

Dual Channel Power Distribution Switches

Features

- VB Operating Range: 2.7V to 5.5V
- INx Operating Range: 1.05V to VB
- 100mΩ High-Side MOSFET
- 2mS Typical Rise Time
- Recovery and Latch OFF mode
- Under Voltage Lockout
- Deglitched Open-Drain Over-Current Flag Output (FLAG)
- TDFN2X2-10 Package (Halogen Free/Pb Free)

General Description

The G2895B is a tiny dual channel integrated power switches for high-side power protection switch application.

Several protection features include current limiting and thermal shutdown to prevent catastrophic switch failure caused by increasing power dissipation when continuous heavy loads or short circuit occurs. A built-in charge pump is used to drive the MOSFET

Application

- High-Side Power Protection Switch

FLAG is an open-drain output report over-current and has typical 9ms deglitch timeout period.

Ordering Information

ORDER NUMBER	MARKING	ENABLE	Output Current	Output MOS $R_{DS(ON)}$	Mode	TEMP. RANGE	PACKAGE (Green)
G2895BK21U	2895B	Active High	1.4A/0.7A	100mΩ	Recovery	-40°C to +85°C	TDFN2X2-10
G2895BLK21U	285BL	Active High	1.4A/0.7A	100mΩ	Latch OFF	-40°C to +85°C	TDFN2X2-10

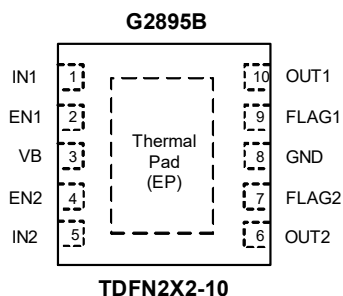
Note: K2: TDFN2X2-10

1: Bonding Code

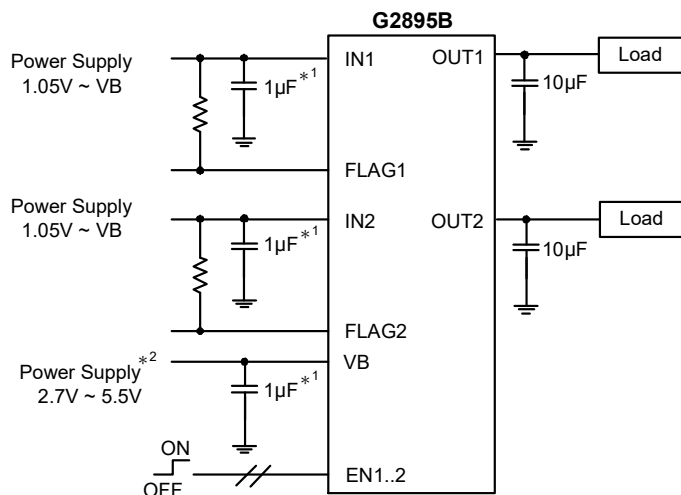
U: Tape & Reel

Green : Lead Free / Halogen Free

Pin Configuration



Typical Application Circuit



*1. 1μF of input capacitor is enough in most application cases.

If the PCB trace of power rail to IN is long, larger input capacitor is necessary.

*2. VB INx

Absolute Maximum Ratings

Terminal Voltage (with respect to GND)
 VB Pin Voltage, VB -0.3V to +6.0V
 INx, OUTx Pin Voltage, VIN, VOUT -0.3V to +6.0V
 ENx, FLAGx Pin Voltage, VEN, VFLG . . . -0.3V to +6.0V
 Junction Temperature. 150°C
 Storage Temperature (TS) -65°C to +150°C
 Reflow Temperature (soldering, 10sec) 260°C

Continuous Power Dissipation (TA = +25°C)*
 TDFN2X2-10 1.0W
 Thermal Resistance Junction to Ambient, (θJA)*
 TDFN2X2-10 127°C/W
 Thermal Resistance Junction to Case, (θJC)
 TDFN2X2-10 60°C/W
 ESD(HBM)⁽¹⁾ 2KV
 ESD(CDM) 1KV

Operating Ratings

VB 2.7V to 5.5V
 INx 1.05V to VB
 Operating Temperature (TA). -40°C to +85°C

(1) Human body model is a 100pF capacitor discharged through a 1.5kΩ resistor into each pin.

