

**$\mu$ HVIC™**

**High-Voltage Start-Up IC**

**Features**

- Up to 480V voltage capability
- Constant output current (4.5mA)
- Programmable upper threshold level
- Fixed lower threshold (4.2V)
- ENN input
- Over-temperature shutdown
- Ultra-low off current (2.5 $\mu$ A)
- Internal 20.8V clamp on VOUT pin
- Excellent latch immunity on all inputs & outputs
- Integrated ESD protection on all pins
- 5-pin SOT-23 package

**Description**

The IRS25751 is a 480V high-voltage start-up IC ideal for supplying initial supply starting current from a high-voltage bus. The IRS25751 supplies a constant current during start-up and then consumes ultra-low standby (off) current. Additional features include programmability of the upper turn-off threshold, an ENN input, and over-temperature protection. IR's proprietary HVIC technology provides robust operation from high input voltage levels with simple yet flexible features.

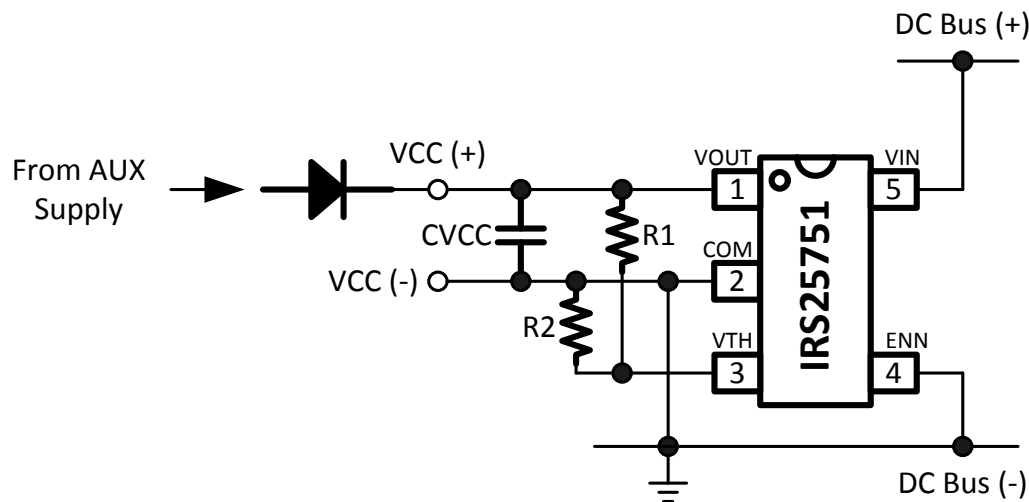
**Applications**

- High-voltage start-up
- Low standby power circuits
- General purpose switched mode power electronics

