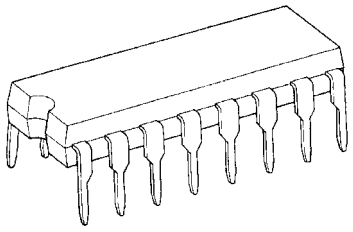
TOSHIBA BIPOLAR DIGITAL INTEGRATED CIRCUIT SILICON MONOLITHIC

TD62064BP−1,TD62064BF

4CH HIGH−CURRENT DARLINGTON SINK DRIVER

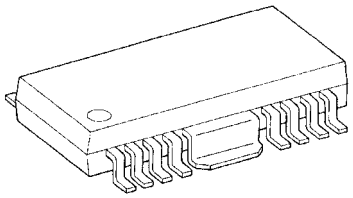
The TD62064BP−1 and TD62064BF are high−voltage, high−current darlington drivers comprised of four NPN darlington pairs. All units feature integral clamp diodes for switching inductive loads.
Applications include relay, hammer, lamp and stepping motor drivers.

TD62064BP-1



DIP16-P-300-2.54A

TD62064BF



HSOP16-P-300-1.00

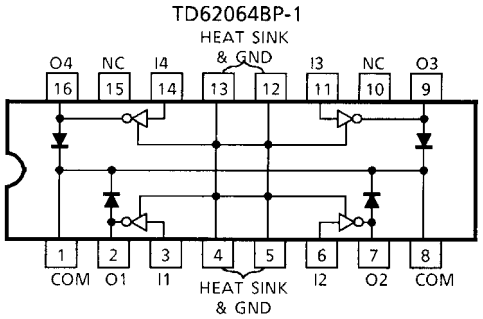
Weight
DIP16−P−300−2.54A : 1.11 g (Typ.)
HSOP16−P−300−1.00 : 0.50 g (Typ.)

FEATURES

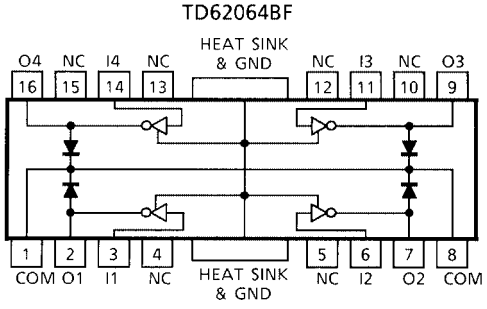
- Package Type BP−1 : DIP16 pin
  BF : HSOP16 pin
- High Output Sustaining Voltage : $V_{CE(SUS)}$ = 80 V (Min)
- Output Current (Single Output) : I_{OUT} = 1.5 A / ch (Max)
- Output Clamp Diodes
- Input Compatible with TTL and 5 V CMOS
- GND and SUB Terminal = Heat Sink

PIN CONNECTION (TOP VIEW)

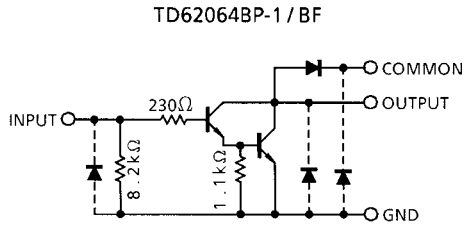
TD62064BP-1



TD62064BF



SCHEMATICS (EACH DRIVER)



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 TD62064BP-1/BF 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)

CHARACTERISTIC		SYMBOL	RATING	UNIT
Output Sustaining Voltage		$V_{CE(SUS)}$	−0.5 ~ 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	BP−1	P_D	1.47 / 2.7 (Note 2)	W
	BF		0.9 / 1.4 (Note 3)	
Operating Temperature		T_{opr}	−40 ~ 85	°C
Storage Temperature		T_{stg}	−55 ~ 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 = −40~85°C)

