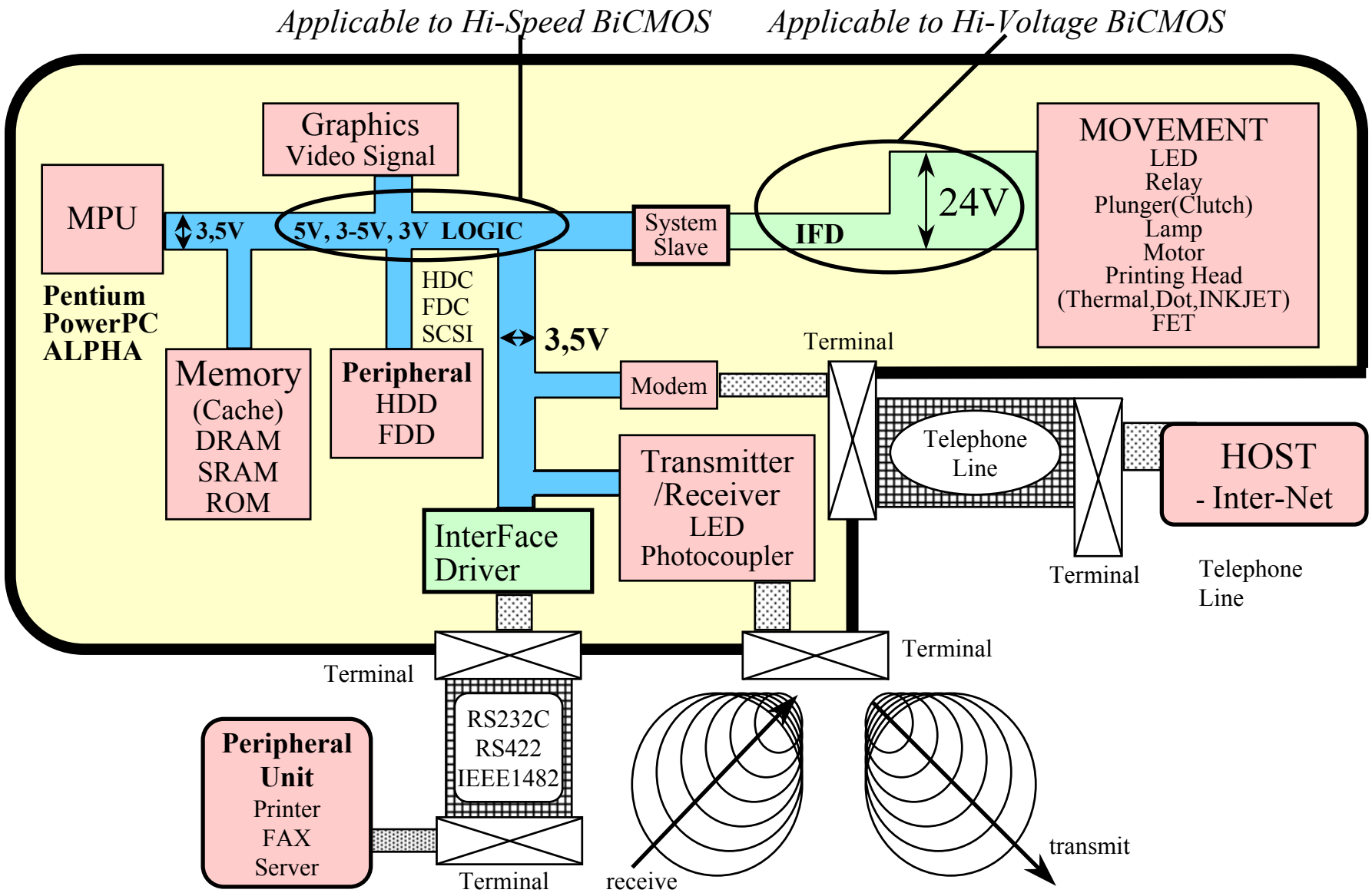
TOSHIBA
INTERFACE DRIVER

ULN2000 SERIES
TD62xxx SERIES
TD62Mxxx SERIES
TB62xxx SERIES

Internal & External Concept



TOSHIBA

Interface Driver Line Up

	Item		Series Number	Device Series
GPP	Bipolar Tr.Array	Standard	7	59
		Original	35	166
	Multi Chip Tr.Array	Original	7	20
	D-MOS Tr.Array	Original	1	18
ASSP	Intelligent Driver		8	12
	Total		58	275

IFD Family Tree

- **Transistor-Array Series**
  - **Monolithic IC Type**
    - **Bipolar Transistor** .....

ULN2000	NPN Darlington Tr.Array
TD62000 to 199	NPN Darlington Tr.Array
TD62300 to 499	with Logical Interface
TD62500 to 599	Single Tr.Array
TD62600 to 699	with Analog Circuit
TD62700 to 799	Source Current Output

    - **D-MOS Transistor** ..... TB62 xxx P/F
  - **Multi-Chip IC Type** ..... TD62M xxx P/F

TD62M 8600 F

- Package Type
- Type No.
- 5:Sink Current Output
- 6:Source Current Output
- 7:Push/Pull Output
- Output Channel

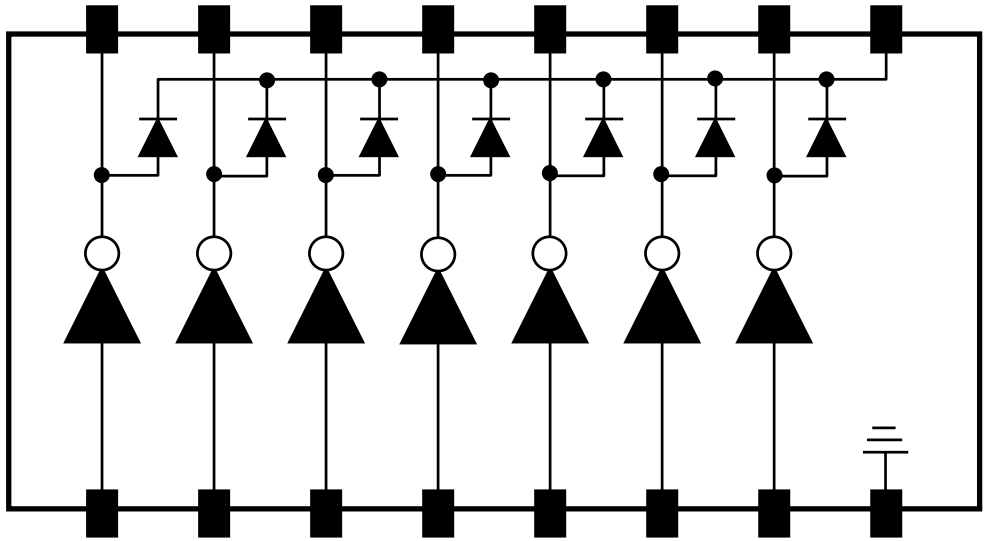
- **Intelligent Driver Series**

TD62C xxx P/F

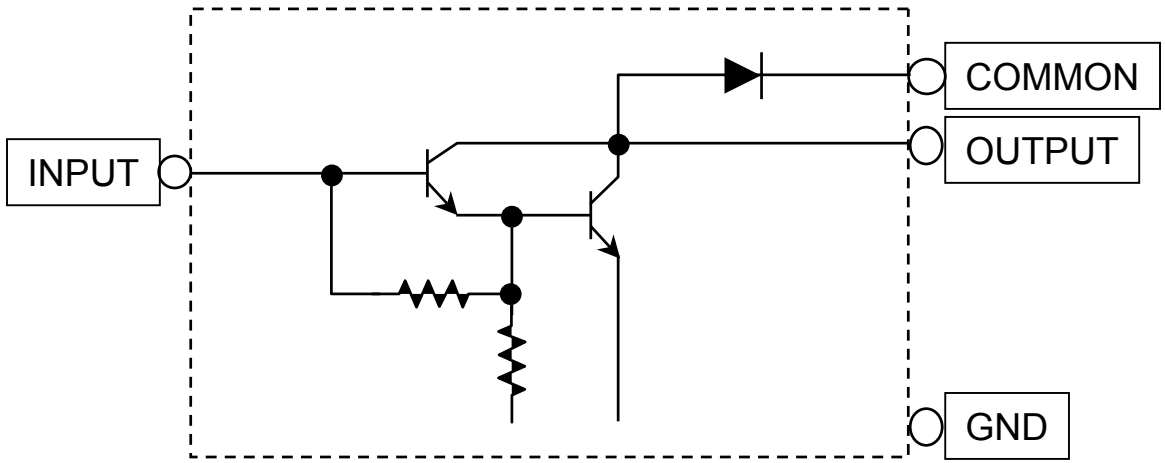
TB62 xxx P/F

- Package
- **Type Number**
  - 400 to 599 : Controller
  - 600 to 699 : TPH Driver
  - 700 to 799 : LED Driver
    Printing Head Driver
  - 800 to 999 : Others
- IFD (BiCMOS