**Package Options**

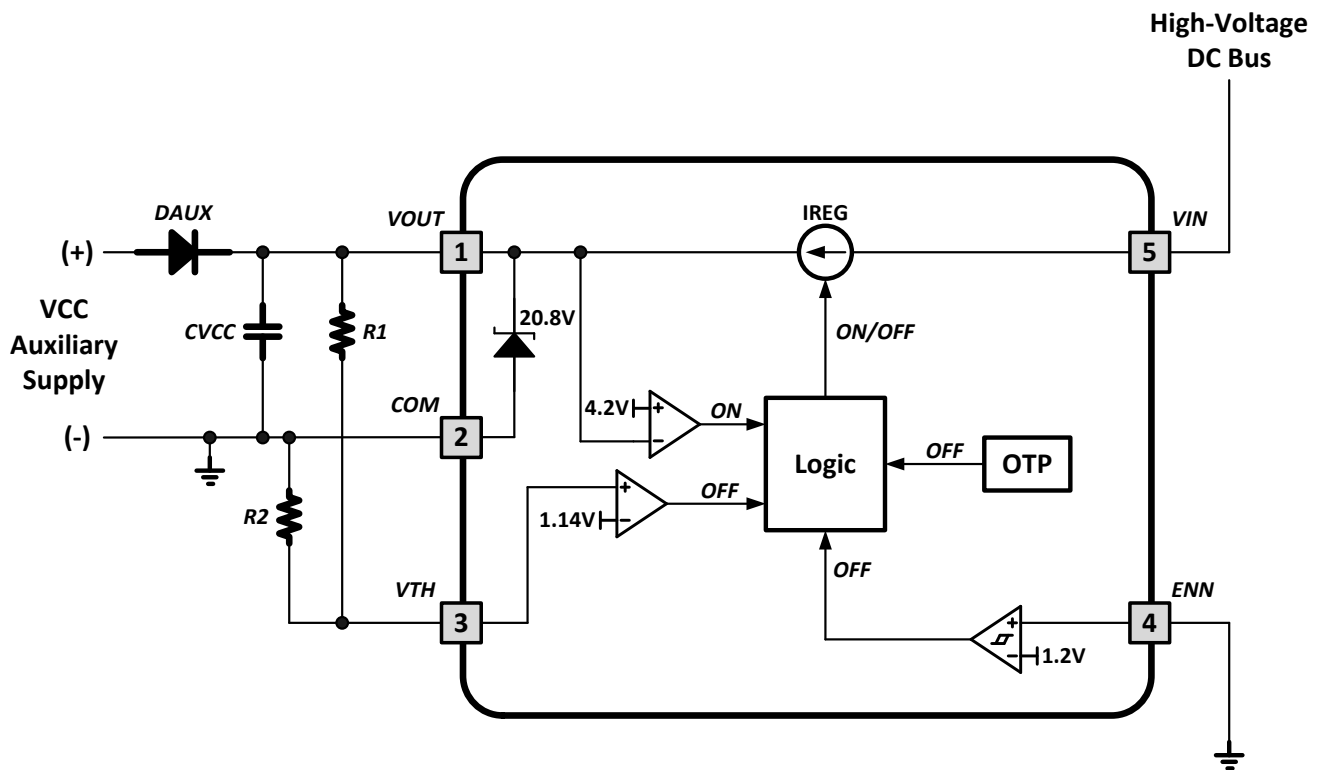


**Application Diagram**

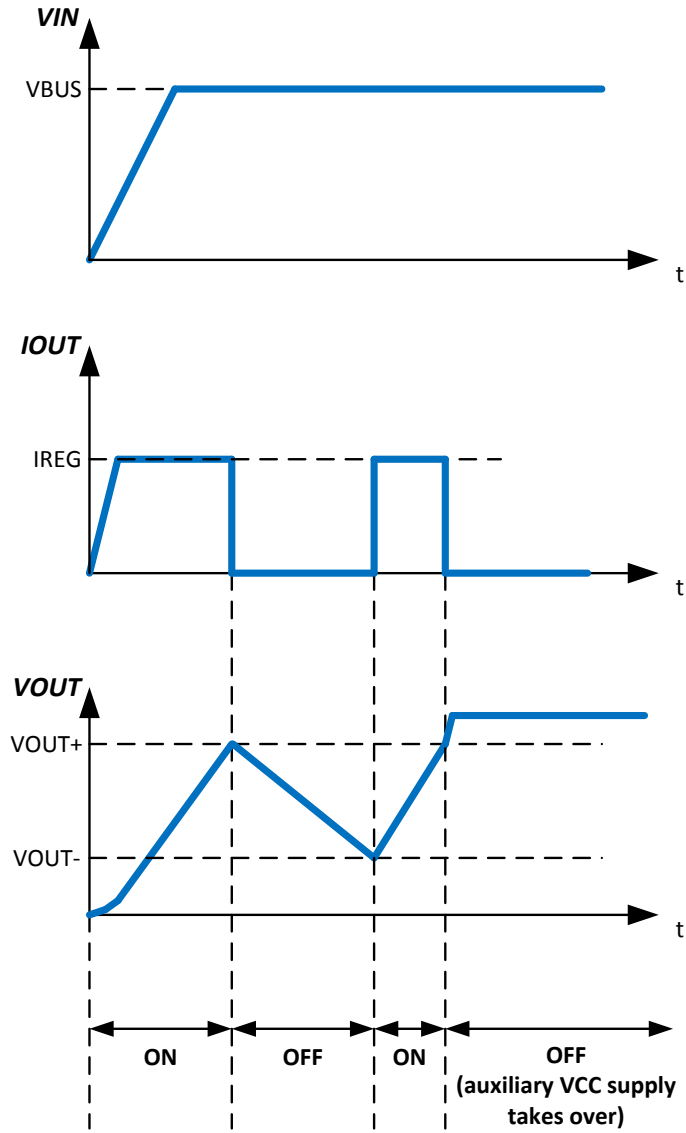


**Ordering Information**

Base Part Number	Package Type	Standard Pack		Orderable Part Number
		Form	Quantity	
IRS25751LPBF	5L-SOT-23	Tape and Reel	3000	IRS25751LTRPBF

**Functional Block Diagram**


Timing Diagram (VIN, IOU, VOUT)



**Qualification Information<sup>†</sup>**

<b>Qualification Level</b>		Industrial <sup>††</sup> (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.	
<b>Moisture Sensitivity Level</b>		SOT-23	MSL1 <sup>†††</sup> (per IPC/JEDEC J-STD-020C)
<b>ESD</b>	Machine Model	Class B (per JEDEC standard EIA/JESD22-A115-A)	
	Human Body Model	Class 2 (per EIA/JEDEC standard JESD22-A114-B)	
<b>IC Latch-Up Test</b>		Class I, Level A (per JESD78A)	
<b>RoHS Compliant</b>		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.

## 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
VIN	VIN pin voltage		-0.3	625	V
VOUT	VOUT pin voltage			VCLAMP <sup>†</sup>	
VTH	VTH pin voltage			VOUT + 0.3	
ENN	ENN pin voltage				
