PT7M6314US

Supervisory Circuit

Features

- Highly accurate: ±1.5% (25℃)
- Detect voltage range: 1.8 to 5V in 100mV increments
- Operating voltage range: 1.0V ~ 5.5V
- Operating temperature range: -40℃ to + 85℃
- Detect voltage temperature characteristics: ±2.5% × TYP
- Output configuration: Bi-dir
- Four reset timeout period available:
  - typical 1.6ms for PT7M6314USxxD1;
  - typical 26ms for PT7M6314USxxD2;
  - typical 200ms for PT7M6314USxxD3;
  - typical 1570ms for PT7M6314USxxD4;

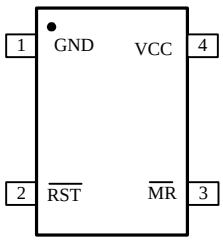
General Description

The series are designed to monitor power supplies in µP and digital systems. It provides excellent circuit reliability and low cost by eliminating external components and adjustments, and a debounced manual reset input.

This device performs a single function: it asserts a reset signal whenever the V_{CC} supply voltage falls below a preset threshold or whenever manual reset is asserted. Reset remains asserted for an internally programmed interval (reset timeout period) after V_{CC} has risen above the reset threshold or manual reset is de-asserted.

PT7M6314USxx are bidirectional output, allowing it to be directly connected to µP with bidirectional reset inputs. The serials come with factory-trimmed reset threshold voltages in 100mV increments from 2.5V to 5V. Preset timeout periods of 200ms and 1570ms (typ.) are available.

Pin Configuration



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Pin Description

Name	Type	Description
$\overline{RST}$	I/O	**Reset Output and Pushbutton Input:** $\overline{RST}$ is asserted when V_{CC} drops below voltage threshold V_{TH-}. Active low. When other devices pull $\overline{RST}$ low, the device will speed its rising edge once the reset condition release.
$\overline{MR}$	I	**Manual Reset:** A logic low on $\overline{MR}$ asserts reset. Reset remains asserted as long as $\overline{MR}$ is low, and for the reset timeout period (t_{RS}) after the reset conditions are terminated. Connect to V_{CC} if not used.
GND	P	**Ground**
V_{CC}	P	**Supply Voltage.**

Maximum Ratings

Storage Temperature .....-65°C to +150°C
Ambient Temperature with Power Applied ..... -40°C to +85°C
Supply Voltage to Ground Potential (Vcc to GND) .....-0.3V to +7.0V
DC Input Voltage (All inputs except Vcc and GND).....-0.3V to V_{CC}+0.3V
DC Output Current (All outputs) 30mA
Power Dissipation ..... 320mW (Depend on package)

Note:
Stresses greater than those listed under MAXIMUM RATINGS may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect reliability.