1. TRANSISTOR ARRAY IC

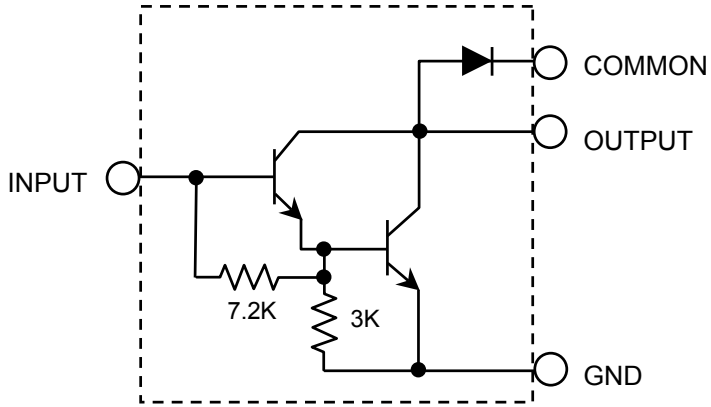


2. BASIC TRANSISTOR AMPLIFIER CIRCUIT

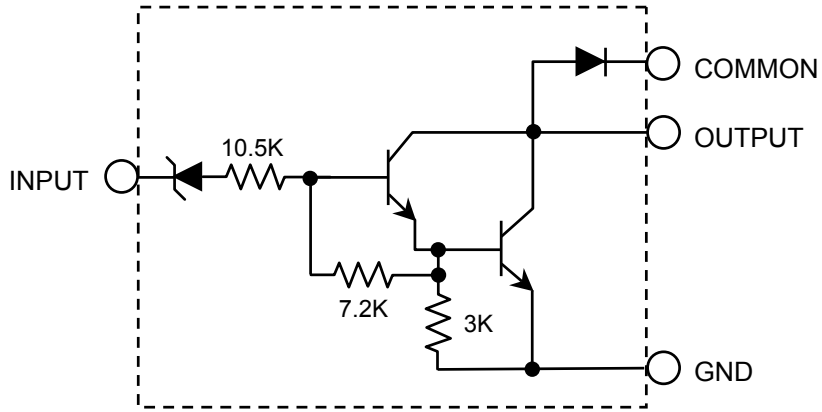


BASIC CIRCUIT DIAGRAM

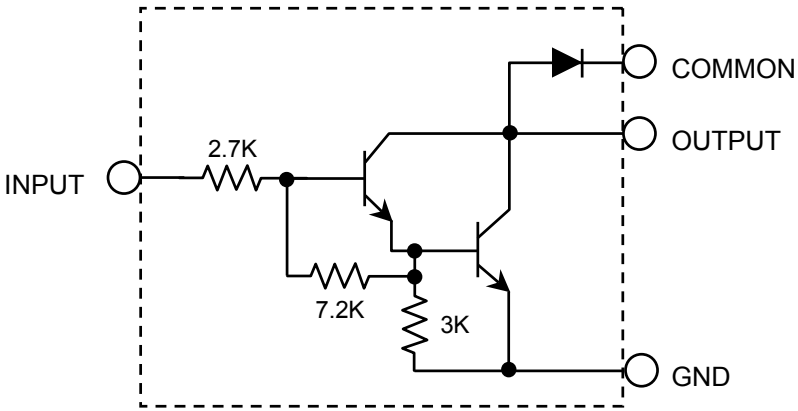
EXAMPLE : TD6200X SERIES



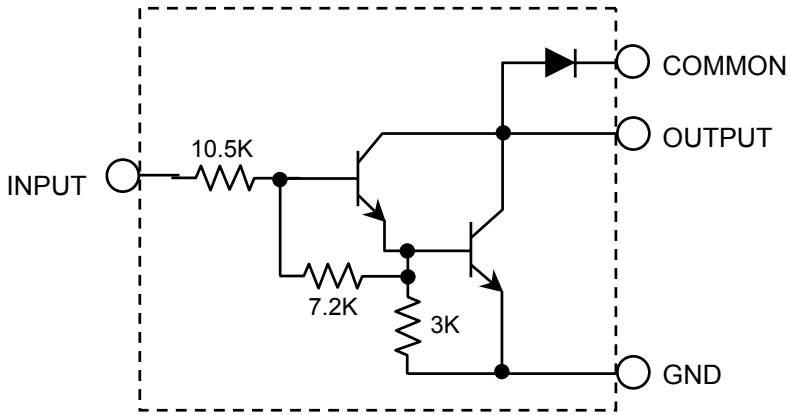
TD62001AP/AF-GENERAL PURPOSE
(NO BUILT-IN INPUT RESISTOR)
CAN BE USED WITH TTL & CMOS



TD62002AP/AF
(BUILT-IN 7V ZENER DIODE & 10.5K)
SPECIFICALLY FOR 14V-25V PMOS

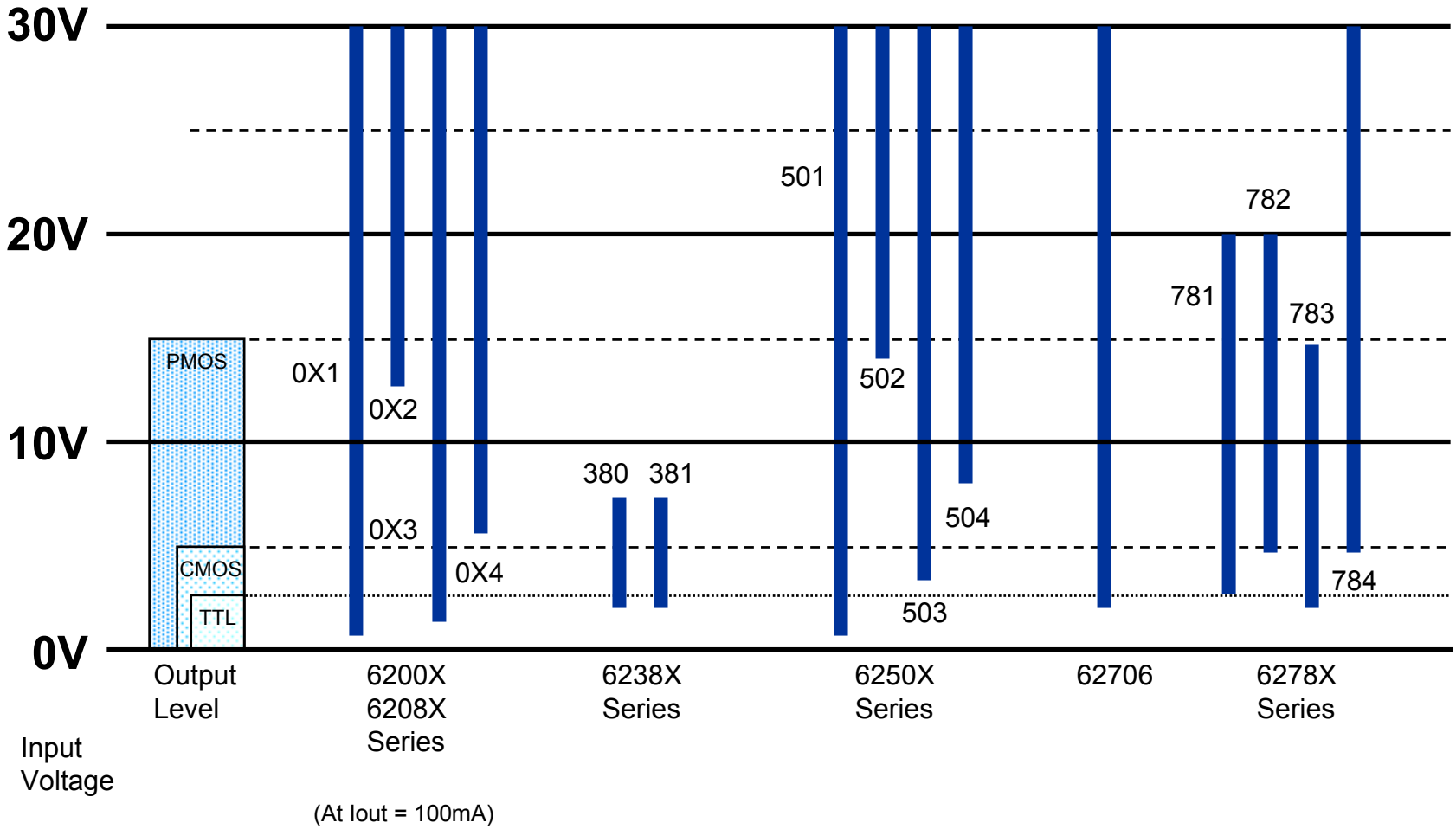


TD62003AP/AF
(BUILT-IN 2.7K INPUT RESISTOR)
OPERATE DIRECTLY WITH TTL OR 5V CMOS



TD62004AP/AF
(BUILT-IN 10.5K INPUT RESISTOR)
OPERATE DIRECTLY WITH 6V-15V CMOS

Interface Level

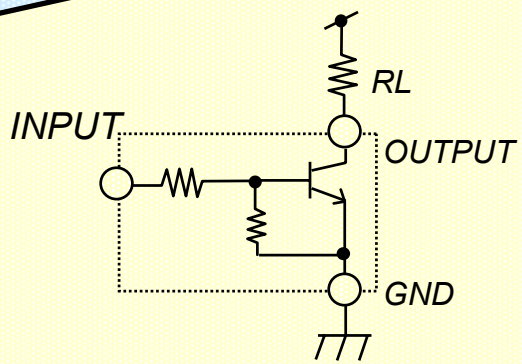


(At Iout = 100mA)

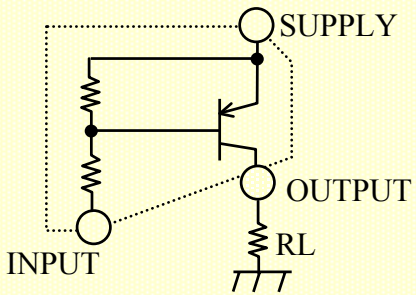
Output Circuits For Application

Application	Thermal printing Head	Plunger,Solenoid, Clutch, Stepping Motor	LCD,Piezo Printing Head
Load Impedance	RESISTANCE	INDUCTANCE	CAPACITANCE