* Please refer to 1in² of 1oz PCB Layout Section.

Electrical Characteristics

VB = 3.3V, VIN = 3.3V, CIN=1μF, COUT=1μF, RL=10Ω TA = 25°C.

The device is not guaranteed to function outside its operating conditions. Parameters with MIN and/or MAX limits are 100% tested at +25°C, unless otherwise specified.

PARAMETER	SYMBOL	CONDITION	MIN	TYP	MAX	UNIT
Bias Voltage Range	VB		2.7	---	5.5	V
INx Input Voltage Range	VINx		1.05	---	VB	V
Quiescent Current	IQ VB	VB= VIN1= VIN2=3.3V, EN1=EN2=High	---	200	---	μA
Off Supply Current	IQ(OFF)	VIN=3.3V or VB=3.3V, ENx=Low	---	1	---	μA
VB Under Voltage Lockout	VB_UVLO	VB	2.3	2.45	2.6	V
Output MOS RDS(ON)	RDS(ON)	IOUTx= 0.2A	---	100	130	mΩ
Over Current Trigger Point	ILIM	G2895B, CH1, IN1-OUT1	1.5	1.7	2	A
		G2895B, CH2, IN2-OUT2	0.8	1.0	1.3	A
EN Input Threshold-High VIH	VEN(H)		1.2	---	---	V
EN Input Threshold-Low VIL	VEN(L)		---	---	0.5	V
Output Turn-on Rising Time	TR	COUT=1μF, 10% to 90% Settling	1	2	4	ms
FLAG Deglitch	TFLAG	FLAG assertion or deassertion	4	9	14	ms
FLAG Output low voltage	VFLAG_LOW	IFLAG = 1mA			0.4	V
FLAG Off-state leakage	IFLAG_OFF	VFLAG = 3.3V			1	μA
Shutdown OUT Pull Low Resistance			---	50	100	Ω
Thermal Limit	OT		---	140	---	°C
Thermal Limit Hysteresis	OT_HYS		---	30	---	°C
Response Time to Short Circuit	tIOS	See figure 1,2	---	2	---	μs

Note:

To exactly identify the short circuit characteristic of IC, avoid the test result interfered by parasitic inductor, output capacitor, and contact resistor. It is necessary to follow the recommendation as follows.

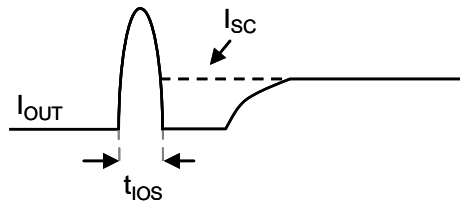


Figure 1

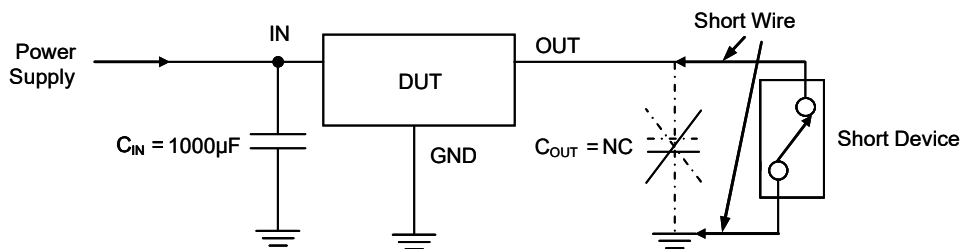


Figure 2

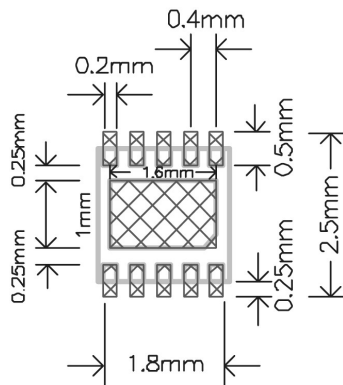
Note:

To exactly identify the short circuit characteristic of IC, avoid the test result interfered by parasitic inductor, output capacitor, and contact resistor. It is necessary to follow the recommendation as follows.

