µHVIC™ 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 (2.5µA)
- 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

Applications

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

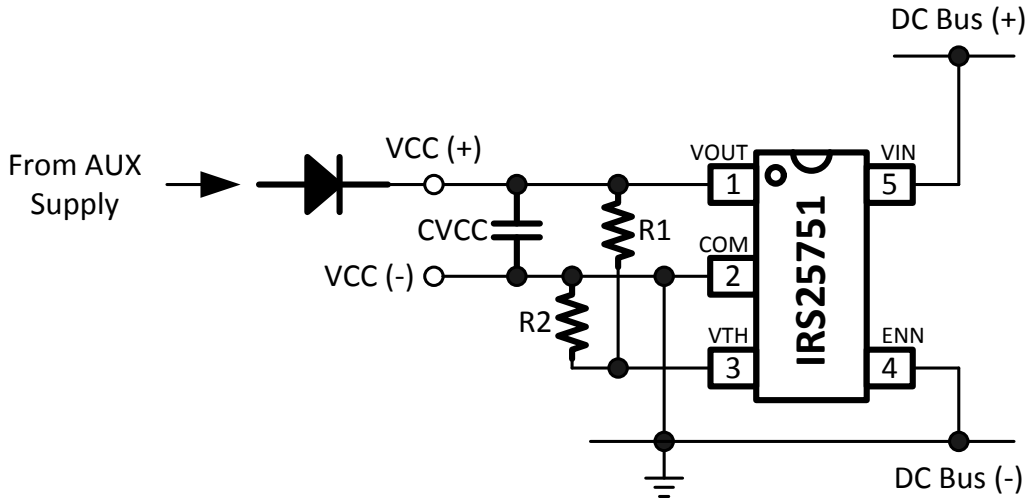
Description

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.

