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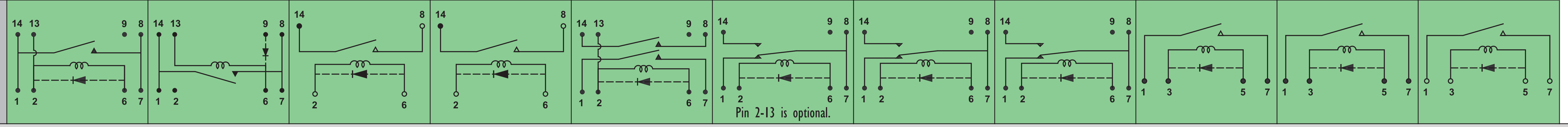
DIL AND SIL REED RELAYS

	Type			3570.1210.xxx			3570.1301.xxx			3570.1341.xxx			3570.1511.xxx		
	Series			PRMA 1A			PRME 1A			DSS7 S 1A			SMD1 1A		
	Contact Form			1A - Normally Open			1A - Normally Open			1A - Normally Open			1A - normally open		
	Features			- Industry Standard - RoHS Compliant			- Industry Standard - RoHS Compliant			- High I/O Isolation - RoHS Compliant			- Surface mount - High I/O isolation - RoHS Compliant		
COIL PARAMETERS	Nominal Voltage		VDC	5	12	24	5	12	24	5	12	24	5	12	24
	Must Operate / Pull in Voltage	Max.	VDC	3.80	9	18	3.80	9	18	3.75	9	18	3.75	9	18
	Must Release / Drop out Voltage	Min.	VDC	0.80	1	2	0.80	1	2	0.80	1	2	0.80	1	2
	Maximum Voltage		VDC	10	20	28	15	20	30	20	30	40	20	30	40
	Nominal Input Power		mW	50	144	268	50	272	288	50	144	268	50	144	268
	Coil Resistance +/- 10 %		Ohms	500	1000	2150	500	1000	2000	500	1000	2150	500	1000	2150
CONTACT PARAMETERS	Switching Power	Max.	W/VA	10			10			10			10		
	Switching Voltage	Max.	VDC/VAC	200			200			200			200		
	Switching Current	Max.	A	0.50			0.50			0.50			0.50		
	Carry Current	Max.	A	1			1			1			1		
	Contact Resistance		m Ohms	Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	Min	Typ	Max
						150			150			150			150
	Dielectric strength Across Open Contact		VDC/VACpeak	200			200			200			200		
	Capacitance Across Open Contact		pF		0.70	1		0.80	1		0.70	1		0.70	1
	Switching Frecuency		Hz	500			500			500			500		
	Life Expectancy Signal Level 1V-10mA		$x10^6$ Operations	300	500		300	500		300	500		300	500	
	Contact Material			Rh			Rh			Rh			Rh		
RELAY PARAMETERS	Dielectric Strength Coil-Contact		VAC	1000			1000			4000			4000		
	Insulation Resistance		Ohms	10^{10}	10^{12}		10^{10}	10^{12}		10^{10}	10^{12}		10^{10}	10^{12}	
	Capacitance Open Contact to Coil		pF		1.50	2		1.50	2		1.50	2		1.50	2
	Operate or Pull in Time Incl. Bounce		ms		0.25	0.50		0.25	0.50		0.25	0.50		0.25	0.50
	Release or Drop Out Time With Diode		ms		0.25	0.50		0.25	0.50		0.25	0.50		0.25	0.50
	Operating Temperature		°C	-40		85	-40		85	-40		85	-40		85
	Storage Temperature		°C	-50		125	-50		125	-50		125	-50		125
	Shock Resistance		g			100			100			100			100
	Vibration Resistance		g			20			20			20			20
	Soldering Temp. 10 sec.		°C			260			260			260			*
	Weight (approx.)		grams		1.80			1.80			2.30			2.30	
	Dimensions			Package Style 1			Package Style 1			Package Style 2			Package Style 3		