R $\theta$ ja	Thermal resistance, junction to ambient	5L-SOT-23	---	191	°C/W
T <sub>J</sub>	Junction temperature		-55	150	°C
T <sub>S</sub>	Storage temperature				
T <sub>L</sub>	IC Pin temperature (soldering, 10 seconds)		---	300	

- † This IC contains voltage clamp structures between the VOUT and COM pins that has a nominal breakdown voltage of 20.8V. Please note that this pin should not be driven by a DC, low impedance power source greater than the VCLAMP specified in the Electrical Characteristics section.

## Recommended Operating Conditions

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

Symbol	Definition	Min.	Max.	Units
VIN	VIN pin voltage	-0.3	480	V
VOUT	VOUT pin voltage	COM	VCLAMP	
VTH	VTH pin voltage		VOUT	
VENN	ENN pin voltage			
T <sub>J</sub>	Junction temperature	-40	125	°C

**Recommended Component Values**

<b>Symbol</b>	<b>Component</b>	<b>Min.</b>	<b>Typ.</b>	<b>Max.</b>	<b>Units</b>
R1	VTH pin programming resistor	---	1.0	---	Meg Ohm
R2	VTH pin programming resistor	---	90.9	---	K Ohm
CVCC	VOOUT pin external capacitor	---	10.0	---	$\mu$ F