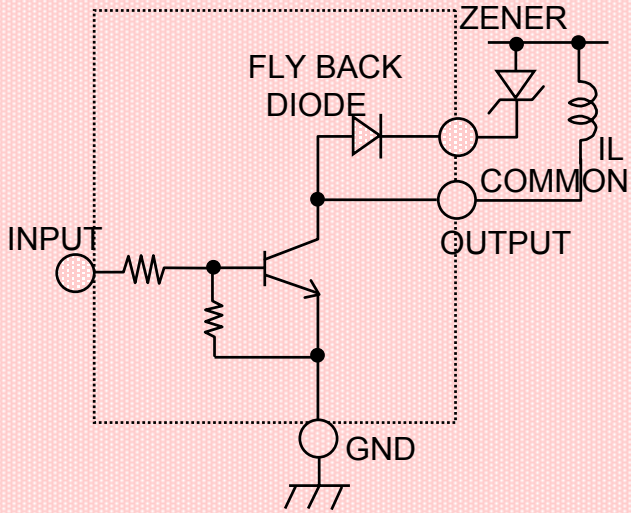
Representative Circuits



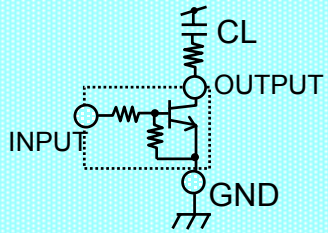
EXAMPLE : TD62003AP



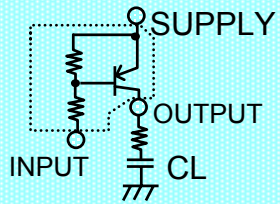
EXAMPLE : TD62706P/F



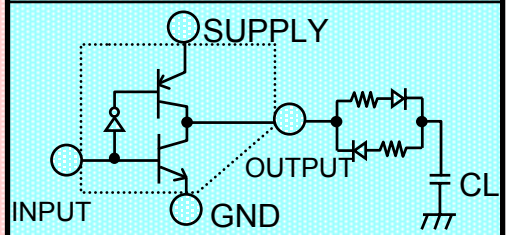
EXAMPLE : TD62308AP/BP-1
TD62064AP/BP-1



EXAMPLE : TD62083AP



EXAMPLE : TD62783AP



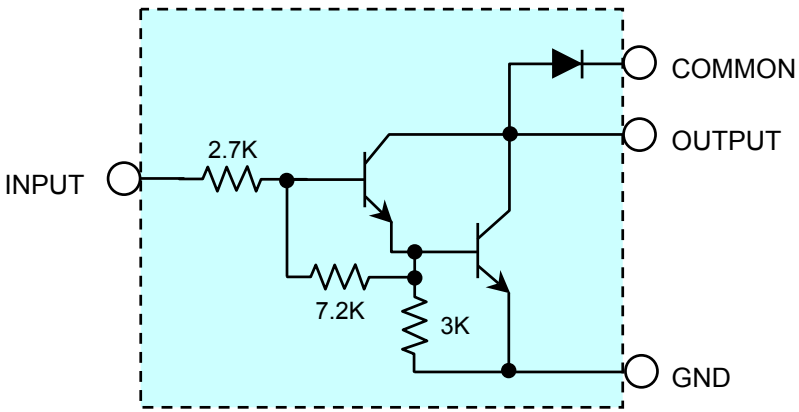
EXAMPLE : TD62981P

TOSHIBA ULN2000 Series

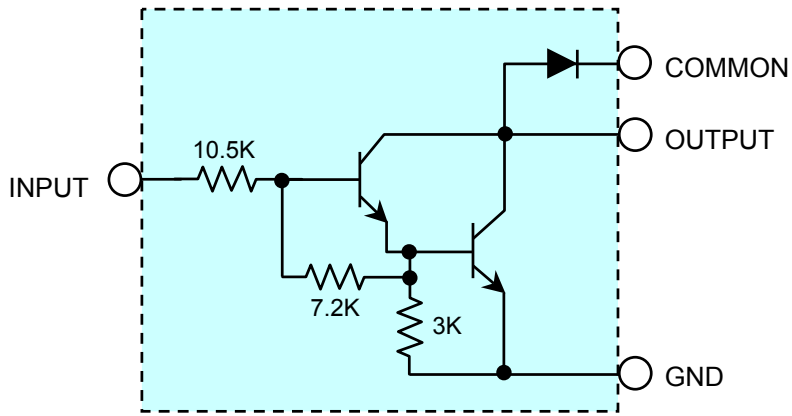
Line up : ULN2003AP/AFW, ULN2004AP/AFW,
ULN2803AP/AFW, ULN2804AP/AFW

1. **VCE(SUS) = 50V (Max)**
2. **IOUT = 500mA/ch (Max)**
3. **Built in Clamp diodes for inductive loads drive**

4. **Package : ULN2003A,ULN2004A (7ch) DIP16,SOL16**
ULN2803A,ULN2804A (8ch) DIP18,SOL18



ULN2003AP/AFW : 7ch
ULN2803AP/AFW : 8ch
(BUILT-IN 2.7K INPUT RESISTOR)
OPERATE DIRECTLY WITH TTL OR 5V CMOS



ULN2004AP/AFW : 7ch
ULN2804AP/AFW : 8ch
(BUILT-IN 10.5K INPUT RESISTOR)
OPERATE DIRECTLY WITH 6V-15V CMOS

Cross Reference of Standard Transistor Array

TOSHIBA	Package	Function	Rating (V/A)	MITSUBISHI	ALLEGRO	SGS/ THOMSON	T.I.	MOTOROLA
TD62001AP	DIP16	7 ch	50/0.5	M54524P	ULN2001A	ULN2001A	ULN2001AN	MC1411P
TD62001AF	SOP16	high active		-	-	ULN2001D	ULN2001AD	MC1411D
TD62002AP	DIP16	darlington		M54525P	ULN2002A	ULN2002A	ULN2002AN	MC1412P
TD62002AF	SOP16	sink driver		-	-	ULN2002D	ULN2002AD	MC1412D
TD62003AP	DIP16			M54523P	ULN2003A	ULN2003A	ULN2003AN	MC1413P
TD62003AF	SOP16			M54523FP	ULN2003L	ULN2003D	ULN2003AD	MC1413D
TD62004AP	DIP16			M54526P	ULN2004A	ULN2004A	ULN2004AN	MC1416P
TD62004AF	SOP16			M54526FP	ULN2004L	ULN2004D	ULN2004AD	MC1416D
TD62081AP	DIP18	8 ch	50/0.5	-	ULN2801A	ULN2801A	ULN2801AN	ULN2801A
TD62081AF	SOP18	high active		-	-	-	-	-
TD62082AP	DIP18	darlington		-	ULN2802A	ULN2802A	ULN2802AN	ULN2802A
TD62082AF	SOP18	sink driver		-	-	-	-	-
TD62083AP	DIP18			M54585P	ULN2803A	ULN2803A	ULN2803AN	ULN2803AN
TD62083AF	SOP18			M54585FP	ULN2803LW	-	-	-
TD62083AFN	SSOP18			-	-	-	-	-
TD62084AP	DIP18			M54522P	ULN2804A	ULN2804A	ULN2804AN	ULN2804A
TD62084AF	SOP18			M54522FP	ULN2804LW	-	-	-
TD62084AFN	SSOP18			-	-	-	-	-
TD62064AP	DIP16	4 ch	50/1.5	M54532P	ULN2064B	ULN2064B	ULN2064	-
TD62064AF	HSOP16	high active		M54532FP	-	-	-	-
TD62064BP-1	DIP16	darlington	80/0.5	M54594P	ULN2065B	ULN2065B	ULN2065	-
TD62064BF	HSOP16	sink driver		-	-	-	-	-
TD62783AP	DIP18	8 ch	50/0.5	M54563P	UDN2981A	-	-	-
TD62783AF	SOP18	high active		M54563FP	-	-	-	-
TD62783AFN	SSOP!8	darlington		-	-	-	-	-
TD62784AP	DIP18	source driver		M54562P	UDN2982	-	-	-
TD62784AF	SOP18			M54562FP	UDN2982LW	-	-	-
TD62784AFN	SSOP18			-	-	-	-	-

Cross Reference of Standard Transistor Array (Part 1)

Device	Function	Rating (V/A)	SPRAGUE(ALLEGRO)		SGS-THOMSON		TI		TOSHIBA			TOSHIBA Rating (V/A)
			DIP	SOP	DIP	SOP	DIP(N)	SOP(NS)	DIP(P)	SOP(F)	SSOP(FN)	
ULN2001A			A	-	A	-	A	A	TD62001AP	TD62001AF	-	
ULS2001H			A	-	-	-	-	-	TD62001AP	TD62001AF	-	
ULN2002A			A	-	A	-	A	A	TD62002AP	TD62002AF	-	
ULS2002H	7ch high active		A	-	-	-	-	-	TD62002AP	TD62002AF	-	
ULN2003A	darlington sink driver	50/0.5	A	A	A	A	A	A	TD62003AP	TD62003AF	-	50/0.5
ULS2003H			A	-	-	-	-	-	TD62003AP	TD62003AF	-	
ULN2004A			A	A	A	A	A	A	TD62004AP	TD62004AF	-	
ULS2004H			A	-	-	-	-	-	TD62004AP	TD62004AF	-	
ULN2005A			A	-	-	-	-	-	(TD62003AP)	(TD62003AF)	-	
ULN2011A			A	-	-	-	-	-	TD62001AP	TD62001AF	-	
ULN2012A	7ch high active		A	-	-	-	-	-	TD62002AP	TD62002AF	-	
ULN2013A	darlington sink driver	50/0.6	A	-	-	-	-	-	TD62003AP	TD62003AF	-	50/0.5
ULN2014A			A	-	-	-	-	-	TD62004AP	TD62004AF	-	
ULN2015A			A	-	-	-	-	-	(TD62003AP)	(TD62003AF)	-	
ULN2021A			A	-	-	-	-	-	TD62001AP	TD62001AF	-	
ULN2022A	7ch high active		A	-	-	-	-	-	TD62002AP	TD62002AF	-	
ULN2023A	darlington sink driver	95/0.5	A	-	-	-	-	-	TD62003AP	TD62003AF	-	50/0.5
ULN2024A			A	-	-	-	-	-	TD62004AP	TD62004AF	-	
ULN2025A			A	-	-	-	-	-	(TD62003AP)	(TD62003AF)	-	
ULN2031A	7ch single driver common Emitter	16/-0.08	A	-	-	-	-	-	(TD62501P)	(TD62501F)	-	35/0.2
ULN2032A	7ch single driver	16/-0.08	A	-	-	-	-	-	(TD62505P)	(TD62505F)	-	35/0.2
ULN2033A	common collector		A	-	-	-	-	-	(TD62505P)	(TD62505F)	-	
ULN2045H	3ch single driver &	20/0.05	A	-	-	-	-	-	(TD62507P)	(TD62507F)	-	
ULN2046A	one differential amp.		A	-	-	-	-	-	(TD62507P)	(TD62507F)	-	35/0.2
ULN2046A-1		30/0.05	A	-	-	-	-	-	(TD62507P)	(TD62507F)	-	
ULN2047A	three differential amp.	30/0.01	A	-	-	-	-	-	(TD62507P)	(TD62507F)	-	35/0.2
ULN2054A	dual differential amp.	15/0.05	A	-	-	-	-	-	(TD62507P)	(TD62507F)	-	35/0.2
ULN2061M	2ch high active	50/1.25	A	-	-	-	-	-	(TD62064BP-1)	(TD62064BF)	-	80/1.5
ULN2062M	darlington sink driver	80/1.5	A	-	-	-	-	-	(TD62064BP-1)	(TD62064BF)	-	
ULN2064B		50/1.25	A	-	A	-	A	-	(TD62064AP)	(TD62064AF)	-	
ULN2065B	4ch high active	80/1.5	A	-	A	-	A	-	(TD62064BP-1)	(TD62064BF)	-	80/1.5
ULN2066B	darlington sink driver	50/1.25	A	-	-	-	-	-	(TD62064AP)	(TD62064AF)	-	
ULN2067B		80/1.5	A	-	-	-	-	-	(TD62064BP-1)	(TD62064BF)	-	
ULN2068B		50/1.25	A	-	-	-	-	-	(TD62064AP)	(TD62064AF)	-	
ULN2069B	4ch high active	80/1.5	A	-	-	-	-	-	(TD62064BP-1)	(TD62064BF)	-	80/1.5
ULN2070B	darlington sink driver	50/1.25	A	-	-	-	-	-	(TD62064AP)	(TD62064AF)	-	
ULN2071B		80/1.5	A	-	-	-	-	-	(TD62064BP-1)	(TD62064BF)	-	
ULN2074B		50/1.25	A	-	A	-	A	-	(TD62074AP)	(TD62074AF)	-	
ULN2075B	4ch high active	80/1.5	A	-	A	-	A	-	(TD62074AP)	(TD62074AF)	-	50/1.5
ULN2076B	darlington sink driver	50/1.25	A	-	-	-	-	-	(TD62074AP)	(TD62074AF)	-	
ULN2077B		80/1.5	A	-	-	-	-	-	(TD62074AP)	(TD62074AF)	-	

