

TD62064BP1G, TD62064BFG

4ch High-Current Darlington Sink Driver

The TD62064BP1G and TD62064BFG are high-voltage, high-current darlington drivers comprised of four NPN darlington pairs. All units feature integral clamp diodes for switching inductive loads.

Applications include relay, hammer, lamp and stepping motor drivers.

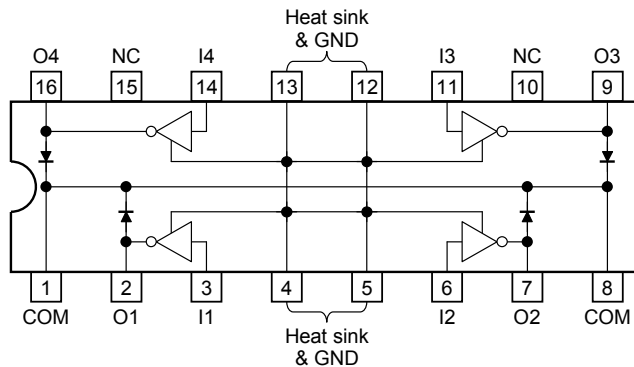
This devices are a product for the Pb free(Sn-Ag).

Features

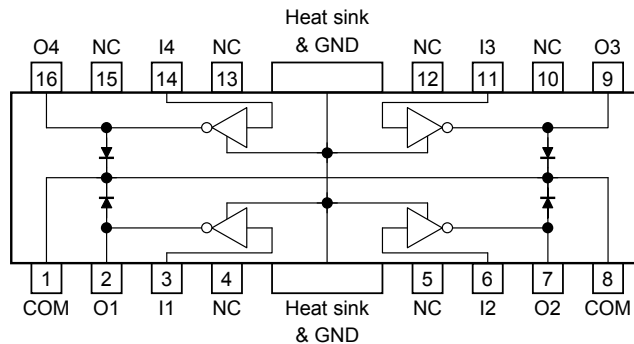
- Package type BP1G: DIP16 pin
BFG: HSOP16 pin
- High output sustaining voltage: $V_{CE(SUS)} = 80\text{ V (min)}$
- Output current (single output): $I_{OUT} = 1.5\text{ A/ch (max)}$
- Output clamp diodes
- Input compatible with TTL and 5 V CMOS
- GND and SUB terminal = Heat sink

Pin Assignment (top view)

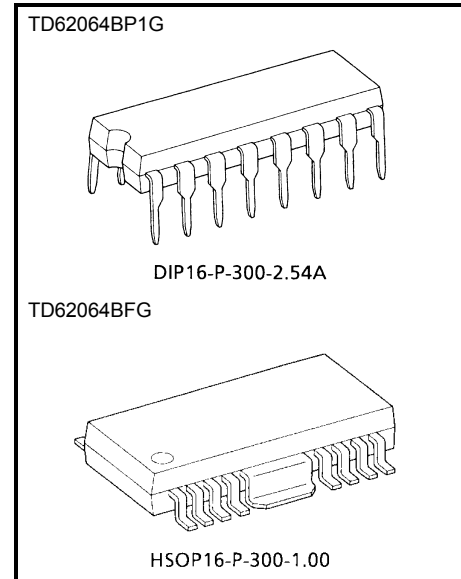
TD62064BP1G



TD62064BFG



Note: The NC pins are not connected to the die. If wiring is required, it is recommended to connect the pins to the Heat sink & GND line(s).

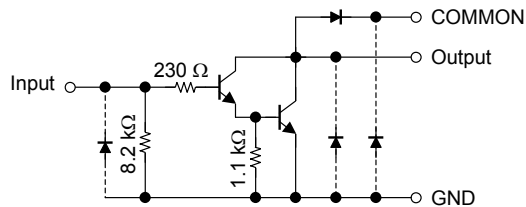


Weight

DIP16-P-300-2.54A: 1.11 g (typ.)
HSOP16-P-300-1.00: 0.50 g (typ.)

Schematics (each driver)

TD62064BP1G/BFG



Note: The input and output parasitic diodes cannot be used as clamp diodes.