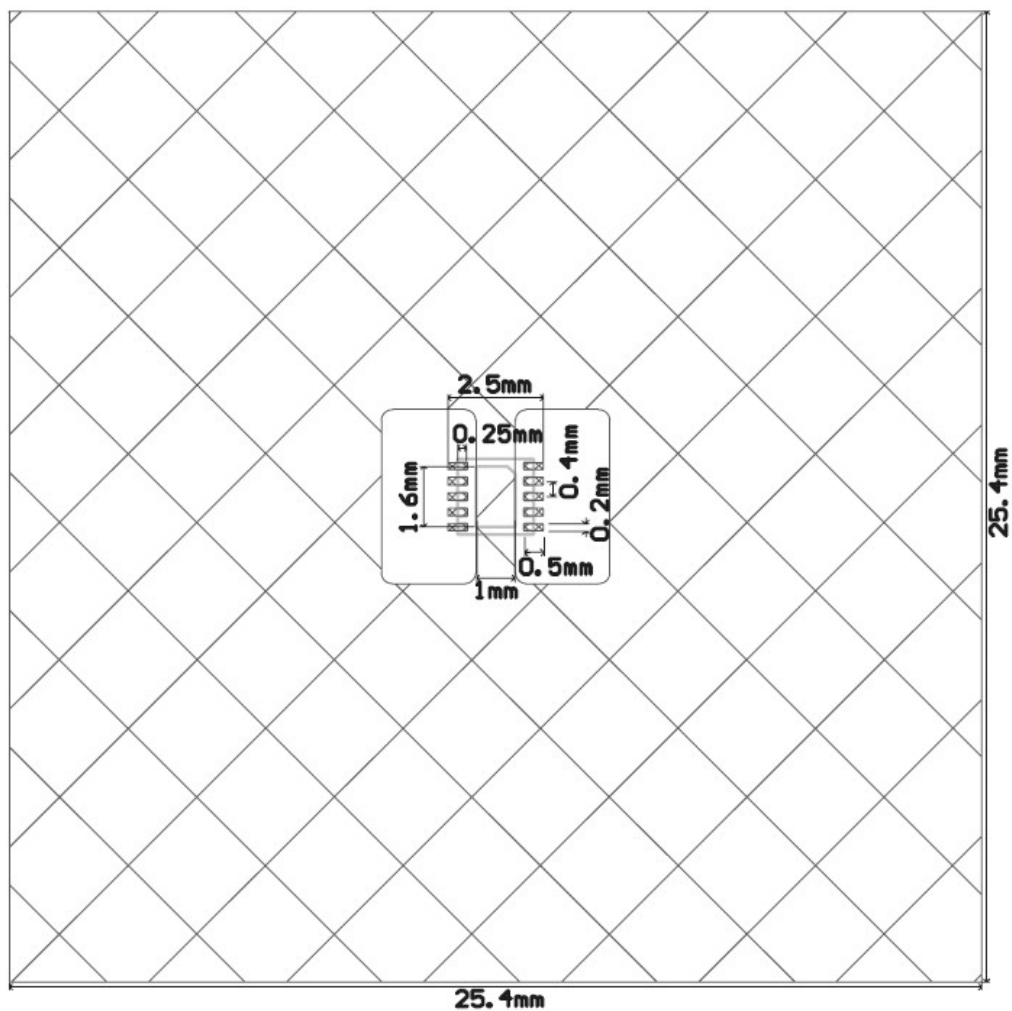
Please,

1. Add 1000μF of capacitor between V_{IN} and GND, and close to IC.
2. Remove output capacitor.
3. Shorter the short circuit device wire.
4. Measure output current (I_{OUT}).

