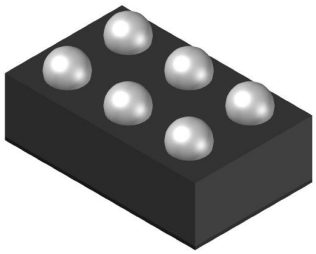
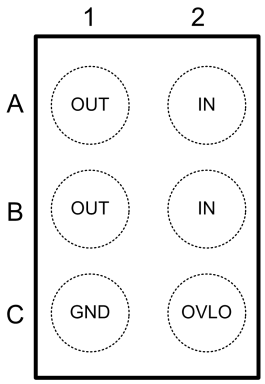
WS3226C

Over-Voltage-Protection load switch with Adjustable OVLO threshold

Http//:www.willsemi.com



CSP-6L (Bottom View)



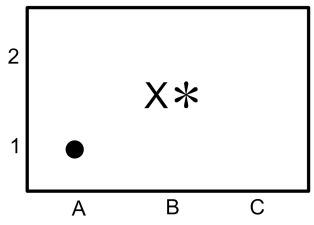
Pin configuration (Top view)

Descriptions

The WS3226C is an Over-Voltage-Protection (OVP) load switch with adjustable OVLO threshold voltage. The device will switch off internal MOSFET to disconnect IN to OUT to protect load when any of input voltage over the threshold.

When the OVLO input set below the external OVLO select voltage, the WS3226C automatically chooses the internal fixed OVLO threshold voltage. The over voltage protection threshold voltage can be adjusted with external resistor divider and the OVLO threshold voltage range is 4~20V. The Over temperature protection (OTP) function monitors chip temperature to protect the device.

The WS3226C is available in 0.8x1.2mm 6-Ball wafer level Chip-Scale-Package. Standard products are Pb-free and Halogen-free.



Marking

X = Device code

*** = Month code (A~Z)**

Features

- Maximum input voltage : 29V
- Switch ON resistance : 28mΩ Typ.
- Ultra fast OVP response time : 50ns Typ.
- OVLO threshold voltage
  Reference voltage for adjustable version
  1.2V : WS3226C with ±2.5% accuracy
  Internal threshold voltage for fixed version
  6.8V : WS3226C with ±4.5% accuracy
  6.0V : WS3226C60 with ±2.5% accuracy