	Type			3572.1220.xxx			3563.1231.xxx			3573.1231.xxx			3565.1231.xxx		
	Series			PRMA 2A			PRMA 1C			PRMA 1C			PRMA 1C		
	Contact Form			2A - normally open			1C - Change Over			1C - Change Over			1C - Change Over		
	Features			- Industry standard - RoHS Compliant			- Industry standard - RoHS Compliant			- Industry standard - Higher switching requirements - RoHS Compliant			- Industry standard - High switching power - RoHS Compliant		
COIL PARAMETERS	Nominal Voltage		VDC	5	12	24	5	12	24	5	12	24	5	12	24
	Must Operate / Pull in Voltage	Max.	VDC	3.80	9	18	3.80	9	18	3.50	8	16	3.50	8	16
	Must Release / Drop out Voltage	Min.	VDC	0.80	1	2	0.80	1	2	1	2	4	1	2	4
	Maximum Voltage		VDC	10	20	40	10	18	35	10	18	35	10	18	35
	Nominal Input Power		mW	179	288	268	125	288	268	125	288	268	125	288	268
	Coil Resistance +/- 10 %		Ohms	140	500	2150	200	500	2150	200	500	2150	200	500	2150
CONTACT PARAMETERS	Switching Power	Max.	W/VA	10			3			5			20		
	Switching Voltage	Max.	VDC/VAC	200			100/70			100			150		
	Switching Current	Max.	A	0.50			0.25			0.50			1		
	Carry Current	Max.	A	1			0.50			1			2		
	Contact Resistance		m Ohms	Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	Min	Typ	Max
						150			150			150			150
	Dielectric strength Across Open Contact		VDC/VACpeak	200			140			200			200		
	Capacitance Across Open Contact		pF		0.70	1		2.50	3		2.50			2.50	3
	Switching Frecuency		Hz	500			250			250			250		
	Life Expectancy Signal Level 1V-10mA		$x10^6$ Operations	300	500			20			20			20	
	Contact Material			Rh			Rh			Rh			Rh		
RELAY PARAMETERS	Dielectric Strength Coil-Contact		VAC	1000			1000			500			500		
	Insulation Resistance		Ohms	10^{10}	10^{12}		10^{9}	10^{10}		10^{10}	10^{12}		10^{10}	10^{12}	
	Capacitance Open Contact to Coil		pF		1.50	2			3			3			3
	Operate or Pull in Time Incl. Bounce		ms		0.25	0.50		1.50	2.00			1.20			2.60
	Release or Drop Out Time With Diode		ms		0.25	0.50		1.50	3.00			0.80			0.50
	Operating Temperature		°C	-40		85	-40		85	-40		85	-40		85
	Storage Temperature		°C	-50		125	-40		125	-40		125	-40		125
	Shock Resistance		g			100			50			50			50
	Vibration Resistance		g			20			10			10			10
	Soldering Temp. 10 sec.		°C			260			260			260			260
	Weight (approx.)		grams		2.30			2.30			2.30			2.30	
	Dimensions			Package Style 1			Package Style 4			Package Style 4			Package Style 4		