Cross Reference of Standard Transistor Array (Part 2)

Device	Function	Rating (V/A)	SPRAGUE(ALLEGRO)		SGS-THOMSON		TI		TOSHIBA			TOSHIBA Rating (V/A)
			DIP	SOP	DIP	SOP	DIP(N)	SOP(NS)	DIP(P)	SOP(F)	SSOP(FN)	
ULN2081A	7ch single driver	16/0.2	A	-	-	-	-	-	(TD62503P)	(TD62503F)	(TD62503FN)	35/0.2
ULN2082A	common emitter		A	-	-	-	-	-	(TD62503P)	(TD62503F)	(TD62503FN)	
ULN2083A			A	-	-	-	-	-	(TD62507P)	(TD62507F)	-	
ULN2083A-1	5ch single driver	15/0.1	A	-	-	-	-	-	(TD62507P)	(TD62507F)	-	35/0.2
ULS2083H	common emitter		A	-	-	-	-	-	(TD62507P)	(TD62507F)	-	
ULN2086A			A	-	-	-	-	-	(TD62507P)	(TD62507F)	-	
UDN2580A	8ch high active darlington source driver	-50/-0.5	A	-	-	-	-	-	(TD62785P)	(TD62785F)	-	7/-0.5
ULN2801A			A	A	A	-	A	-	TD62081AP	TD62081AF	-	
ULN2802A	8ch high active		A	-	A	-	A	-	TD62082AP	TD62082AF	-	
ULN2803A	darlington sink driver	50/0.5	A	A	A	-	A	-	TD62083AP	TD62083AF	TD62083AFN	50/0.5
ULN2804A			A	A	A	-	A	-	TD62084AP	TD62084AF	TD62084AFN	
ULN2805A			A	-	-	-	-	-	(TD62083AP)	(TD62083AF)	(TD62083AFN)	
ULN2811A			A	-	-	-	-	-	TD62081AP	TD62081AF	-	
ULN2812A	8ch high active		A	-	-	-	-	-	TD62082AP	TD62082AF	-	
ULN2813A	darlington sink driver	50/0.6	A	-	-	-	-	-	TD62083AP	TD62083AF	TD62083AFN	50/0.5
ULN2814A			A	-	-	-	-	-	TD62084AP	TD62084AF	TD62084AFN	
ULN2815A			A	-	-	-	-	-	(TD62083AP)	(TD62083AF)	(TD62083AFN)	
ULN2821A			A	-	-	-	-	-	TD62081AP	TD62081AF	-	
ULN2822A	8ch high active		A	-	-	-	-	-	TD62082AP	TD62082AF	-	
ULN2823A	darlington sink driver	95/0.5	A	-	-	-	-	-	TD62083AP	TD62083AF	TD62083AFN	50/0.5
ULN2824A			A	-	-	-	-	-	TD62084AP	TD62084AF	TD62084AFN	
ULN2825A			A	-	-	-	-	-	(TD62083AP)	(TD62083AF)	(TD62083AFN)	
ULN2841B			A	-	-	-	-	-	-	-	-	-
ULN2842B			A	-	-	-	-	-	-	-	-	-
ULN2843B	4ch high active	50/1.75	A	-	-	-	-	-	-	-	-	-
ULN2844B	darlington sink driver		A	-	-	-	-	-	-	-	-	-
ULN2845B			A	-	-	-	-	-	-	-	-	-
ULN2846B			A	-	-	-	-	-	-	-	-	-
UDN2956A	5ch high active	-80/-0.5	A	-	-	-	-	-	-	-	-	-
UDN2957A	darlington source driver		A	-	-	-	-	-	-	-	-	-
UDN2981A		50/-0.5	A	-	-	-	-	-	TD62783AP	TD62783AF	TD62783AFN	
UDN2982A	8ch high active		A	A	-	-	-	-	TD62784AP	TD62784AF	TD62784AFN	50/-0.5
UDN2983A	darlington source driver	80/-0.5	A	-	-	-	-	-	TD62783AP	TD62783AF	TD62783AFN	
UDN2984A			A	A	-	-	-	-	TD62784AP	TD62784AF	TD62784AFN	
UDN5711M	dual peripheral AND driver		A	-	-	-	(SN75476)	-	(TD62476P)	-	-	
UDN5712M	dual peripheral NAND driver	80/0.6	A	-	-	-	(SN75477)	-	(TD62477P)	-	-	35/0.35
UDN5713M	dual peripheral OR driver		A	-	-	-	(SN75478)	-	(TD62478P)	-	-	
UDN5714M	dual peripheral NOR driver		A	-	-	-	(SN75479)	-	(TD62479P)	-	-	
UDN6116A	6ch segment driver	85/0.04	A	-	-	-	-	-	-	-	-	-
UDN6126A			A	-	-	-	-	-	-	-	-	-
UDN6118A	8ch segment driver	85/0.04	A	-	-	-	-	-	(TD62781AP)	(TD62781AF)	-	60/-0.05
UDN6128A			A	-	-	-	-	-	(TD62782AP)	(TD62782AF)	-	

A: Available

Cross Reference of Standard Transistor Array (vs MOTOROLA)

Device	Package	Function	Rating (V/A)	TOSHIBA	TOSHIBA Rating (V/A)
MC1411P/D MC1412P/D MC1413P/D MC1414P/D	DIP16 SOP16	7ch high active darlington sink driver	50/0.5	TD62001AP TD62002AP TD62003AP TD62004AP	50/0.5
MC1471P	DIP8	dual peripheral AND driver		(TD62476P)	35/0.35
MC1472P	DIP8	dual peripheral NAND driver	80/0.3	(TD62477P)	35/0.35
MC1473P	DIP8	dual peripheral OR driver		(TD62478P)	35/0.35
MC1474P	DIP8	dual peripheral NOR driver		(TD62479P)	35/0.35
ULN2074B	DIP16	4ch high active darlington sink driver	50/1.75	(TD62074P)	50/1.5
ULN2801 ULN2802 ULN2803 ULN2804	DIP18	8ch high active darlington sink driver	50/1.75	(TD62081AP) (TD62082AP) (TD62083AP) (TD62084AP)	50/0.5

TOSHIBA Original Transistor Array

Complementary devices

Low input active driver series

1. Low input active type of standard Tr. array
2. Power supply voltage : Vcc=5.0[V]
3. IOUT = 0.5[A], 0.7[A],1.5[A], -0.5[A]
4. VCE(sus) = 50[V] : A Type
   80[V] : B Type

Standard type

ex. ULN2003AP/FW
TD62003AP/F

Input	Output
Low	OFF
High	ON

Original type

ex. TD62304AP/F
Pin compatible!

Input	Output
Low	On
High	OFF

TOSHIBA Original Transistor Array (1)
Line up

Original Part No.	Package	Function	Rating [V/A]	Feature	Standard Part No.
TD62304AP **TD62304AF** **TD62304AFN** **TD62305AP** **TD62305AF** **TD62305AFN**	DIP16 SOP16 SSOP16 DIP16 SOP16 SSOP16	7ch high active darlington sink driver	50/0.5	non inverer type (low active)	**ULN2003AP,TD62003AP** **ULN2003AFW,TD62003AF** **–** **ULN2004AP,TD62004AP** **ULN2004AFW,TD62004AF** **–**
TD62387AP **TD62387AF** **TD62387AFN** **TD62388AP** **TD62388AF** **TD62388AFN**	DIP18 SOP18 SSOP18 DIP18 SOP18 SSOP18	8ch high active darlington sink driver	50/0.5	non inverer type (low active)	**ULN2803AP,TD62083AP** **ULN2803AFW,TD62083AF** **TD62083AFN** **ULN2804AP,TD62084AP** **ULN2804AFW,TD62084AF** **TD62084AFN**
TD62308AP **TD62308AF** **TD62308BP-1** **TD62308BF**	DIP16 HSOP16 DIP16 HSOP16	4ch high active darlington sink driver	50/1.5 80/1.5	non inverer type (low active)	**TD62064AP** **TD62064AF** **TD62064BP-1** **TD62064BF**
TD62318AP **TD62318AF** **TD62318BP** **TD62318BF**	DIP16 HSOP16 DIP16 HSOP16	4ch high active single sink driver	50/0.7 80/0.7	non inverer type (low active)	**TD62164AP** **TD62164AF** **TD62164BP** **TD62164BF**
TD62786AP **TD62786AF** **TD62786AFN** **TD62787AP** **TD62787AF** **–**	DIP18 SOP18 SSOP18 DIP18 SOP18 SSOP18	8ch high active darlington source driver	50/0.5	non inverer type (low active)	**TD62783AP** **TD62783AF, TD62783AFW** **TD62783AFN** **TD62784AP** **TD62784AF, TD62784AFW** **TD62784AFN**

TOSHIBA Original Transistor Array (2)

(1) Standard + Feature

a) Low saturation driver
b) Single output driver
c) Special driver

(2) 4ch 80v Flat Package line up

(3) SSOP Package line up

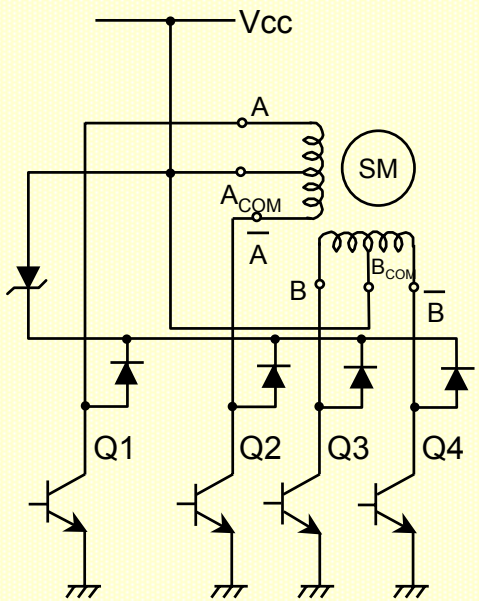
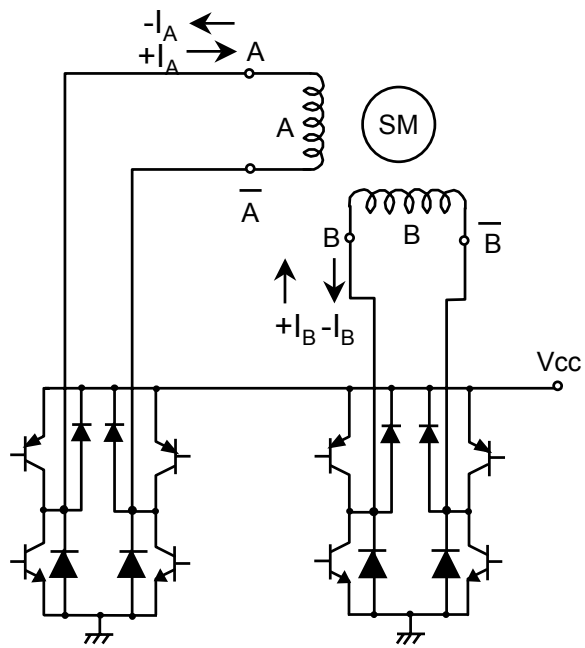
TOSHIBA Original Transistor Array (2)
Line up