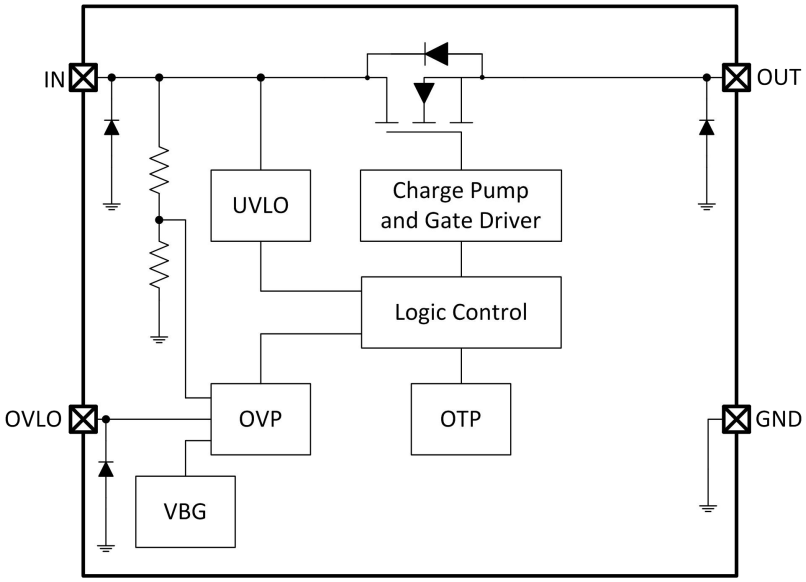
Applications

- Mobile Handsets and Tablets
- Portable Media Players
- Peripherals

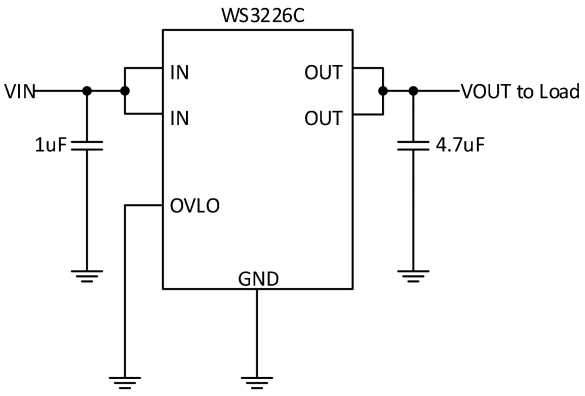
Order information

Device	Marking	Package	Shipping
WS3226C-6/TR	G*	CSP-6L	3000/Reel&Tape
WS3226C60-6/TR	C*	CSP-6L	3000/Reel&Tape

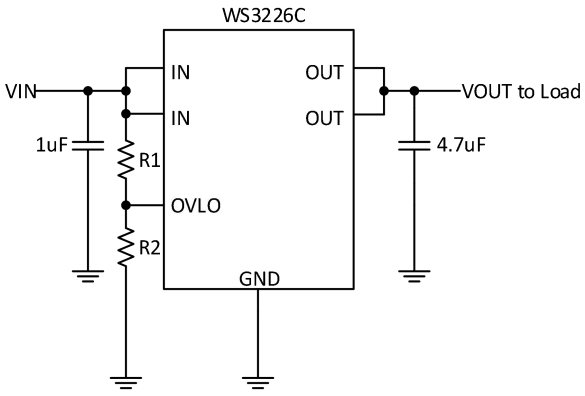
Function Block Diagram



Typical Applications



Over Voltage Protect with Internal OVLO Threshold Setting



Over Voltage Protect with External OVLO Threshold Setting

Note1: R1 and R2 are only required for External OVP, otherwise connect OVLO to GND

Note2: Recommend 10K≤R2≤50K

Pin Descriptions

Pin No.	Symbol	Descriptions
A1, B1	OUT	Switch Output to Load.
A2, B2	IN	Switch Input and Device Power Supply.
C1	GND	Ground
C2	OVLO	External OVLO adjustment. Connect a resistor-divider to set different OVLO threshold, V_{OVLO}=1.2x(1+R1/R2) as shown typical application diagram. Connect OVLO to GND when using the internal fixed threshold voltage.

Absolute Maximum Ratings

Parameter		Symbol	Value	Unit
Input voltage (IN pin)		V_{IN}	-0.3 ~ 29	V
Output voltage (OUT pin)		V_{OUT}	-0.3 ~ 22	V
Input voltage (OVLO pin)		V_{OVLO}	-0.3~15	V
MAX Continuous Output current		I_{OUT}	4	A
Switch FET Body Diode Continuous Current		I_{DIODE}	2.5	A
Body Diode Forward Peak Pulse Current*1	Pulse Width=10ms	I_{PP}	20	A
	Pulse Width=20us		50	A
Thermal resistance		$R_{\theta JA}$	98	°C/W
Junction temperature		T_J	150	°C
Lead temperature(10s)		T_L	260	°C
Storage temperature		Tstg	-55 ~ 150	°C
ESD Ratings		HBM	±4000	V
		MM	±200	V

***1 Single Pulse**

These are stress ratings only. Stresses exceeding the range specified under “Absolute Maximum Ratings” may cause substantial damage to the device. Functional operation of this device at other conditions beyond those listed in the specification is not implied and prolonged exposure to extreme conditions may affect device reliability.