CHARACTERISTIC		SYMBOL	CONDITION		MIN	TYP.	MAX	UNIT
Output Sustaining Voltage		$V_{CE(SUS)}$			0	—	80	V
Output Current		I_{OUT}	DC 1 Circuit, Ta = 25°C		0	—	1250	mA / ch
	BP−1 (Note 1)		T_{pw} = 25ms 4 Circuits T_j = 120°C Ta = 85°C	Duty = 10 %	0	—	1250	
				Duty = 50 %	0	—	380	
	BF (Note 2)			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	V
	(Output Off)	$V_{IN(OFF)}$			0	—	0.4	V
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	BP−1	P_D	Ta = 85°C	(Note 1)	—	—	1.4	W
	BF		Ta = 85°C	(Note 2)	—	—	0.7	

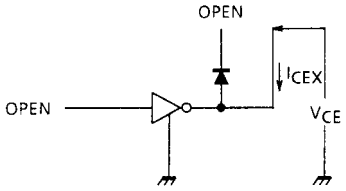
Note 1: On Glass Epoxy PCB (50 × 50 × 1.6 mm Cu 50%)
Note 2: On Glass Epoxy PCB (60 × 30 × 1.6 mm Cu 30%)

ELECTRICAL CHARACTERISTICS (Ta = 25°C unless otherwise noted)

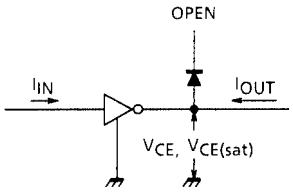
CHARACTERISTIC	SYMBOL	TEST CIR−CUIT	TEST CONDITION	MIN	TYP.	MAX	UNIT
Output Leakage Current	I_{CEX}	1	V_{CE} = 80 V, Ta = 25°C	—	—	50	μA
			V_{CE} = 80 V, Ta = 85°C	—	—	100	
Output Saturation Voltage	$V_{CE(sat)}$	2	I_{OUT} = 1.25 A, V_{IN} = 2.4 V	—	—	1.6	V
			I_{OUT} = 0.75 A, V_{IN} = 2.4 V	—	—	1.25	
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}			—	1.0	—	
Parasitic Transistor Output Voltage	V_{CEF}	8	I_{CEF} = 150 mA	80	—	—	V