Precautions for Using

- (1) This IC does not include built-in protection circuits for excess current or overvoltage. If this IC is subjected to excess current or overvoltage, it may be destroyed. Hence, the utmost care must be taken when systems which incorporate this IC are designed. Utmost care is necessary in the design of the output line, COMMON and GND line since IC may be destroyed due to short-circuit between outputs, air contamination fault, or fault by improper grounding.
- (2) If a TD62064BP1G/BFG is being used to drive an inductive load (such as a motor, solenoid or relay), Toshiba recommends that the diodes (pins 1 and 8) be connected to the secondary power supply pin so as to absorb the counter electromotive force generated by the load. Please adhere to the device's maximum ratings. Toshiba recommends that zener diodes be connected between the diodes (pins 1 and 8) and the secondary power supply pin (as the anode) so as to enable rapid absorption of the counter electromotive force. Again, please adhere to the device's maximum ratings.

Maximum Ratings (Ta = 25°C)

Characteristics		Symbol	Rating	Unit
Output sustaining voltage		$V_{CE(SUS)}$	-0.5 to 80	V
Parasitic transistor output voltage		V_{CEF} (Note 1)	80	V
Output current		I_{OUT}	1.5	A/ch
Input current		I_{IN}	50	mA
Input voltage		V_{IN}	7	V
Clamp diode reverse voltage		V_R	80	V
Clamp diode forward current		I_F	1.5	A
Power dissipation	BP1G	P_D	1.47/2.7 (Note 2)	W
	BFG		0.9/1.4 (Note 3)	
Operating temperature		T_{opr}	-40 to 85	°C
Storage temperature		T_{stg}	-55 to 150	°C

Note 1: Parasitic transistor (COMMON – GND – OUTPUT) output voltage

Note 2: On glass epoxy PCB (50 × 50 × 1.6 mm Cu 50%)

Note 3: On glass epoxy PCB (60 × 30 × 1.6 mm Cu 30%)

Recommended Operating Conditions (Ta = -40 to 85°C)

Characteristics		Symbol	Test Condition		Min	Typ.	Max	Unit
Output sustaining voltage		V _{CE (SUS)}	—		0	—	80	V
Output current	BP1G (Note 1)	I _{OUT}	DC1 circuit, Ta = 25°C		0	—	1250	mA/ch
			T _{pw} = 25 ms 4 circuits Ta = 85°C T _j = 120°C	Duty = 10%	0	—	1250	
	Duty = 50%			0	—	380		
	Duty = 10%			0	—	900		
	Duty = 50%			0	—	170		
Input voltage		V _{IN}	—		0	—	5.5	V
	Output ON	V _{IN (ON)}	I _{OUT} = 1.25 A		2.5	—	8	
	Output OFF	V _{IN (OFF)}	—		0	—	0.4	
Input current		I _{IN}	—		0	—	20	mA
Clamp diode reverse voltage		V _R	—		0	—	80	V
Clamp diode forward current		I _F	—		—	—	1.25	A
Power dissipation	BP1G	P _D	Ta = 85°C (Note 1)		—	—	1.4	W
	BFG		Ta = 85°C (Note 2)		—	—	0.7	

Note 1: On glass epoxy PCB (50 × 50 × 1.6 mm Cu 50%)

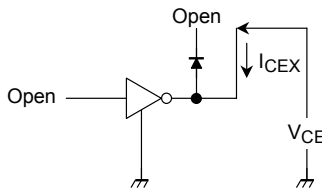
Note 2: On glass epoxy PCB (60 × 30 × 1.6 mm Cu 30%)

Electrical Characteristics (Ta = 25°C unless otherwise noted)

