

CB-2W Series

2W 2:1 Regulated Single & Dual output



Features

- SIP8 / DIP16
- Wide 2:1 Input Range
- 1000 VDC Isolation, Up to 3000 VDC
- Continuous Short Circuit Protection
- Efficiency up to 81%
- Operation Temperature Range -40 ~ 99°C max.
- Plastic Case Standard
- Remote ON/OFF Control (Optional)



UL[®] CB FC CE UK CA

PART NUMBER STRUCTURE

CB - **24** **05** **SD** **2** **H** **C**
(1) (2) (3) (4) (5) (6) (7)

(1) Series

(2) Input Voltage Range

05 - 4.5-9 V
12 - 9-18 V
24 - 18-36 V
48 - 36-72 V

(3) Output Voltage

3R3 - 3.3 V
05 - 5.0 V
09 - 9.0 V
12 - 12 V
15 - 15 V
24 - 24 V

(4) Case & Output Type

S - SIP Single Output
D - DIP Single Output
SD - SIP Dual Output
DD - DIP Dual Output
SZ - Optional For SIP
Dual Output

(5) Watt

(6) Isolation Voltage (Optional)

Blank - 1000 VDC
H - 3000 VDC

(7) Control Pin

Optional For SIP Models

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ALL SPECIFICATIONS ARE TYPICAL AT 25°C, NOMINAL INPUT AND FULL LOAD UNLESS OTHERWISE NOTED

Model Number	Input Voltage Range (VDC)	Input Current		Output Voltage (VDC)	Output Current		Efficiency @FL (% , typ.)	Capacitive Load (µF, max.)
		No-Load (mA, max.)	Full Load (mA, typ.)		Min. load (mA)	Full load (mA)		
CB-053R3S2	4.5-9	20	508	3.3	125	500	65	3300
CB-0505S2	4.5-9	25	588	5	100	400	68	3300
CB-0509S2	4.5-9	50	555	9	56	222	72	470
CB-0512S2	4.5-9	85	563	12	42	167	71	470
CB-0515S2	4.5-9	30	555	15	33	133	72	470
CB-0524S2	4.5-9	70	555	24	21	83	72	220
CB-123R3S2	9-18	15	196	3.3	125	500	70	3300
CB-1205S2	9-18	10	216	5	100	400	77	3300
CB-1209S2	9-18	15	214	9	56	222	78	470
CB-1212S2	9-18	15	216	12	42	167	77	470
CB-1215S2	9-18	15	210	15	33	133	79	470
CB-1224S2	9-18	25	214	24	21	83	78	220
CB-243R3S2	18-36	8	94	3.3	125	500	73	3300
CB-2405S2	18-36	8	108	5	100	400	77	3300
CB-2409S2	18-36	10	107	9	56	222	78	470
CB-2412S2	18-36	12	105	12	42	167	79	470
CB-2415S2	18-36	12	104	15	33	133	80	470
CB-2424S2	18-36	15	105	24	21	83	79	220
CB-483R3S2	36-72	6	50	3.3	125	500	69	3300
CB-4805S2	36-72	6	55	5	100	400	76	3300
CB-4809S2	36-72	6	55	9	56	222	76	470
CB-4812S2	36-72	6	53	12	42	167	78	470
CB-4815S2	36-72	6	53	15	33	133	78	470
CB-4824S2	36-72	8	54	24	21	83	77	220
CB-053R3D2	4.5-9	20	508	3.3	125	500	65	3300
CB-0505D2	4.5-9	20	588	5	100	400	68	3300
CB-0509D2	4.5-9	50	580	9	56	222	69	470
CB-0512D2	4.5-9	30	563	12	42	167	71	470
CB-0515D2	4.5-9	70	563	15	33	133	71	470
CB-0524D2	4.5-9	70	556	24	21	83	72	220
CB-123R3D2	9-18	15	196	3.3	125	500	70	3300
CB-1205D2	9-18	10	222	5	100	400	75	3300
CB-1209D2	9-18	15	219	9	56	222	76	470
CB-1212D2	9-18	15	214	12	42	167	78	470
CB-1215D2	9-18	15	214	15	33	133	78	470
CB-1224D2	9-18	35	216	24	21	83	77	220
CB-243R3D2	18-36	8	97	3.3	125	500	71	3300
CB-2405D2	18-36	8	111	5	100	400	75	3300
CB-2409D2	18-36	10	105	9	56	222	79	470
CB-2412D2	18-36	15	104	12	42	167	80	470
CB-2415D2	18-36	15	105	15	33	133	79	470
CB-2424D2	18-36	15	108	24	21	83	77	220
CB-483R3D2	36-72	6	51	3.3	125	500	67	3300
CB-4805D2	36-72	6	56	5	100	400	75	3300
CB-4809D2	36-72	10	57	9	56	222	73	470
CB-4812D2	36-72	10	54	12	42	167	77	470
CB-4815D2	36-72	6	54	15	33	133	77	470
CB-4824D2	36-72	8	54	24	21	83	77	220