TEST CIRCUIT

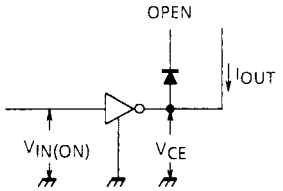
1. I_{CEX}



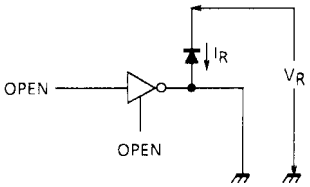
2. $V_{CE\ (sat)}$、h_{FE}



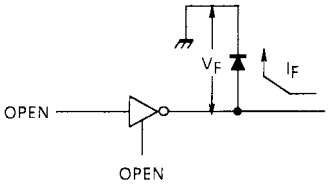
3. $V_{IN\ (ON)}$



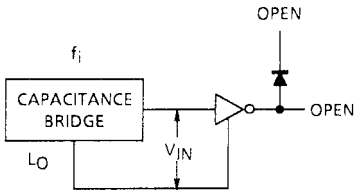
4. I_R



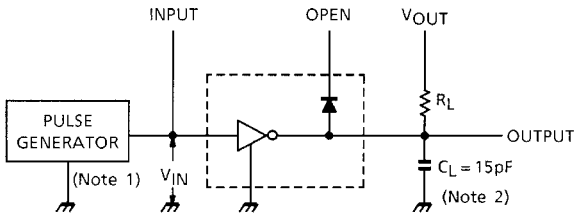
5. V_F

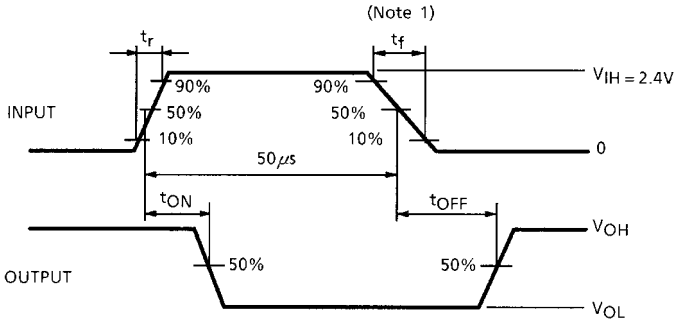


6. C_{IN}



7. t_{ON}、t_{OFF}

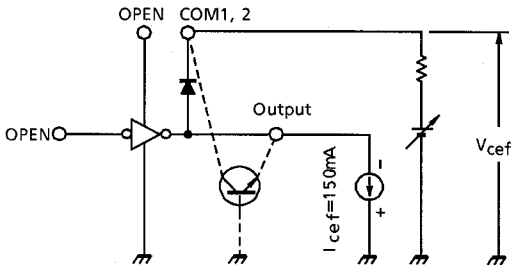




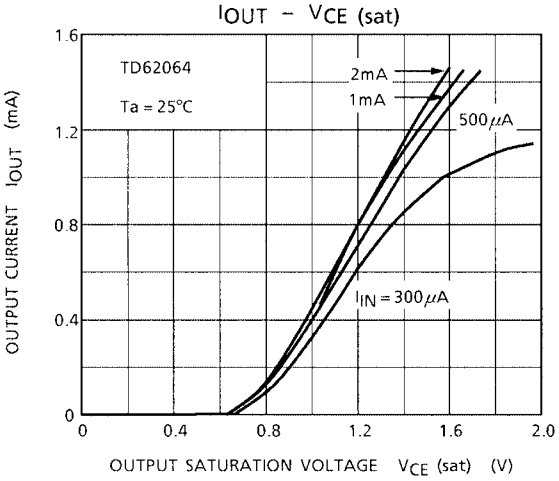
Note 1: Pulse Width 50 μs, Duty Cycle 10%
Output Impedance 50 Ω, $t_r \leq 5$ns, $t_f \leq 10$ ns

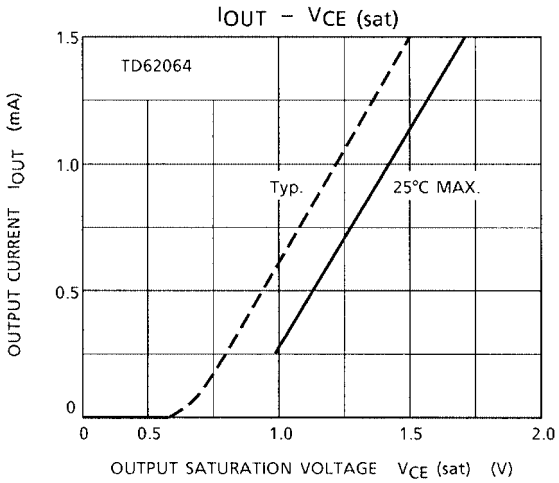
Note 2: C_L includes probe and jig capacitance