Package Options

5-Pin SOT-23

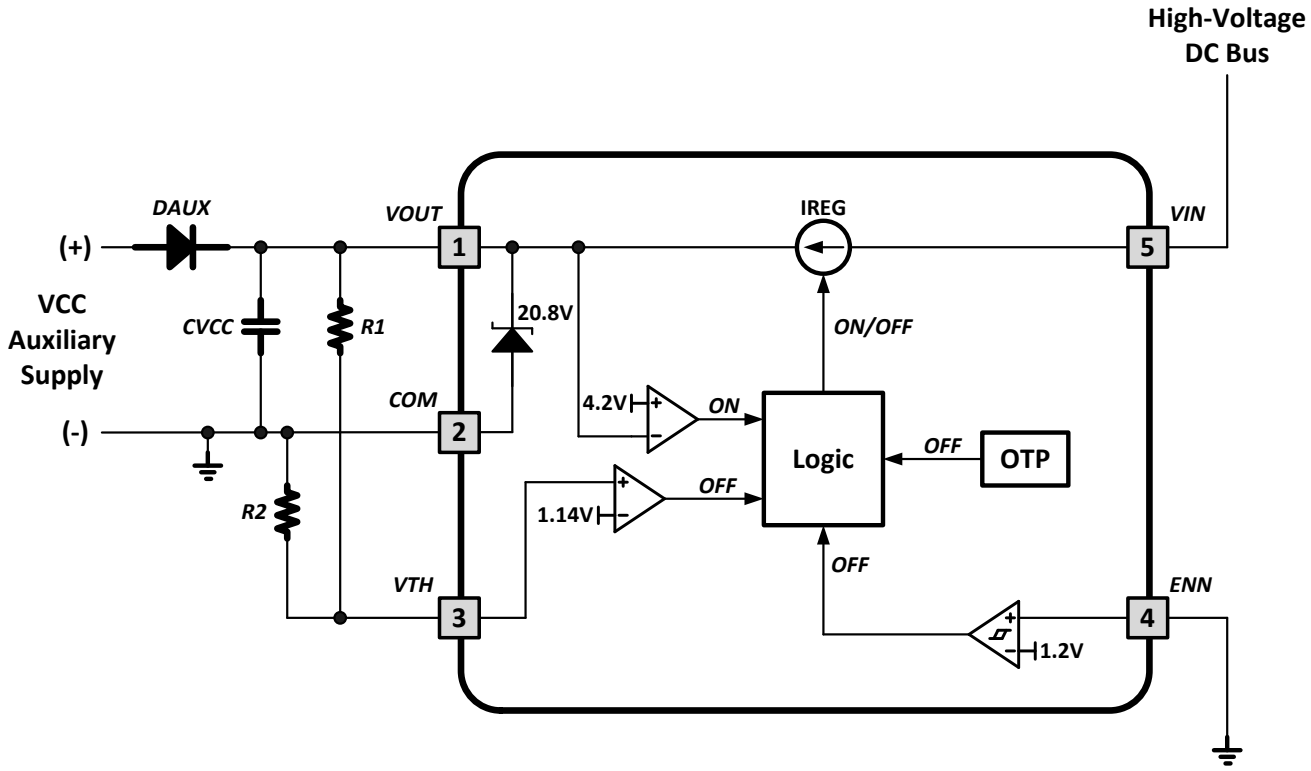
Application Diagram



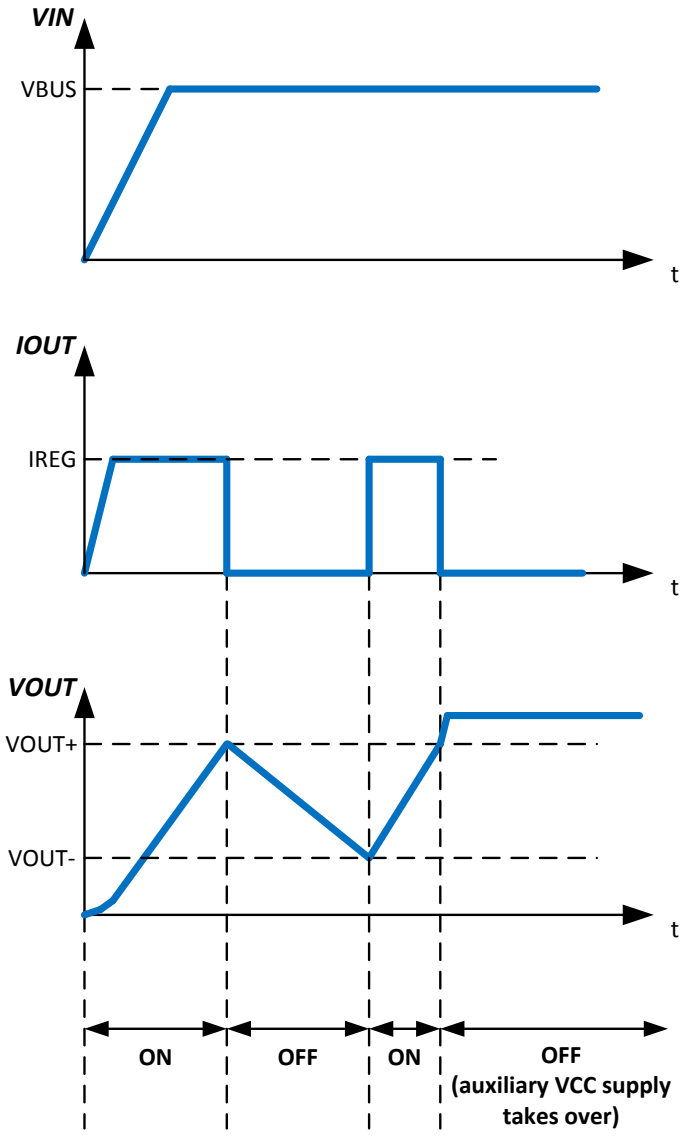
Ordering Information

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, IOUT, VOUT)



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 2 (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.

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†	
VTH	VTH pin voltage			VOUT + 0.3	
ENN	ENN pin voltage				
RΘja	Thermal resistance, junction to ambient	5L-SOT-23	---	191	ºC/W
T_J	Junction temperature		-55	150	ºC
T_S	Storage temperature				
T_L	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_J	Junction temperature	-40	125	ºC

Recommended Component Values

Symbol	Component	Min.	Typ.	Max.	Units
R1	VTH pin programming resistor	---	1.0	---	Meg Ohm
R2	VTH pin programming resistor	---	90.9	---	K Ohm
CVCC	VOUT pin external capacitor	---	10.0	---	μF

Electrical Characteristics

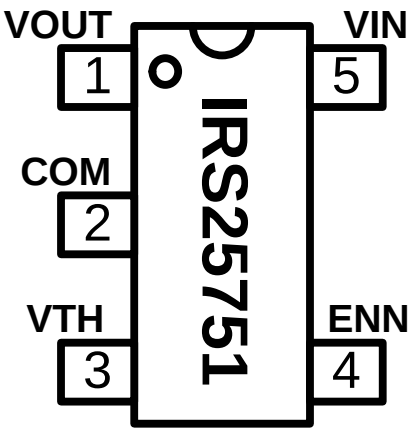
R1 = 1Meg Ohm, R2 = 90.9K Ohm, Ta = 25 °C unless otherwise specified. All parameters are referenced to COM pin.