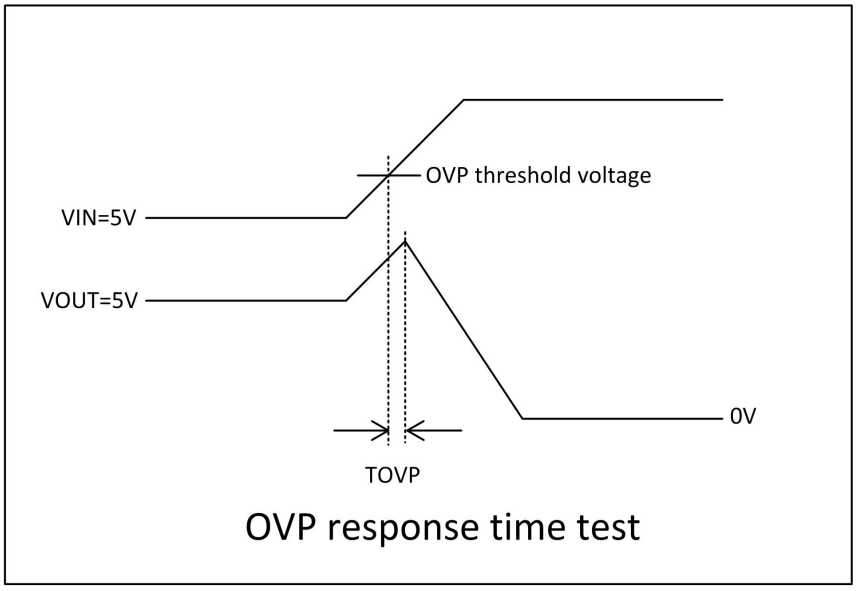
Recommend Operating Conditions (Ta=25°C, unless otherwise noted)

Parameter	Symbol	Value	Unit
Input voltage	V_{IN}	2.5 ~ 28	V
Ambient operating temperature	Topr	-40 ~ 85	°C

Electronics Characteristics (V_{IN}=5V, C_{IN}=1uF, C_{OUT}=4.7uF, Ta=25°C, unless otherwise noted)

Parameter	Symbol	Conditions		Min.	Typ.	Max.	Units
Input voltage range	V_{IN}			2.5		28	V
Quiescent current	I_Q	NO Load			110		uA
OVLO Input Leakage Current	I_{OVLO}	V_{OVLO}=V_{OVLO_TH}		-100		100	nA
ON resistance	R_{ON}	V_{IN}=5V, I_{OUT}=1A			28	35	mΩ
OVP response time	t_{OVP}	V_{IN} rising, C_{IN}=C_L=0pF *1			50		ns
Default OVP Trip Level		V_{IN} rising	WS3226C	6.5	6.8	7.1	V
			WS3226C60	5.85	6.0	6.15	V
OVP threshold voltage	V_{OVLO_TH}	WS3226C, adj. version	V_{OVLO_TH}	1.17	1.2	1.23	V
			V_{OVLO_HYS}*2		35		mV
Adjust OVP voltage range	V_{OVLO_RANGE}	V_{IN} rising		4		20	V
External OVLO select Threshold	V_{OVLO_SELECT}			0.2		0.3	V
UVLO threshold voltage	V_{UVLO}	V_{IN} rising			2.3		V
UVLO hysteresis voltage	V_{UVLO_HYS}	V_{IN} falling			0.25		V
Turn ON time	T_{ON}	V_{IN}>UVLO to V_{OUT}=V_{IN}*90% C_L=0			16		ms
Output discharge resistance	R_{DCHG}	V_{IN}=5V			220		Ω
OTP threshold temperature	T_{OTP}	V_{IN}=5V			150		°C
OTP hysteresis temperature	T_{HYS}	V_{IN}=5V			20		°C