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Model Number	Input Voltage Range (VDC)	Input Current		Output Voltage (VDC)	Output Current		Efficiency @FL (% typ.)	Capacitive Load (µF, max.)
		No-Load (mA, max.)	Full Load (mA, typ.)		Min. load (mA)	Full load (mA)		
CB-053R3SD2	4.5-9	25	493	±3.3	±63	±250	67	±1000
CB-0505SD2	4.5-9	35	493	±5	±50	±200	67	±1000
CB-0509SD2	4.5-9	30	548	±9	±28	±111	73	±220
CB-0512SD2	4.5-9	35	548	±12	±21	±83	73	±220
CB-0515SD2	4.5-9	40	556	±15	±17	±67	72	±220
CB-0524SD2	4.5-9	120	580	±24	±10	±42	69	±100
CB-123R3SD2	9-18	15	196	±3.3	±63	±250	70	±1000
CB-1205SD2	9-18	20	228	±5	±50	±200	73	±1000
CB-1209SD2	9-18	20	210	±9	±28	±111	79	±220
CB-1212SD2	9-18	15	210	±12	±21	±83	79	±220
CB-1215SD2	9-18	20	210	±15	±17	±67	79	±220
CB-1224SD2	9-18	35	219	±24	±10	±42	76	±100
CB-243R3SD2	18-36	8	97	±3.3	±63	±250	71	±1000
CB-2405SD2	18-36	8	108	±5	±50	±200	77	±1000
CB-2409SD2	18-36	8	108	±9	±28	±111	77	±220
CB-2412SD2	18-36	8	102	±12	±21	±83	81	±220
CB-2415SD2	18-36	12	105	±15	±17	±67	80	±220
CB-2424SD2	18-36	25	107	±24	±10	±42	78	±100
CB-483R3SD2	36-72	6	48	±3.3	±63	±250	71	±1000
CB-4805SD2	36-72	6	57	±5	±50	±200	73	±1000
CB-4809SD2	36-72	6	55	±9	±28	±111	76	±220
CB-4812SD2	36-72	6	53	±12	±21	±83	78	±220
CB-4815SD2	36-72	8	52	±15	±17	±67	80	±220
CB-4824SD2	36-72	12	56	±24	±10	±42	74	±100
CB-053R3DD2	4.5-9	25	485	±3.3	±63	±250	68	±1000
CB-0505DD2	4.5-9	35	597	±5	±50	±200	67	±1000
CB-0509DD2	4.5-9	30	547	±9	±28	±111	73	±220
CB-0512DD2	4.5-9	60	555	±12	±21	±83	72	±220
CB-0515DD2	4.5-9	60	555	±15	±17	±67	72	±220
CB-0524DD2	4.5-9	110	563	±24	±10	±42	71	±100
CB-123R3DD2	9-18	15	194	±3.3	±63	±250	71	±1000
CB-1205DD2	9-18	20	231	±5	±50	±200	72	±1000
CB-1209DD2	9-18	20	211	±9	±28	±111	79	±220
CB-1212DD2	9-18	15	214	±12	±21	±83	78	±220
CB-1215DD2	9-18	30	214	±15	±17	±67	78	±220
CB-1224DD2	9-18	45	222	±24	±10	±42	75	±100
CB-243R3DD2	18-36	8	95	±3.3	±63	±250	72	±1000
CB-2405DD2	18-36	10	113	±5	±50	±200	74	±1000
CB-2409DD2	18-36	8	105	±9	±28	±111	79	±220
CB-2412DD2	18-36	10	105	±12	±21	±83	79	±220
CB-2415DD2	18-36	12	105	±15	±17	±67	79	±220
CB-2424DD2	18-36	25	108	±24	±10	±42	77	±100
CB-483R3DD2	36-72	6	49	±3.3	±63	±250	70	±1000
CB-4805DD2	36-72	6	57	±5	±50	±200	73	±1000
CB-4809DD2	36-72	6	54	±9	±28	±111	77	±220
CB-4812DD2	36-72	10	53	±12	±21	±83	79	±220
CB-4815DD2	36-72	8	53	±15	±17	±67	78	±220
CB-4824DD2	36-72	12	56	±24	±10	±42	74	±100

