DATA SHEET

# COMPOUND FIELD EFFECT POWER TRANSISTOR $\mu$ PA1604

# MONOLITHIC POWER MOS FET ARRAY

## DESCRIPTION

The  $\mu$ PA1604 is Monolithic N-channel Power MOS FET Array that built in 4 circuits, Clump Diode and resistances designed for LED, Relay, Thermal Head, and so on.

## **FEATURES**

- Direct driving is possible by standard Logic IC or Microcomputer. (4 V driving is possible)
- Output Voltage: Vo(peak) = 50 V MAX.
  Output Current: lo(peak) = 1.5 A MAX.
- Ron = 1  $\Omega$  TYP. at: Io = 600 mA, VI = 4.5 V
- Wide Operation Temperature: -40 to +85 °C
- Output Voltage Clump Diode built in.
- Low Input Active

## **ORDERING INFORMATION**

Part Number	Package	Quality Grade
μΡΑ1604CX	16-Pin DIP	Standard

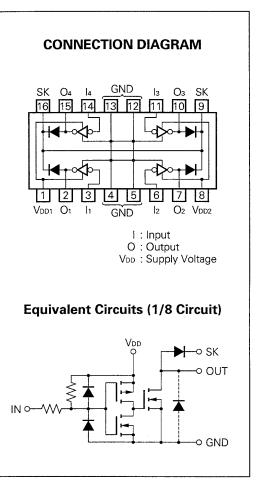
Please refer to "Quality grade on NEC Semiconductor Devices" (Document number IEI-1209) published by NEC Corporation to know the specification of quality grade on the devices and its recommended applications.

### ABSOLUTE MAXIMUM RATINGS (Ta = 25 °C)

Supply Voltage	Vdd	-0.5 to +7.0	V
Output Voltage	VO(DC)	30	V
Output Peak Voltage*	VO(peak)	50	V
Input Voltage	Vi	-0.5 to VDD +0.5	V
Output Current (DC)		870	mA/unit
Output Current (pulse)**	O(puise)	1500	mA/unit
Input Current	h	±10	mA/unit
Diode Reverse Voltage	VR	50	V
Diode Forward Current	١F	1500	mA/unit
Total Power Dissipation	Po	1.0	W/PKG
Operating Temperature	Topt	-40 to +85	°C
Storage Temperature	Tstg	–55 to +150	°C

\* PW  $\leq 10$  ms, Duty Cycle  $\leq 50$  %

\*\* PW ≦ 10 ms, Duty Cycle ≦ 30 %



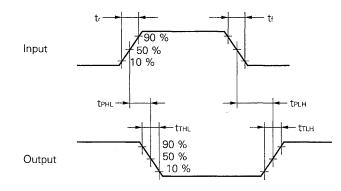
# **RECOMMENDED OPERATING CONDITIONS (Ta = -40 to +85 °C)**

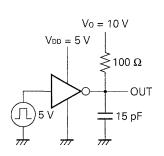
CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
Supply Voltage	VDD	4.5	5.0	5.5	V	
Output Voltage	Vo(DC)			28	V	
	Ιο(DC)			540	mA/unit	DC, 1 circuit
Output Current	IO(pulse)			600	mA/unit	PW ≦ 10 ms, Duty Cycle ≦ 20 %, 4 circuits
Input Voltage	Vi	0		5	V	
High-Level Input Voltage	Vih	2			v	
Low-Level Input Voltage	ViL			0.8	V	
Diode Reverse Voltage	Vr			40	V	
Diode Forward Current	lF			600	mA	