Feature	Original Part No.	Package	Function	Rating [VA]
Low saturation driver	TD62309P/F	DIP16/HSOP16	6ch sink driver	20/0.7
	TD62381P/F/FN	DIP18/SOP18/SSOP18	8ch sink driver	15/0.5
	TD62785P/F	DIP18/SOP18	8ch source driver	7/0.5
Single output driver	TD62501P/F	DIP16/SOP16	7ch source driver	35/0.2
	TD62502P/F/FN	DIP16/SOP16/SSOP16		
	TD62503P/F/FN			
	TD62504P/F/FN			
	TD62591AP	DIP18	8ch sink driver	50/0.2
	TD62592AP			
	TD62593AP/AFN	DIP18/SSOP18		
	TD62594AP/AFN			
	TD62595AP/AF	DIP18/SOP18		
	TD62596AP/AF			
	TD62597AP/AF/AFN	DIP18/SOP18/SSOP18		
	TD598AP/AF/AFN			
Special driver	TD62601P/F	DIP16/SOP16	6ch threshold free driver	20/0.01
	TD62602P/F			
	TD62603P/F			
	TD62604P/F			

4ch BP-1 & BF Series

Recommended for 80V Applications

Application

Circuit		
Drive	4 Phase Unipolar Driver	2 Phase Bipolar Driver
Feature	High Speed	High Torque

TOSHIBA INTERFACE DRIVER

SSOP Package

Sep.1999

SSOP package series

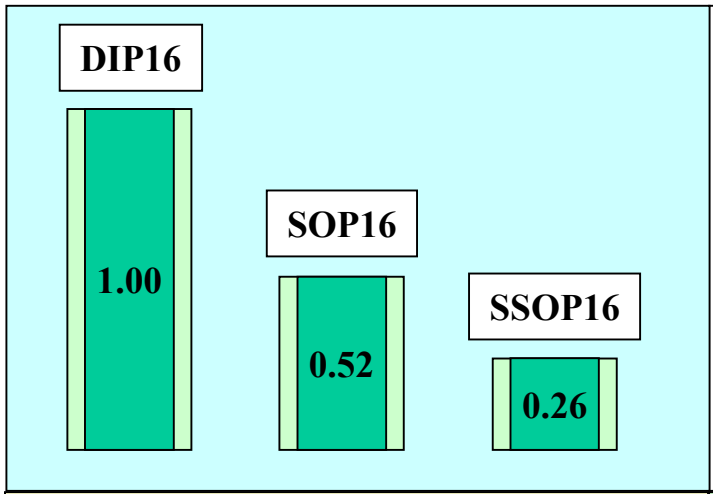
1. Very small mounting area (0.65mm pitch SSOP Package)
   Suitable for many outputs application and
   small boad application

2. Power dissipation
   PD = 0.78[W] @ SSOP16
   0.96[W] @ SSOP18/SSOP20
   (on Glass Epoxy PCB : 50x50x1.6mm Cu 40%)

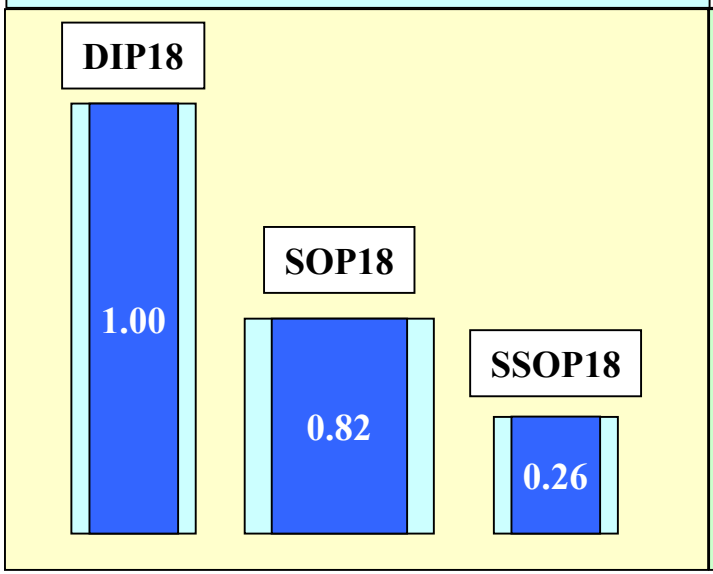
3. SSOP series : Total 18 parts

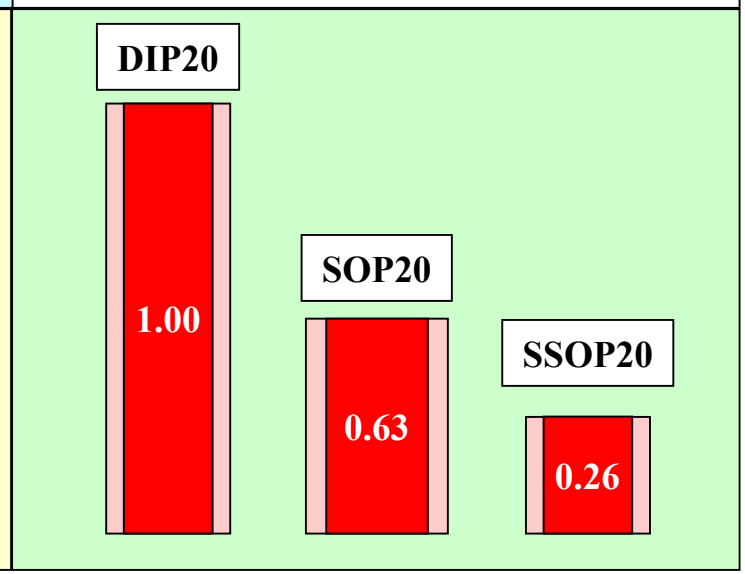
SSOP16-P-225-0.65B	5 parts
SSOP18-P-225-0.65A	11 parts
SSOP20-P-225-0.65A	2 parts

Package size Comparisons



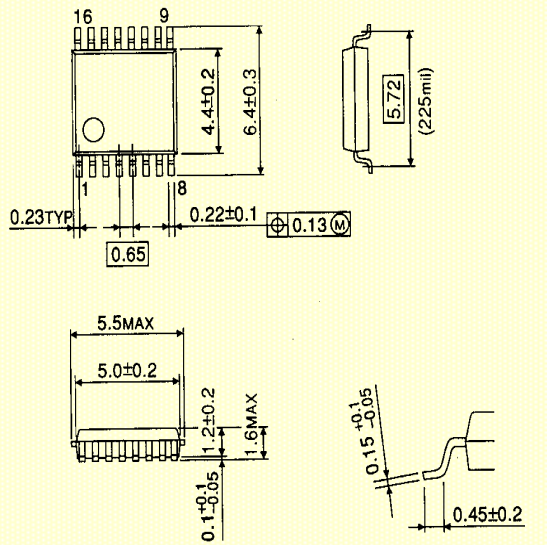
Package	Mounting Area
SSOP16-P-225-0.65B	6.4 x 5.0 [mm²]
SSOP18-P-225-0.65A	6.4 x 6.5 [mm²]
SSOP20-P-225-0.65A	6.4 x 6.5 [mm²]



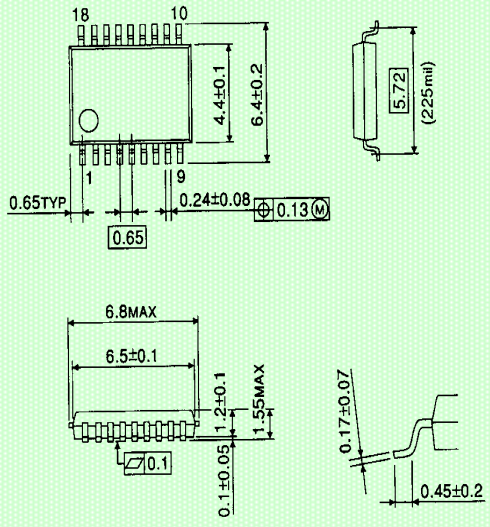


Package Outline

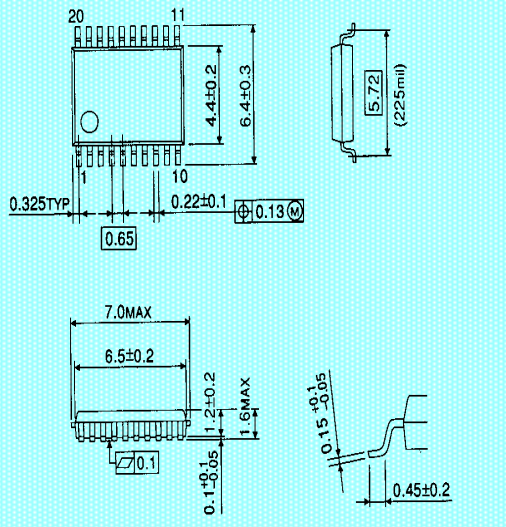
SSOP16-P-225B(VSOP-16)



SSOP18-P-225A(VSOP-18)



SSOP20-P-225A(VSOP-20)