	Type			3570.1331.xxx			3570.1332.xxx			3570.1321.xxx		
	Series			DSS4/SIP 1A			DSS4/SIP 1A			SIL 1A		
	Contact Form			1A - normally open			1A - normally open			1A - normally open		
	Features			- Industry standard - RoHS Compliant - ATE version available as 3570.1333.xx for high reliability			- Industry standard - Low input power - RoHS Compliant			- Industry standard - RoHS Compliant		
COIL PARAMETERS	Nominal Voltage		VDC	5	12	24	5	12		5	12	24
	Must Operate / Pull in Voltage	Max.	VDC	3.80	9	18	3.80	9		3.80	9	18
	Must Release / Drop out Voltage	Min.	VDC	0.80	1	2	0.80	1		0.80	1	2
	Maximum Voltage		VDC	10	20	28	10	28		10	20	28
	Nominal Input Power		mW	50	144	288	25	48		50	144	288
	Coil Resistance +/- 10 %		Ohms	500	1000	2000	1000	3000		500	1000	2000
CONTACT PARAMETERS	Switching Power	Max.	W/VA	10			10			10		
	Switching Voltage	Max.	VDC/VAC	200			200			200		
	Switching Current	Max.	A	0.50			0.50			0.50		
	Carry Current	Max.	A	2			2			2		
	Contact Resistance		m Ohms	Min	Typ	Max	Min	Typ	Max	Min	Typ	Max
						100			100			100
	Dielectric strength Across Open Contact		VDC/VACpeak	250			250			250		
	Capacitance Across Open Contact		pF		0.70	1		0.70	1			
	Switching Frecuency		Hz	500			500			500		
	Life Expectancy Signal Level 1V-10mA		$x10^6$ Operations	300	500		300	500		300	500	
	Contact Material			Rh			Rh			Rh		
RELAY PARAMETERS	Dielectric Strength Coil-Contact		VAC	1000			1000			1800		
	Insulation Resistance		Ohms	10^{11}	10^{12}		10^{11}	10^{12}		10^{11}	10^{12}	
	Capacitance Open Contact to Coil		pF		1.50	2		1.50	2			
	Operate or Pull in Time Incl. Bounce		ms		0.25	0.50		0.25	0.50		0.25	0.50
	Release or Drop Out Time With Diode		ms		0.25	0.50		0.25	0.50		0.25	0.50
	Operating Temperature		°C	-40		85	-40		85	-40		85
	Storage Temperature		°C	-40		125	-40		125	-40		125
	Shock Resistance		g			100			100			100
	Vibration Resistance		g			20			20			20
	Soldering Temp. 10 sec.		°C			260			260			260
	Weight (approx.)		grams		1.60			1.60			2	
	Dimensions			Package Style 5			Package Style 5			Package Style 6		

Pin Configuration (top view)