DC Electrical Characteristics

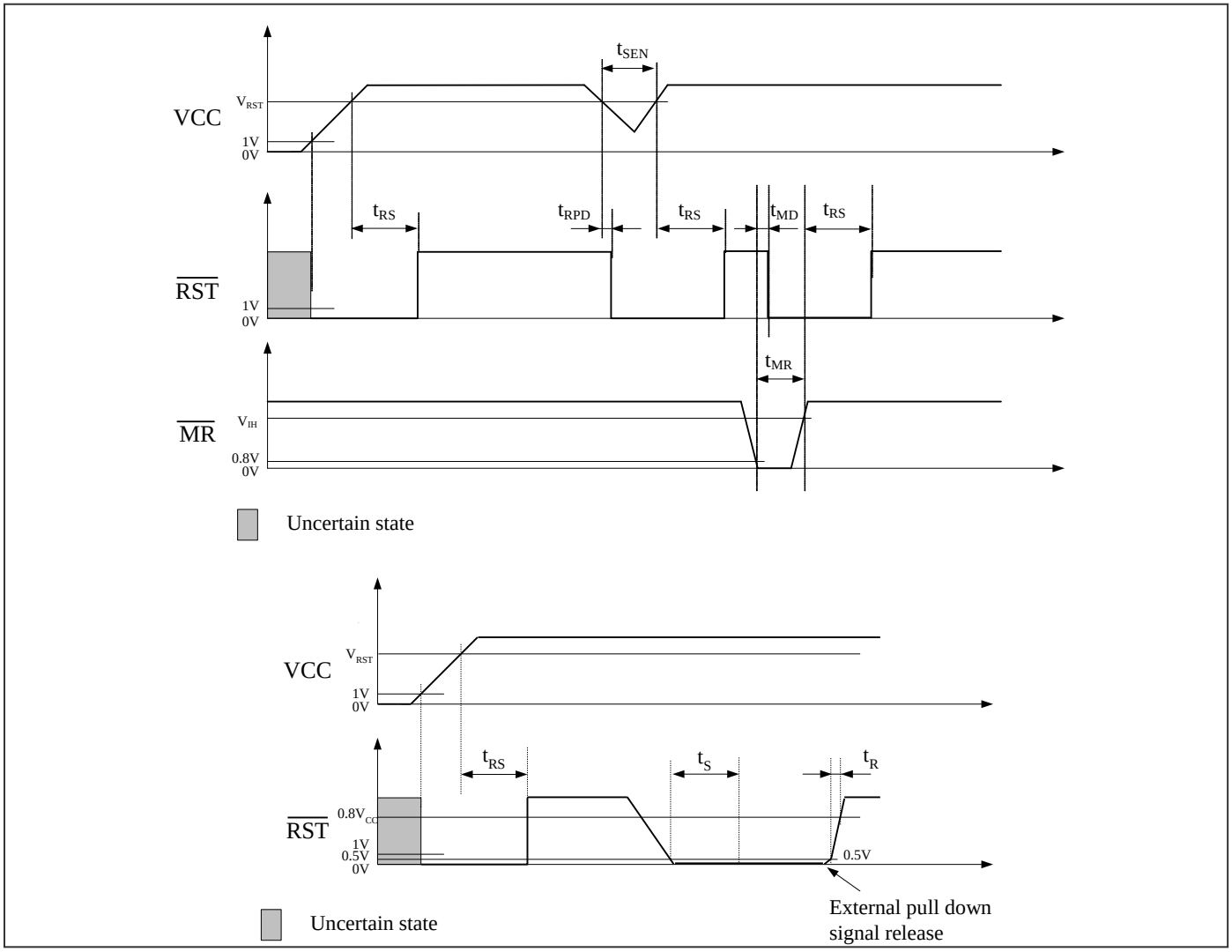
(T_A= -40~85℃, unless otherwise noted. Typical values are at T_A = +25℃)

Description	Sym.	Test Conditions	Min.	Typ.	Max.	Unit
Supply Voltage	V_{CC}		1.0		5.5	V
Supply Current	I_{CC}	V_{CC} = 5.5V. No load.			12	μA
		V_{CC} = 3.6V. No load.			10	μA
Voltage Threshold	V_{TH-}	+25°C	(V_{TH-}) ×0.985	V_{TH-}	(V_{TH-}) ×1.015	V
		-40°C~85°C	(V_{TH-}) ×0.975	V_{TH-}	(V_{TH-}) ×1.025	
Hysteresis	V_{HYS}	V_{TH+} - V_{TH-}*		50		mV
Output Driving — Output low	V_{OL}	I_{OH} = 8mA, V_{CC} = 5V			0.4	V
		I_{OH} = 4mA, V_{CC} = 3V			0.3	
		I_{OH} = -50μA, V_{CC} = 1V			0.09	
Internal pull-up resistor	R_P	$\overline{MR}$	32	63	100	kΩ
		$\overline{RST}$ pin. V_{CC} = 3V.	-	11	20	kΩ
		$\overline{RST}$ pin. V_{CC} = 5V.	-	5	10	
Input High Voltage	V_{IH}	$\overline{MR}$, V_{CC} < 4V	0.7×Vcc			V
		$\overline{MR}$, V_{CC} > 4V	2.4			
Input Low Voltage	V_{IL}	$\overline{MR}$, V_{CC} < 4V			0.3×Vcc	V
		$\overline{MR}$, V_{CC} > 4V			0.8	
$\overline{RST}$ active pull-up enable threshold	V_{THUP}	V_{CC} = 5V	0.7	0.9	1.2	V
$\overline{RST}$ active pull-up current		V_{CC} = 3.3V		20		mA

Note: V_{TH-} is voltage threshold when V_{CC} falls from high to low. V_{TH+} is voltage threshold when V_{CC} rises from low to high.

