

**MMI**

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**DC/DC CONVERTER  
2W**

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# MMI 13D-2W SERIES

## 1000VDC SINGLE OUTPUT 2 WATT DC-DC CONVERTER

### FEATURES

- 4 PIN SIP PACKAGE.
- 1000VDC ISOLATION.
- UNREGULATED OUTPUT TYPES.
- UL 94V-0 PACKAGE MATERIAL.
- WIND TEMPERATURE PERFORMANCE AT FULL 2 WATT LOAD, -40°C TO 85°C



### GENERAL SPECIFICATIONS

- ISOLATION RESISTANCE :1000M $\Omega$  MIN @500VDC
- SWITCHING FREQUENCY :90KHz TYP.
- OPERATING TEMPERATURE :-40 °C TO 85°C
- ISOLATION VOLTAGE :1000 VDC
- RIPPLE AND NOISE :200 mVp-p MAX

### ELECTRICAL SPECIFICATIONS

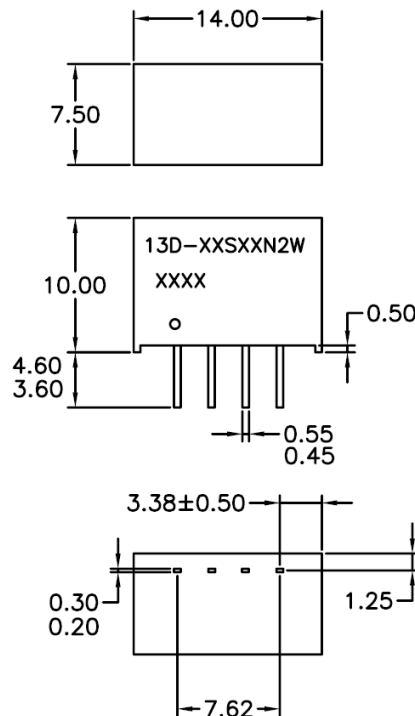
- INPUT VOLTAGE RANGE : $\pm$ 10%
- OUTPUT VOLTAGE TOLERANCE : $\pm$ 5%
- LINE REGULATION(10% TO 100% F.L.) : $\pm$ 1.2%/1% OF Vin
- LOAD REGULATION(10% TO 100% F.L.)  
5V AND 15V OUTPUT TYPES :15% MAX  
9V AND 12V OUTPUT TYPES :10% MAX

Specifications typical at TA=25°C, nominal input voltage and rated output current unless otherwise specified

PART NUMBER	NOMINAL INPUT VOLTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT	RIPPLE AND NOISE	INPUT CURRENT AT RATED LOAD	EFFICIENCY	ISOLATION CAPACITANCE
	(V)	(V)	(mA)	(mVp-p)	(mA)	(%)	(pF)
13D-05S05N2W	5	5	400	96	513	78	19
13D-05S09N2W	5	9	222	67	492	81	27
13D-05S12N2W	5	12	167	59	479	84	32
13D-05S15N2W	5	15	133	53	481	83	27
13D-12S05N2W	12	5	400	76	207	81	28
13D-12S09N2W	12	9	222	63	198	84	42
13D-12S12N2W	12	12	167	53	197	85	46
13D-12S15N2W	12	15	133	45	197	85	54

### MARKINGS AND DIMENSIONS

### PIN CONNECTION



PIN	SINGLE OUTPUT
1	-INPUT
2	+INPUT
3	-OUTPUT
4	+OUTPUT

Dimensions: inches/mm

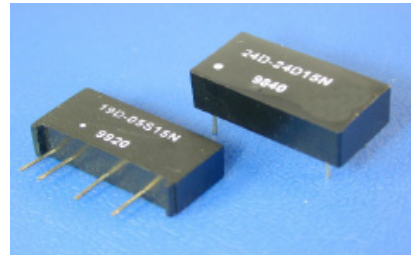
Unless otherwise specified, all tolerances are  $\pm$ .005/ $\pm$ 0.13



# 1000VDC DUAL OUTPUT 19D/24D SERIES 2WATT DC-DC CONVERTER

## FEATURES

- 7 PIN SIP AND 14 PIN DIL PACKAGE.
- 1000VDC ISOLATION.
- UL 94V-0 PACKAGE MATERIAL.