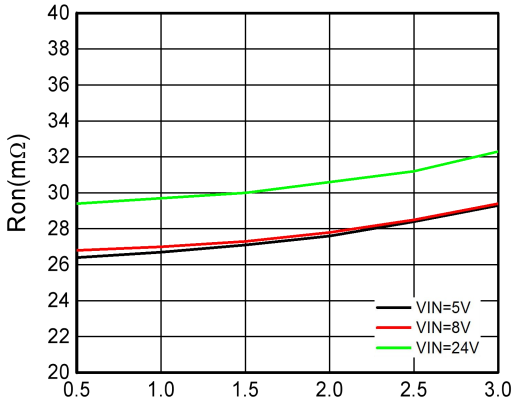
*1: Guaranteed by design



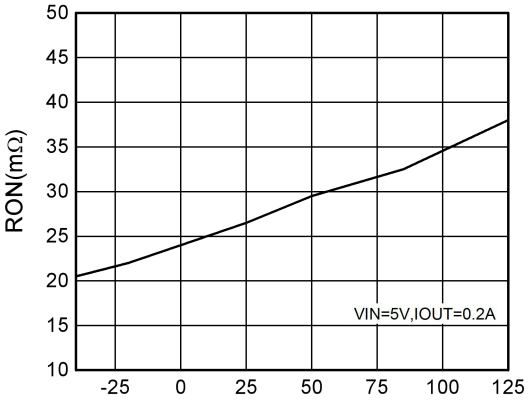
OVP response time test

***2:** If connect a resistor-divider to set different OVLO threshold, then V_{OVLO_HYS} = 35 x (1+R1/R2) mV

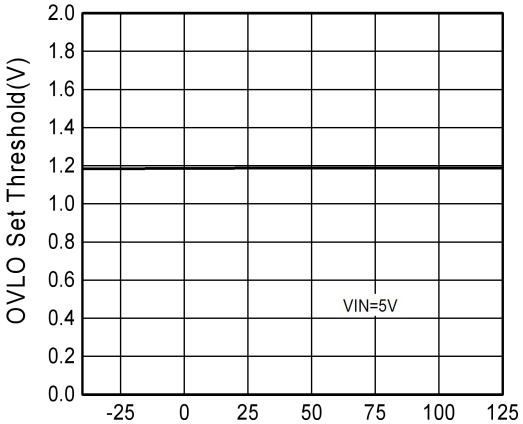
Typical Characteristics (T_A=25°C, unless otherwise noted)