AC Electrical Characteristics

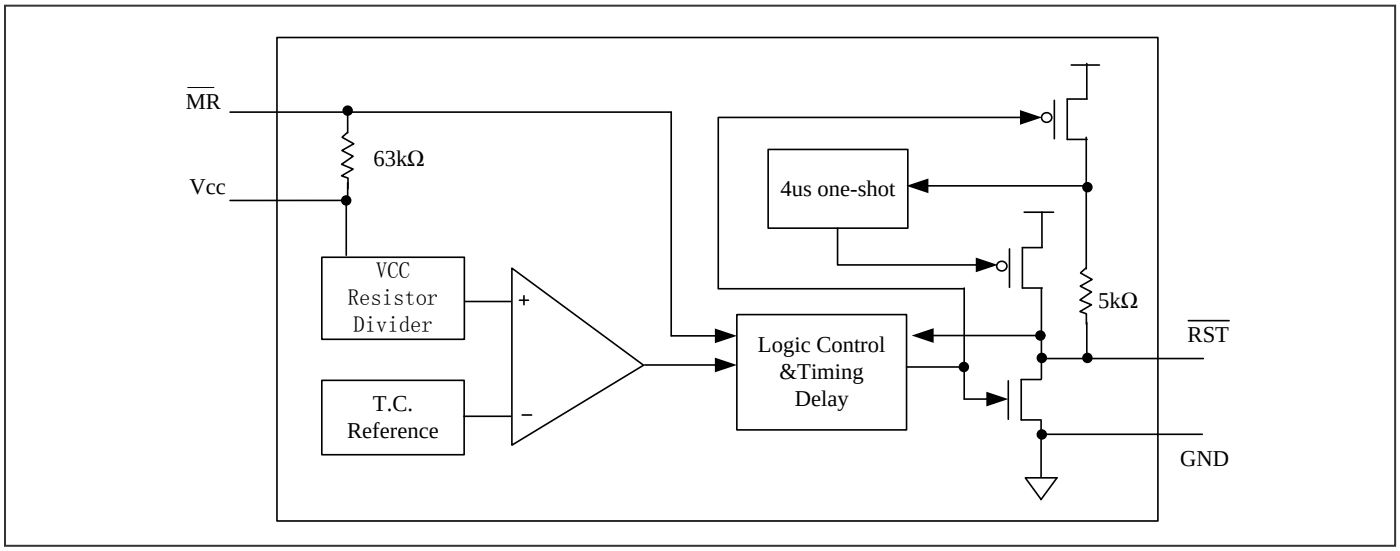
Timing diagram



(V_{CC} = 1.0V to 5.5V, T_A= -40~85 ℃, unless otherwise noted. Typical values are at T_A = +25 ℃)

Sym.	Description	Test Conditions		Part No.	Min.	Typ.	Max.	Unit
t_{RS}	Reset Timeout Period			6314USxxD1	1	1.6	2.2	ms
				6314USxxD2	17	26	40	ms
				6314USxxD3	140	200	280	ms
				6314USxxD4	1120	1570	2240	ms
t_{RPD}	Delay					10		ns
t_{SEN}	Sensitivity				20			µs
t_{MD}	$\overline{MR}$ to Reset Delay					500		ns
t_{MR}	$\overline{MR}$ Pulse Width				1			µs
t_S	External Pull Down Signal Pulse	$\overline{RST}$ pin			1			µs
t_R	$\overline{RST}$ Output Rise Time	V_{CC} = 3V	C_{LOAD} = 120pF				333	ns
			C_{LOAD} = 250pF				666	
		V_{CC} = 5V	C_{LOAD} = 200pF				333	
			C_{LOAD} = 400pF				666	

Block Diagram



Function Description

Power Monitor

A microprocessor's (µP's) reset input starts the µP in a known state. Whenever the µP is in an unknown state, it should be held in reset. The supervisory circuits assert reset during power-up and prevent code execution errors during power-down or brownout conditions.