Minimum Footprint PCB Layout Section



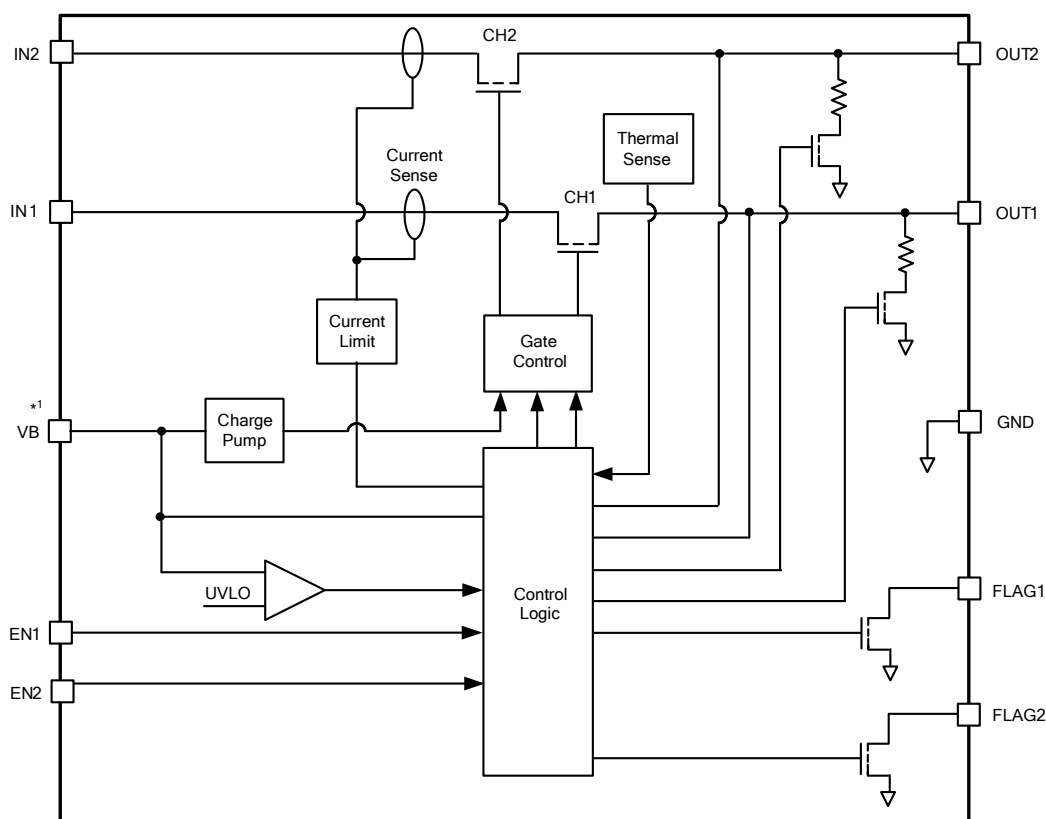
1in² of 1oz PCB Layout Section



Pin Description

PIN	Name	FUNCTION
1	IN1	CH1 input power supply, Connect to a positive supply.
2	EN1	CH1 logic level enable input.
3	VB	Internal bias supply, $VB \geq INx$
4	EN2	CH2 logic level enable input.
5	IN2	CH2 Input power supply, Connect to a positive supply.
6	OUT2	CH2 output terminal
7	FLAG2	CH2 Open-Drain Over-Current Flag output.
8	GND	Ground.
9	FLAG1	CH1 Open-Drain Over-Current Flag output.
10	OUT1	CH1 output terminal

Block Diagram



Note:

*1 . $VB \geq INx$

Functional Description

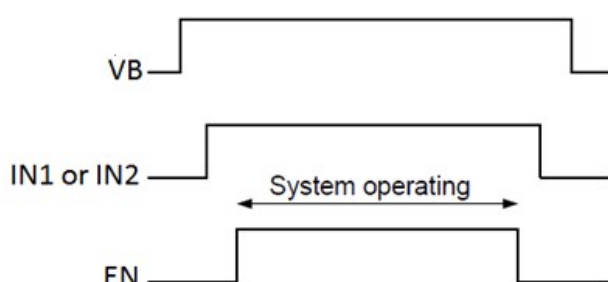
VB, INx, and OUT

VB is the power supply for the controller logic circuitry and a charge pump. IN1 and IN2 (input) is the power supply connecting the drain of the MOSFET. OUT1 and OUT2 (output) is the source of the MOSFET. In a typical application, current flows through the MOSFET from IN to OUT toward the load.

EN, the Enable Input

EN must be driven logic high or logic low for a clearly defined input. EN should not be allowed to go negative with respect to GND.

Power Sequence Timing



FLAG Function

The FLAG open-drain output is asserted (active low) when an over current condition is encountered after a 9ms deglitch timeout. The output remains asserted until the overcurrent condition is removed.