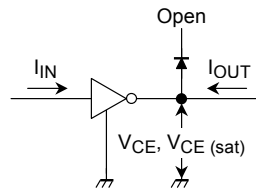
Characteristics	Symbol	Test Circuit	Test Condition	Min	Typ.	Max	Unit
Output leakage current	I _{CEX}	1	V _{CE} = 80 V, Ta = 25°C	—	—	50	μA
			V _{CE} = 80 V, Ta = 85°C	—	—	100	
Output saturation voltage	V _{CE (sat)}	2	I _{OUT} = 1.25 A, V _{IN} = 2.4 V	—	—	1.6	V
			I _{OUT} = 0.75 A, V _{IN} = 2.4 V	—	—	1.25	
DC current transfer ratio	h _{FE}	2	V _{CE} = 2 V, I _{OUT} = 1.25 A	—	1500	—	
Input voltage (output on)	V _{IN (ON)}	3	I _{OUT} = 1.25 A, I _{IN} = 2 mA	—	—	2.4	V
Clamp diode leakage current	I _R	4	V _R = 80 V, Ta = 25°C	—	—	50	μA
			V _R = 80 V, Ta = 85°C	—	—	100	
Clamp diode forward voltage	V _F	5	I _F = 1.25 A	—	1.5	2.0	V
Input capacitance	C _{IN}	6	V _{IN} = 0, f = 1 MHz	—	15	—	pF
Turn-ON delay	t _{ON}	7	V _{OUT} = 80 V, R _L = 68 Ω	—	0.1	—	μs
Turn-OFF delay	t _{OFF}	7	V _{OUT} = 80 V, R _L = 68 Ω	—	1.0	—	μs
Parasitic transistor output voltage	V _{CEF}	8	I _{CEF} = 150 mA	80	—	—	V

Test Circuit

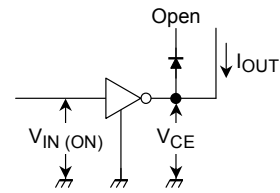
1. I_{CEX}



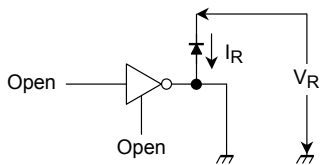
2. $V_{CE} (sat)$, h_{FE}



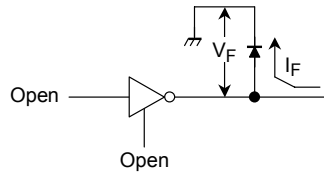
3. $V_{IN} (ON)$



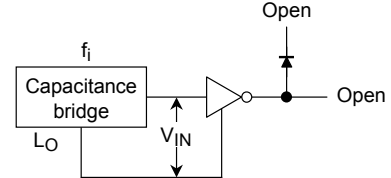
4. I_R



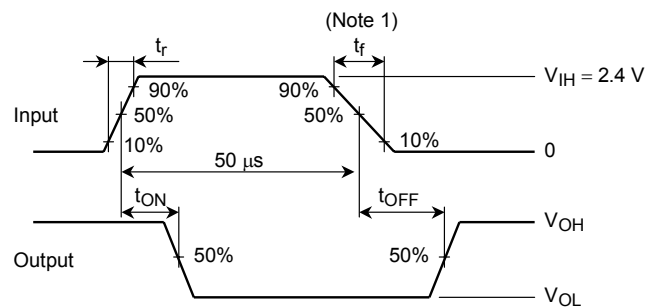
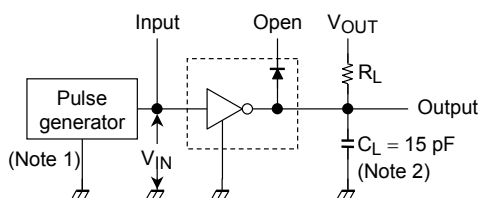
5. V_F