## ELECTRICAL CHARACTERISTICS (Ta = 25 °C)

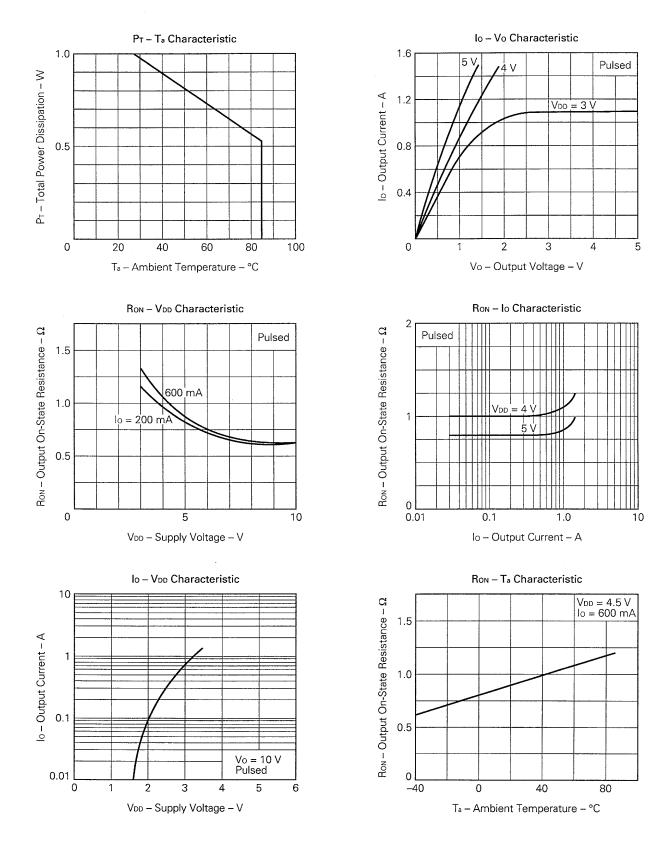
CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS	
Supply Voltage	DD(ON)			1	mA	$V_{DD} = 5.5 V, V_1 = 0$	
				10	μA	Vdd = 5.5 V, Vi = 5.5 V	
Output Leakage Current	lo(off)	-		10	μA	$V_{DD} = 5.5 V, V_1 = 5.5 V, V_0 = 50 V$	
Output On-state Resistance	Ron		1	1.3	Ω	V <sub>DD</sub> = 4.5 V, V <sub>I</sub> = 0, Io = 600 mA	
Output On state Voltage				0.1	V	VDD = 4.5 V, VI = 0, Io = 10 mA	
Output On-state Voltage				1.0	v	$V_{DD} = 4.5 \text{ V}, \text{ V}_{i} = 0, \text{ io} = 600 \text{ mA}$	
	VI(OFF)	2			V	$V_{DD} = 5 \text{ V}, \text{ Vo} = 50 \text{ V}, \text{ Io} = 100 \ \mu\text{A}$	
Input Voltage	VI(ON)1			0.8	V	VDD = 5 V, Vo = 0.8 V, Io = 1 mA	
Input Current	Ін			10	μA	$V_{DD} = 5.5 \text{ V}, \text{ Vi} = 5.5 \text{ V}, \text{ Vo} = 0 \text{ V}$	
input current	lı.			-1	mA	$V_{DD} = 5.5 V, V_1 = 0 V, V_0 = 50 V$	
Input Capacitance	Cin		10		pF	f = 1 MHz	
Delay Time	tрнl		70		ns	$V_{DD} = 5 V, R_L = 100 \Omega$	
Delay Time	tр⊥н		50		ns	$V_{0} = 10 \text{ V}, \text{ CL} = 15 \text{ pF}$	
Rise Time	tтьн		40		ns	tr, tr≦5 ns See Fig. 1	
Fall Time	tтнı		110		ns		
Diada Laskaga Current	rrent Is			50	μA	V <sub>R</sub> = 50 V, T <sub>a</sub> = 25 °C	
Diode Leakage Current				100	μA	V <sub>R</sub> = 50 V, T <sub>a</sub> = 85 °C	
Diode Forward Voltage	VF			2	V	I⊧ = 1.25 A	

## Fig. 1 Switching Wave Forms and Test Circuits

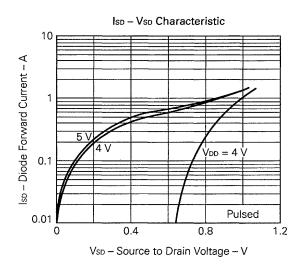




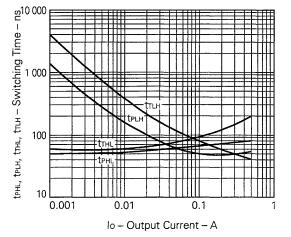
## TYPICAL CHARACTERISTICS (T<sub>a</sub> = 25 °C)



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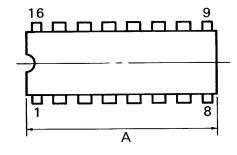
tphl, tplh, tthl, ttlh - lo Characteristic

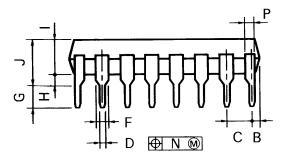


## PACKAGE DIMENSIONS

• *µ***PA1604CX** 

16PIN PLASTIC DIP (300 mil)







P16C-100-300A,C

#### NOTES

- Each lead centerline is located within 0.25 mm (0.01 inch) of its true position (T.P.) at maximum material condition.
- Item "K" to center of leads when formed parallel.

ITEM	MILLIMETERS	INCHES
А	20.32 MAX.	0.800 MAX.
В	1.27 MAX.	0.050 MAX.
С	2.54 (T.P.)	0.100 (T.P.)
D	0.50 <sup>±0.10</sup>	0.020 +0.004
F	1.2 MIN.	0.047 MIN.
G	3.5 <sup>±0.3</sup>	0.138 <sup>±0.012</sup>
н	0.51 MIN.	0.020 MIN.
I	4.31 MAX.	0.170 MAX.
J	5.08 MAX.	0.200 MAX.
к	7.62 (T.P.)	0.300 (T.P.)
L	6.4	0.252
м	0.25 - 0.05	0.010 - 0.004
N	0.25	0.01
Р	1.0 MIN.	0.039 MIN.

## **RECOMMENDED SOLDERING CONDITIONS**

The following conditions (see table below) must be met when soldering this product.

Please consult with our sales offices in case other soldering process is used, or in case soldering is done under different conditions.

## **TYPES OF THROUGH HOLE MOUNT DEVICE**

#### μPA1604CX

Soldering process	Soldering conditions	Symbol
Wave soldering	Solder temperature: 260 °C or below, Flow time: 10 seconds or below	

#### Reference

Document name	Document No.
Quality control of NEC semiconductors devices.	TEI-1202
Quality control guide of semiconductors devices.	MEI-1202
Assembly manual of semiconductors devices.	IEI-1207
Semiconductor device package manual	IEI-1213
SMD surface mount technology manual	IEI-1207

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Application examples recommended by NEC Corporation.

Standard: Computer, Office equipment, Communication equipment, Test and Measurement equipment, Machine tools, Industrial robots, Audio and Visual equipment, Other consumer products, etc.

Special: Automotive and Transportation equipment, Traffic control systems, Antidisaster systems, Anticrime systems, etc.

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