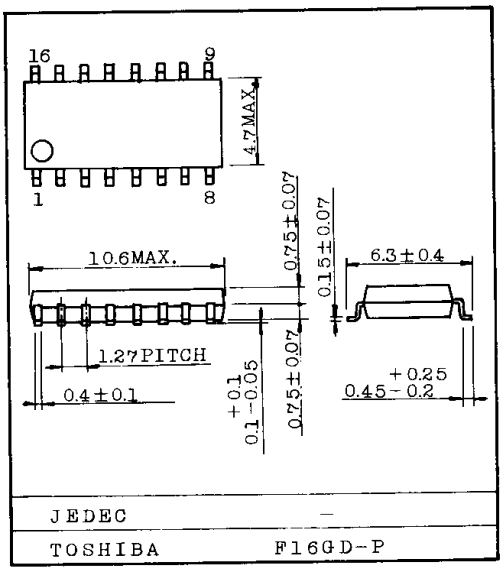
TA76494F

○ GENERAL USE SWITCHING REGULATOR (494 TYPE)

The TA76494F is an IC for 494 type switching regulator, with 5V reference voltage, built-in error amplifier, saw tooth wave generating circuit, dead time adjusting comparater, flip-flop, and output buffer.

- Wide same phase range of the error amplifier
- Built-in 100mA output buffer
- Dead time is adjustable
- Built-in low supply voltage protective circuit

Unit in mm



MAXIMUM RATINGS (Ta=25°C)

CHARACTERISTIC	SYMBOL	RATING	UNIT
Supply Voltage	V_{CC}	25	V
Error Amplifier Input Voltage	V_{ICM}	V_{CC} + 0.3	V
Output Voltage	V_{CER}	25	V
Output Current	I_C	100	mA
Power Consumption	P_D	400	mW
Operating Temperature	T_{opr}	-30 ∿ 75	°C
Storage Temperature	T_{stg}	-55 ∿ 150	°C

RECOMMENDED OPERATING CONDITIONS

CHARACTERISTIC	SYMBOL	MIN	TYP	MAX	UNIT
Supply Voltage	V_{CC}	7	-	25	V
Output Voltage	V_{CER}	-0.3	-	25	V
Output Current (per one stage of output unit)	I_C	-	-	100	mA
Error Amplifier Sink Current	I_{OAMP}	-	-	-0.3	mA
Timing Capacitor	C_T	0.47	-	10000	nF
Timing Resistor	R_T	1.8	-	500	kΩ
Oscillation Frequency	f_{OSC}	1	-	300	kHz
Operating Temperature	T_{opr}	-20	-	70	℃

ELECTRICAL CHARACTERISTICS (Unless otherwise specified, V_{CC}=15V, f_{OSC}=10kHz)

REFERENCE VOLTAGE UNIT

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Output Voltage	V_{ref}	I_{ref}=1mA, Ta=25°C	4.75	5.00	5.25	V
Input Stability	$R_{eg\ IN}$	7V ≦ V_{CC} ≦ 25V, I_{ref} = 1mA, Ta = 25°C	-	8	25	mV
Load stability	$R_{eg\ L}$	1mA ≦ I_{ref} ≦ 10mA, Ta=25°C	-	1	15	mV
Output Voltage Temp. Change	Tc V_{ref}	-20°C≦Ta≦75°C, I_{ref} = 1mA	-	0.01	0.03	%/°C
Output Short-Circuit Current	I_S	V_{ref}=0	-	50	-	mA

OSCILLATION UNIT

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Oscillation Frequency Set Value	f_{osc}	C_T=0.001μF, R_T=30kΩ	-	40	-	kHz
Oscillation Frequency Setting Accuracy	f_{DIV}	C_T=0.001μF, R_T=30kΩ	-	3.0	-	%
Frequency Input Stability	Δf_{VIN}	7V ≦ V_{CC} ≦ 40V, Ta = 25°C	-	0.1	-	%
Frequency Temp. Change	Δf_{Ta}	0°C ≦ Ta ≦ 70°C	-	1	2	%

PAUSE PERIOD ADJUSTING UNIT

CHARACTERISTIC	SYMBOL	TEST CONDITON	MIN.	TYP.	MAX.	UNIT
Input Bias Current	I_{IND}	0 ≦ V_{IN} ≦ 5.25V PIN 4	-	-2	-10	A
Max. Duty (Each Output Stage)	D_y MAX	V_{in}=0, CT=0.1μF, R_T=12kΩ	45	48	-	%
Input Threshold Voltage 1	V_{TH-1}	Output pulse 0% duty	-	2.8	3.3	V
Input Threshold Voltage 2	V_{TH-2}	Output pulse max. duty	0	-	-	V