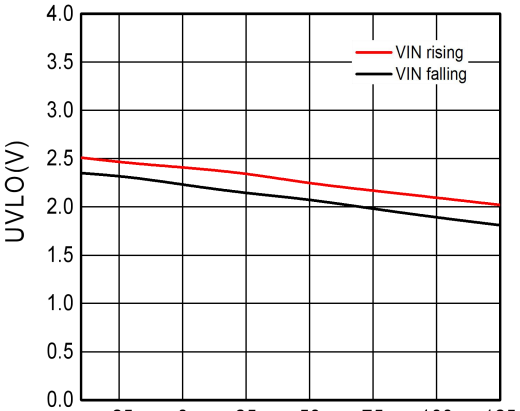
Ron vs. output current



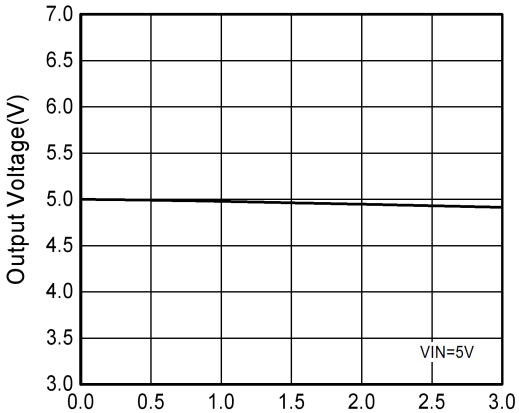
RON vs. Temperature



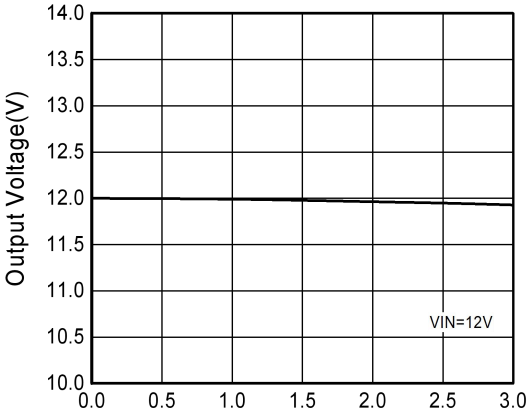
OVLO Set Threshold vs. Temperature



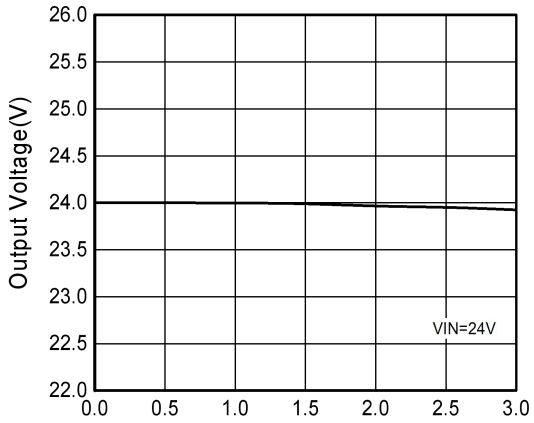
UVLO vs. Temperature



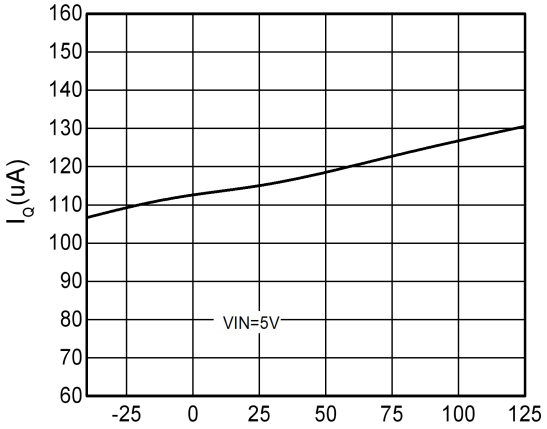
Output Voltage vs. Output current



Output Voltage vs. Output current



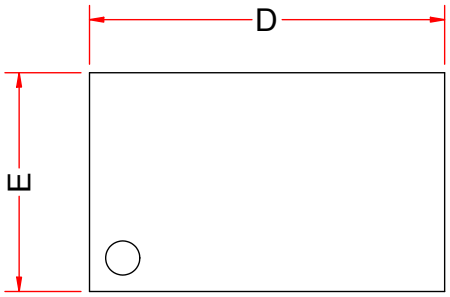
Output Voltage vs. Output current



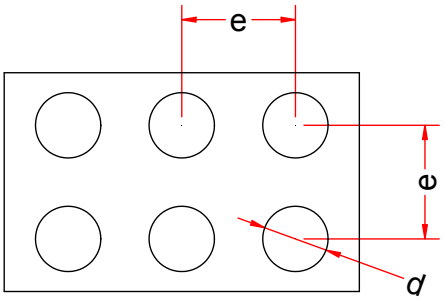
I_Q vs. Temperature

PACKAGE OUTLINE DIMENSIONS

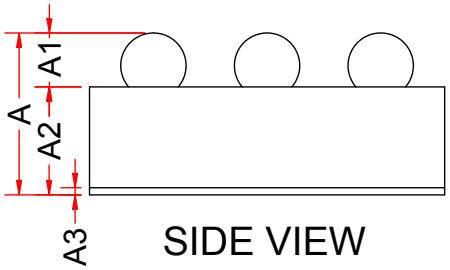
CSP-6L



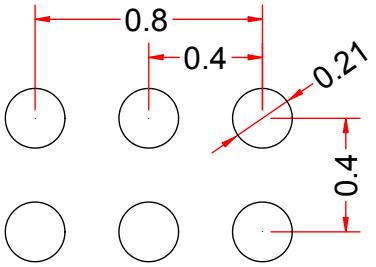
TOP VIEW



BOTTOM VIEW



SIDE VIEW