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

Pin Definitions

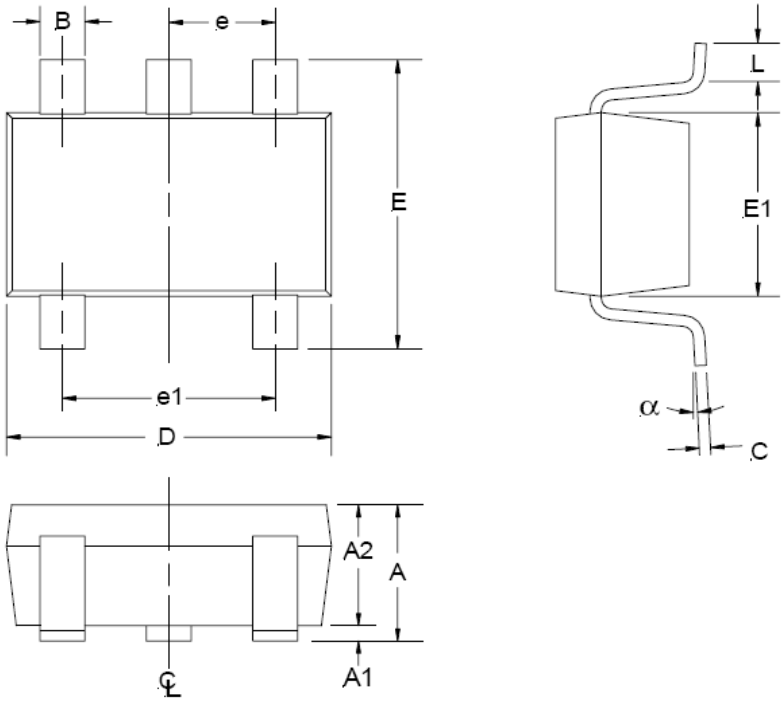
Pin	Name	Description
1	VOUT	Output voltage and current
2	COM	IC ground
3	VTH	Programmable upper VOUT turn-off threshold input
4	ENN	Enable pin (high level disables IC)
5	VIN	High-voltage input