## GENERAL SPECIFICATIONS

- OUTPUT RIPPLE & NOISE :150mVp-p(20MHz B.W.)
- ISOLATION RESISTANCE :1000MΩ MIN @500VDC
- SWITCHING FREQUENCY :75KHz TYP.
- OPERATING TEMPERATURE :0 °C TO 70°C
- SHORT CIRCUIT PROTECTION :SHORT TERM
- ISOLATION VOLTAGE :1000 VDC

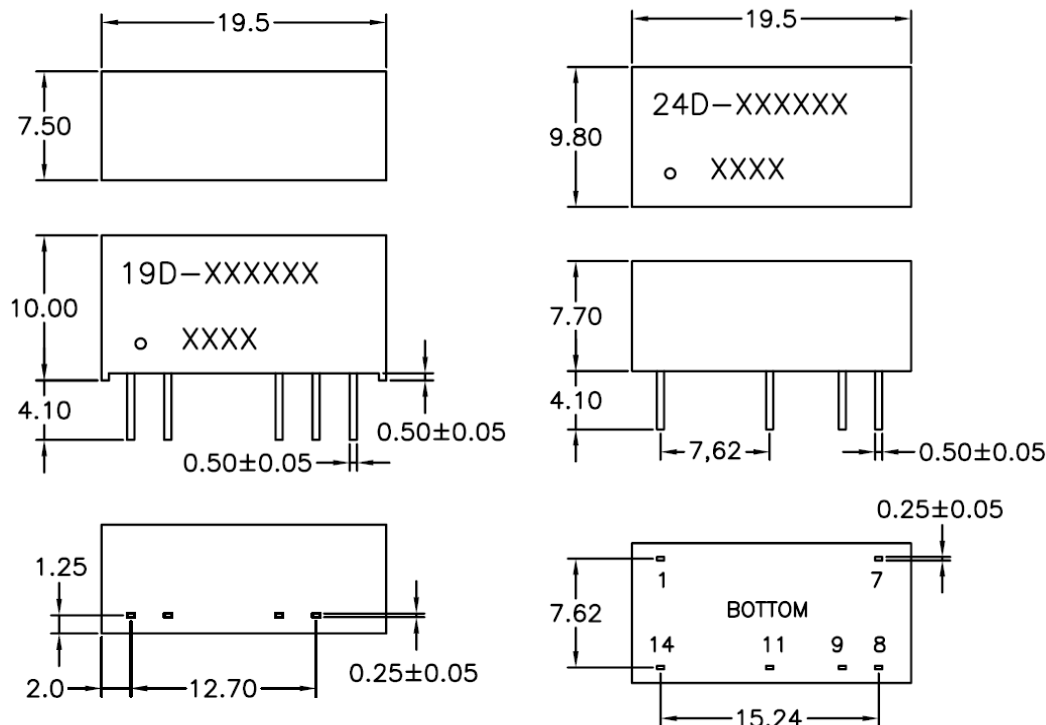
## ELECTRICAL SPECIFICATIONS

- INPUT VOLTAGE RANGE :±10%
- OUTPUT VOLTAGE TOLERANCE :±5%
- LINE REGULATION(10% TO 100% F.L.) :±1.2% OF Vin
- LOAD REGULATION(10% TO 100% F.L.) :15% MAX
- 5V OUTPUT TYPES :10% MAX
- 9V,12V AND 15V OUTPUT TYPES :10% MAX

### 5v,12v,24v input types

PART NUMBER	OUTPUT VOLTAGE (VDC)	OUTPUT CURRENT (mA)	EFFICIENCY (% TYP.)	PACKAGE STYLE
19D-XXD05N	±5	±200	65	1
19D-XXD09N	±9	±111	70	1
19D-XXD12N	±12	±83	70	1
19D-XXD15N	±15	±67	70	1
24D-XXD05N	±5	±200	65	2
24D-XXD09N	±9	±111	70	2
24D-XXD12N	±12	±83	70	2
24D-XXD15N	±15	±67	70	2

## MARKINGS AND DIMENSIONS



## PIN CONNECTION

PIN	7PIN SIP		14PIN DIL
1	+INPUT	1	-INOUT
2	-INPUT	7	NC
4	-OUTPUT	8	COMMON
5	COMMON	9	+OUTPUT
6	+OUTPUT	11	-OUTPUT
		14	+INPUT