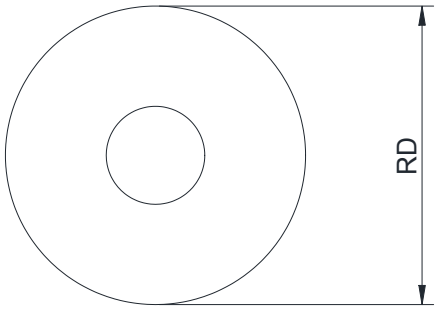


RECOMMENDED LAND PATTERN(unit:mm)

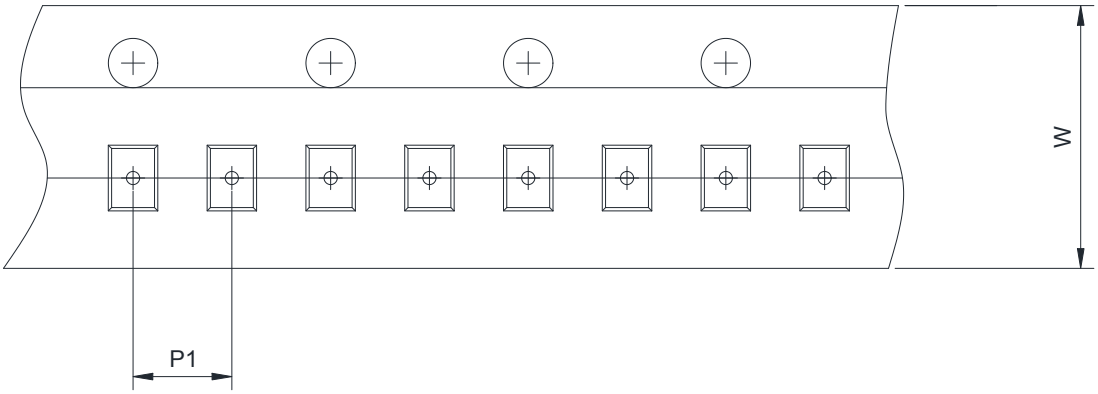
Symbol	Dimensions in Millimeters		
	Min.	Typ.	Max.
A	0.52	0.57	0.63
A1	0.16	0.19	0.22
A2	0.36	0.38	0.41
A3		0.25 typ	
D	1.22	1.25	1.28
E	0.74	0.77	0.80
e		0.40Typ.	
d	0.19	0.23	0.27

TAPE AND REEL INFORMATION

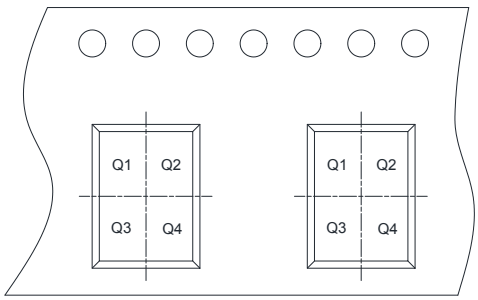
Reel Dimensions



Tape Dimensions



Quadrant Assignments For PIN1 Orientation In Tape



User Direction of Feed

RD	Reel Dimension	☑ 7inch	☐ 13inch		
W	Overall width of the carrier tape	☑ 8mm	☐ 12mm	☐ 16mm	
P1	Pitch between successive cavity centers	☐ 2mm	☑ 4mm	☐ 8mm	
Pin1	Pin1 Quadrant	☑ Q1	☐ Q2	☐ Q3	☐ Q4