6. C_{IN}



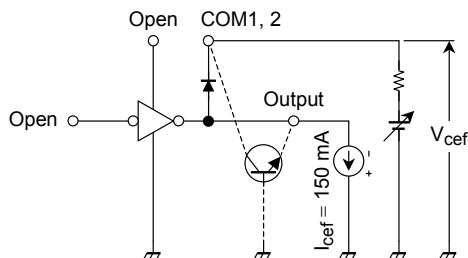
7. t_{ON} , t_{OFF}



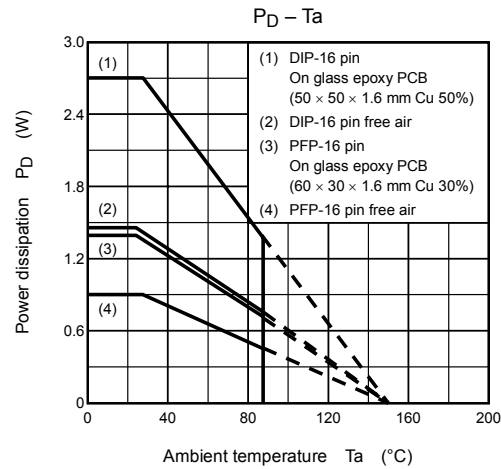
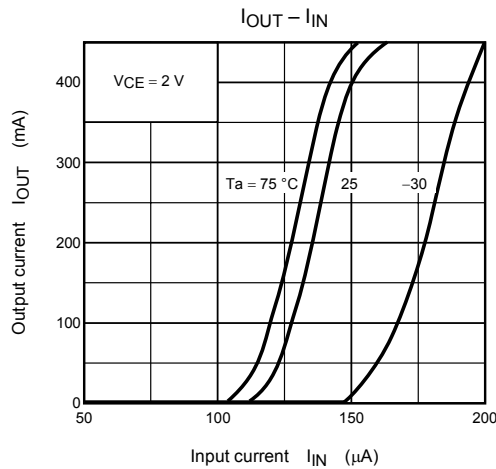
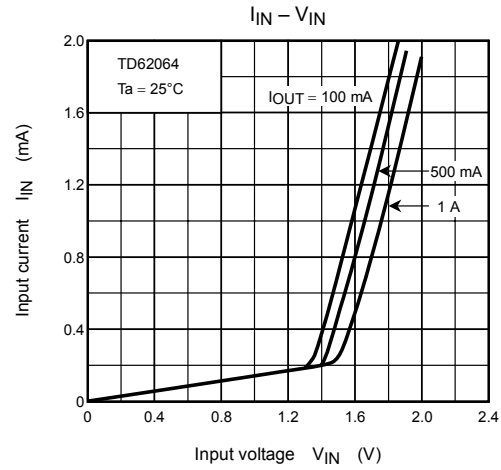
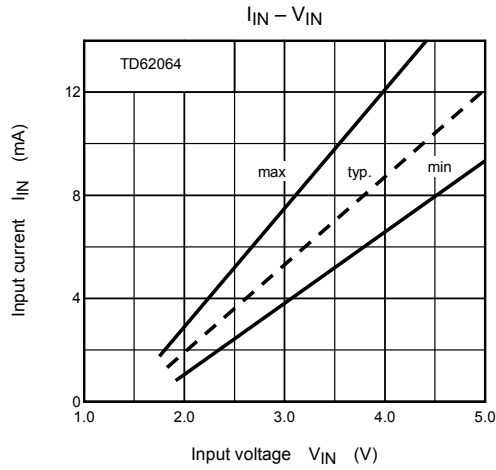
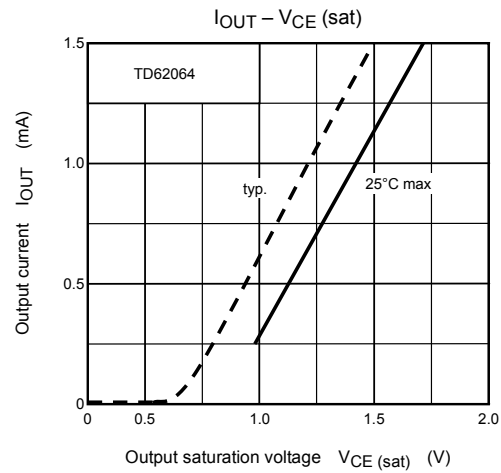
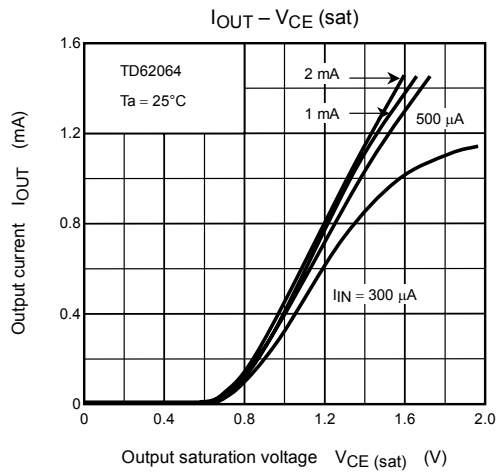
Note 1: Pulse Width 50 μ s, Duty Cycle 10%
Output Impedance 50 Ω , $t_r \leq 5$ ns, $t_f \leq 10$ ns