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INPUT SPECIFICATIONS

Parameter	Conditions	Min.	Typ.	Max.	Unit
Input Voltage Range	05V Input	4.5	5	9	VDC
	12V Input	9	12	18	
	24V Input	18	24	36	
	48V Input	36	48	72	
Input Filter		Capacitor			
Input Reflected Ripple Current (1)			35		mApk-pk
Start up Time	Nominal Vin and constant resistive load		20		ms
Remote ON/OFF Control	Module ON	0 ~ 0.8VDC max. (Short circuit Pin 1 and Pin 3) or open circuit			
	Module OFF	4.5 to 15VDC max.(or 3.5mA to 15mA max.) (via R1,D1)			
	OFF idle current		5		mA
Recommended input fuse (slow blow)	05V Input	0.75			A
	12V Input	0.3			
	24V Input	0.2			
	48V Input	0.1			

Note :

1. Measured with a simulated source inductance of 12 μ H and a source capacitor Cin (47 μ F, ESR<1.0 Ω at 100kHz).

OUTPUT SPECIFICATIONS

Parameter	Conditions	Min.	Typ.	Max.	Unit
Output Voltage Accuracy		-2.0		+2.0	%
Line Regulation		-0.5		+0.5	%
Load Regulation	From 25% to 100% Load	-1.0		+1.0	%
Cross Regulation	Asymmetrical Load 25% / 100% for Dual Output	-5		+5	%
Ripple & Noise	20MHz bandwidth			80	mVpk-pk
Short Circuit Protection		Indefinite (Automatic Recovery)			
Temperature Coefficient		-0.02		+0.02	%/°C
Maximum Capacitive Load	Minimum Vin and constant resistive load	See Table			

ABSOLUTE MAXIMUM RATINGS

Parameter	Conditions	Min.	Typ.	Max.	Unit
Input Surge Voltage (100 ms)	05V Input			12	VDC
	12V Input			24	
	24V Input			40	
	48V Input			80	
Soldering Temperature	1.5mm from case 10sec max.			260	°C

Note : These are stress ratings. Exposure of devices to any of these conditions may adversely affect long-term reliability.

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GENERAL SPECIFICATIONS

Parameter	Conditions		Min.	Typ.	Max.	Unit
Isolation Voltage	Input-output, and rated for 60sec	Standard Type	1000			VDC
		Suffix "H"	3000			
Isolation Resistance	Input-output		1000			MΩ
Isolation Capacitance	Input-output				60	pF
Switching Frequency			100		650	kHz
MTBF	MIL-HDBK-217 F @ 25°C		1.61			M hours
Safety Approval	IEC / EN / UL 62368-1		DK-63953-UL, E252573			
Environmental compliance			RoHS			

ENVIRONMENT SPECIFICATIONS

Parameter	Conditions	Min.	Typ.	Max.	Unit
Operating Ambient Temperature	See the Derating Curve	-40		99	°C
Maximum Case Temperature				100	°C
Thermal Impedance		27.18			°C/W
Storage Humidity				95	% rel. H
Storage Temperature		-55		125	°C
Cooling	Natural Convection	30-65 LFM			

EMC SPECIFICATIONS

Parameter	Standard	Condition	Criterion
Conducted Emissions	EN55032	with external components	A
Radiated Emissions	EN55032		A
ESD	IEC 61000-4-2	Air: ±8kV / Indirect: ±6kV	A
RS	IEC 61000-4-3	10V/m	A
EFT	IEC 61000-4-4	±2kV with external components	A
Surge	IEC 61000-4-5	±1kV with external components	A
CS	IEC 61000-4-6	10Vrms	A
PFMF	IEC 61000-4-8	1A/m	A