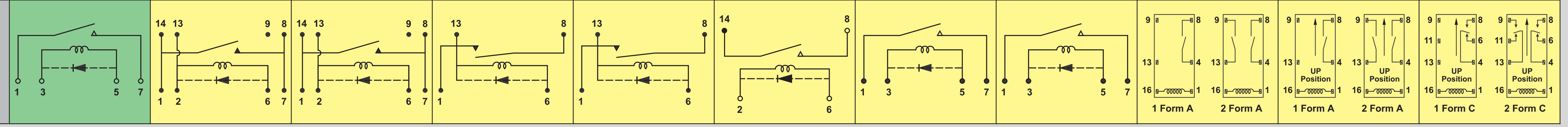
* Suitable for SMD solder process

	Type			3570.1326.xxx			3585.1210.xxx			3582.7210.xxx			3585.7251.xxx		
	Series			SIL 1A			MSS2 1A			MVS2 1A			MSS7 1A - GRMA		
	Contact Form			1A - normally open			1A - normally open			1A - normally open			1A - normally open		
	Features			- Industry standard - ATE relay - RoHS Compliant			- Wetted, no bounce - All position mounting - High performance			- Wetted, no bounce - High performance - High reliability / long life			- Wetted, no bounce - All position mounting - High performance - 4KV I/O isolation / ATE		
COIL PARAMETERS	Nominal Voltage		VDC	5	12	24	5	12	24	5	12	24	5	12	24
	Must Operate / Pull in Voltage	Max.	VDC	3.80	9	18	3.75	9	18	3.75	9	18	3.75	9	18
	Must Release / Drop out Voltage	Min.	VDC	0.80	1	2	0.50	1	2	0.50	1	2	0.50	1	2
	Maximum Voltage		VDC	10	20	28	10	20	40	10	20	40	10	20	40
	Nominal Input Power		mW	50	144	275	179	288	268	238	288	268	179	288	268
	Coil Resistance +/- 10 %		Ohms	500	1000	2100	140	500	2150	105	500	2150	140	500	2150
CONTACT PARAMETERS	Switching Power	Max.	W/VA	25			50			50			50		
	Switching Voltage	Max.	VDC/VAC	1000			500			500 (1000V with limited current)			500		
	Switching Current	Max.	A	1			2			2			2		
	Carry Current	Max.	A	2			2			3			2		
	Contact Resistance		m Ohms	Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	Min	Typ	Max
						150			100			100			100
	Dielectric strength Across Open Contact		VDC/VACpeak	2500			1500			2000			1500		
	Capacitance Across Open Contact		pF					1.50			0.70			1.50	
	Switching Frecuency		Hz	500			300			180			300		
	Life Expectancy Signal Level 1V-10mA		$x10^6$ Operations	2 (@1000 Vdc-10mA)			500			1000			500		
	Contact Material			Rh			Hg	16 mg		Hg	40 mg		Hg	16 mg	
RELAY PARAMETERS	Dielectric Strength Coil-Contact		VAC	1800			1000			1000			4000		
	Insulation Resistance		Ohms	10^{11}	10^{12}		10^{10}	10^{11}		10^{11}	10^{12}		10^{10}	10^{11}	
	Capacitance Open Contact to Coil		pF					3			1.20			3	
	Operate or Pull in Time Incl. Bounce		ms		0.25	0.50		1.20	1.75		1.50	2.50		1.20	1.75
	Release or Drop Out Time With Diode		ms		0.25	0.50		1	1.50		1	2.50		1	1.50
	Operating Temperature		°C	-40		85	-35		75	-35		75	-35		75
	Storage Temperature		°C	-40		125	-40		105	-40		105	-40		105
	Shock Resistance		g			100			30			30			30
	Vibration Resistance		g			20			10			10			10
	Soldering Temp. 10 sec.		°C			260			260			260			260
	Weight (approx.)		grams		2			2.40			2.40			2.40	
	Dimensions			Package Style 6			Package Style 7			Package Style 7			Package Style 8		

	Type			3582.7251.xxx			3585.7511.xxx			3585.1331.xxx			3582.7331.xxx		
	Series			MVS7 1A - GRMA			SMD6 1A			MSS4 1A			MVS4 1A		
	Contact Form			1A - normally open			1A - normally open			1A - normally open			1A - normally open		
	Features			- Wetted, no bounce - High performance - High reliability / long life - 4KV I/O isolation / ATE			- Wetted, no bounce - All position mounting - High performance - 4KV I/O isolation / ATE			- Wetted, no bounce - All position mounting - High performance - ATE relay			- Wetted, no bounce - High performance - High reliability / long life - ATE relay		
COIL PARAMETERS	Nominal Voltage		VDC	5	12	24	5	12	24	5	12	24	5	12	24
	Must Operate / Pull in Voltage	Max.	VDC	3.75	9	18	3.75	9	18	3.75	9	18	3.75	9	18
	Must Release / Drop out Voltage	Min.	VDC	0.50	1	2	0.50	1	2	0.50	1	2	0.50	1	2
	Maximum Voltage		VDC	10	20	40	10	20	410	10	20	40	10	20	40
	Nominal Input Power		mW	238	288	268	179	288	268	179	288	268	238	288	268
	Coil Resistance +/- 10 %		Ohms	105	500	2150	140	500	2150	140	500	2150	105	500	2150
CONTACT PARAMETERS	Switching Power	Max.	W/VA	50			50			50			50		
	Switching Voltage	Max.	VDC/VAC	500 (1000V with limited current)			500			500			500 (1000V with limitted current)		
	Switching Current	Max.	A	2			2			2			2		
	Carry Current	Max.	A	3			2			2			3		
	Contact Resistance		m Ohms	Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	Min	Typ	Max
						100			100			100			100
	Dielectric strength Across Open Contact		VDC/VACpeak	2000			1500			1500			2000		
	Capacitance Across Open Contact		pF		0.70			1.50			1.30			0.80	
	Switching Frecuency		Hz	180			300			300			180		
	Life Expectancy Signal Level 1V-10mA		$x10^6$ Operations	1000			500			500			1000		
	Contact Material			Hg	40 mg		Hg	16 mg		Hg	16 mg		Hg	40 mg	
RELAY PARAMETERS	Dielectric Strength Coil-Contact		VAC	4000			4000			1000			1000		
	Insulation Resistance		Ohms	10^{11}	10^{12}		10^{10}	10^{11}		10^{8}	10^{10}		10^{10}	10^{12}	
	Capacitance Open Contact to Coil		pF		1.20			3			3			2.20	
	Operate or Pull in Time Incl. Bounce		ms		1.50	2.50		1.20	1.75		1.20	1.75		1.50	2.50
	Release or Drop Out Time With Diode		ms		1	2.50		1	1.50		1	1.50		1	2.50
	Operating Temperature		°C	-35		75	-35		75	-35		75	-35		75
	Storage Temperature		°C	-40		105	-40		105	-40		105	-40		105
	Shock Resistance		g			30			30			30			30
	Vibration Resistance		g			10			10			10			10
	Soldering Temp. 10 sec.		°C			260			260			260			260
	Weight (approx.)		grams		2.40			2.40			2.40			2.40	
	Dimensions			Package Style 8			Package Style 3			Package Style 9			Package Style 9		