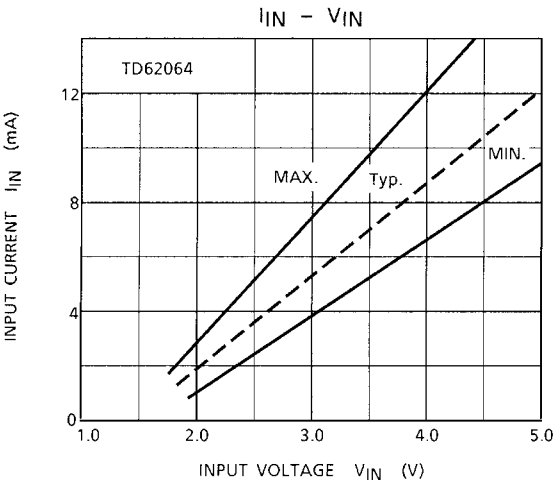
8. V_{cef}

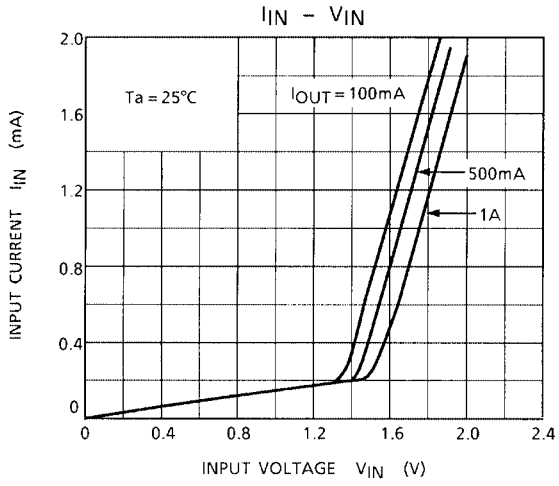


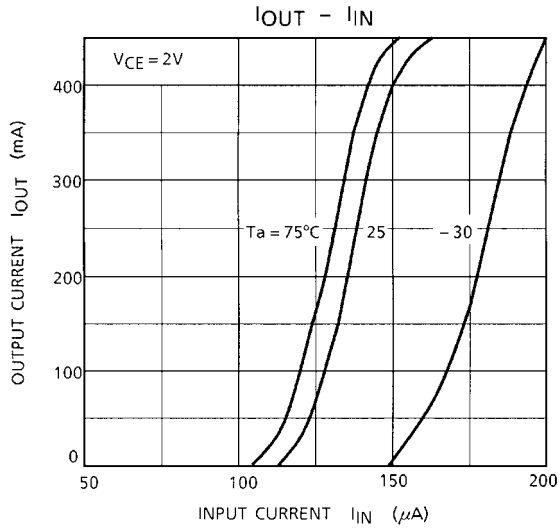
I_{cef} = 150mA (at. Single palse = 5ms)

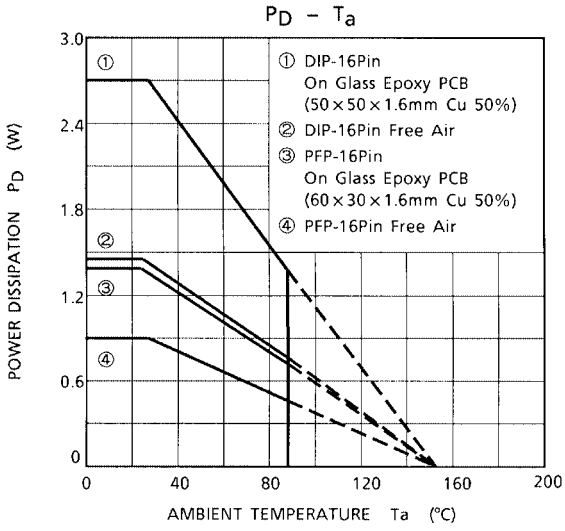

I_{OUT} – V_{CE} (sat)
TD62064
Ta = 25°C
2mA
1mA
500μA
I_{IN} = 300μA
OUTPUT CURRENT I_{OUT} (mA)
OUTPUT SATURATION VOLTAGE V_{CE} (sat) (V)

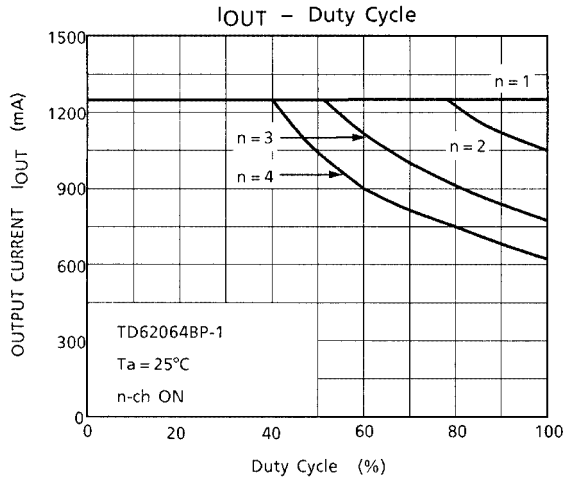

I_{OUT} – V_{CE} (sat)
TD62064
Typ.
25°C MAX.
OUTPUT CURRENT I_{OUT} (mA)
OUTPUT SATURATION VOLTAGE V_{CE} (sat) (V)