Pin Assignments



5-Lead SOT 23

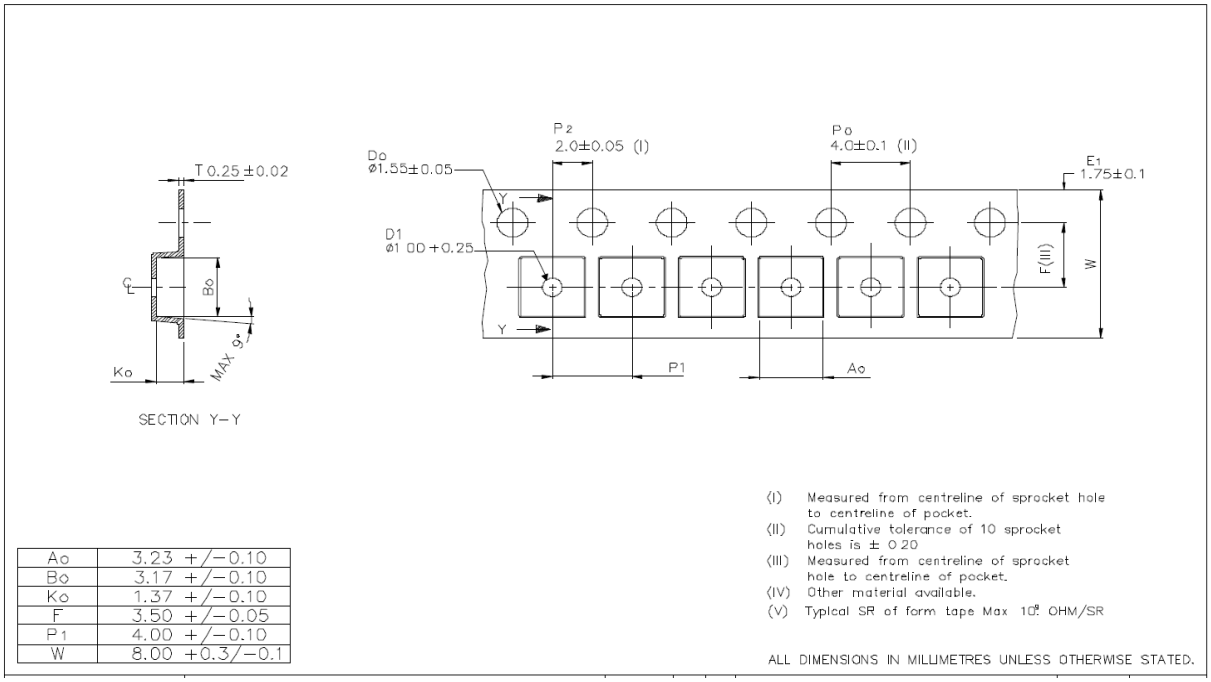
Package Details: 5-Pin SOT23



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
α	08	108

NOTE: ALL MEASUREMENTS ARE IN MILLIMETERS.

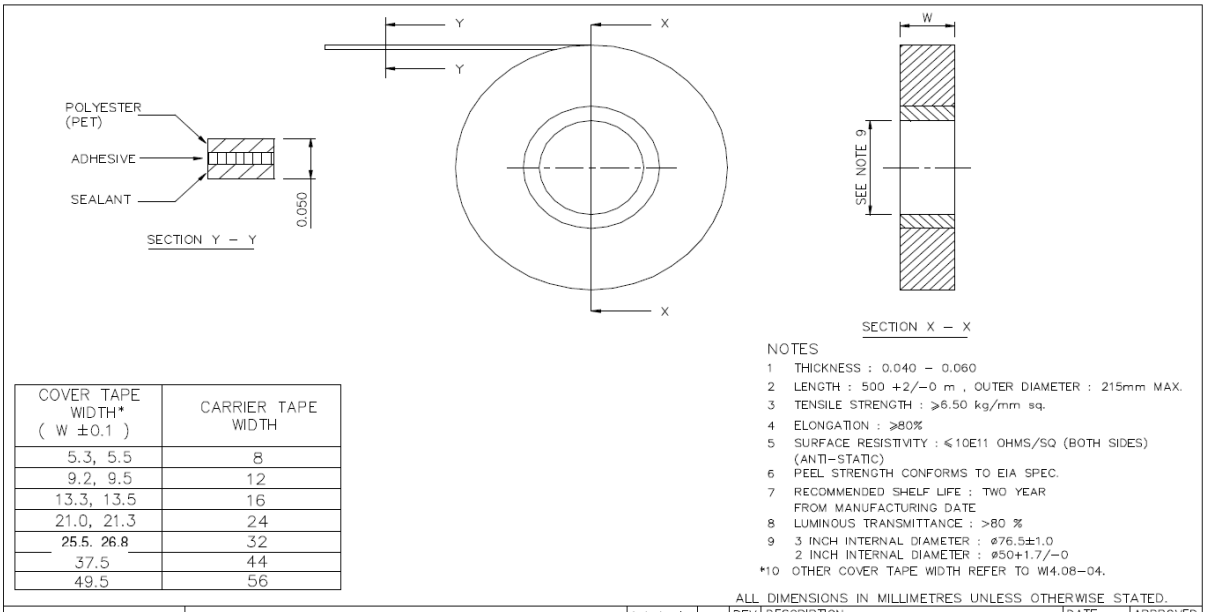
Tape and Reel Details: 5-Pin SOT23



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 10^{9} OHM/SR

ALL DIMENSIONS IN MILLIMETRES UNLESS OTHERWISE STATED.