	Type			3885.7811.xxx			3882.7811.xxx			3880.7831.xxx		
	Series			MSS6 2A			MVS6 2A			HGZM 2C		
	Contact Form			2A - normally open			2A - normally open			2C - change over		
	Features			- Wetted, no bounce - All position mounting - High performance - 1A also available			- Wetted, no bounce - High performance - High reliability / long life - 1A also available			- Wetted, no bounce - High performance - High reliability / long life - 1C also available		
COIL PARAMETERS	Nominal Voltage		VDC	5	12	24	5	12	24	5	12	24
	Must Operate / Pull in Voltage	Max.	VDC	3.75	9	18	3.75	9	18	3.75	9	18
	Must Release / Drop out Voltage	Min.	VDC	0.50	1	2	0.50	1	2	0.50	1	2
	Maximum Voltage		VDC	9	21	43	9	21	43	7	17	33
	Nominal Input Power		mW	313	335	329	313	335	329	568	514	549
	Coil Resistance +/- 10 %		Ohms	80	430	1750	80	430	1750	44	280	1050
CONTACT PARAMETERS	Switching Power	Max.	W/VA	50			50			50		
	Switching Voltage	Max.	VDC/VAC	500			500 (1000V with limitted current)			500 (1000V with limitted current)		
	Switching Current	Max.	A	2			2			2		
	Carry Current	Max.	A	2			3			3		
	Contact Resistance		m Ohms	Min	Typ	Max	Min	Typ	Max	Min	Typ	Max
						150			150			150
	Dielectric strength Across Open Contact		VDC/VACpeak	1400			2000			1400		
	Capacitance Across Open Contact		pF		0.90			0.80			1	
	Switching Frecuency		Hz	300			180			100		
	Life Expectancy Signal Level 1V-10mA		$x10^6$ Operations	500			1000			1000		
	Contact Material			Hg	32 mg		Hg	80 mg		Hg	144mg	
RELAY PARAMETERS	Dielectric Strength Coil-Contact		VAC	1000			1000			1000		
	Insulation Resistance		Ohms	10^{8}	10^{11}		10^{10}	10^{12}		10^{10}	10^{11}	
	Capacitance Open Contact to Coil		pF		1.80			2.20			1.20	
	Operate or Pull in Time Incl. Bounce		ms		1.20	1.75		1.50	2.50		2.50	5.00
	Release or Drop Out Time With Diode		ms		1	1.70		1	2.50		1.70	5.00
	Operating Temperature		°C	-35		75	-35		75	-35		75
	Storage Temperature		°C	-40		105	-40		105	-40		105
	Shock Resistance		g			30			30			30
	Vibration Resistance		g			10			10			10
	Soldering Temp. 10 sec.		°C			260			260			260
	Weight (approx.)		grams		3.40			3.40			3.40	
	Dimensions			Package Style 10			Package Style 10			Package Style 11		

Pin Configuration (top view)



GENERAL INFORMATION

DESCRIPTION

Reed relays consist of a reed switch and coil assembled into a housing, which could be plastic, metal or molded. The reed switches consist of two or three ferro-magnetic blades, which are hermetically sealed in an inert atmosphere within a glass tube, preventing the ingress of contaminants. It also minimizes arcing and contact damage.