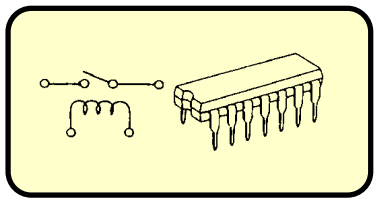
SSOP Package Line Up

All products : Under mass production

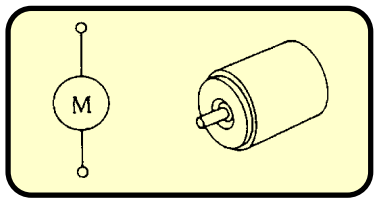
PART NUMBER	PACKAGE	OUTPUT SUSTAINED VOLTAGE(V)	OUTPUT CURRENT(mA)	FUNCTION
TD62304AFN	SSOP16-P-225-0.65B	50	500	7CH LOW ACTIVE DARLINGTON DRIVERS
TD62305AFN	SSOP16-P-225-0.65B	50	500	7CH LOW ACTIVE DARLINGTON DRIVERS
TD62502FN	SSOP16-P-225-0.65B	35	200	7CH SINGLE DRIVERS
TD62503FN	SSOP16-P-225-0.65B	35	200	8CH DARLINGTON DRIVERS
TD62504FN	SSOP16-P-225-0.65B	35	200	8CH DARLINGTON DRIVERS
TD62083AFN	SSOP18-P-225-0.65A	50	500	8CH DARLINGTON DRIVERS
TD62084AFN	SSOP18-P-225-0.65A	50	500	8CH LOW SATURATION DRIVERS
TD62381FN	SSOP18-P-225-0.65A	15	500	8CH LOW SATURATION DRIVERS
TD62382AFN	SSOP18-P-225-0.65A	50	50	8CH LOW ACTIVE SATURATION DRIVERS
TD62593AFN	SSOP18-P-225-0.65A	50	200	8CH SINGLE DRIVERS
TD62594AFN	SSOP18-P-225-0.65A	50	200	8CH SINGLE DRIVERS
TD62597AFN	SSOP18-P-225-0.65A	50	200	8CH SINGLE DRIVERS
TD62598AFN	SSOP18-P-225-0.65A	50	200	8CH SINGLE DRIVERS
TD62783AFN	SSOP18-P-225-0.65A	50	500	8CH DARLINGTON SOURCE DRIVERS
TD62784AFN	SSOP18-P-225-0.65A	50	500	8CH DARLINGTON SOURCE DRIVERS
TD62786AFN	SSOP18-P-225-0.65A	50	500	8CH DARLINGTON SOURCE DRIVERS
TD62387AFN	SSOP20-P-225-0.65A	50	500	8CH LOW ACTIVE DARLINGTON DRIVERS
TD62388AFN	SSOP20-P-225-0.65A	50	500	8CH LOW ACTIVE DARLINGTON DRIVERS

IFD Applications

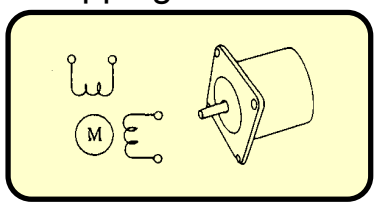
Relay



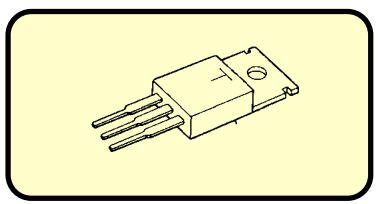
Motor

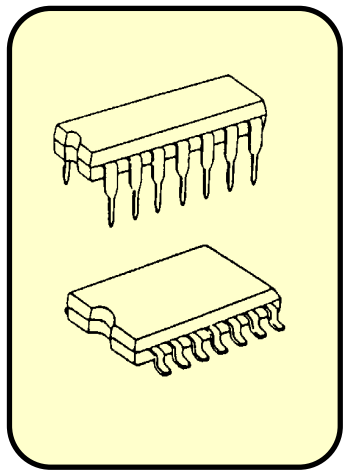


Stepping Motor

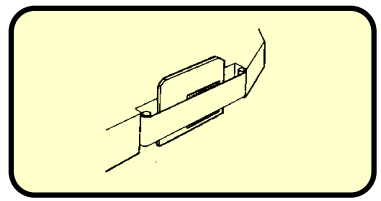


FET

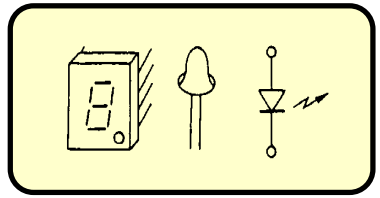




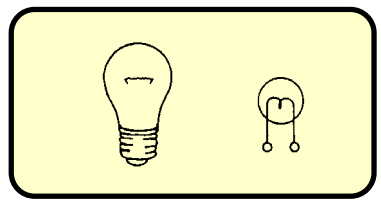
Thermal Head



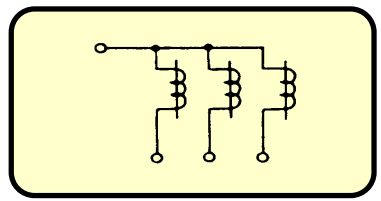
LED



Lamp



Plunger,Solenoid,Clutch

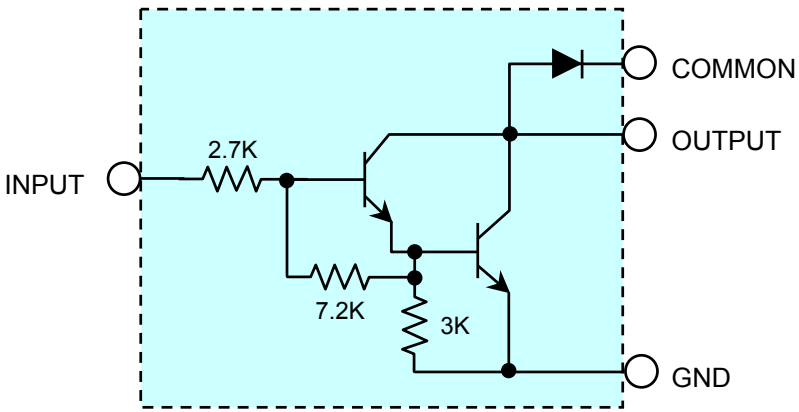


TOSHIBA ULN2000 Series

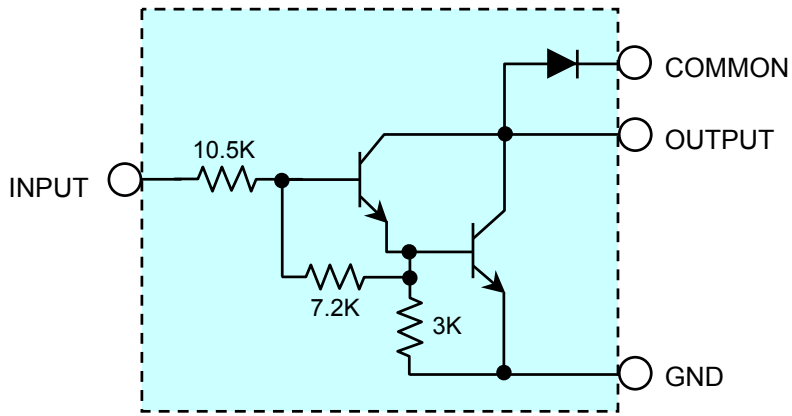
Line up : ULN2003AP/AFW, ULN2004AP/AFW,
ULN2803AP/AFW, ULN2804AP/AFW

1. **VCE(SUS) = 50V (Max)**
2. **IOUT = 500mA/ch (Max)**
3. **Built in Clamp diodes for inductive loads drive**

4. **Package : ULN2003A,ULN2004A (7ch) DIP16,SOL16**
ULN2803A,ULN2804A (8ch) DIP18,SOL18