Dimensions:inches/mm

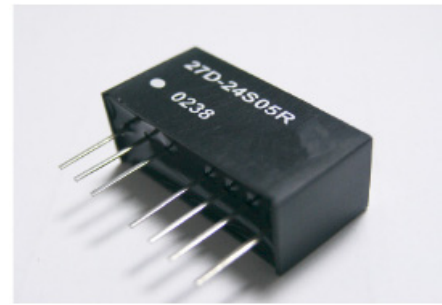
Unless otherwise specified, all tolerances are ±.005/±0.13

## FEATURES

- 2:1 WIDE INPUT VOLTAGES RANGE
- EFFICIENCY TO 83%
- UL 94V-0 PACKAGE METERIAL
- CONTINUOUS SHORT CIRCIUT PROTECTION WITH CURRENT FOLDBACK
- LOW RIPPLE AND NOISE

## GENERAL SPECIFICATIONS

- RIPPPLE & NOISE (VOUT = 5-9V TYPES) : 100mVp-p MAX (20MHz B.W.)
- RIPPPLE & NOISE (VOUT = 12-15VTYPES) : 1% OF VOUT
- ISOLATION VOLTAGE : 1KVDC
- SWITHINGFREQUENCY : 50KHz MIN
- SHORT CIRCUIT PROTECTION : CONTINUOUS
- OPERATING TEMPERATURE : -40°C TO 85°C
- STORAGE TEMPERATURE RANGE : -50°C TO 130°C



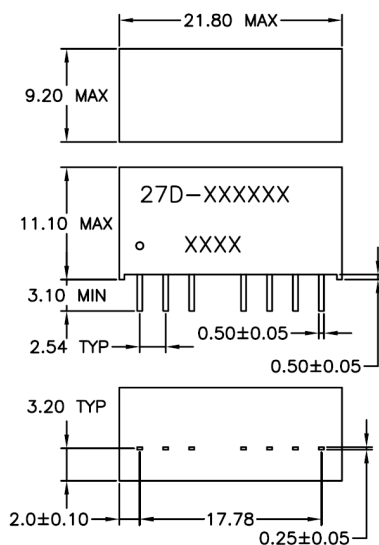
## ELECTRICAL SPECIFICATIONS

- INPUT VOLTAGE RANGE : 2 : 1
- OUTPUT VOLTAGE TOLERANCE : ±3%
- LINE REGULATION (REGULATED) : 0.5% MAX
- LOAD REGULATION (REGULATED) : 0.8% MAX
- EFFICIENCY : UP TO 83%

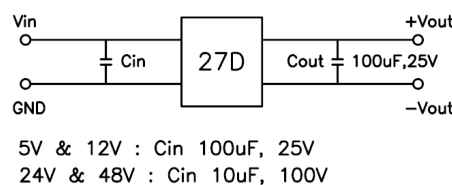
(Typical at nominal input , rated load and 25°C unless otherwise specified)

PART NO.	INPUT VOLTAGE RANGE	OUTPUT VOLTAGE RANGE	OUTPUT CURRENT	EFFICIENCY (%)	MTBF KHrs
27D-05S05R	5-9VDC	5VDC	400mA	66	>1000
27D-05S09R	5-9VDC	9VDC	222mA	71	
27D-05S12R	5-9VDC	12VDC	167mA	71	
27D-05S15R	5-9VDC	15VDC	133mA	73	
27D-12S05R	9-18VDC	5VDC	400mA	73	
27D-12S09R	9-18VDC	9VDC	222mA	79	
27D-12S12R	9-18VDC	12VDC	167mA	80	
27D-12S15R	9-18VDC	15VDC	133mA	81	
27D-24S05R	18-36VDC	5VDC	400mA	74	
27D-24S09R	18-36VDC	9VDC	222mA	81	
27D-24S12R	18-36VDC	12VDC	167mA	81	
27D-24S15R	18-36VDC	15VDC	133mA	83	
27D-48S05R	36-72VDC	5VDC	400mA	73	
27D-48S09R	36-72VDC	9VDC	222mA	80	
27D-48S12R	36-72VDC	12VDC	167mA	81	
27D-48S15R	36-72VDC	15VDC	133mA	82	