**Electrical Characteristics**

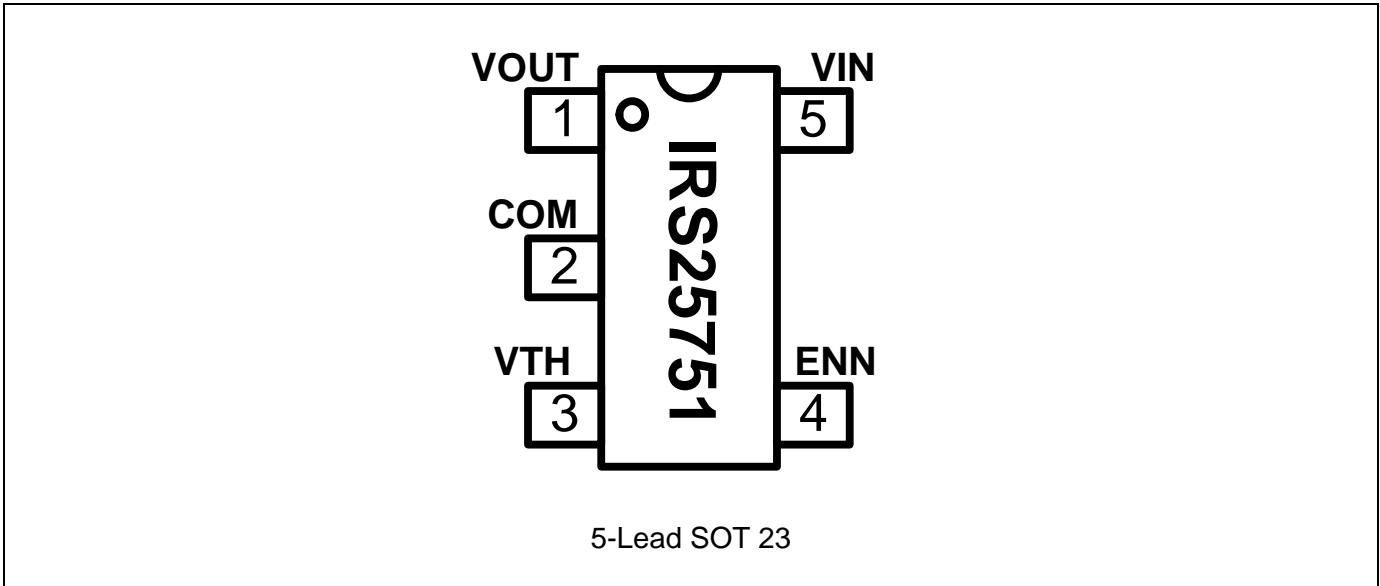
R1 = 1Meg Ohm, R2 = 90.9K Ohm, Ta = 25 °C unless otherwise specified. All parameters are referenced to COM pin.