Compared with electro-mechanical relays, reed relays are smaller in size and generally have a faster response time, lower power consumption and longer life. They can also directly be driven by TTL/CMOS. Compared with solid state relays, reed relays have a real galvanic isolation between input and output. The leakage current and the ON-resistance is much lower. Reed relays also can offer a higher dielectric strength.

OPERATION

Reed relays have outstanding performance in insulation and stand-off voltage.

Energizing the coil operates a reed switch, causing the contacts to close, to open or to change over. It is important that the switch is not overloaded by applying loads in excess of the switch ratings. For details on switch loads refer to the reed relay specifications in the technical table or on specific data 0sheets.

Washability

Resistant to most of the common cleaning fluids. During the final rinsing phase only the purest substances should be used.

Pull-in and Drop-out voltage, Coil resistance

The tolerances indicated are valid at 25°C+/- 3°C. The temperature coefficient of the coil resistance is 0.4%/°C.

Vibration and shock resistance

During the evaluation of vibration and shock resistance, the relays are driven with nominal voltage. The switches should not open longer than 10 µsec.

	Normally open	Change Over	Wetted contacts
Vibration Resist.	20 g / 5…2000 Hz	10 g / 5…500 Hz	10 g / 10...500 Hz
Shock Resistance	100 g / 11ms Sine half wave	50 g / 11ms Sine half wave	30 g / 11ms Sine half wave

Switching Voltage, Current and capacity

The parameters as listed for switching voltage, current and capacity are maximum values. Exceeding any one of these values causes overload and reduces relay life expectancy.

Contact resistance

The contact resistance indicated is valid for new relays at nominal coil voltage. The four-point method at 2Vdc/100mA or 10mA is applied. Custom solutions for special applications, especially for switching signals smaller than 1 mV and 10 µA (low level applications) or applications requiring dynamic contact resistance measurement can be produced for special switching needs.

GENERAL PARAMETERS

Life expectancy

The life expectancy of a reed relay is at least 105…106 operations at nominal load. At minimum load the life expectancy can be up to 5x108 operations. The mechanical life expectancy is 109 operations (minimum). Through the switching of higher loads, especially inductive or capacitive and lamp loads, life expectancy can be considerably reduced due to exceeding the permissible maximum current.

Inductive loads :

Contact arcing can occur while breaking an inductive load (back EMF). This arcing can damage the contact. Contact protection is advised in such cases by using a RC-snubber, MOV or transient voltage suppression diode.

Capacitive loads :

By switching a capacitive load (capacitors or long cables) the surge current may exceed the contact rating. These inrush currents should be limited by series resistors.

Lamp loads :

By switching on lamps the inrush current can be as high as 10 times the steady state current. This current must be limited with a series resistor within the allowed contact rating.

Thermoelectric voltage

Between FeNi (reed switch) and Cu (PCB) a thermoelectric voltage Uth = k x (T1-T2) occurs with the constant k = 50 µV/°C (T=temperature).

Thermal resistance of the DIL-SIL reed relays : 70 K/W.

Capacitance

The capacitance parameters are regarded as typical and are calculated for versions without shielding.

Solderability

All relays meet the DIN 8505 requirements. Hole diameter in PCB : 0.65 mm.

Switching time

When using dry reed switches in relays, contact bounce may occur.

Pull-in or operate time (incl. Bounce time) typ. 0,5 … 1,8 ms at nominal voltage and 20 Hz.

Drop-out or release time (with diode suppression) typ. 0,5…1,5 ms at nominal voltage and 20 Hz.

Temperature Range

The operating temperature of the relay is the equivalent of the internal temperature. If the relays are used in ambient temperatures higher than 20°C, the maximum permissible operating voltage (UT) must be calculated according to the table indicated below, using the formula :

UT = Umax x kl

(Umax = max. permissible operating voltage)

T (°C)	20	30	40	50	60	70
k_l	1.00	0.96	0.92	0.88	0.84	0.80