## MARKINGS AND DIMENSIONS



## RECOMMENDED TEST CIRCUIT



## PIN CONNECTION

PIN	SINGLE OUTPUT
1	-INPUT
2	+INPUT
3	CTRL- Control input can (can be left open)
4	NO PIN
5	NE- No external connection allowed
6	+OUTPUT
7	-OUTPUT
8	CS Optional external capacitor

Dimensions: inches/mm

Unless otherwise specified, all tolerances are ±.005/±0.13



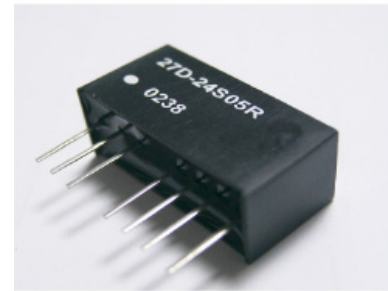
# 27D SERIES ISOLATION 1000VDC DC-DC CONVERTER

## FEATURES

- 2:1 WIDE INPUT VOLTAGES RANGE
- EFFICIENCY TO 83%
- UL 94V-0 PACKAGE MATERIAL
- CONTINUOUS SHORT CIRCUIT PROTECTION WITH CURRENT FOLDBACK
- LOW RIPPLE AND NOISE

## GENERAL SPECIFICATIONS

- RIPPLE & NOISE (VOUT = 5-9V TYPES) : 100mVp-p MAX (20MHz B.W.)
- RIPPLE & NOISE (VOUT = 12-15V TYPES) : 1% OF VOUT
- ISOLATION VOLTAGE : 1KVDC
- SWITCHING FREQUENCY : 50KHz MIN
- SHORT CIRCUIT PROTECTION : CONTINUOUS
- OPERATING TEMPERATURE : -40°C TO 85°C
- STORAGE TEMPERATURE RANGE : -50°C TO 130°C



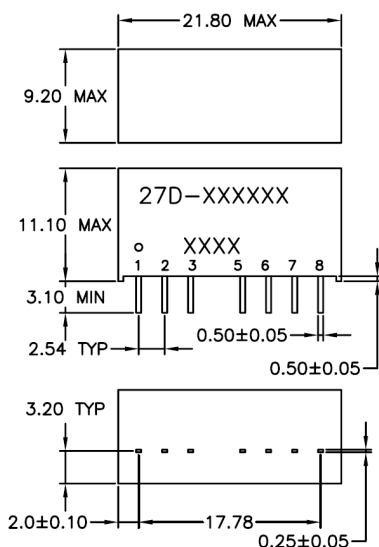
## ELECTRICAL SPECIFICATIONS

- INPUT VOLTAGE RANGE : 2:1
- OUTPUT VOLTAGE TOLERANCE : ±3%
- LINE REGULATION (REGULATED) : 0.5% MAX
- LOAD REGULATION (REGULATED) : 0.8% MAX
- EFFICIENCY : UP TO 83%

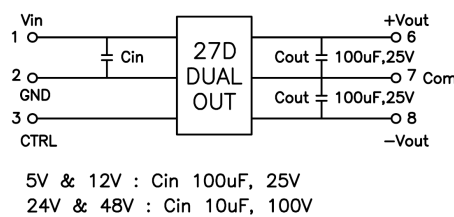
(Typical at nominal input, rated load and 25°C unless otherwise specified)

PART NO.	INPUT VOLTAGE RANGE	OUTPUT VOLTAGE RANGE	OUTPUT CURRENT	EFFICIENCY (%)	MTBF KHrs
27D-05D05R	5-9VDC	±5VDC	±200mA	66	>1000
27D-05D09R	5-9VDC	±9VDC	±111mA	71	
27D-05D12R	5-9VDC	±12VDC	±83mA	71	
27D-05D15R	5-9VDC	±15VDC	±66mA	73	
27D-12D05R	9-18VDC	±5VDC	±200mA	73	
27D-12D09R	9-18VDC	±9VDC	±111mA	79	
27D-12D12R	9-18VDC	±12VDC	±83mA	80	
27D-12D15R	9-18VDC	±15VDC	±66mA	81	
27D-24D05R	18-36VDC	±5VDC	±200mA	74	
27D-24D09R	18-36VDC	±9VDC	±111mA	81	
27D-24D12R	18-36VDC	±12VDC	±83mA	81	
27D-24D15R	18-36VDC	±15VDC	±66mA	83	
27D-48D05R	36-72VDC	±5VDC	±200mA	73	
27D-48D09R	36-72VDC	±9VDC	±111mA	80	
27D-48D12R	36-72VDC	±12VDC	±83mA	81	
27D-48D15R	36-72VDC	±15VDC	±66mA	82	