ERROR AMPLIFIER I, II

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Input Offset Voltage	V_{IO}	V_O PIN 3 = 2.5V	-	2	10	mV
Input Offset Current	I_{IO}	V_O PIN 3 = 2.5V	-	5.0	250	nA
Input Bias Current	I_{IB}	V_O PIN 3 = 2.5V	-	0.1	1	A
Common Mode Input Voltage Range	CMV_{IN}	7V ≦ V_{CC} ≦ 25V	0.3	-	V_{CC}-2	V
Open loop Gain	G_V	V_O PIN 3 = 0.5∿3.5V, R_L=2kΩ	70	95	-	dB
Unity Gain Frequency	f_o	V_O PIN 3 = 0.5∿3.5V, R_L=2kΩ	-	350	-	kHz
Common Mode Rejection Ratio	CMRR	V_{CC} = 25V	65	90	-	dB
Output Sink Current	I_{SINK}	V_O PIN 3 = 0.7V	0.3	0.7	-	mA
Output Source Current	I_{SOURCE}	V_O PIN 3 = 3.5V	-2	-10	-	mA

PWM COMPARATOR

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Input Threshold Voltage	V_{TH}	Zero duty cycle	-	4	4.5	V
Input Sink Current	I_I	V_O PIN 3 = 0.7V	0.3	0.7	-	mA

OUTPUT UNIT

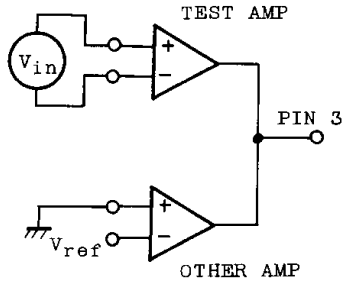
CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Collector Cut-off Current		I_{CER}	V_{CE}=25V, V_{CC}=25V Emitter grounded	-	-	100	μA
Emitter Cut-off Current		$I_{E(OFF)}$	V_{CC}=V_C=25V, V_E=0V Emitter follower	-	-	-100	μA
Emitter Saturation Voltage (Emitter grounded)		$V_{SAT(C)}$	I_C = 50mA, V_E = 0V	-	0.95	1.3	V
Collector Saturation Voltage (Emitter follower)		$V_{SAT(E)}$	I_E=-50mA, V_C = 15V	-	1.6	2.5	V
Output Voltage Rise Time (Emitter grounded)		$t_{r\ 1}$		-	100	200	ns
Output Voltage Fall Time (Emitter follower)		$t_{f\ 1}$		-	25	100	
Output Voltage Rise Time (Emitter follower)		$t_{f\ 2}$		-	100	200	ns
Output Voltage Fall Time (Emitter grounded)		$t_{f\ 2}$		-	40	100	
Output Control Input Operating Current	"L" State	I_{OCL}	$V_{OC} \leqq 0.4V$	-	10	-	μA
	"H" State	I_{OCH}	V_{OC} = V_{ref}	-	0.2	3.5	mA

CURRENT CONSUMPTION (TOTAL)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Standby Current	$I_{CC(S\cdot B)}$	V_{CC} = 15V, Other terminal opened	-	8	12.5	mA
Bias Current	$I_{CC\ total}$	$V_{PIN\ 4}$= 2V, C_T = 0.01μF R_T = 12kΩ, V_{CC} = 15V	-	10	-	mA

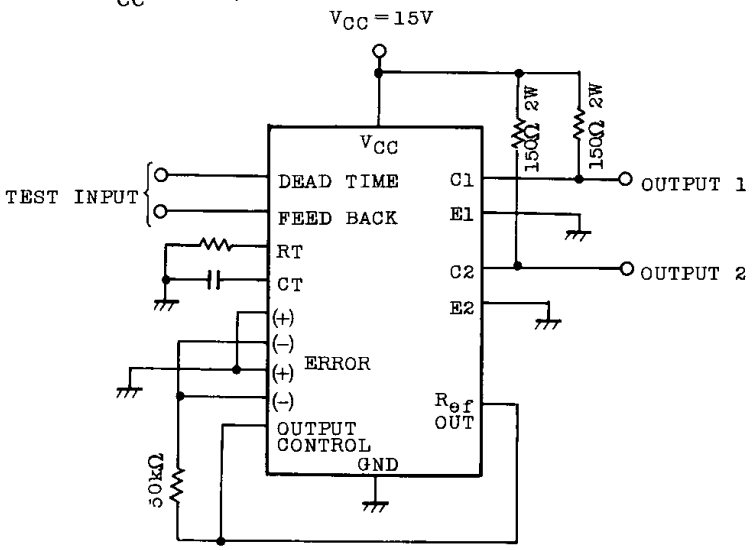
TEST CIRCUIT 1

(Error Amplifier)