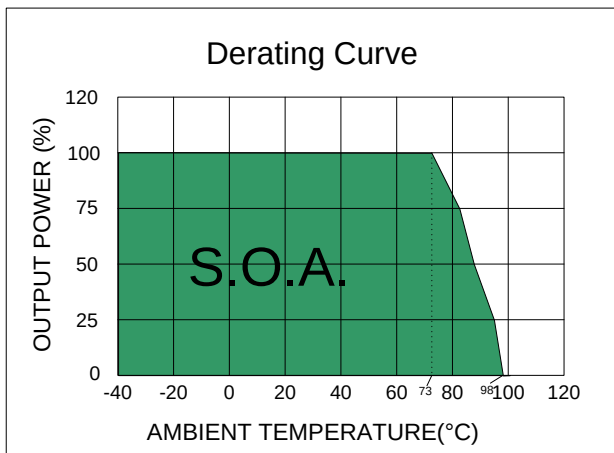
PHYSICAL SPECIFICATIONS

Parameter	Value
Case Material	Nonconductive Black Plastic (UL94V-0 rated)
Pin Material	SIP Case : Alloy42 Solder-coated
	DIP Case : Ø0.5mm Brass Solder-coated
Potting Material	Epoxy (UL94V-0 rated)
Weight	SIP Case : 4.5 g , typ.
	DIP Case : 6.0 g , typ.
Dimensions	SIP Case : 0.86" x 0.36" x 0.44"
	DIP Case : 0.92" x 0.55" x 0.40"

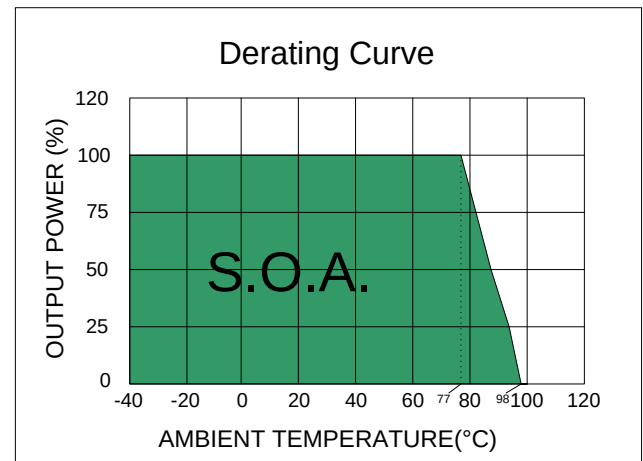
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2W 2:1 Regulated Single & Dual output