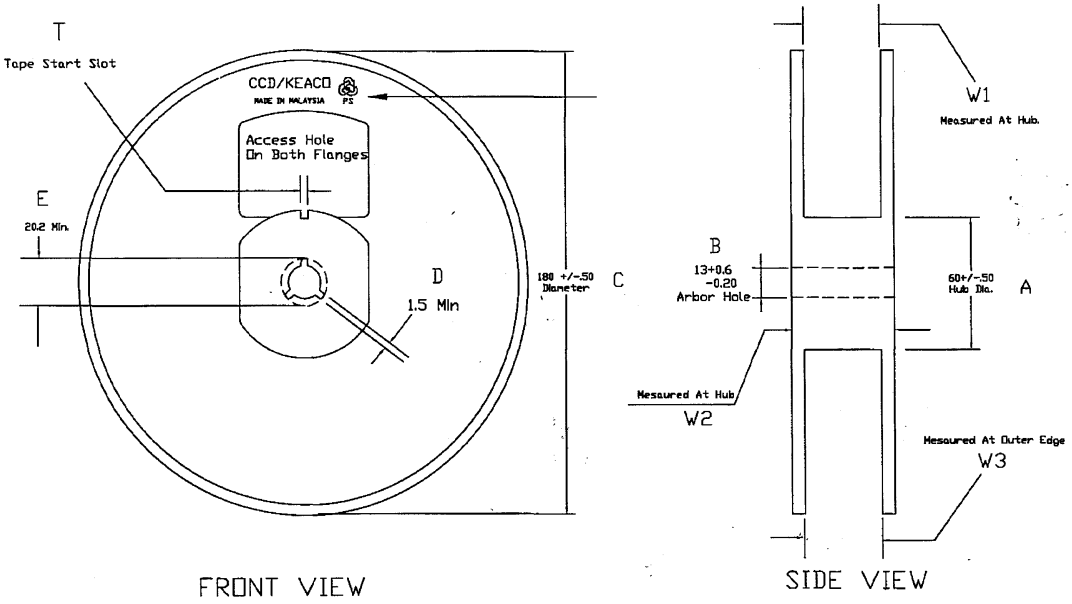


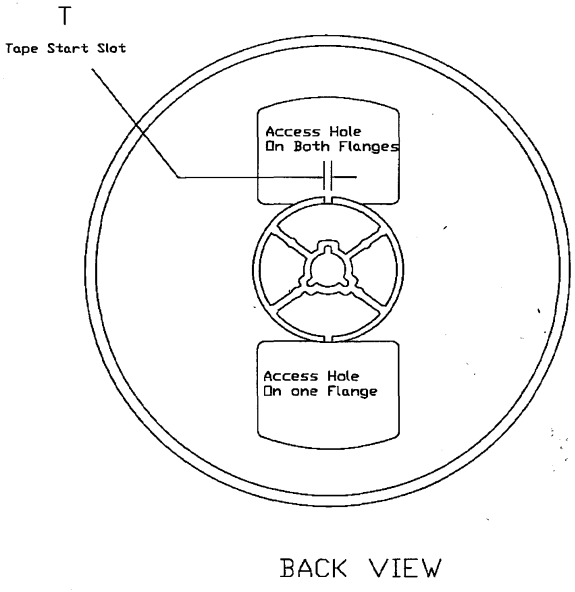
COVER TAPE WIDTH* (W ±0.1)	CARRIER TAPE WIDTH
5.3, 5.5	8
9.2, 9.5	12
13.3, 13.5	16
21.0, 21.3	24
25.5, 26.8	32
37.5	44
49.5	56

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.

Tape and Reel Details: 5-Pin SOT23

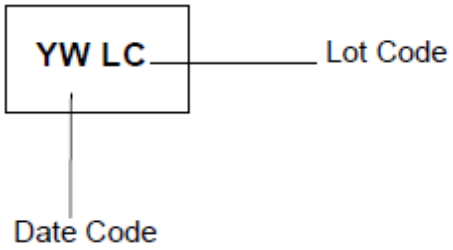




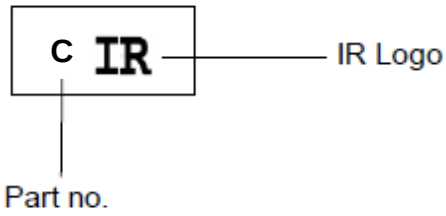
NOTE:
1. MATERIAL : POLYSTRENE
2. SURFACE RESISTIVITY : </= 10E11 OHMS/SQ (EXTERNAL OR DIPPED)
3. STATIC DECAY : < 2SEC. AT 50%RH

Part Marking Information: 5-Pin SOT23

Top Marking



Bottom Marking



For technical support, please contact IR's Technical Assistance Center
http://www.irf.com/technical-info/

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