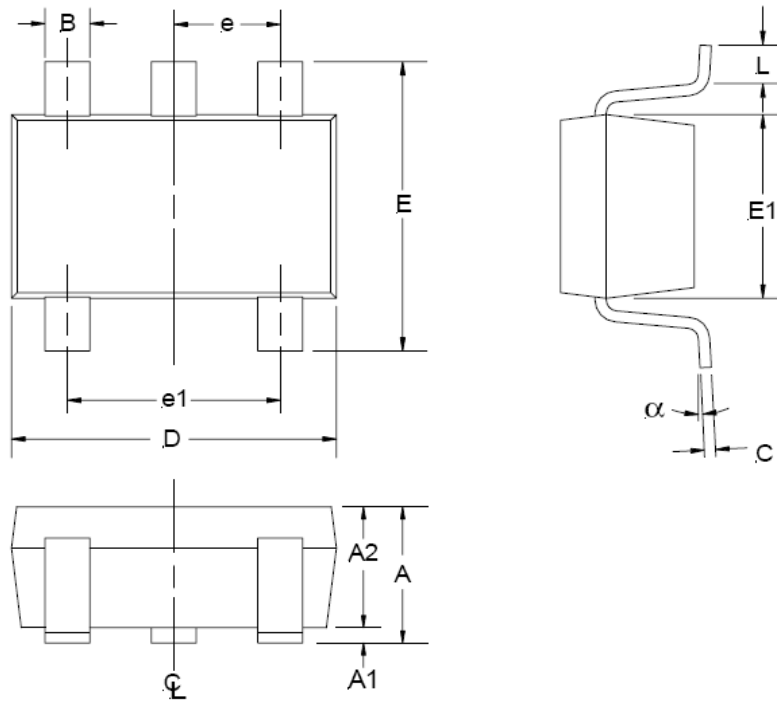
Symbol	Definition	Min	Typ	Max	Units	Test Conditions
<b>VOUT Pin Characteristics</b>						
VOUT-	VOUT pin falling turn-on threshold	3.78	4.2	4.62	V	VIN = COM, IVOUT = 5mA
VCLAMP	VOUT pin internal clamp voltage	19.8	20.8	21.8		
I <sub>REG</sub>	Regulated output current	---	4.6	---	mA	VIN = 400V, VOUT = COM
<b>VIN Pin Characteristics</b>						
I <sub>VIN_OFF</sub>	VIN pin off-state leakage current	---	2.5	---	μA	VIN = 400V
<b>VTH Pin Characteristics</b>						
VTH+	VTH pin rising turn-off threshold	1.08	1.14	1.2	V	
<b>ENN Pin Characteristics</b>						
VENN+	ENN pin rising disable threshold	---	1.2	---	V	
<b>Over-Temperature Protection</b>						
T <sub>JSD</sub>	Junction temperature thermal shutdown	---	155	---	°C	
T <sub>JSD_HYS</sub>	Junction temperature thermal shutdown hysteresis	---	50	---		