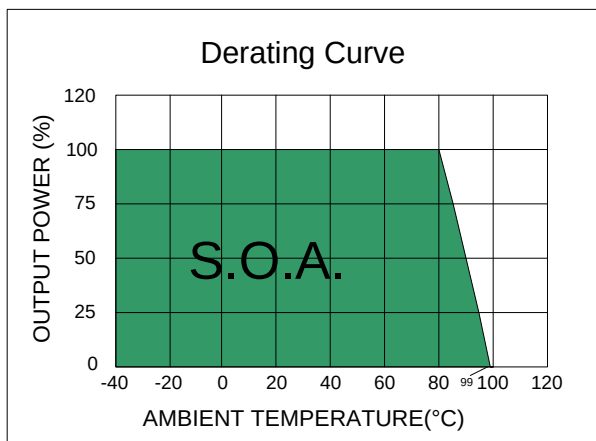
ELECTRICAL CHARACTERISTIC CURVES



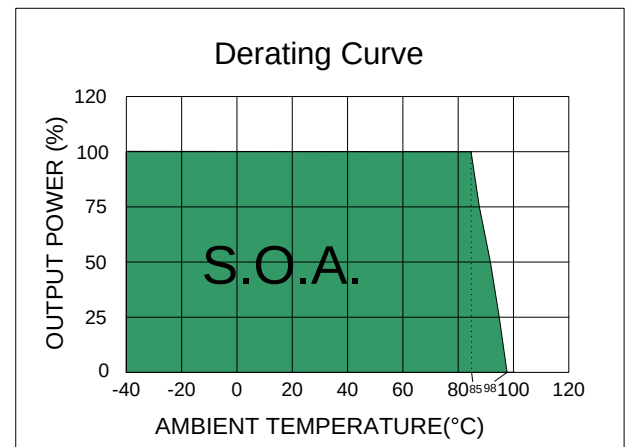
Efficiency = 65% ~ 69%



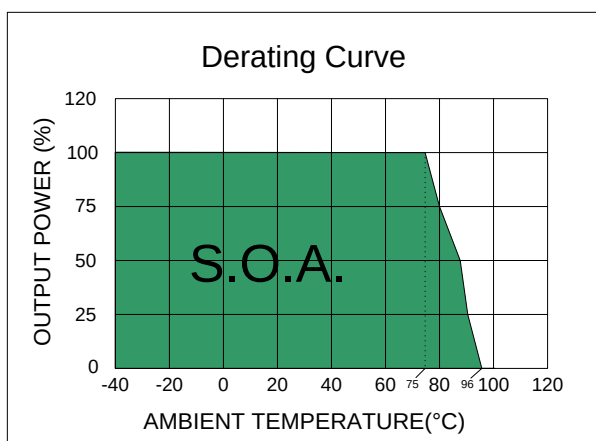
Efficiency = 71% ~ 73%



Efficiency = 74% ~ 77%



Efficiency = 78% ~ 81%



CB-053R3S2、CB-053R3D2、CB-483R3D2、
CB-053R3SD2、CB-053R3DD2

CB-123R3S2、CB-243R3S2、CB-483R3S2、
CB-123R3D2、CB-243R3D2、CB-123R3SD2、
CB-243R3SD2、CB-483R3SD2、CB-123R3DD2、
CB-243R3DD2、CB-483R3DD2

CB-2W Series

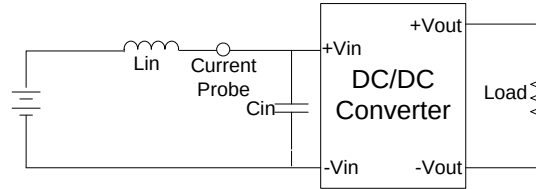
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TEST CONFIGURATIONS

Input Reflected Ripple Current Test Step

Input reflected ripple current is measured with a source inductor L_{in} ($12\mu H$) and a source capacitor C_{in} ($47\mu F$, $ESR < 1.0\Omega$ at $100kHz$) at nominal input and full load.



DESIGN & FEATURE CONFIGURATIONS

Remote Module ON / OFF

MCU (Master Control Unit)

The MCU Pin Voltage is referenced to $-V_{in}$ (Pin 1)

ON: $0 \sim 0.8VDC$ max. (Short circuit Pin 1 and Pin 3) or open circuit

OFF: 4.5 to $15VDC$ max. (or $3.5mA$ to $15mA$ max.) (via R1,D1)

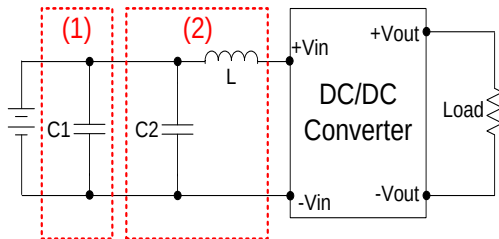
OFF idle current: $5mA$ typ.



DESIGN & FEATURE CONFIGURATIONS

EMC Filter

The part (1) Circuit is used to meet Surge & EFT test, and the part (2) Circuit is used to meet EMI test.

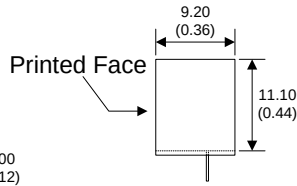
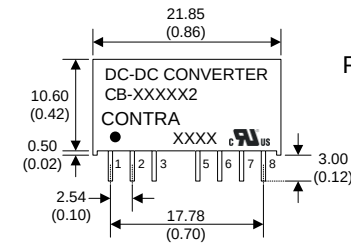


	C1	C2	L
CB-05XXX2	NIPPON	NIPPON	12 μH
CB-12XXX2	Chemi-con	Chemi-con	
CB-24XXX2	KY series	KY series	
CB-48XXX2	220 μF , 100V	100 μF , 100V	

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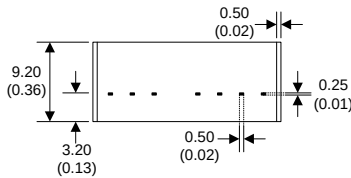
MECHANICAL SPECIFICATIONS



SIP8 Package

Notes : All dimensions are typical in millimeters (inches).