On power-up, once Vcc reaches about 1.0V, $\overline{RST}$ is a guaranteed logic low of 0.4V or less. As Vcc rises, $\overline{RST}$ stays low. When Vcc rises above the reset threshold V_{RST}, an internal timer releases $\overline{RST}$ after about 1570ms (PT7M6314USxxD4). $\overline{RST}$ asserts whenever Vcc drops below the reset threshold, i.e. brownout condition. If brownout occurs in the middle of a previously initiated reset pulse, the pulse continues for at least another 1.6ms or 26ms or 200ms or 1570ms (PT7M6314USxxD4). On power-down, once Vcc falls below the reset threshold, RST stays low and is guaranteed to be 0.4V or less until Vcc drops below 1V.

Manual Reset

The manual-reset input ($\overline{MR}$) allows reset to be triggered by a pushbutton switch. The switch is effectively debounced by the 1.6ms (PT7M6314USxxD1) or 26ms (PT7M6314USxxD2) or 200ms (PT7M6314USxxD3) or 1570ms (PT7M6314USxxD4) reset pulse width.

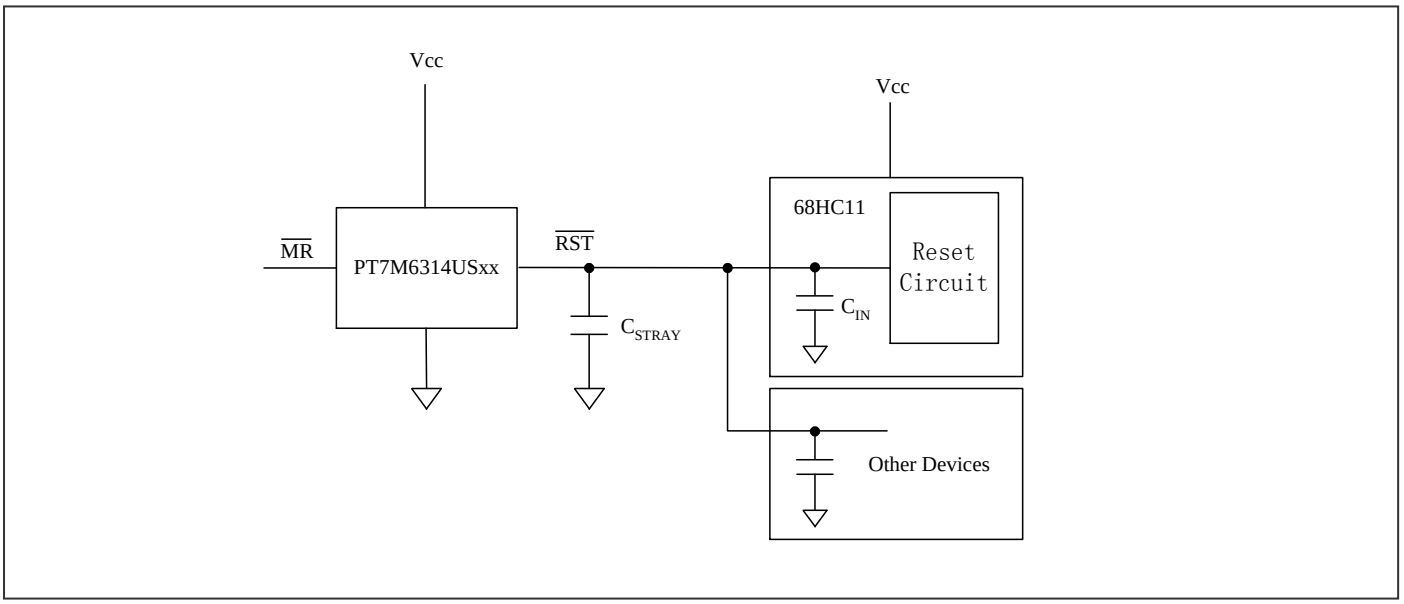
Reset Output: Bi-direction

The PT7M6314USxx's RESET output is designed to interface with µPs that have bidirectional reset pins, such as the Motorola 68HC11. Like an open-drain output, the PT7M6314USxx allows the µP or other devices to pull $\overline{RST}$ low and assert a reset condition. However, unlike a standard open-drain output, it includes the commonly specified 5kΩ pull-up resistor with a P-channel active pull-up in parallel. This structure can speed the rising edge when the reset condition releases. The reset condition will occur when Vcc drops below the reset threshold, or Manual Reset is set to ground, or $\overline{RST}$ is pulled down.

