

Ultra Small, Low Input Voltage, Low R_{ON} , Load Switch

Features

- Low input voltage 1.0V to 3.6V
- Ultra low R_{ON}
 - $R_{ON} = 26m\Omega$ at $V_{IN}=3.6V$
 - $R_{ON} = 30m\Omega$ at $V_{IN}=2.5V$
 - $R_{ON} = 35m\Omega$ at $V_{IN}=1.8V$
 - $R_{ON} = 56m\Omega$ at $V_{IN}=1.2V$
- 1A maximum continuous operating current.
- Ultra low quiescent current $<1\mu A$
- Ultra low sundown current $<2.5\mu A$
- Low Control Input Thresholds Enable Use of Low-Voltage Logic.
- Controlled Slew Rate to Avoid Inrush Currents
- Quick Output Discharge.
- 1.0 mmX1.0 mm 4-pin, pin pitch 0.5mm ultra small CSP Package
- With Input Pin Pull Low resistance 250k Ω .

Applications

- Cellular phones.
- Personal Digital Assistants (PDAs)
- GPS Devices
- MP3 Players
- Digital Cameras
- RF Modules
- Peripheral Ports
- Portable Instrumentation

General Description

The G5017 is ultra-small, low ON resistance (R_{on}) load switches with controlled turn on. The devices contain a P-channel MOSFET that operates over an input voltage range 1.0V to 3.6V. The switch is controlled by an on/off input (EN), which is capable of interfacing directly with low-voltage control signals. In G5017 a 80 Ω on-chip load resistor is added for output quick discharge when the switch is turned off.

G5017 is available in a space-saving 4-terminal WLCSP with 0.5mm pitch. The devices are characterized for operation over the free-air temperature range for -40°C to 80°C.

Ordering Information

ORDER NUMBER	MARKING	R_{on} at 3.6V	Slew rate	Discharge	Max Output Current	Enable	SPEC	PACKAGE (Green)
G5017B11U	50 7x	26m Ω	134 μs	Yes	1A	Active High	Soft start=134 μs	WLCSP2X2-4
G5017B12U	50 Ax	26m Ω	134 μs	Yes	1A	Active High	Soft start=134 μs	WLCSP2X2-4

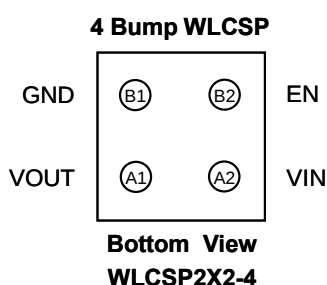
Note: B1: WLCSP2X2-4

1: Bonding Code 2: BSC (Back Side Coating)

U: Tape & Reel

Green : Lead Free / Halogen Free

Pin Configuration



Absolute Maximum Ratings

Input Voltage Range (V_{IN}) -0.3V to +4.0V
 Out Voltage Range (V_{OUT}) VIN+0.3V
 Input Voltage Range (V_{EN}) -0.3V to +4.0V
 Thermal Resistance Junction to Ambient, (θ_{JA})
 WLCSP2X2-4⁽²⁾ 95°C/W
 Maximum Continuous Switch Current (I_{MAX}) for
 VIN>1.2V 1000mA
 Maximum Continuous Switch Current (I_{MAX})
 for VIN=1V 600mA
 Operating Temperature Range -40°C to 80°C
 Storage Temperature Range -65°C to 150°C
 Maximum Lead Temperature (soldering, 10sec)
 300°C

ESD(HBM)⁽³⁾ 2KV
 ESD(MM) 200V
 ESD(CDM) 1KV

Recommended Operating Conditions

Input Voltage Range (V_{IN}) +1.0V to +3.6V
 Out Voltage Range (V_{OUT}) +0V to +3.6V
 High Level Input Voltage, ON (V_{IH}) .. +1.2V to +3.6V
 Low Level Input Voltage ON (V_{IL}) +0.3V
 Input Capacitor (C_{IN}) 1μF

1. Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.
2. Measured using the PCB with area 30mm X 44mm
3. Devices are ESD sensitive. Handling precaution recommended. The Human Body model is a 100pF capacitor discharged through a 1.5kΩ resistor into each pin.

Electrical Characteristics

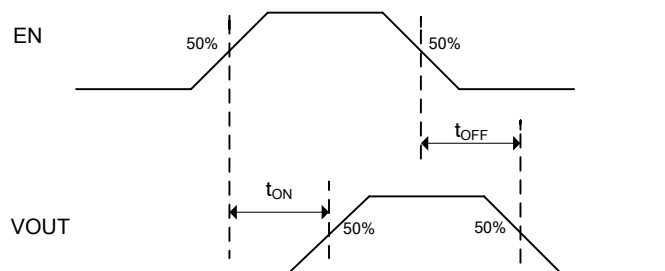
(T_A = -40°C to 85°C, unless otherwise noted. Typical values are for VIN=3.6V, and T_A = 25°C.)