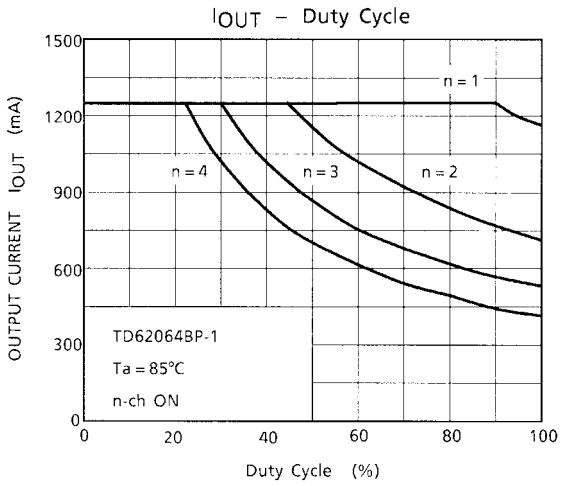

I_{IN} – V_{IN}
TD62064
MAX.
Typ.
MIN.
INPUT CURRENT I_{IN} (mA)
INPUT VOLTAGE V_{IN} (V)

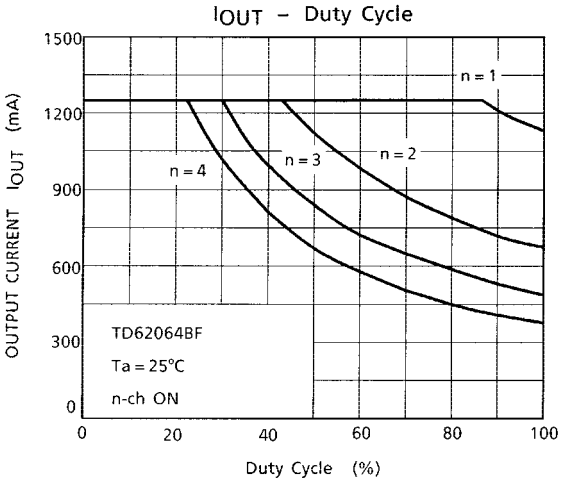

I_{IN} – V_{IN}
Ta = 25°C
I_{OUT} = 100mA
500mA
1A
INPUT CURRENT I_{IN} (mA)
INPUT VOLTAGE V_{IN} (V)

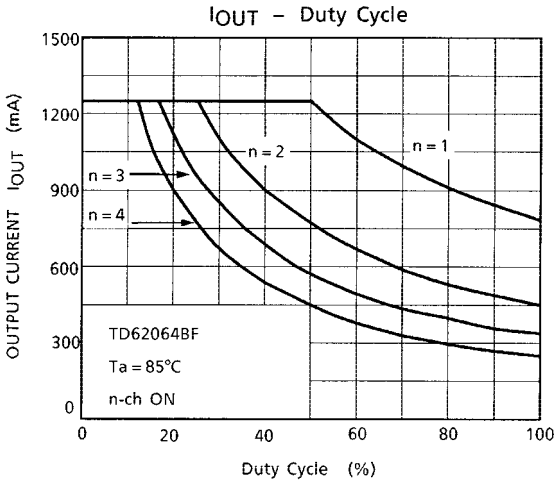

I_{OUT} – I_{IN}
V_{CE} = 2V
Ta = 75°C
25
– 30
OUTPUT CURRENT I_{OUT} (mA)
INPUT CURRENT I_{IN} (μA)


P_D – T_a
① DIP-16Pin
On Glass Epoxy PCB
(50×50×1.6mm Cu 50%)
② DIP-16Pin Free Air
③ PFP-16Pin
On Glass Epoxy PCB
(60×30×1.6mm Cu 50%)
④ PFP-16Pin Free Air
POWER DISSIPATION P_D (W)
AMBIENT TEMPERATURE Ta (°C)


