



GENERAL INFORMATION

SELECTOR CHART

Series	Series Types	Enclosure	Contacts		Nominal Coil Voltage or Current	Operating Power at P.I. (mW)	Applicable Specification Approvals			
			Arrangement	Rating			MILITARY		CECC	
							Mil-PRF-39016/	Mil-PRF-28776/	16101-	16207-
MA	MA	TO-5	DPDT	1A / 28 Vdc	5...30,0 Vdc	130	9			
	MA-D				5...26,5 Vdc	15				
	MA-DD					20				
	MA-T					130		1		
MA2		TO-5	DPDT	1A / 28 Vdc	5...30,0 Vdc	130			003	
MCA		TO-5	DPDT	2A / 28 Vdc	5...26,5 Vdc	150				
MS	MS	TO-5	DPDT	1A / 28 Vdc	5...48,0 Vdc	60	11			
	MS-D					16				
	MS-DD					21				
	MS-T					60		3		
MS2		TO-5	DPDT	1A / 28 Vdc	5...48,0 Vdc	60			004	
1MA	1MA	TO-5	SPDT	1A / 28 Vdc	5...26,5 Vdc	100	7			
	1MA-D					23				
	1MA-DD					24				
	1MA-T					100		5		
1MA1		TO-5	SPDT	1A / 28 Vdc	5...26,5 Vdc	100			005	
1MS	1MS	TO-5	SPDT	1A / 28 Vdc	5...40,0 Vdc	50	10			
	1MS-D					25				
	1MS-DD					40	26			
	1MS-T					50		4		
1MS1		TO-5	SPDT	1A / 28 Vdc	5...40,0 Vdc	50			006	
MGA	MGA	CUBIC .100GRID	DPDT	1A / 28 Vdc	5...26,5 Vdc	130	17			
	MGA-D					18				
	MGA-DD					150	19			
MGAE	MGAE	CUBIC .100GRID	DPDT	1A / 28 Vdc	5...28,0 Vdc	130			801	
	MGAE-D									
	MGAE-DD					150				
MGA2	MGA2 / D2	CUBIC	DPDT	1A / 28 Vdc	5...28,0 Vdc	140			007	
MGS	MGS	CUBIC .100GRID	DPDT	1A / 28 Vdc	5...48,0 Vdc	60	41			
	MGS-D					42				
	MGS-DD					43				
MGSE	MGSE	CUBIC .100GRID	DPDT	1A / 28 Vdc	5...48,0 Vdc	60			802	
	MGSE-D									
	MGSE-DD									
MGS2	MGS2 / D2	CUBIC	DPDT	1A / 28 Vdc	5...48,0 Vdc	60			008	
12K		1/2 CC	DPDT	2A / 28 Vdc	5...26,5 Vdc	250	6			
2K		1/2 CC	DPDT	2A / 28 Vdc	5...48,0 Vdc	250				
2K6600		1/2 CC	DPDT	2A / 28 Vdc	5...48,0 Vdc	250			007,014,021	
							MILITARY Compliance			
							Mil-R-39016/	Mil-R-5757/		
2K7940		1/2 CC	DPDT	2A / 28 Vdc	6...26,5 Vdc	250	22			
KA	2KA	1/2 CC	DPDT	2A / 28 Vdc	5...48,0 Vdc	100				
HA	2HA	1/2 CC	DPDT	5A / 28 Vdc	5...48,0 Vdc	300				
B	2B	CC	DPDT	2A / 28 Vdc	6...76,0 Vdc	250				
	2BR		DPDT		26,5...115 Vac	370				
2B6660		CC	DPDT	3A / 28 Vdc	6...76,0 Vdc	250			008	
2B7506		CC	DPDT	2A / 28 Vdc	6...26,5 Vdc	250		10		
BS	2BSA	CC	DPDT	2A / 28 Vdc	6...26,5 Vdc	100				
	1BSK		SPDT		3,2...70,6mA	25				
	2BSK		DPDT		4,0...89,2mA	40				
BN	1BN	CC	SPDT	5A / 28 Vdc	6...76,0 Vdc	280				
	2BN		DPDT							
2BC7201		CC	DPDT	2A / 28 Vdc	4,0...90,0mA	40		13		
BCN	1BCN	CC	SPDT	5A / 28 Vdc	6...40,0 Vdc	80				
	2BCN		DPDT							
4B			4PDT	2A / 28 Vdc	6...115 Vdc	400				
T	2T	CC	DPDT	10A / 28 Vdc	6...115 Vdc	500				
	2TR				115 Vac					
TN	2TN	CC	DPDT	15A / 28 Vdc	6...115 Vdc	500				
	2TNR				115 Vac					
2T7188		CC	DPDT	10A / 28 Vdc	6...120 Vdc	500		23		
RFK	RFK	1/2 CC	SPDT	2A / 28 Vdc	6...26,5 Vdc	250				
	2RFK		DPDT							
RFB	RFB	CC	SPDT	2A / 28 Vdc	6...76,5 Vdc	250				
	2RFB		DPDT							
RFBC	RFBC	CC	SPDT	2A / 28 Vdc	4,0...89,2 mA	40				
	2RFBC		DPDT							
4MA		CC	4PDT	1A / 28 Vdc	5,0...30,0 Vdc	260				
4MS		CC	4PDT	1A / 28 Vdc	5,0...48,0 Vdc	120				