**Pin Definitions**

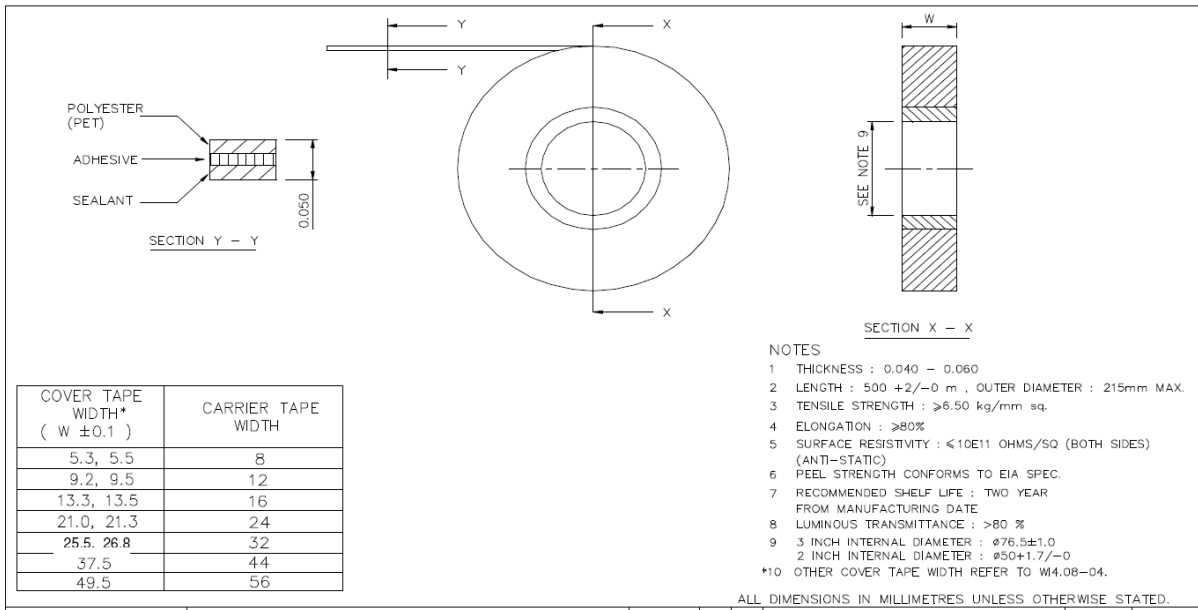
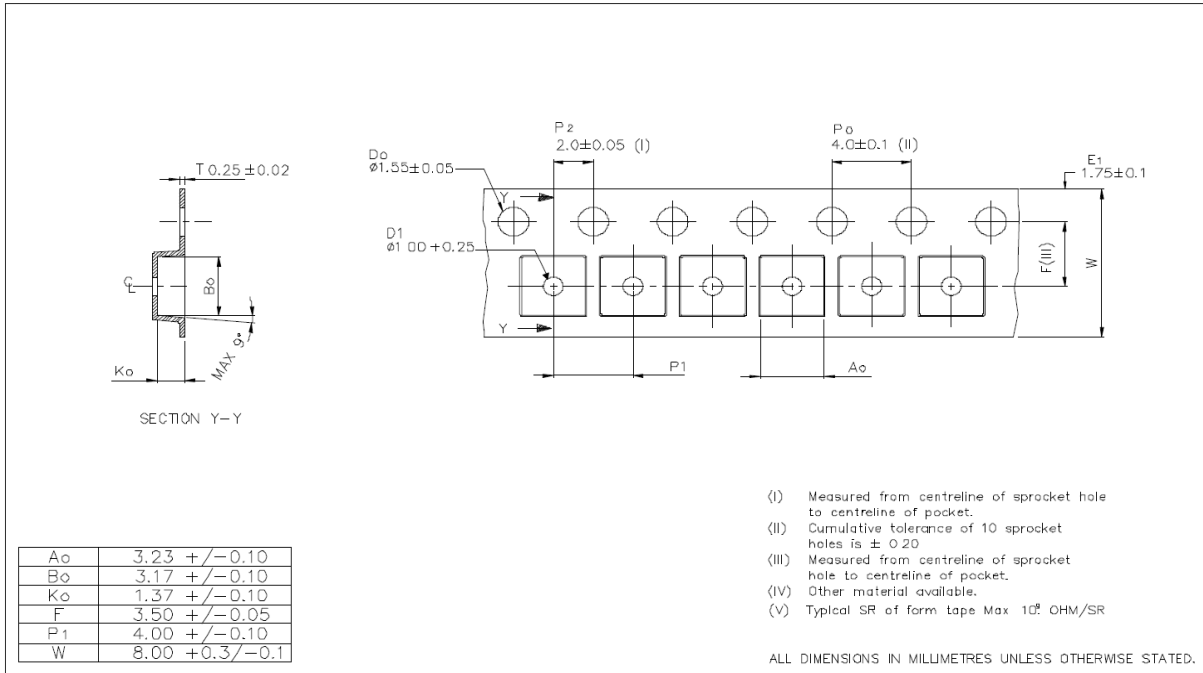
Pin	Name	Description
1	<b>VOUT</b>	Output voltage and current
2	<b>COM</b>	IC ground
3	<b>VTH</b>	Programmable upper VOUT turn-off threshold input
4	<b>ENN</b>	Enable pin (high level disables IC)
5	<b>VIN</b>	High-voltage input