Application Information

Typical Operation Circuit

Fig 6. PT7M6314USxx Application Example



Mechanical Information

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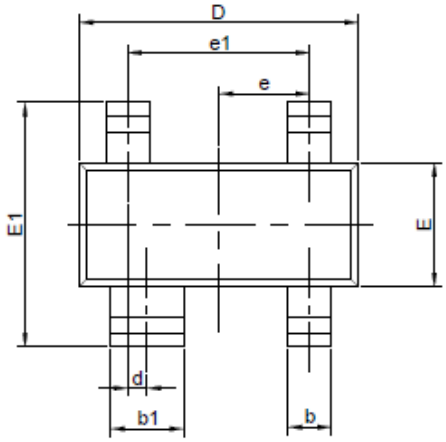

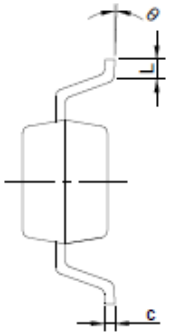

PKG. DIMENSIONS(MM)		
SYMBOL	Min	Max
A	0.90	1.15
A1	0.00	0.10
A2	0.90	1.05
b	0.30	0.50
b1	0.75	0.90
c	0.08	0.15
D	2.80	3.00
d	0.20 TYP	
E	1.20	1.40
E1	2.25	2.55
e	0.95 TYP	
e1	1.80	2.00
L	0.30	0.50
θ	0°	8°

Note:
1. Ref: JEDEC TO-253D

PERICOM Enabling Serial Connectivity

DATE: 06/18/13

DESCRIPTION: 4-Pin, SOT143

PACKAGE CODE: TB (TB4)

DOCUMENT CONTROL#: PD-2146 REVISION: –

Ordering Information

Part Number	Package Code	Package
PT7M6314USxxD1TBEX	TB	Lead free and Green SOT143-4, Tape & Reel
PT7M6314USxxD2TBEX	TB	Lead free and Green SOT143-4, Tape & Reel
PT7M6314USxxD3TBEX	TB	Lead free and Green SOT143-4, Tape & Reel
PT7M6314USxxD4TBEX	TB	Lead free and Green SOT143-4, Tape & Reel

Note:

- "xx" refer to voltage range, see below table 1.
- E=Lead-free and Green Packaging
- Adding X suffix=Tape/Reel
- Contact Pericom for availability.

Table 1 Suffix "xx" definition of PT7M6314USxx

Suffix xx	V_{TH-} (V)	Suffix xx	V_{TH-} (V)	Suffix xx	V_{TH-} (V)	Suffix xx	V_{TH-} (V)
25	2.5	32	3.2	39	3.9	46	4.6
26	2.6	33	3.3	40	4.0	47	4.7
27	2.7	34	3.4	41	4.1	48	4.8
28	2.8	35	3.5	42	4.2	49	4.9
29	2.9	36	3.6	43	4.3	50	5.0
30	3.0	37	3.7	44	4.4		
31	3.1	38	3.8	45	4.5		