.100 GRID TERMINAL RELAY DPDT

• Basic • Suppression • Suppression/Steering

Series
MGAE

Product Description

A series of ultra miniature hermetically sealed relays with .100 inch grid spaced terminations. These relays are similar to MA series TO-5 relays construction and are provided for the operation in military and/or commercial equipment and/or installations with increased mechanical and environmental requirements. The following construction methods ensure the highest reliability in extreme environments:

- All welded relay construction
- Cleaning and sealing techniques ensures maximum internal cleanliness
- Low level to 1 amp. switching
- 2 form C, DPDT contacts, special metal alloy with gold plating
- Frame design and force / mass ratio provides exceptional immunity to shock and vibration

Low Intercontact capacitance and contact circuit losses, provides also a reliable switching function in demanding RF applications, combined with small size and low coil power dissipation (see figure 1).

Series Types

- MGAE Basic Relay, 2 form C, DPDT
- MGAED Basic relay combined with an internal diode for coil suppression
- MGAEDD Basic Relay incorporates two internal diodes for coil transient suppression and polarity reversal protection

Environmental and Physical Specifications

Temperature (Ambient)	-65°C to +125°C
Shock	75 g's, 6 msec., half sine wave
Vibration (sinusoidal)	30 g's, 10 to 3000 Hz, 2,0 peak amplitude
Vibration (random)	0,2 g ² /s/Hz, 20 to 2000 Hz
Bump	40 g's, 6 msec., half sine wave
Sealing	All welded, Hermetic
Weight	2,55 grams (0,09 oz.) max.
Finish	Case: bright tin lead plated Terminations: bright tin lead and gold plated



CECC 16207-801



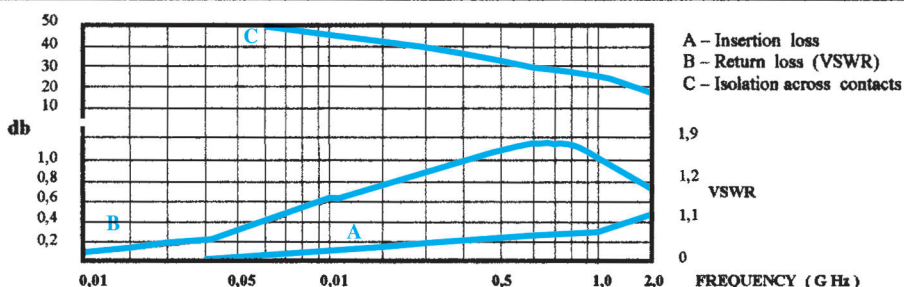
Electrical Characteristics (over the Temperature range, unless otherwise noted)

Coil Data	See Typical Characteristics chart		
Contact Rating	Type Load	Contact Load	Cycles min.
(Note : All ratings with grounded case)	Low Level	30 mV / 10 mA max	1.000.000
	Resistive	1 Amp / 28 Vdc	100.000
	Inductive	0,2 Amp / 28Vdc (320 mH)	100.000
	Lamp	0,1 Amp / 28 Vdc	100.000
	Intermediate	0,1 Amp / 28 Vdc	50.000
	Resistive overload	2 Amp / 28 Vdc	100
	Inductive overload	0,4 Amp / 28Vdc (320 mH)	100
Contact Resistance	0,1 ohm max. initial, 0,2 ohm max after life		
Operate Time	2,0 msec. max.		
Release Time	1,5 msec. max. series MGAE	4,0 msec. max. series MGAED, MGAEDD	
Contact Bounce	1,5 msec. max.		
Contact stabilisation Time	2,5 msec. max.		
Dielectric Strength	500 Vrms min. 50-60 Hz, all points at sea level	250 Vrms min. 50-60 Hz, all points at 25.000 mt.	
Insulation Resistance	10.000 megohms min. all points at 500 Vdc		
Intercontact Capacitance	0,4 pF typical		
Sensitivity	140 milliwatts at pick-up, 500 milliwatts at nominal rated coil voltage, max. at 25 °C		
Diode P.I.V.	100 Vdc min. Series MGAED, MGAEDD		
Negative Coil Transient	1,0 Vdc max. Series MGAED, MGAEDD		

Figure 1 - Radio Frequency Curves

Note:

Radio frequency curves are typical characteristics based on factory knowledge. Tests to ensure compliance on RF performance, are not performed.