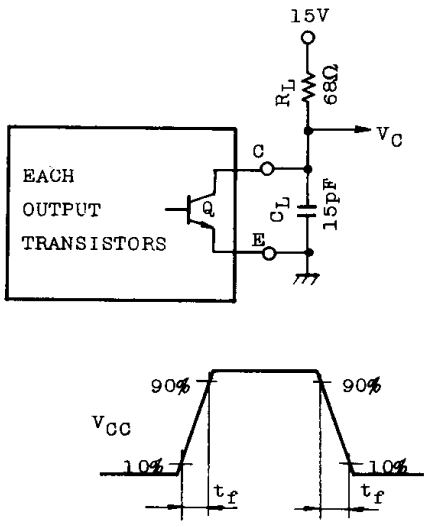
TEST CIRCUIT 2

(Pause time adjusting unit, feedback circuit and I_{CC} total)



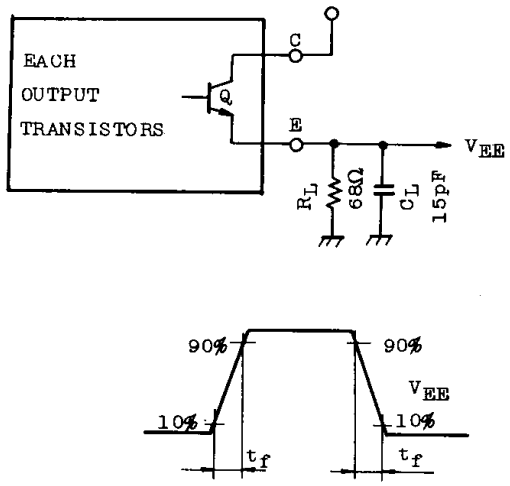
TEST CIRCUIT 3

(Test with the output unit and emitter grounded)

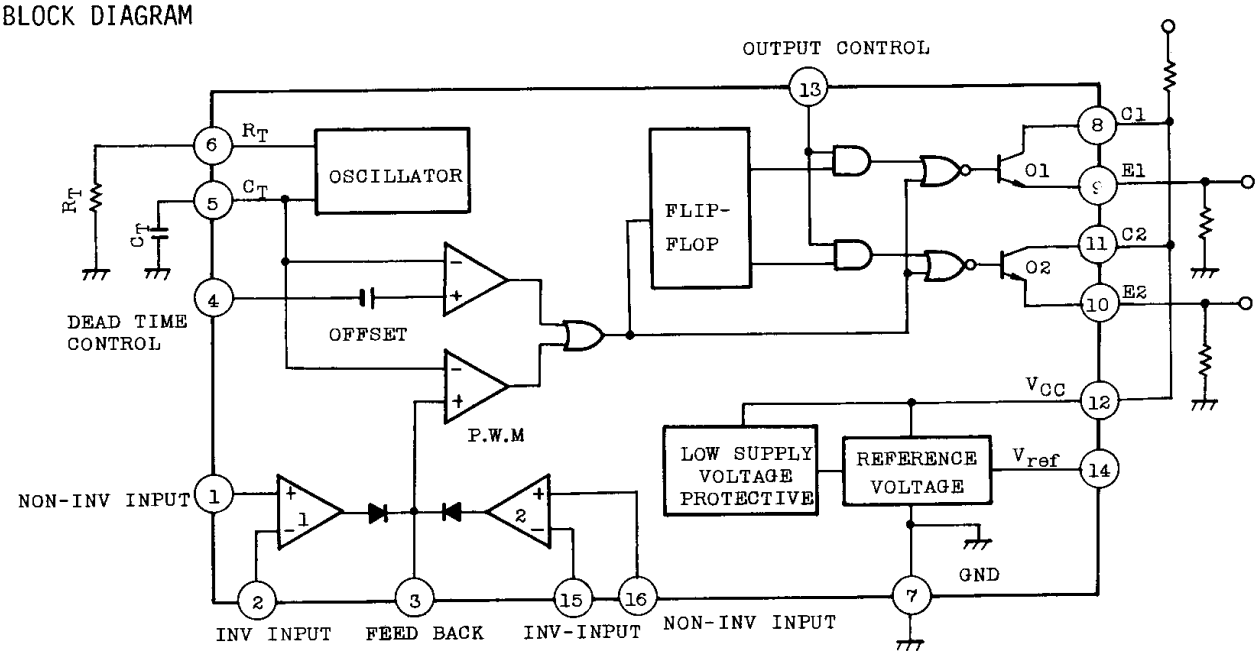


TEST CIRCUIT 4

(Test with the output unit and emitter followed)



BLOCK DIAGRAM



(Note) PIN ⑬ BECOMES SINGLE MODE AT "L" AND PUSH-PULL MODE AT "H".

OPERATING WAVEFORM