## MARKINGS AND DIMENSIONS



## RECOMMENDED TEST CIRCUIT



## PIN CONNECTION

PIN	SINGLE OUTPUT
1	-INPUT
2	+INPUT
3	CTRL- Control input can (can be left open)
4	NO PIN
5	NE- No external connection allowed
6	+OUTPUT
7	COMMON
8	-OUTPUT

Dimensions: inches/mm

Unless otherwise specified, all tolerances are ±.005/±0.13

### FEATURES

- UP TO 1.8 WATTS OUTPUT POWER
- 16PIN SMD PACKAGE
- 2000Vrms ISOLATION
- UNREGULATED OUTPUT TYPES

### GENERAL SPECIFICATIONS

- OUTPUT RIPPLE & NOISE :100mVp-p(20MHz B.W.)
- ISOLATION RESISTANCE :100MΩ MIN @500VDC
- SWITHINGFREQUENCY :100KHz TYP.
- OPERATING TEMPERATURE :0 °C TO 70°C
- EFFICIENCY(UNREGULATED) :70% TYP
- SHORT CIRCUIT PROTECTION :SHORT TERM



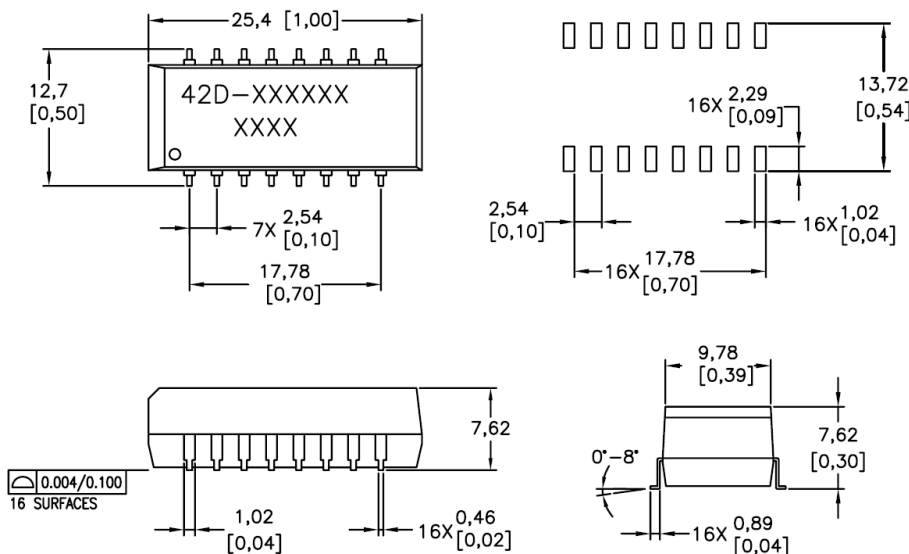
### ELECTRICAL SPECIFICATIONS

- INPUT VOLTAGE RANGE :±5%
- OUTPUT VOLTAGE TOLERANCE :±5%
- LINE REGULATION(10% TO 100% F.L.) :±1.2%
- LOAD REGULATION(10% TO 100% F.L.) :±10%

(Typical at nominal input , rated load and 25°C unless otherwise specified)

PART NO.	INPUT VOLTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT	EFFICIENCY(%)
42D-05S05N	5VDC	5VDC	360mA	70
42D-05S09N	5VDC	9VDC	200mA	75
42D-05S12N	5VDC	12VDC	150mA	75
42D-05S15N	5VDC	15VDC	120mA	75
42D-12S05N	12VDC	5VDC	360mA	70
42D-12S09N	12VDC	9VDC	200mA	75
42D-12S12N	12VDC	12VDC	150mA	75
42D-12S15N	12VDC	15VDC	120mA	75