ULN2003AP/AFW : 7ch
ULN2803AP/AFW : 8ch
(BUILT-IN 2.7K INPUT RESISTOR)
OPERATE DIRECTLY WITH TTL OR 5V CMOS



ULN2004AP/AFW : 7ch
ULN2804AP/AFW : 8ch
(BUILT-IN 10.5K INPUT RESISTOR)
OPERATE DIRECTLY WITH 6V-15V CMOS

TOSHIBA Original Transistor Array 2

(1) Standard + Feature

a) Low saturation driver

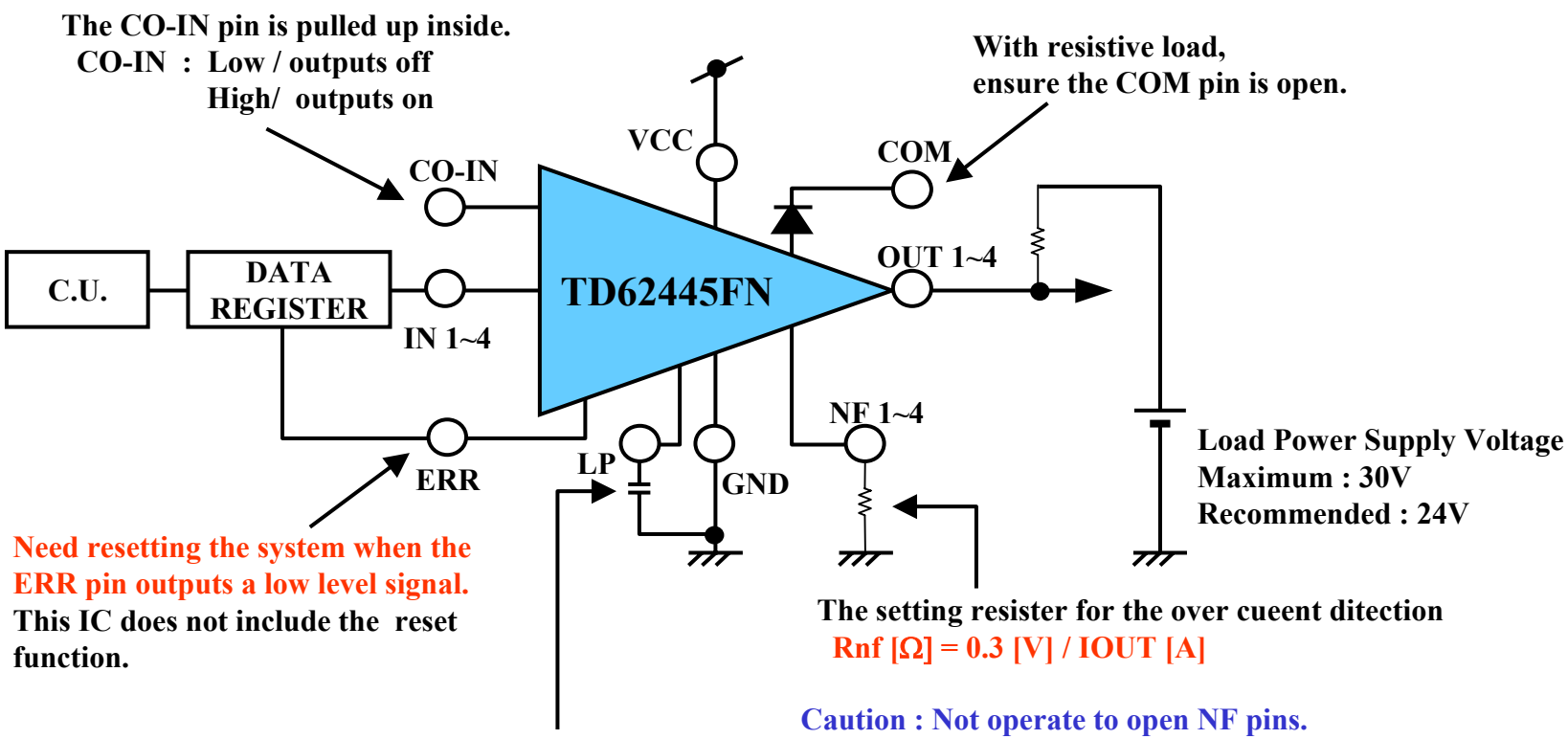
b) Single output driver

c) Special driver

(2) 4ch 80v Flat Package line up

(3) SSOP Package line up

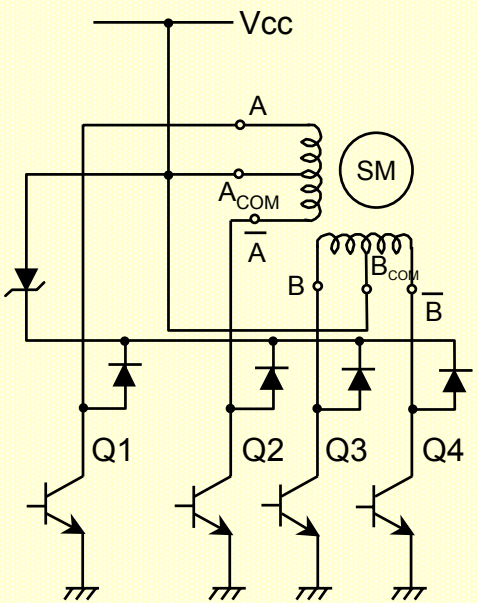
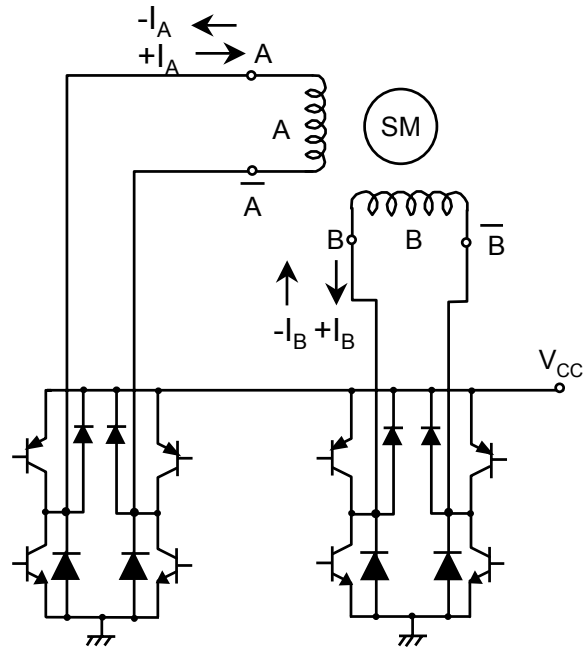
TD62445FN
Application circuit



4ch BP-1 & BF Series

Recommended for 80V Applications

Application

Circuit		
Drive	4 Phase-Unipolar Driver	2 Phase-Bipolar Driver
Feature	High Speed	High Torque

TD62064BP-1, TD62164BP/BF, TD62308BP-1/BF, TD62318BP/BF

4ch High Current Darlington Sink Drivers

Recommended 4ch & 80V Series

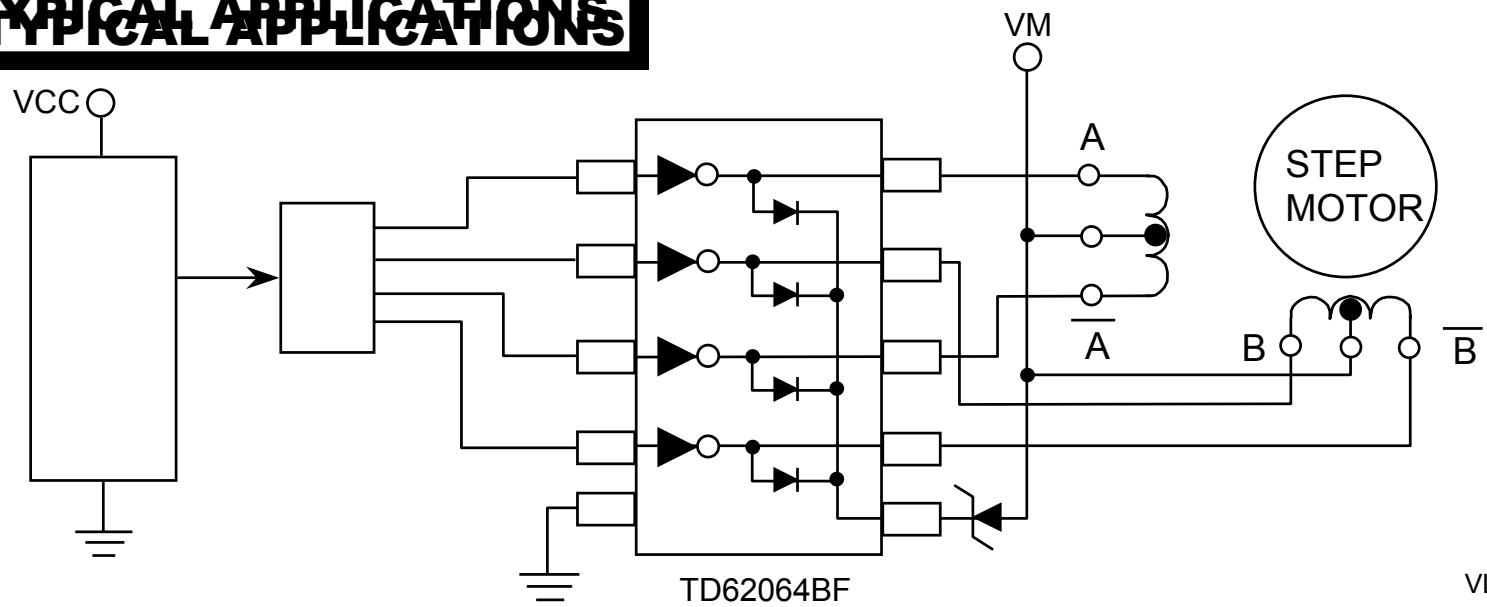
The BP & BF Series are high voltage, high current darlington drivers comprised of four NPN darlington pairs. All units feature integral clamp diode for switching inductive Loads. Applications include relay, hammer, lamp and stepping motor drivers.

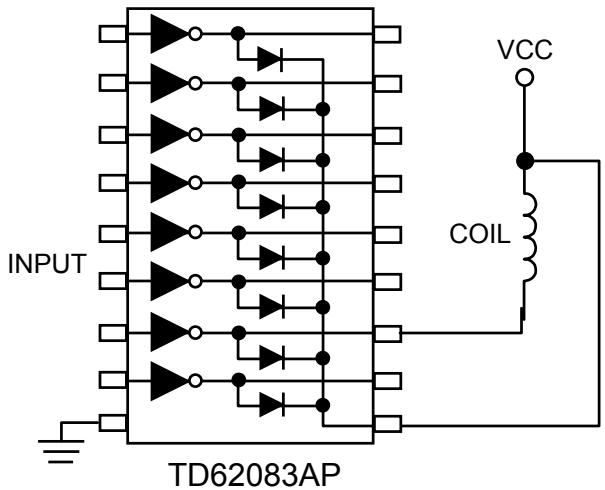
- **High Sustained Voltage Output:**: Vce(sus)=80V(min.)
- **Output Current:**
  TD62064/308 Iout=1.5A/ch(MAX.)
  TD62164/318 Iout=0.7A/ch(MAX.)
- **Output Clamp Diodes**
- **Input Compatible with TTL and 5V CMOS**
- **GND and SUB Terminal = Heat Sink**
- **Package:**
  BP/BP-1: DIP16-P-300 (Dual In line Package;DIP-16
  BF: HSOP16-P-300 (Power Flat Package;PFP-16).

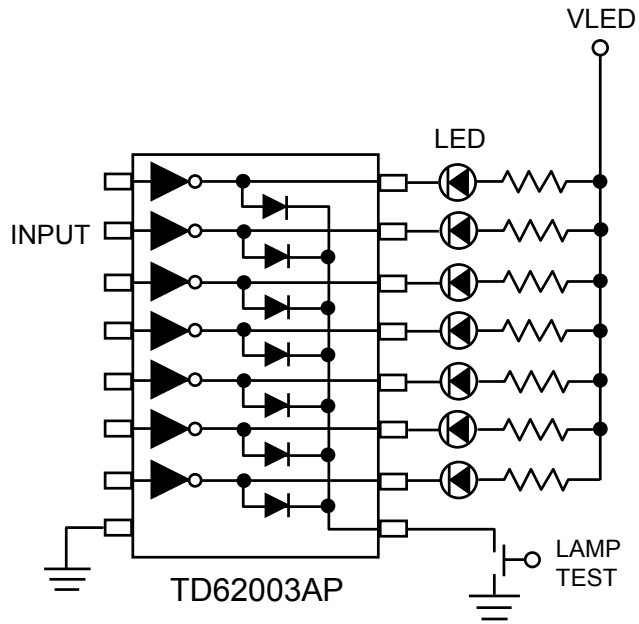
Maximum Ratings (Ta=25degC unless otherwise noted)

Characteristic		Symbol	Rating	Unit
Output Sustained Voltage		VCE(SUS)	80	V
Parasitic Transistor Output Voltage		VCEF	80	V
Output Current	TD62064	IOUT	1.5	A/ch
	TD62308			
	TD62164		0.7	
	TD62318			
Input Current	TD62064	IIN	50	mA
	TD62308			
	TD62164		10	
	TD62318			
Input Voltage	TD62064	VIN	7	V
	TD62308			
	TD62164		17	
	TD62318			
Power Dissipation	BP,BP-1	PD	27	W
	BF		1.4	
Operating Temperature		Topr	-40 to 85	deg C
Storage Temperature		Tstg	-55 to 150	

TYPICAL APPLICATIONS







IFD (Interface Driver) for FAX

Application : (1) driver for 4 phase unipolar stepping motor of paper feeder (in receiving/sending)
(2) driver for LED display panel
(3) driver for solenoid of paper cutter

Recommended Devices:

Device	Stepping motor	LED	Solenoid
ULN2003AP	X	X	X
TD62003AP	X	X	X
TD62064AP	X	-	-
ULN2803AP	-	X	X
TD62083AP	-	X	X