.100 GRID TERMINAL RELAY DPDT

Series
MGAE

• Basic • Suppression • Suppression/Steering

Typical Characteristics

Identification letter of the Coil	Coil Voltage V dc		Coil resistance ohm ± 10% at 23 °C	Must Operated Voltage Vdc		Release Voltage V dc				Special Attributes Code No. (*)
	Rated	Max.		23 °C	125 °C	Max.		Min.		
						23 °C	125 °C	23 °C	-65 °C	
A	5,0	5,8	50	2,7	3,5	1,4	2,3	0,22	0,14	0 or 1
B	6,0	8,0	98	3,5	4,5	2,0	3,2	0,28	0,18	0 or 1
C	9,0	12,0	220	5,3	6,8	3,0	4,9	0,54	0,35	0 or 1
D	12,0	16,0	390	7,0	9,0	4,0	6,5	0,63	0,41	0 or 1
E	18,0	24,0	880	10,5	13,5	6,0	10,0	0,91	0,59	0 or 1
G	28,0	32,0	1560	14,2	18,0	8,0	13,0	1,37	0,89	0 or 1
A	5,0	5,8	39	3,2	4,0	2,3	2,8	0,6	0,6	2
B	6,0	8,0	78	4,0	5,0	2,8	3,4	0,7	0,7	2
C	9,0	12,0	220	6,3	7,8	4,2	5,3	0,9	0,8	2
D	12,0	16,0	390	8,0	10,0	5,2	6,5	1,1	0,9	2
E	18,0	24,0	880	11,5	14,5	7,3	10,0	1,4	1,1	2
G	28,0	32,0	1560	15,2	19,0	9,5	13,0	1,8	1,4	2

Note : *Without transient suppression, code "0", with transient suppression, code "1", with transient suppression and reverse polarity protection, code "2"

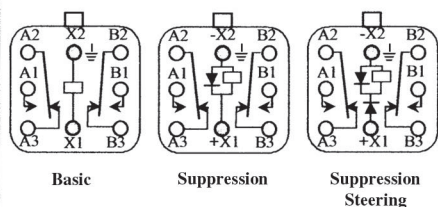
Terminal (T) and Mounting (M) Variants

T	M	T	M	T	M	T	M	T	M	T	M	T	M		
B	A	Without ground pin		B	P	Without ground pin		B	T	Without ground pin					
		D	A			D	P			O	A	O	P	O	T
		E	A			E	P			P	A	P	P	T	
C	A	With ground pin		C	P	With ground pin		C	T	With ground pin					
		D	J			D	K			O	J	O	K	O	L
		E	J			E	K			P	J	P	K	P	L

Note : - Dimensions are shown in inches (millimetres)

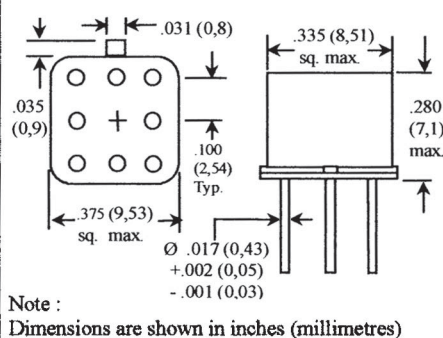
CODE	TERMINAL	CODE	MOUNTING VARIANT
B	Pins, tinned	J	Ground pin
C	Pins, gold plated	K	Ground pin with mounting pad round 0,36 mm
D	Leads 19,05 mm, tinned	L	Ground pin with pad grid 2,54 mm, H = 0,8 mm
E	Leads 19,05 mm, gold plated	A	Without mounting hardware accessories
O	Leads 12,7 mm, tinned	P	Mounting pad round, H = 0,36 mm
P	Leads 12,7 mm, gold plated	T	Pad grid 2,54 mm, H = 0,8 mm

Schematic Diagrams



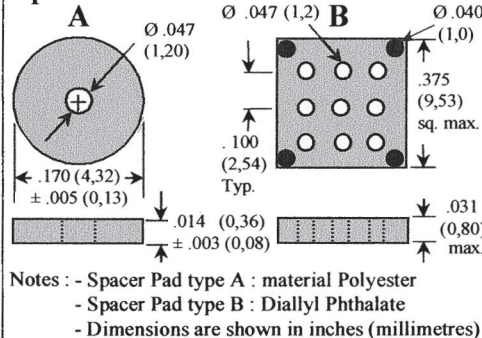
Note :
- Schematics are viewed from terminals
- Diagram references are not marked on the relay

Outline Dimensions



Note :
Dimensions are shown in inches (millimetres)

Spacer Pads



Notes : - Spacer Pad type A : material Polyester
- Spacer Pad type B : Diallyl Phthalate
- Dimensions are shown in inches (millimetres)

Failure rate level	
Code	Failures per 1 million cycles
E3	3
E5	1
E6	0,1
E7	0,01

How to Order

CECC 16207- 801 A B C 1 Y E5

CECC number	Failure rate level (Identification code)
Type Code (CECC registration No)	Assessment level
Coil Voltage (Identification letter)	Special attributes (Identification No. code)
Terminals (Identification letter)	Mounting (Identification letter)