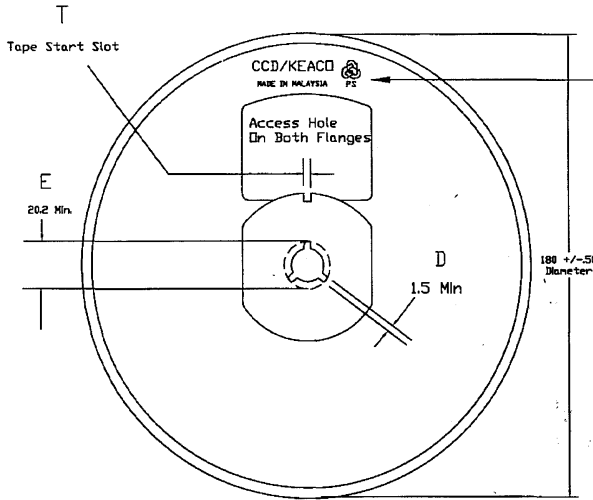
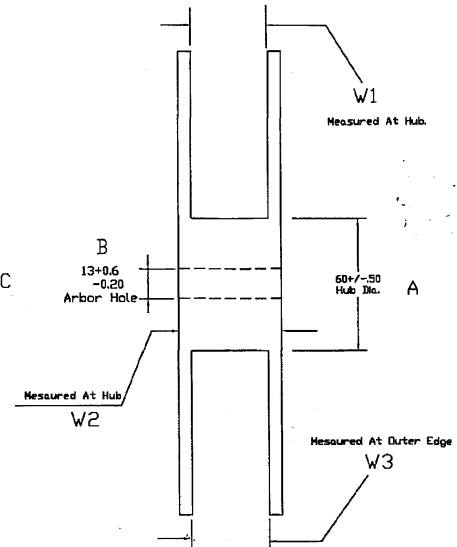
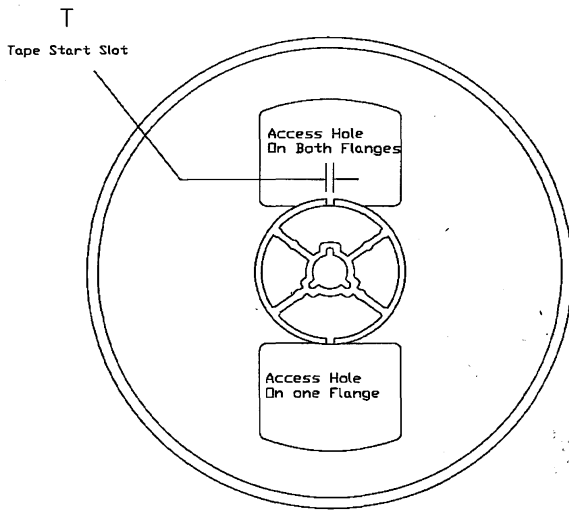
**Pin Assignments**


**Package Details: 5-Pin SOT23**


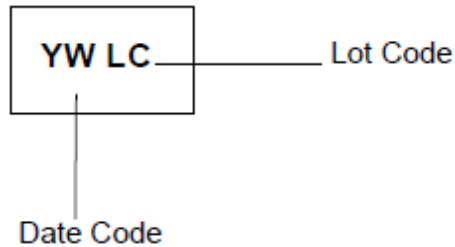
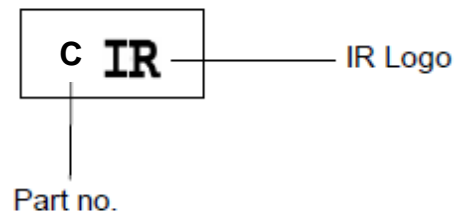
SYMBOL	MIN	MAX
A	0.90	1.45
A1	0.00	0.15
A2	0.90	1.30
B	0.25	0.50
C	0.09	0.20
D	2.80	3.00
E	2.60	3.00
E1	1.50	1.75
e	0.95 REF	
e1	1.90 REF	
L	0.35	0.55
$\alpha$	0°	10°

NOTE: ALL MEASUREMENTS ARE IN MILLIMETERS.

**Tape and Reel Details: 5-Pin SOT23**


**Tape and Reel Details: 5-Pin SOT23**

**FRONT VIEW**

**SIDE VIEW**

**BACK VIEW**
**NOTE:**

1. MATERIAL : POLYSTYRENE
2. SURFACE RESISTIVITY :  $\leq 10E11$  OHMS/SQ (EXTERNAL OR DIPPED)
3. STATIC DECAY :  $< 2$  SEC. AT 50%RH

**Part Marking Information: 5-Pin SOT23**
**Top Marking**

**Bottom Marking**


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