I_{OUT} – Duty Cycle
OUTPUT CURRENT I_{OUT} (mA)
1500
1200
900
600
300
0
n = 1
n = 3
n = 2
n = 4
TD62064BP-1
Ta = 25°C
n-ch ON
0
20
40
60
80
100
Duty Cycle (%)

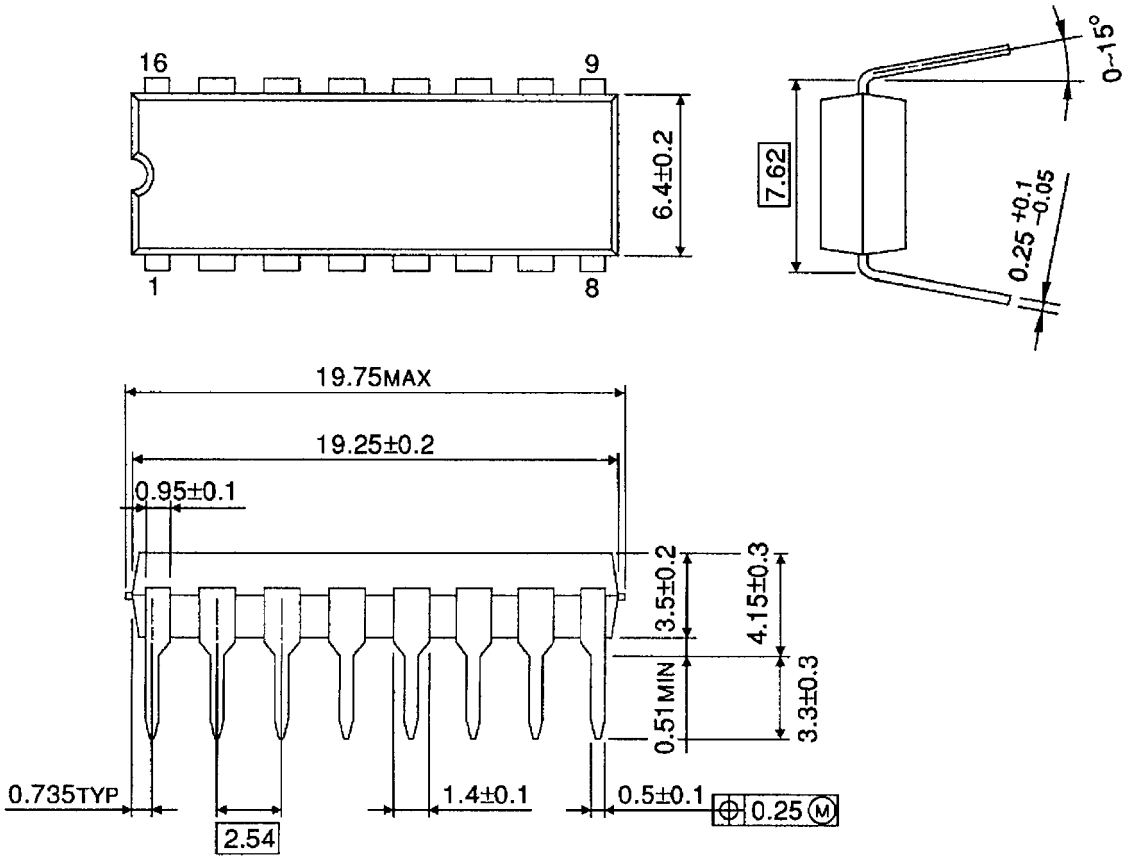

I_{OUT} – Duty Cycle
OUTPUT CURRENT I_{OUT} (mA)
1500
1200
900
600
300
0
n = 1
n = 4
n = 3
n = 2
TD62064BP-1
Ta = 85°C
n-ch ON
0
20
40
60
80
100
Duty Cycle (%)


I_{OUT} – Duty Cycle
OUTPUT CURRENT I_{OUT} (mA)
1500
1200
900
600
300
0
n = 1
n = 4
n = 3
n = 2
TD62064BF
Ta = 25°C
n-ch ON
0
20
40
60
80
100
Duty Cycle (%)