PARAMETER	SYMBOL	CONDITION		TA	MIN	TYP	MAX	UNIT
Quiescent current	I _{IN}	EN=VIN, IOUT=0,		Full	---	0.19	1	μA
OFF-state switch current	I _{IN} (LEAK)	EN=GND, VOUT=0 or OPEN, VIN=1V to 3.6V		25°C	---	0.5	1	μA
	I _{IN} (LEAK)	EN=GND, VOUT=0 or OPEN, VIN=1.2V		25°C	---	0.1	0.2	
	I _{IN} (LEAK)	EN=GND, VOUT=0 or OPEN, VIN=1.8V		25°C	---	0.2	0.3	
	I _{IN} (LEAK)	EN=GND, VOUT=0 or OPEN, VIN=1.2V		85°C	---	0.7	1	
	I _{IN} (LEAK)	EN=GND, VOUT=0 or OPEN, VIN=1.8V		85°C	---	1.3	2	
EN pin pulldown resistance	RPDON	EN =1.1V & 3.6V		Full	---	250	---	kΩ
High Level Input Voltage, EN	V _{IH}	VIN=1.2V & 3.6V		T=25	1.1	---	---	V
Low Level Input Voltage, EN	V _{IL}	VIN=1.2V & 3.6V		T=25	---	---	0.4	V
ON-state resistance	R _{ON}	IOUT = - 200mA	VIN=3.6V	25°C	---	26	32.1	mΩ
				Full	---	---	36	
			VIN=2.5V	25°C	---	30	37.5	
				Full	---	---	41	
			VIN=1.8V	25°C	---	35	45	
				Full	---	---	49	
			VIN=1.2V	25°C	---	56	70	
				Full	---	---	76	
			VIN=1.0V	25°C	---	100	---	
				Full	---	---	---	
Output pulldown resistance	RFD	VIN=3.3V, EN= 0V, IOUT=30mA		25°C	---	80	100	Ω

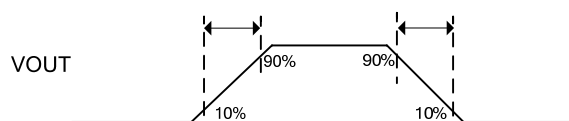
Pin Descriptions

Pin number	Pin name	Pin function
A1	VOUT	Drain of P-channel MOS
A2	VIN	Source of P-channel MOS
B1	GND	Ground (should be connected to electrical ground).
B2	EN	Switch control input, active high.

Switching Characteristics



T_{ON} and T_{OFF} waveform



T_R and T_F waveform

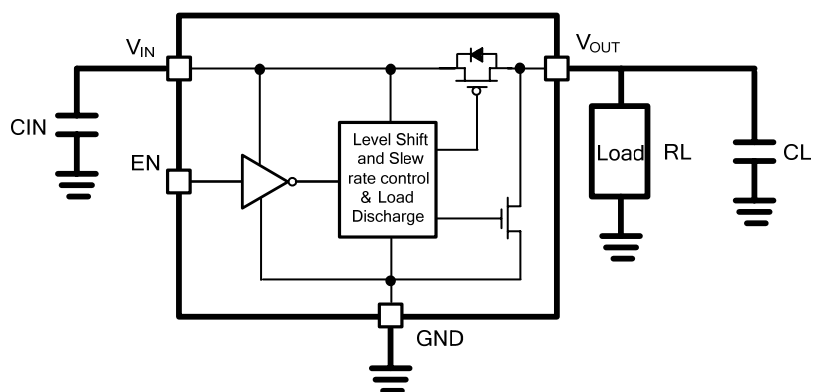
($T_A = 25^\circ\text{C}$, $V_{IN} = 3.6\text{V}$, unless otherwise noted.)

PARAMETER	TEST CONDITION	G5017			unit
		MIN	TYP	MAX	
Turn-ON time (t_{ON})	$R_L = 10\Omega, C_L = 0.1\mu\text{F}$	---	122	---	μs
Turn-OFF time (t_{OFF})	$R_L = 10\Omega, C_L = 0.1\mu\text{F}$	---	20	---	μs
VOUT rise time (t_R)	$R_L = 10\Omega, C_L = 0.1\mu\text{F}$	---	134	---	μs
VOUT fall time (t_F)	$R_L = 10\Omega, C_L = 0.1\mu\text{F}$	---	3	---	μs

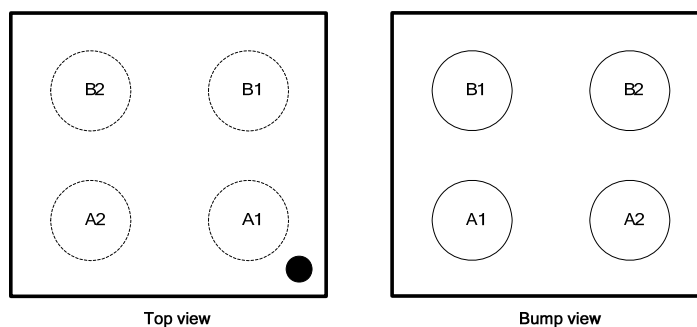
($T_A = 25^\circ\text{C}$, $V_{IN} = 1.0\text{V}$, unless otherwise noted.)