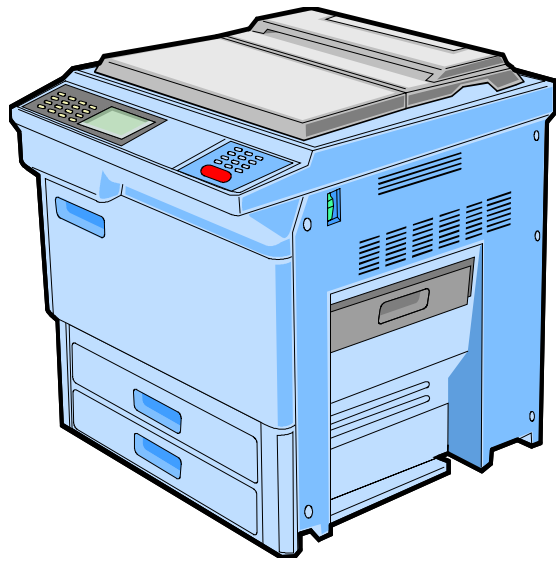
IFD (Interface Driver) for PPC

Application :

(1) driver for solenoid and clutch in PPC engine
(2) driver for stepping motor in scanner
(3) driver for LED display pannel

Recommended Devices:

Device	Solenoid	Clutch	Stepping motor	LED	Plunger	Relay
ULN2003AP	X	X	-	X	-	X
TD62003AP	X	X	-	X	-	X
ULN2803AP	X	X	-	-	-	-
TD62083AP	X	X	-	-	-	-
TD62308AP	-	-	X	-	X	-
308AF	X	X	-	-	X	-
TD62304AP	X	X	-	X	-	X



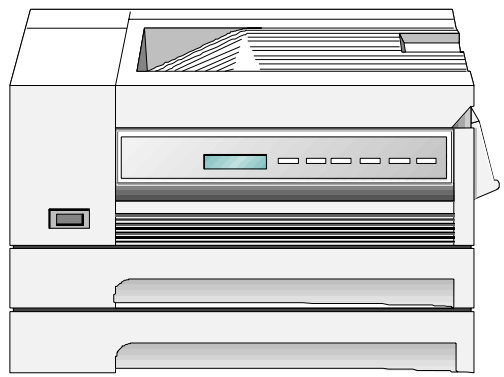
IFD (Interface Driver) for Printer

Application:

(1) driver for carriage motor of printing head
(2) driver for 4 phase unipolar stepping motor of paper feeder
(3) driver for printing head

Recommended Devices:

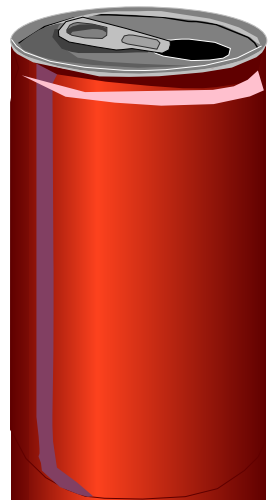
Device	Carriage motor	Stepping motor	Head driver
TD62708N	-	-	X
ULN2803AP	X	X	X
TD62083AP	X	X	X
TD62064AP/BP-1	X	X	-
TD308AP/BP-1	X	X	-



IFD (Interface Driver) for Vending Machine

- Application : (1) driver for interface between 24V (power parts) and 5V (micro processor)
  (2) driver for 24V communication (4800bps)
  (3) driver for relay matrix for sending goods
- Recommended Devices :

Device	Interface between 24V and 5V	24V Communication	Relay
TD62502P/F/FN	—	X	—
TD62503P/F/FN	X	—	—
TD62783AP/AF/AFN	—	—	X
ULN2803AP/AFW	—	—	X
TD62083AP/AF/AFN	—	—	X
TD62650F	X	X	—
TD62651F	X	X	—
TD62652F	X	X	—
TD62445FN	—	—	X



TD62930P,TD62930F
3ch Small Signal IGBT Gate Driver

- Suitable for driving IGBT for home appliances
- 5V CMOS compatible inputs
- Easy on/off timing control of IGBT
  by the separated output (High side & Low side)

Absorute Maximum Ratings (Ta=25degC)

Power Supply Voltage : VCC = 30 [V]
VDD = 7[V]

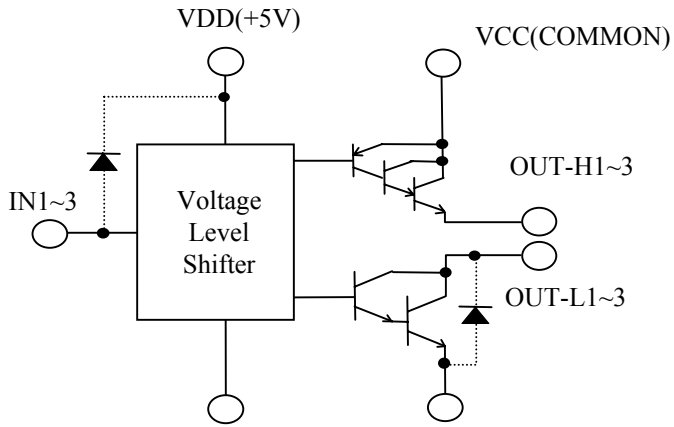
Output Current
High side peak source current : IOUT = -0.4 [A]
Low side peak sink current : IOUT = 0.4[A]

Operating Temperature : -20 to +85 [degC]
Storage Temperature : -55 to +150 [degC]

Package

TD62930P : DIP16-P-300-2.54A
TD62930F : SOP16-P-225-1.00A

Equivalent internal circuit (Each channel)



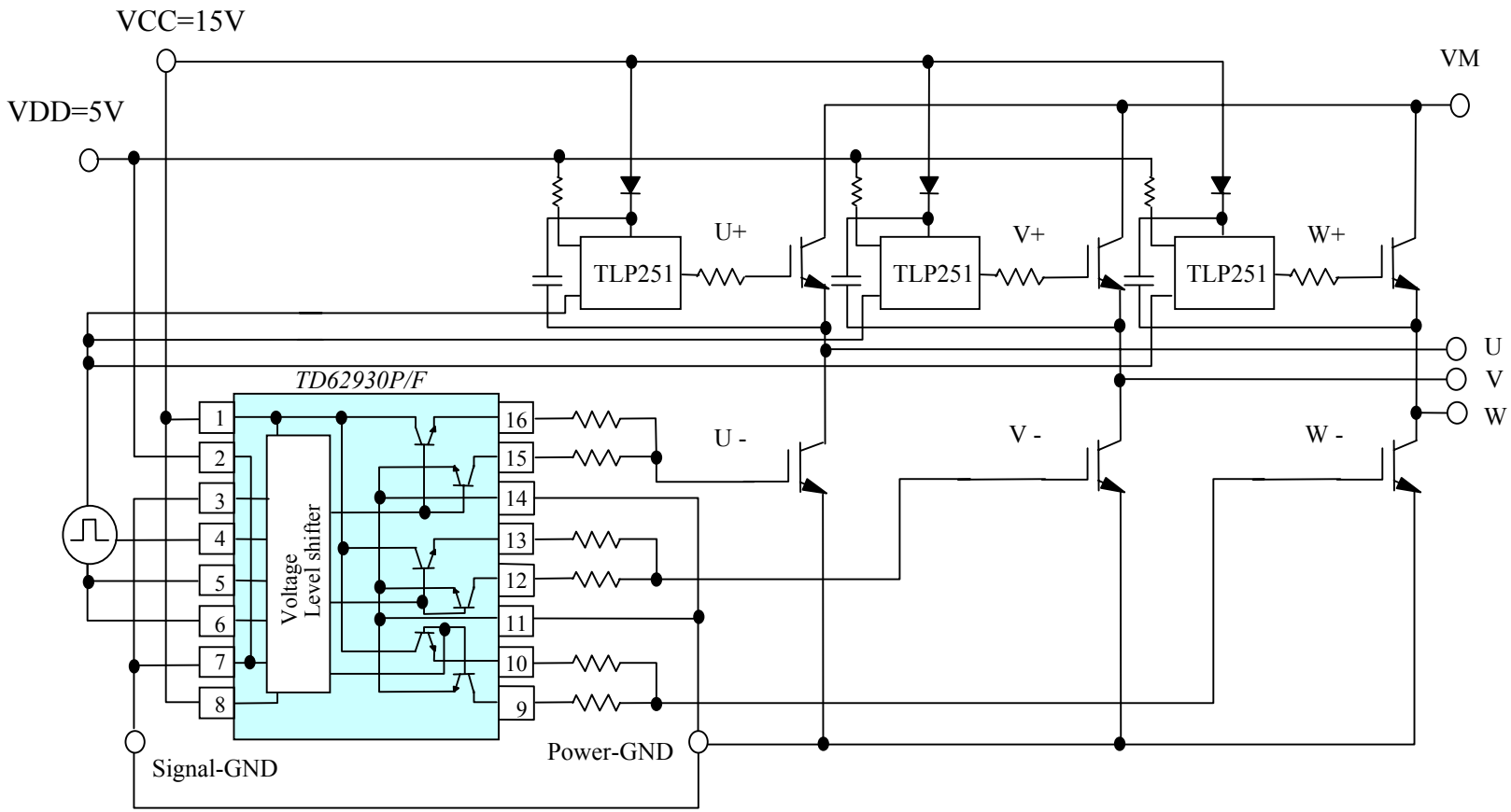
Function Table

Input	Low side Output	High side Output
Low	Low	Hi-Z
High	Hi-Z	High

Hi-Z : High Impedance

TD62930P,TD62930F

example for Application circuit

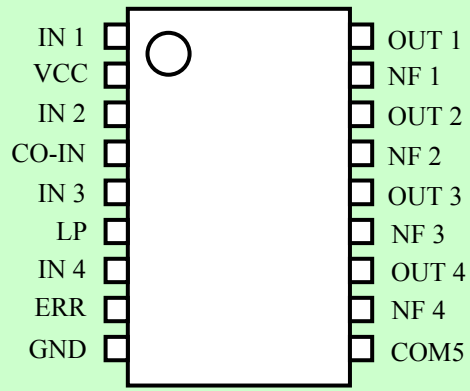


TD62445FN

4Bit Relay Drivers with Over Current Detection

- 4Bit low satulation sink drivers
- Built in the **over current detection**
- Each output current limit is set up by each external resistor.
- TTL compatible inputs

Pin Connection (Top View)



Absorute Maximum Ratings (Ta=25degC)

Power Supply Voltage : VCC = 7 [V]

Output Sustainning Voltage : VCEO = 30 [V]

Output Current : IOUT = 150 [mA/ch]

Operating Temperature : -10 to +85 [degC]

Storage Temperature : -55 to +150 [degC]

Package

TD62445FN : SSOP18-P-225-0.65

Function Table

IN 1~4	CO-IN	OUT 1~4	NF 1~4 - GND	ERR
L	H	OFF	0 [V]	OFF
H	H	ON	Less than 0.3 [V]	OFF
H	H	ON	Less than 0.3 [V]	ON
X	L	OFF	0 [V]	OFF