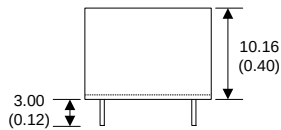
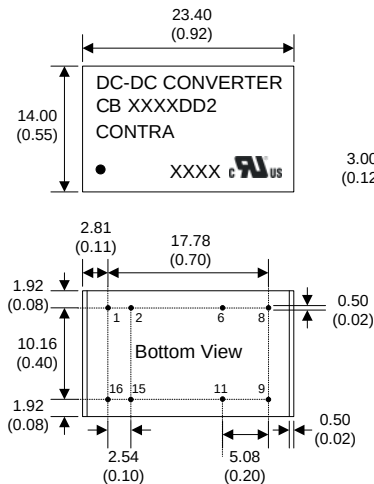
1. Pin dimension tolerance: ± 0.05 (± 0.002)
2. Pin pitch and length tolerance: ± 0.35 (± 0.014)
3. Pin to case tolerance: ± 0.5 (± 0.02)
4. Case Tolerance: ± 0.5 (± 0.02)
5. Stand-off tolerance: ± 0.1 (± 0.004)



SIP PIN CONNECTIONS						
PIN NUMBER	SINGLE	SINGLE+C	DUAL/(SD)	DUAL/(SD+C)	DUAL/(SZ)	DUAL/(SZ+C)
1	-Vin	-Vin	-Vin	-Vin	-Vin	-Vin
2	+Vin	+Vin	+Vin	+Vin	+Vin	+Vin
3	N.P.	CTRL	N.C.	CTRL	N.C.	CTRL
5	N.P.	N.C.	N.C.	N.C.	N.C.	N.C.
6	+Vout	+Vout	+Vout	+Vout	+Vout	+Vout
7	-Vout	-Vout	-Vout	-Vout	COM	COM
8	N.C.	N.C.	COM	COM	-Vout	-Vout

*N.P. : No PIN

*N.C. : No Connection



DIP16 Package

Notes : All dimensions are typical in millimeters (inches).

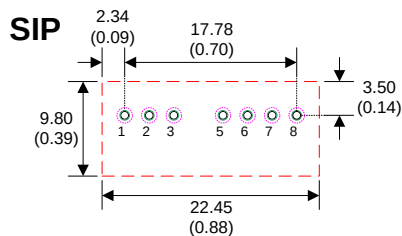
1. Pin diameter: 0.5 ± 0.05 (0.02 ± 0.002)
2. Pin pitch and length tolerance: ± 0.35 (± 0.014)
3. Pin to case tolerance: ± 0.5 (± 0.02)
4. Case Tolerance: ± 0.5 (± 0.02)
5. Stand-off tolerance: ± 0.1 (± 0.004)

DIP PIN CONNECTIONS		
PIN NUMBER	SINGLE	DUAL
1	-Vin	-Vin
2	-Vin	-Vin
6	N.C.	COM
8	N.C.	-Vout
9	+Vout	+Vout
11	-Vout	COM
15	+Vin	+Vin
16	+Vin	+Vin

*N.P. : No PIN

*N.C. : No Connection

RECOMMENDED FOOTPRINT DETAILS

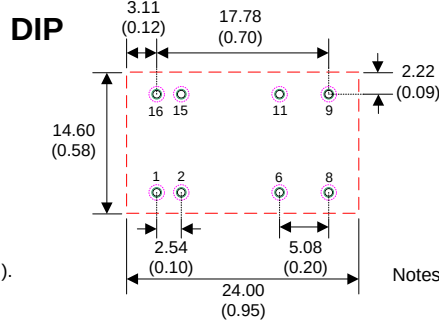


Notes : 1. All dimensions are typical in millimeters (inches).

Through hole (black) 1 ~ 8: $\varnothing 0.80$ (0.031)

Top view pad (green) 1 ~ 8: $\varnothing 1.00$ (0.039)

Bottom view pad (pink) 1 ~ 8: $\varnothing 1.60$ (0.063)



Notes : 1. All dimensions are typical in millimeters (inches).

Through hole (black) 1 ~ 16: $\varnothing 0.80$ (0.031)

Top view pad (green) 1 ~ 16: $\varnothing 1.00$ (0.039)

Bottom view pad (pink) 1 ~ 16: $\varnothing 1.60$ (0.063)