PARAMETER	TEST CONDITION	G5017			unit
		MIN	TYP	MAX	
Turn-ON time (t_{ON})	$R_L = 10\Omega, C_L = 0.1\mu\text{F}$	---	590	---	μs
Turn-OFF time (t_{OFF})	$R_L = 10\Omega, C_L = 0.1\mu\text{F}$	---	11	---	μs
VOUT rise time (t_R)	$R_L = 10\Omega, C_L = 0.1\mu\text{F}$	---	370	---	μs
VOUT fall time (t_F)	$R_L = 10\Omega, C_L = 0.1\mu\text{F}$	---	3	---	μs

Typical Application



G5017 (soft-start with auto-discharge)



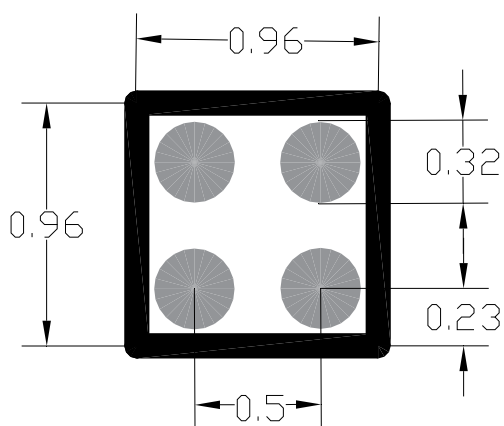
G5017x4 pin WCSP (1.0mmx1.0mm)

Function Table

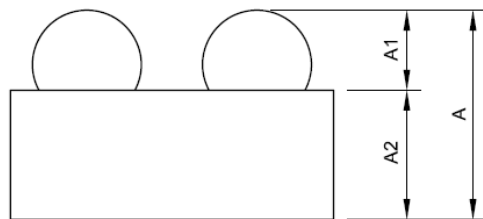
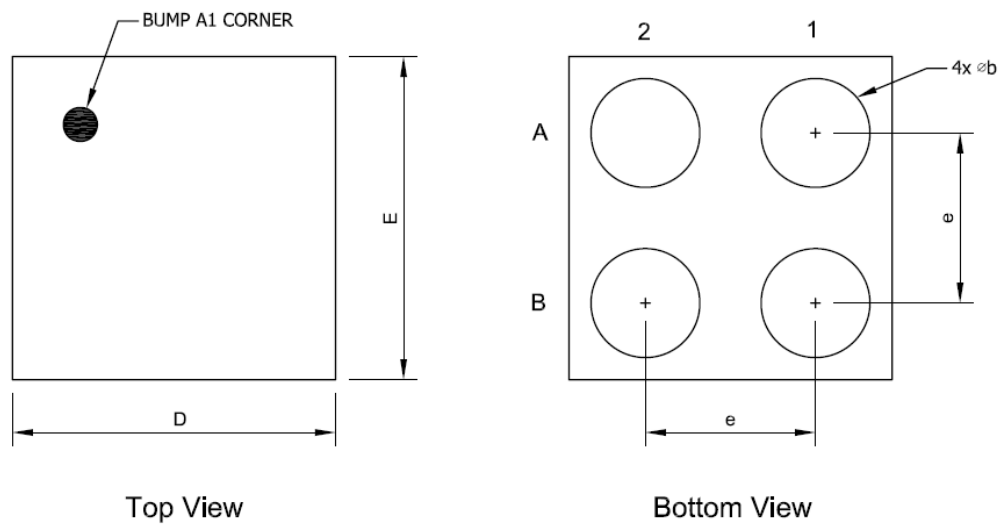
ON (controller input)	V_{IN} to V_{OUT}	V_{OUT} to GND
L	OFF	ON
H	ON	OFF