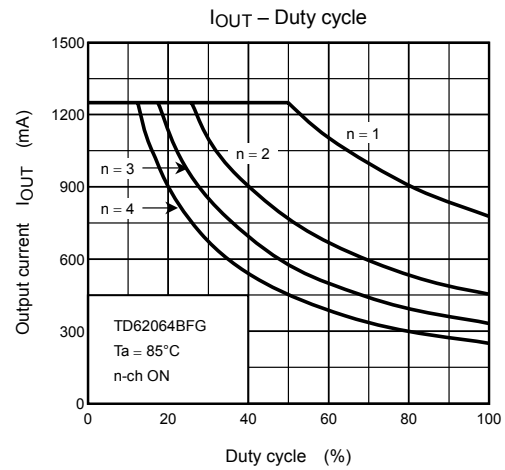
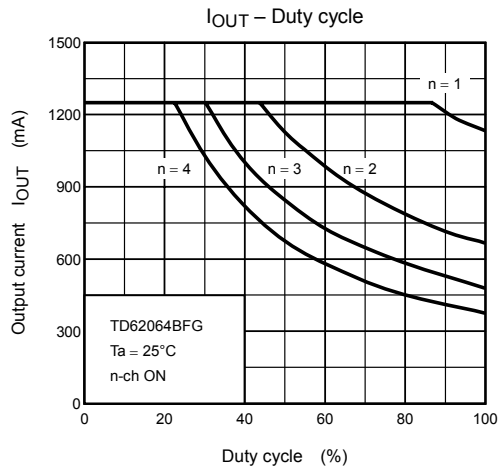
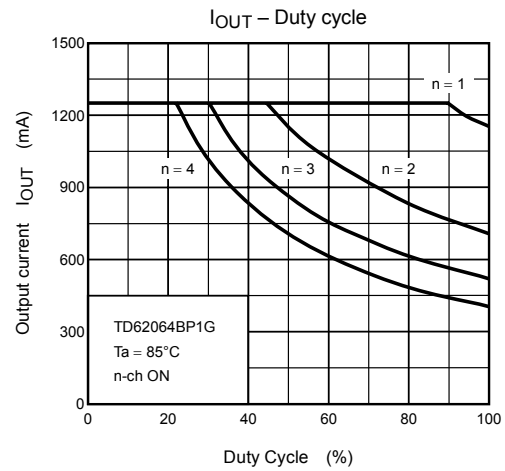
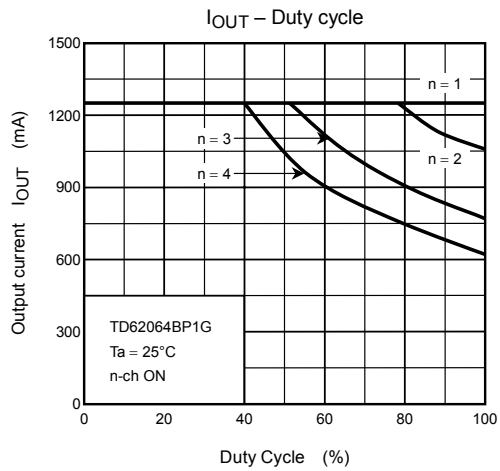
Note 2: C_L includes probe and jig capacitance

8. V_{cef}



$I_{cef} = 150$ mA (at. single pulse = 5 ms)