I_{OUT} – Duty Cycle
OUTPUT CURRENT I_{OUT} (mA)
1500
1200
900
600
300
0
n = 2
n = 1
n = 3
n = 4
TD62064BF
Ta = 85°C
n-ch ON
0
20
40
60
80
100
Duty Cycle (%)

PACKAGE DIMENSIONS

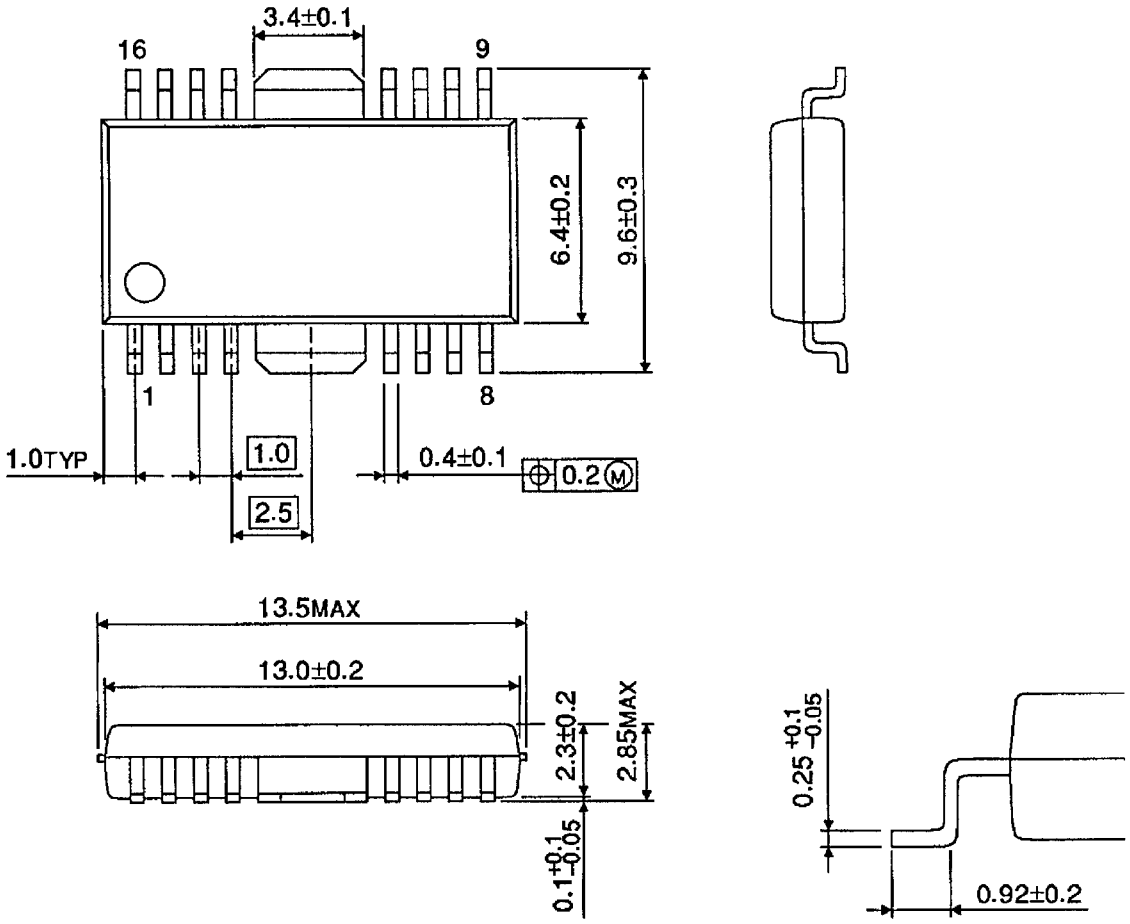
DIP16−P−300−2.54A Unit : mm



Weight: 1.11 g (Typ.)

PACKAGE DIMENSIONS

HSOP16−P−300−1.00 Unit : mm



Weight: 0.50 g (Typ.)

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000707EBA

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