SOT-143 Package Top Marking Instruction

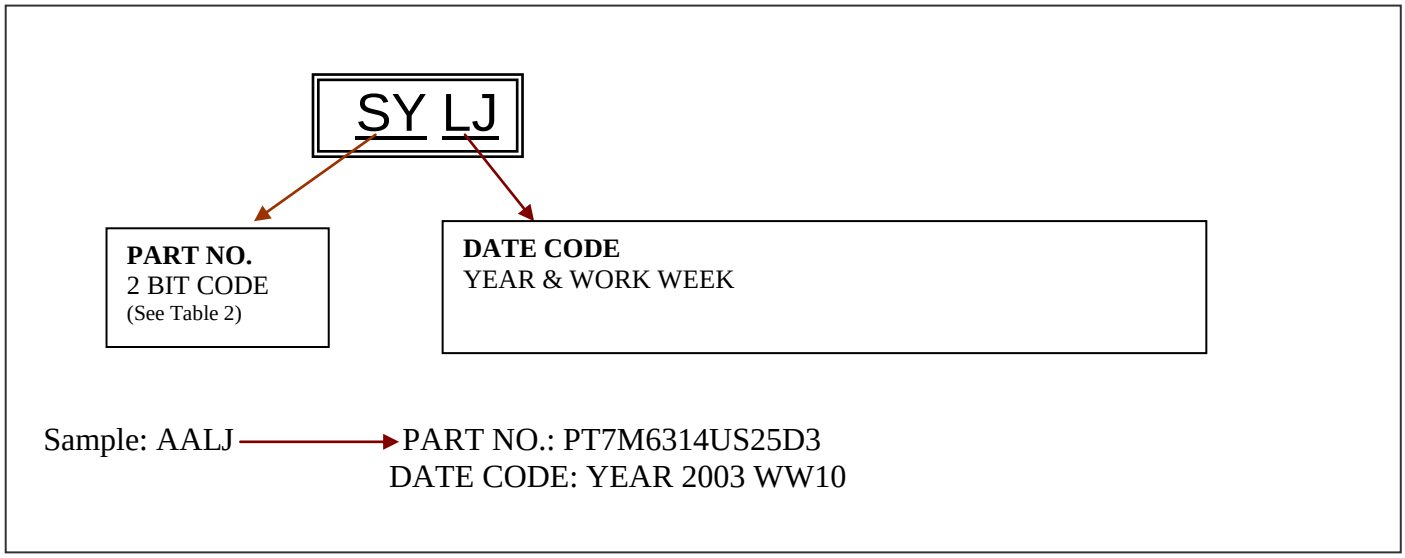

Table2

Part No.	Code	Part No.	*Code*	*Part No.*	*Code*
PT7M6314US25D3	SY	PT7M6314US34D3	UI	PT7M6314US43D3	VS
PT7M6314US25D4	SZ	PT7M6314US34D4	UJ	PT7M6314US43D4	VT
PT7M6314US26D3	TC	PT7M6314US35D3	UM	PT7M6314US44D3	VW
PT7M6314US26D4	TD	PT7M6314US35D4	UN	PT7M6314US44D4	VX
PT7M6314US27D3	TG	PT7M6314US36D3	UQ	PT7M6314US45D3	WA
PT7M6314US27D4	TH	PT7M6314US36D4	UR	PT7M6314US45D4	WB
PT7M6314US28D3	TK	PT7M6314US37D3	UU	PT7M6314US46D3	WE
PT7M6314US28D4	TL	PT7M6314US37D4	UV	PT7M6314US46D4	WF
PT7M6314US29D3	TO	PT7M6314US38D3	UY	PT7M6314US47D3	WI
PT7M6314US29D4	TP	PT7M6314US38D4	UZ	PT7M6314US47D4	WJ
PT7M6314US30D3	TS	PT7M6314US39D3	VC	PT7M6314US48D3	WM
PT7M6314US30D4	TT	PT7M6314US39D4	VD	PT7M6314US48D4	WN
PT7M6314US31D3	TW	PT7M6314US40D3	VG	PT7M6314US49D3	WQ
PT7M6314US31D4	TX	PT7M6314US40D4	VH	PT7M6314US49D4	WR
PT7M6314US32D3	UA	PT7M6314US41D3	VK	PT7M6314US50D3	WU
PT7M6314US32D4	UB	PT7M6314US41D4	VL	PT7M6314US50D4	WV
PT7M6314US33D3	UE	PT7M6314US42D3	VO		
PT7M6314US33D4	UF	PT7M6314US42D4	VP		