Over Current Threshold

The typical overcurrent threshold of G2895B is 1.7A for CH1 and 1.0A for CH2.

Undervoltage Lockout

UVLO (undervoltage lockout) prevents the output MOSFET from turning on until VB or IN (input voltage) exceeds 2.45V typically. After the switch turns on, if the voltage drops below 2.45V typically, UVLO shuts off the output MOSFET.

Thermal Shutdown

Thermal shutdown protects G2895B from excessive power dissipation. If the die temperature exceeds the aforementioned OT spec., the MOSFET switch is shut off. The hysteresis prevents the switch from turning on until the die temperature drops to OT_{HYS} . Thermal shutdown circuit functions only when the switch is enabled.

MODE, Recovery and Latched

G2895B has two options, G2895B is recovery mode, in the recovery mode option, IC will automatically resume after fault events are removed if EN keeps high. G2895BL is latched mode, in latched mode, the switch keeps OFF when overcurrent event occurs, even if fault event is removed. The switch can be turned on by either power or EN resetting, however, the power sequence still needs to match with previous section description.

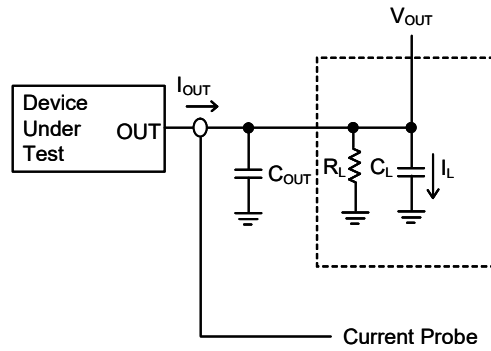
Applications Information

Supply Filtering

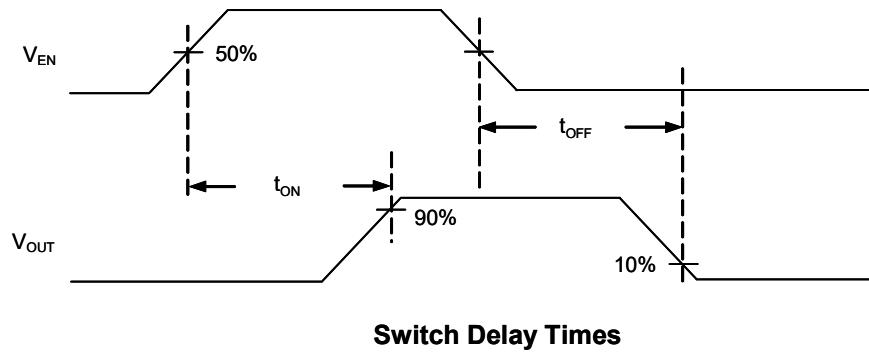
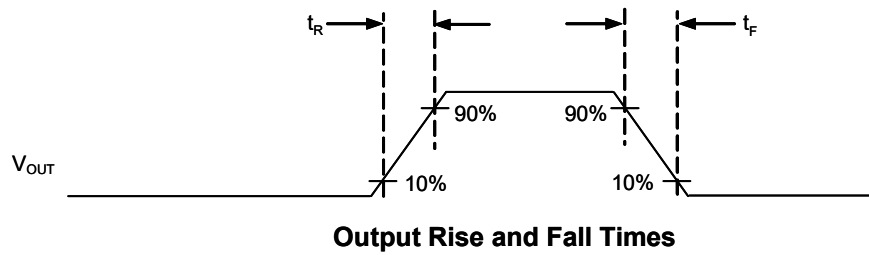
A 1 μ F bypass capacitor for each power supply from VB, IN1, and IN2 to GND, located near the G2895B, is strongly recommended to control supply transients. Without a bypass capacitor, an output short may cause sufficient ringing on the input (from supply lead inductance) to damage internal control circuitry.

Input transients must not exceed the absolute maximum supply voltage ($V_{IN\ max} = 6V$) even for a short duration.

