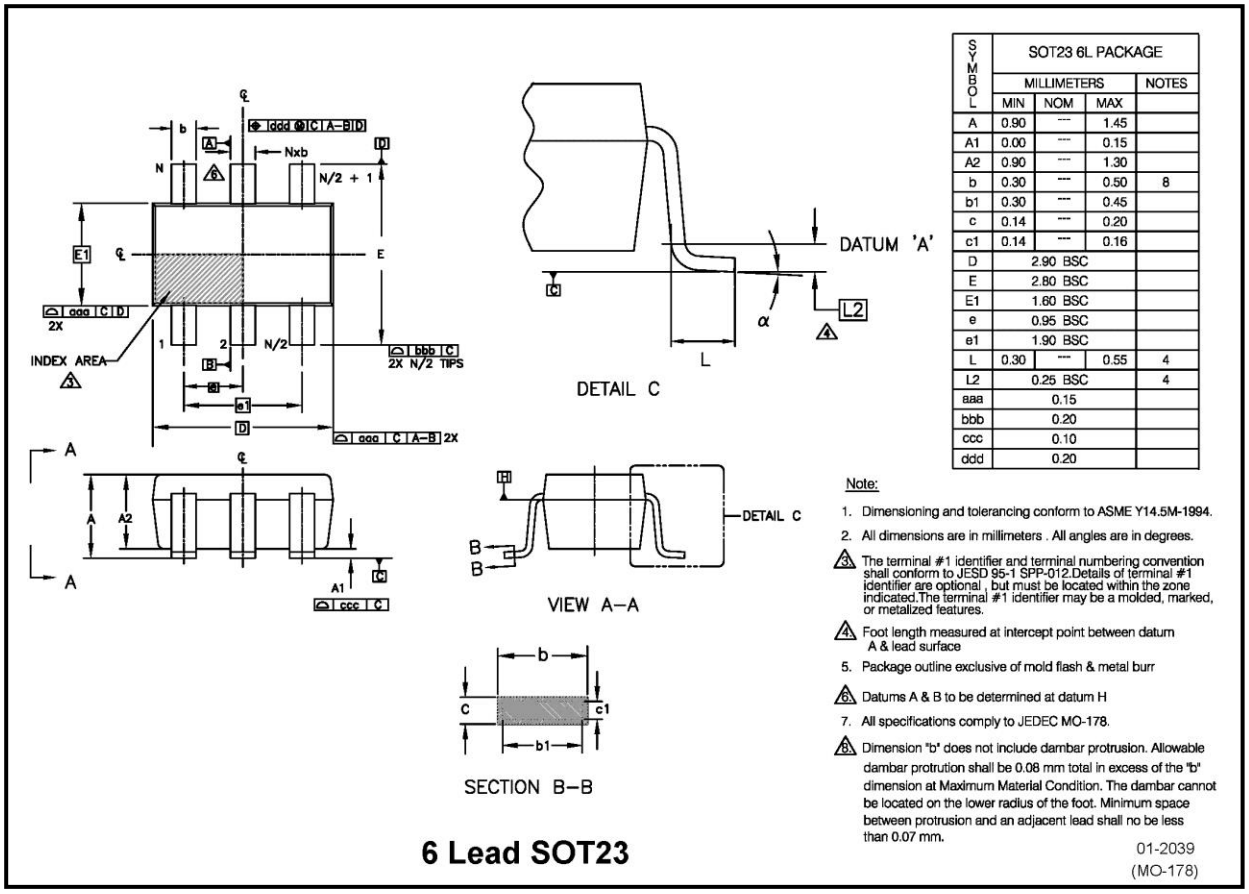
Package Details: 6L-SOT23



SYMBOL	SOT23 6L PACKAGE			
	MILLIMETERS			NOTES
	MIN	NOM	MAX	
A	0.90	---	1.45	
A1	0.00	---	0.15	
A2	0.90	---	1.30	
b	0.30	---	0.50	8
b1	0.30	---	0.45	
c	0.14	---	0.20	
c1	0.14	---	0.16	
D	2.90 BSC			
E	2.80 BSC			
E1	1.60 BSC			
e	0.95 BSC			
e1	1.90 BSC			
L	0.30	---	0.55	4
L2	0.25 BSC			4
aaa	0.15			
bbb	0.20			
ccc	0.10			
ddd	0.20			

Note:

1. Dimensioning and tolerancing conform to ASME Y14.5M-1994.
2. All dimensions are in millimeters . All angles are in degrees.
3. The terminal #1 identifier and terminal numbering convention shall conform to JESD 95-1 SPP-012.Details of terminal #1 identifier are optional , but must be located within the zone indicated.The terminal #1 identifier may be a molded, marked, or metalized features.
4. Foot length measured at intercept point between datum A & lead surface
5. Package outline exclusive of mold flash & metal burr
6. Datums A & B to be determined at datum H
7. All specifications comply to JEDEC MO-178.
8. Dimension "b" does not include dambar protrusion. Allowable dambar protrution shall be 0.08 mm total in excess of the "b" dimension at Maximum Material Condition. The dambar cannot be located on the lower radius of the foot. Minimum space between protrusion and an adjacent lead shall no be less than 0.07 mm.

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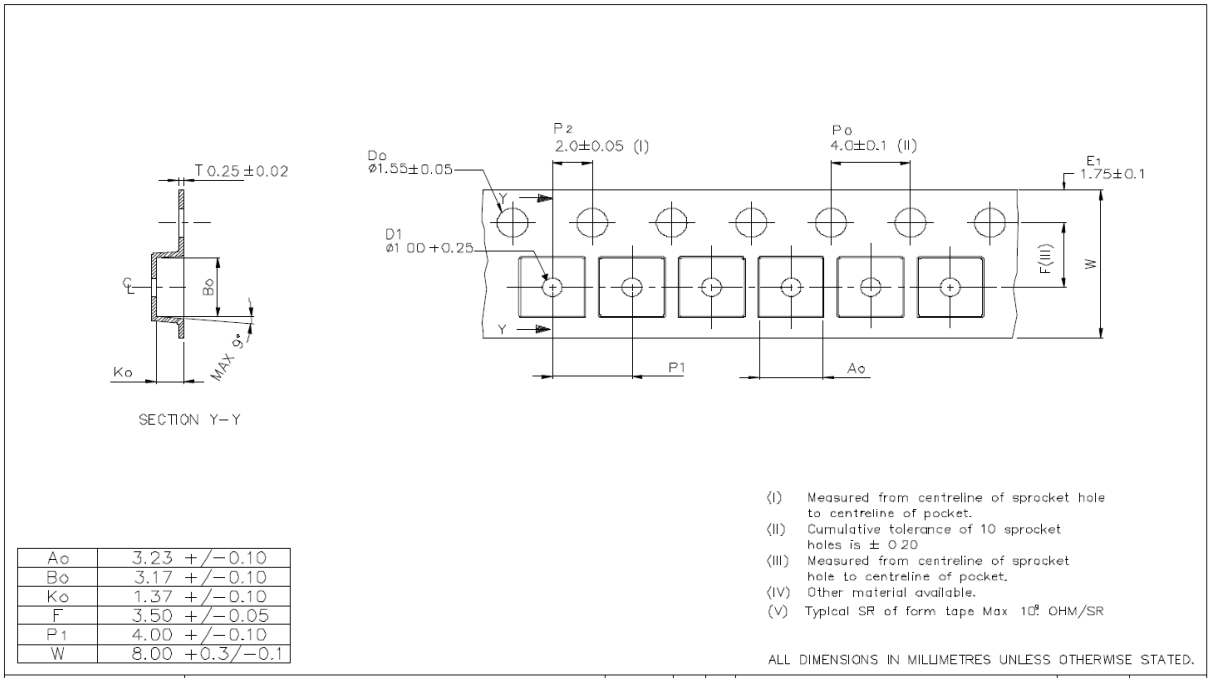
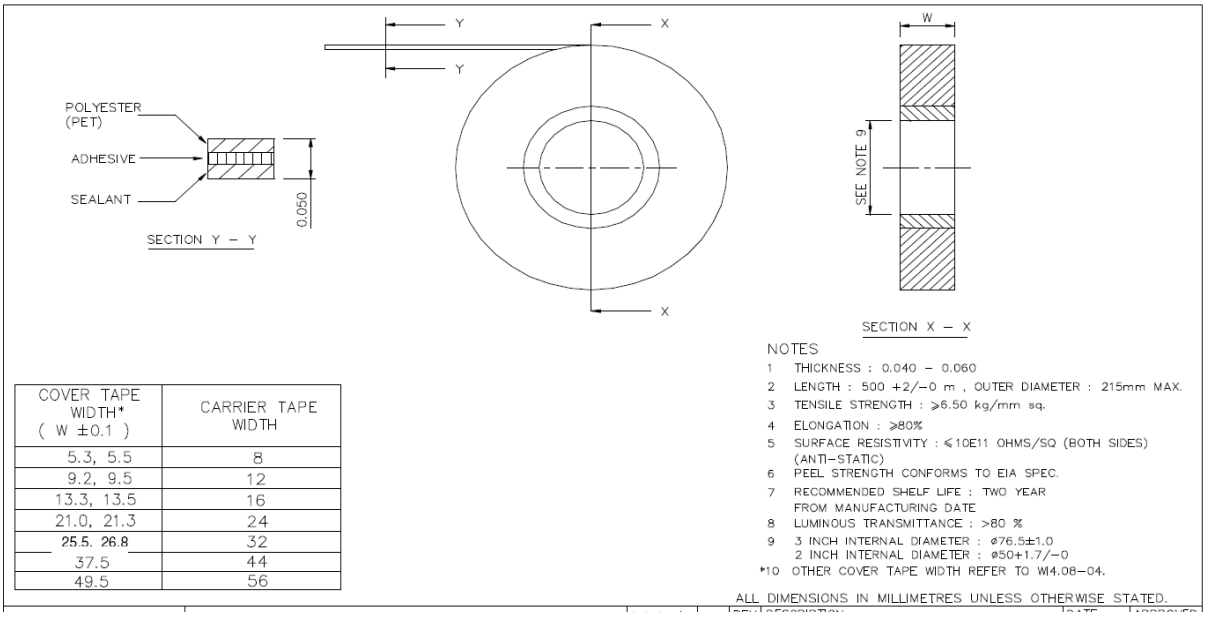
Tape and Reel Details: 6L-SOT23