Minimum Footprint PCB Layout Section

WLCSP2X2-4



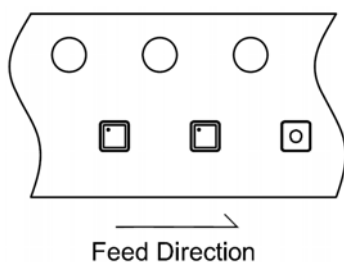
Package Information



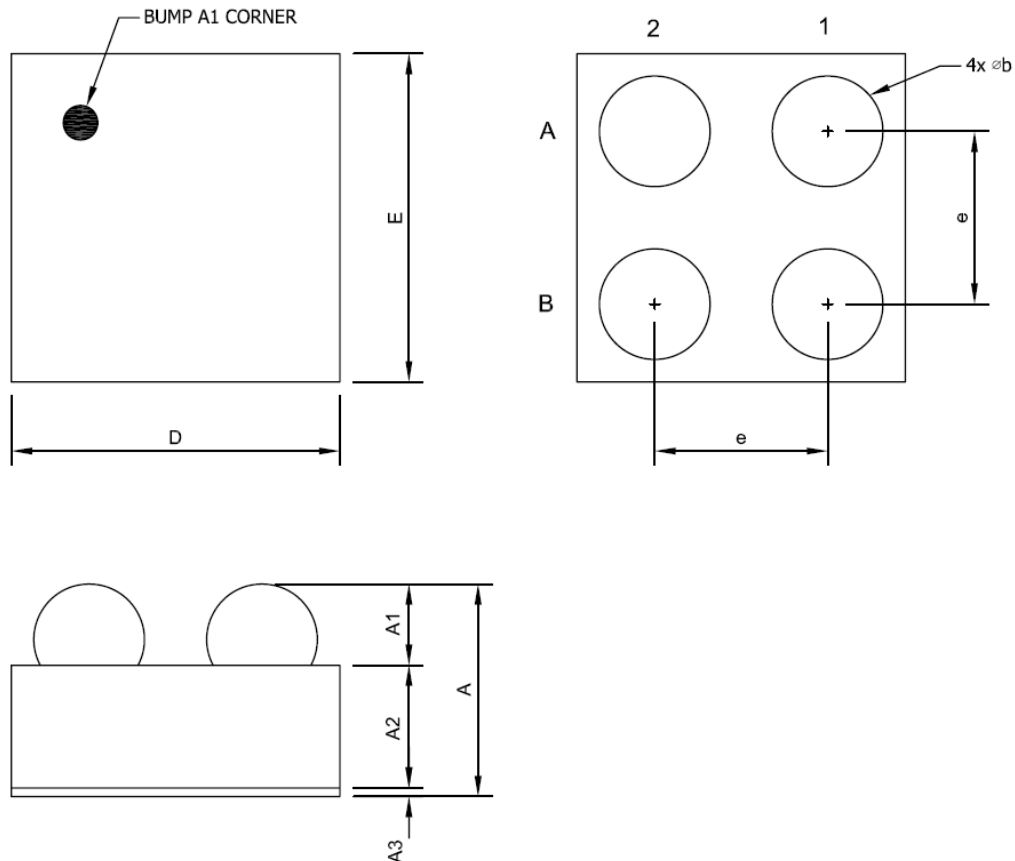
WLCSP2X2-4 (B11) Package

Symbol	DIMENSION IN MM			DIMENSION IN INCH		
	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.
A	0.540	0.600	0.660	0.0212	0.0236	0.0260
A1	0.210	0.235	0.260	0.0083	0.0093	0.0102
A2	0.330	0.365	0.400	0.0130	0.0144	0.0157
D	0.920	0.960	1.000	0.0362	0.0378	0.0394
E	0.920	0.960	1.000	0.0362	0.0378	0.0394
b	0.300	0.320	0.340	0.0118	0.0126	0.0134
e	0.50 BSC			0.0197 BSC		

Taping Specification



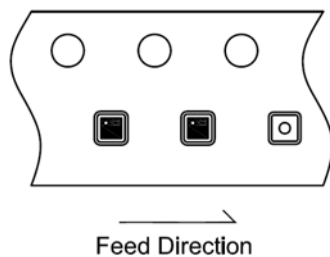
PACKAGE	Q'TY/REEL
WLCSP2X2-4	3,000 ea



WLCSP2X2-4 (B12) Package

Symbol	DIMENSION IN MM			DIMENSION IN INCH		
	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.
A	0.540	0.600	0.660	0.0212	0.0236	0.0260
A1	0.210	0.235	0.260	0.0083	0.0093	0.0102
A2	0.310	0.340	0.370	0.0122	0.0134	0.0146
A3	0.020	0.025	0.030	0.0008	0.0010	0.0012
D	0.920	0.960	1.000	0.0362	0.0378	0.0394
E	0.920	0.960	1.000	0.0362	0.0378	0.0394
b	0.300	0.320	0.340	0.0118	0.0126	0.0134
e	0.50 BSC			0.0197 BSC		

Taping Specification



PACKAGE	Q'TY/REEL
WLCSP2X2-4	3,000 ea

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