### MARKINGS AND DIMENSIONS



### PIN CONNECTION

PIN	SINGLE OUTPUT
1	-INPUT
2	N.C
3	+INPUT
7	+OUTPUT
8	-OUTPUT
OTHER	N.C

### FEATURES

- UP TO 2 WATTS OUTPUT POWER
- 24PIN DIL PACKAGE
- 3000Vrms ISOLATION
- REGULATED OUTPUT TYPES
- LOW RIPPLE AND NOISE

### GENERAL SPECIFICATIONS

- OUTPUT RIPPLE & NOISE : 50mVp-p(20MHz B.W.)
- ISOLATION RESISTANCE : 100MΩ MIN.
- SWITCHING FREQUENCY : 125KHz TYP.
- OPERATING TEMPERATURE : 0°C TO 70°C
- STORAGE TEMPERATURE RANGE : -40°C TO 125°C
- SHORT CIRCUIT PROTECTION : CONTINUOUS
- SHORT CIRCUIT RESTART : AUTOMATIC



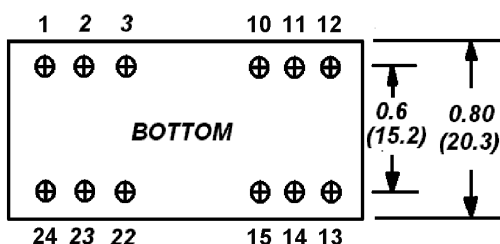
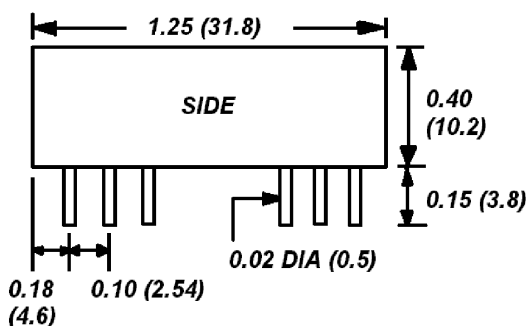
### ELECTRICAL SPECIFICATIONS

- INPUT VOLTAGE RANGE : ±10%
- OUTPUT VOLTAGE TOLERANCE : ±5%
- LINE REGULATION (REGULATED) : ±0.3%
- LOAD REGULATION (REGULATED) : ±0.5%
- EFFICIENCY (REGULATED) : 60% TYP

(Typical at nominal input , rated load and 25°C unless otherwise specified)

PART NO.	INPUT VOLTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT	PART NO.	INPUT VOLTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT
45D-05S05R	5VDC	5VDC	400mA	45D-24S15R	24	15VDC	133mA
45D-05S12R	5VDC	12VDC	165mA	45D-24D12R	24	±12VDC	±83mA
45D-05S15R	5VDC	15VDC	133mA	45D-24D15R	24	±15VDC	±66mA
45D-05D12R	5VDC	±12VDC	±83mA	45D-28S05R	28	5VDC	400mA
45D-05D15R	5VDC	±15VDC	±66mA	45D-28S12R	28	12VDC	165mA
45D-12S05R	12VDC	5VDC	400mA	45D-28S15R	28	15VDC	133mA
45D-12S12R	12VDC	15VDC	166mA	45D-28D12R	28	±12VDC	±83mA
45D-12S15R	12VDC	15VDC	133mA	45D-28D15R	28	±15VDC	±66mA
45D-12D12R	12VDC	±12VDC	±83mA	45D-48S05R	48	5VDC	400mA
45D-12D15R	12VDC	±15VDC	±66mA	45D-48S12R	48	12VDC	165mA
45D-24S05R	24VDC	5VDC	400mA	45D-48S15R	48	15VDC	133mA
45D-24S12R	24VDC	12VDC	165mA	45D-48D12R	48	±12VDC	±83mA

### MARKINGS AND DIMENSIONS



### PIN CONNECTION

PIN	SINGLE OUTPUT	DUAL OUTPUT
1,2,3	+INPUT	+INPUT
10,11	NC	COMMON
12	-OUTPUT	NC
13	+OUTPUT	-OUTPUT
15	NC	+OUTPUT
22,23,24	-INPUT	-INPUT