Ao	3.23 +/−0.10
Bo	3.17 +/−0.10
Ko	1.37 +/−0.10
F	3.50 +/−0.05
P1	4.00 +/−0.10
W	8.00 +0.3/−0.1

(I) Measured from centreline of sprocket hole to centreline of pocket.
(II) Cumulative tolerance of 10 sprocket holes is ± 0 20
(III) Measured from centreline of sprocket hole to centreline of pocket.
(IV) Other material available.
(V) Typical SR of form tape Max 10⁸ OHM/SR

ALL DIMENSIONS IN MILLIMETRES UNLESS OTHERWISE STATED.



COVER TAPE WIDTH* (W ±0.1)	CARRIER TAPE WIDTH
5.3, 5.5	8
9.2, 9.5	12
13.3, 13.5	16
21.0, 21.3	24
25.5, 26.8	32
37.5	44
49.5	56

NOTES
1 THICKNESS : 0.040 – 0.060
2 LENGTH : 500 +2/−0 m , OUTER DIAMETER : 215mm MAX.
3 TENSILE STRENGTH : ≥6.50 kg/mm sq.
4 ELONGATION : ≥80%
5 SURFACE RESISTIVITY : ≤10E11 OHMS/SQ (BOTH SIDES) (ANTI−STATIC)
6 PEEL STRENGTH CONFORMS TO EIA SPEC.
7 RECOMMENDED SHELF LIFE : TWO YEAR FROM MANUFACTURING DATE
8 LUMINOUS TRANSMITTANCE : >80 %
9 3 INCH INTERNAL DIAMETER : ø76.5±1.0
2 INCH INTERNAL DIAMETER : ø50+1.7/−0
*10 OTHER COVER TAPE WIDTH REFER TO W14.08−04.

ALL DIMENSIONS IN MILLIMETRES UNLESS OTHERWISE STATED.