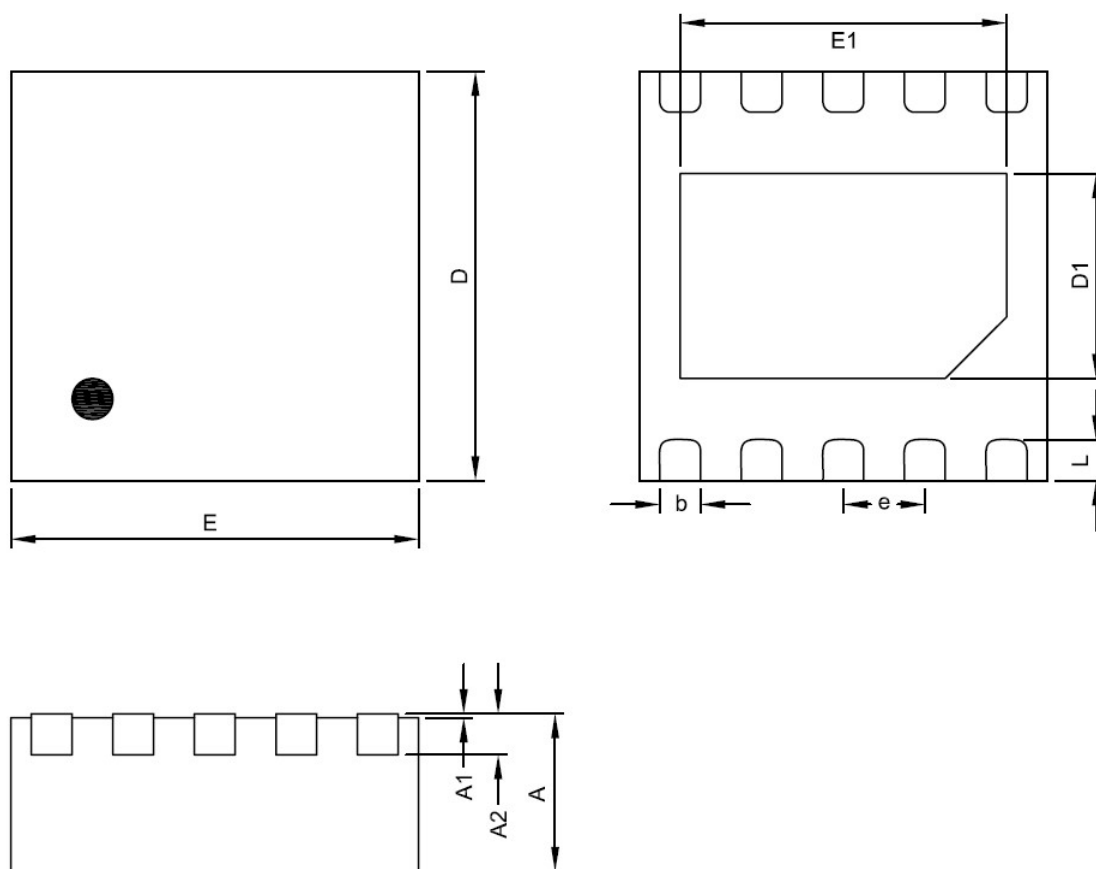
Test Circuit



Timing Diagrams



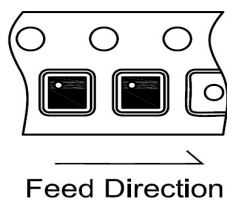
Package Information



TDFN2X2-10 Package

Symbol	DIMENSION IN MM			DIMENSION IN INCH		
	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.
A	0.70	0.75	0.80	0.0276	0.0295	0.0315
A1	0.00	---	0.05	0.0000	---	0.0020
A2	0.20 REF			0.0079 REF		
D	1.95	2.00	2.05	0.0768	0.0787	0.0807
E	1.95	2.00	2.05	0.0768	0.0787	0.0807
D1	0.95	1.00	1.05	0.0374	0.0394	0.0413
E1	1.55	1.60	1.65	0.0610	0.0630	0.0650
b	0.15	0.20	0.25	0.0059	0.0079	0.0098
e	0.40 BSC			0.0157 BSC		
L	0.20	0.25	0.30	0.0079	0.0098	0.0118

Taping Specification



PACKAGE	Q'TY/REEL
TDFN2X2-10	3,000 ea

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