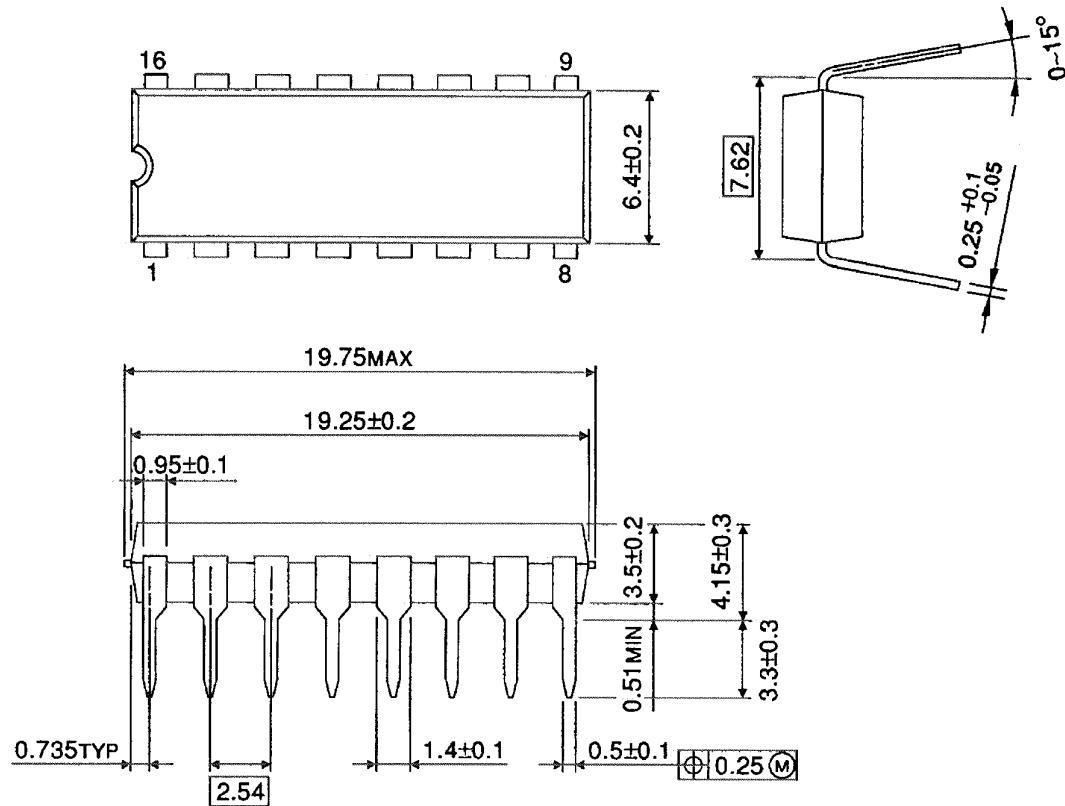




Package Dimensions

DIP16-P-300-2.54A

Unit : mm

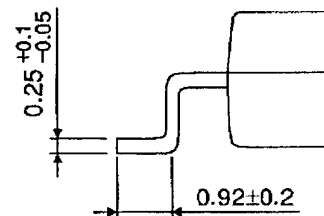
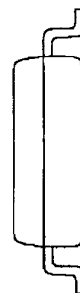
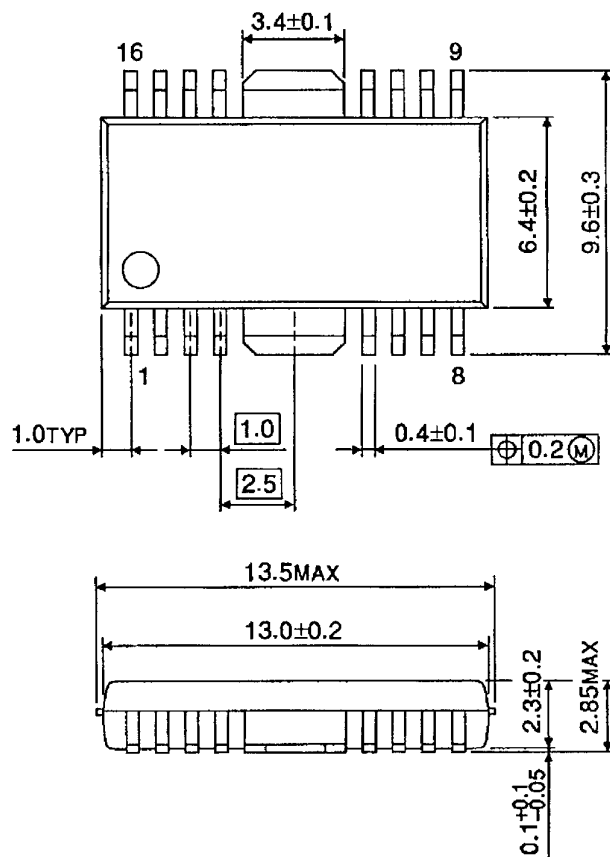


Weight: 1.11 g (typ.)

Package Dimensions

HSOP16-P-300-1.00

Unit : mm



Weight: 0.50 g (typ.)

About solderability, following conditions were confirmed

- Solderability

- (1) Use of Sn-63Pb solder Bath
 - solder bath temperature = 230°C
 - dipping time = 5seconds
 - the number of times = once
 - use of R-type flux
- (2) Use of Sn-3.0Ag-0.5Cu solder Bath
 - solder bath temperature = 245°C
 - dipping time = 5seconds
 - the number of times = once
 - use of R-type flux

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