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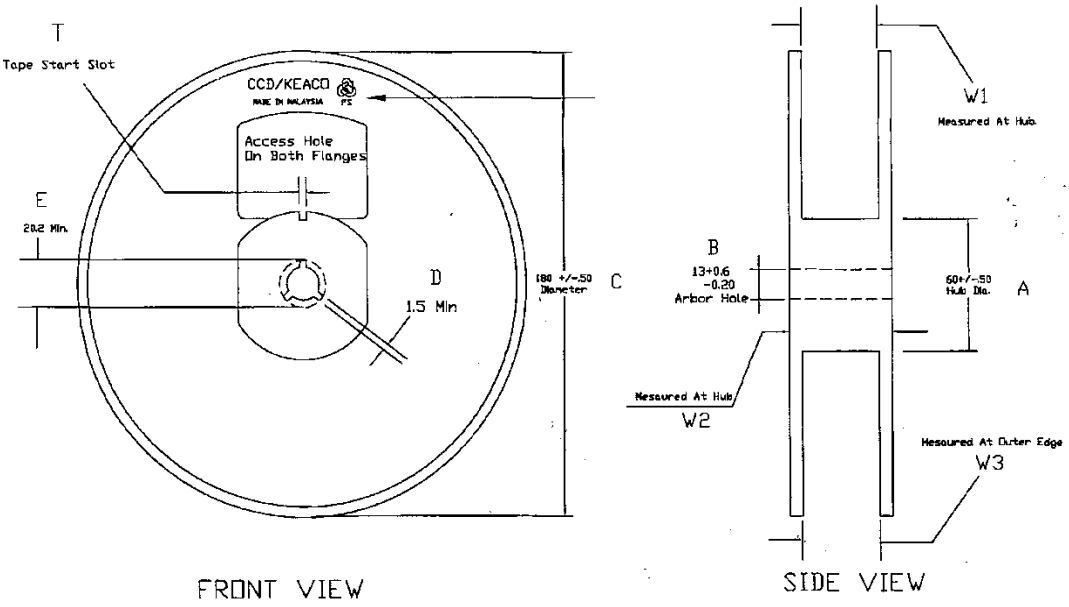
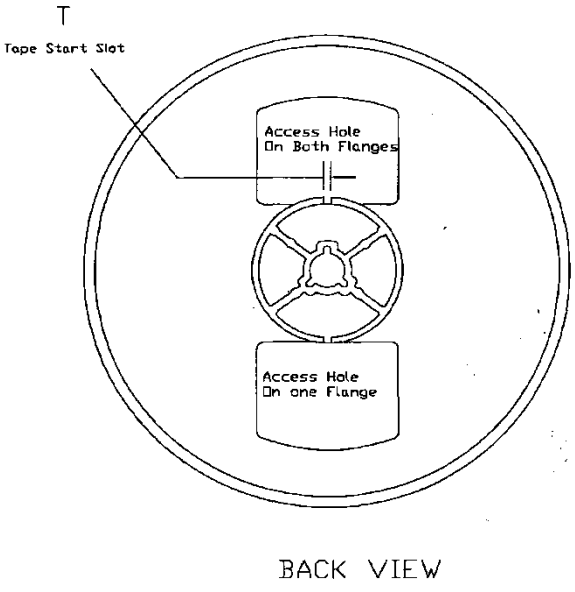
Tape and Reel Details: 6L-SOT23





NOTE:
1. MATERIAL : POLYSTRENE
2. SURFACE RESISTIVITY : </= 10E11 OHMS/SQ
(EXTERNAL OR DIPPED)
3. STATIC DECAY : < 2SEC. AT 50%RH

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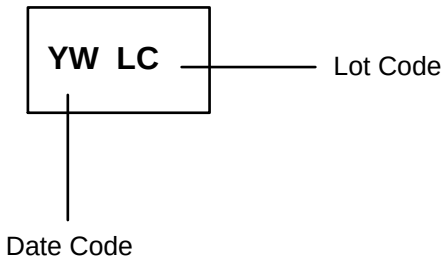
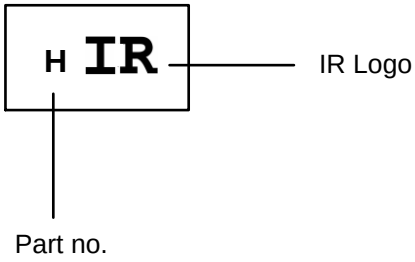
Part Marking Information: 6 Lead SOT23

Top Marking



Bottom Marking



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Qualification Information†

Qualification Level		Industrial†† (per JEDEC JESD 47E)	
		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		SOT-23	MSL1††† (per IPC/JEDEC J-STD-020C)
ESD	Machine Model	Class B (per JEDEC standard EIA/JESD22-A115-A)	
	Human Body Model	Class 1B (per EIA/JEDEC standard JESD22-A114-B)	
IC Latch-Up Test		Class I, Level A (per JESD78A)	
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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