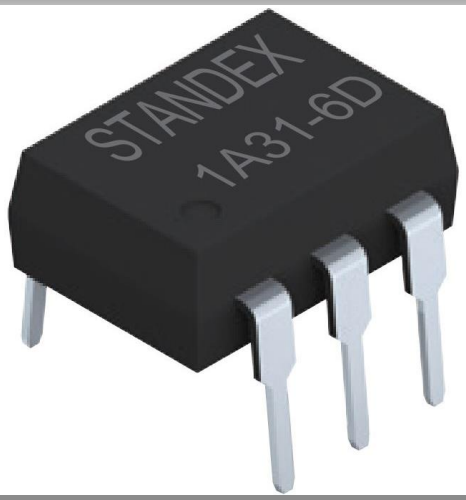
31 Series Photo-MOSFET Relay

- **Features: General Purpose Photo MOSFET Relay, switching up to 350V DC or Peak AC**
- **THT, SMD or SOP**
- **UL listed, RoHS Compliance**
- **Applications: Automatic Test Equipment, Battery Management Systems, I/O Modules, Telephone Equipment**
- **Markets: Automotive, Telecommunication, Test & Measurement, Security**



Part Description: S M P - X A 3 1 - X X X - X

Number of Poles	Contact Form	Series Number	Number of Pins	Mounting Type	Package Style	Special Features
1, 2	A	31	4, 6, 8	D, S, P	Tube, Reel	Nil, Q, R

See page 7 for Glossary

Maximum Ratings @ Ambient Temperature = 25⁰C								
Parameters	Symbol	Value					Units	Condition
		1A31-4P	2A31-8P	1A31-4D, S	2A31-8D, S	1A31-6D, S		
INPUT SPECIFICATIONS								
Continuous LED Current	I_F	50	50	50	50	50	mA	-
Peak LED Current	I_{FP}	500	500	500	500	500	mA	f=100Hz, 1% Duty Cycle
LED Reverse Voltage	V_R	5	5	5	5	5	V	-
Input Power Dissipation	P_{IN}	75	75	75	75	75	mW	-
OUTPUT SPECIFICATIONS								
Load Voltage	V_L	350	350	350	350	350	DC or Peak AC	-
Load Current	I_L	120	100	130	110	130	mA	
Peak Load Current	I_{PEAK}	600	600	600	600	600	mA	1 ms, 1 shot
Output Power Dissipation	P_{OUT}	300	450	450	600	450	mW	-
GENERAL SPECIFICATIONS								
Total Power Dissipation	P_T	350	500	500	650	500	mW	-
I/O Breakdown Voltage	$V_{I/O}$	1500	1500	3750	3750	3750	V_{RMS}	-
I/O Breakdown Voltage	$V_{I/O}$	3750	3750	5000	5000	5000	V_{RMS}	Suffix R
Operating Temperature	T_{OPR}	-40/+85	-40/+85	-40/+85	-40/+85	-40/+85	⁰C	-
Storage Temperature	T_{STG}	-40/+100	-40/+100	-40/+100	-40/+100	-40/+100	⁰C	-

c UL us RoHS REACH COMPLIANT

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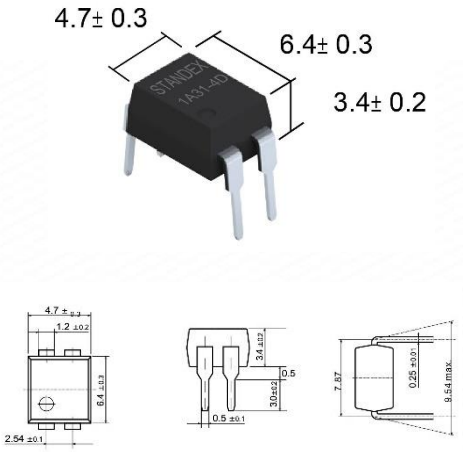
31 Series Photo-MOSFET Relay

Maximum Ratings @ Ambient Temperature = 25⁰C						
Parameters	Symbol	Min	Typ	Max	Units	Condition
INPUT SPECIFICATIONS						
LED Forward Voltage	V_F	1.0	1.17	1.5	V	I_F = 10mA
Operation LED Current	$I_{F\ ON}$	-	0.8	3.0	mA	-
Recovery LED Voltage	$V_{F\ OFF}$	0.5	1.0	-	V	-
OUTPUT SPECIFICATIONS						
On Resistance: Drain to Drain	R_{ON}	-	20	24	Ω	I_F = 5mA, I_L=Rating (within 1 sec.)
Off-State Leakage Current	I_{LEAK}	-	-	1.0	µA	V_L=350V
Output Capacitance	C_{OUT}	-	55	-	ρF	V_L=0V, f=1MHz
TRANSMISSION SPECIFICATIONS						
Turn-On Time	T_{ON}	-	0.25	0.5	ms	I_F = 5mA, I_L=Rating (for SOP type)
Turn-Off Time	T_{OFF}	-	0.05	0.2	ms	
Turn-On Time	T_{ON}	-	0.2	1.0	ms	I_F = 10mA, I_L=Rating (for DIP/SMD type)
Turn-Off Time	T_{OFF}	-	0.05	0.5	ms	
COUPLED SPECIFICATIONS						
I/O Insulation Resistance	$R_{I/O}$	10^9	-	-	Ω	-
I/O Capacitance	$C_{I/O}$	-	1.3	-	ρF	f=1MHz

Photo-MOSFET Relay Dimensions (Tolerances acc. to ISO 2768-mp)

DIP4



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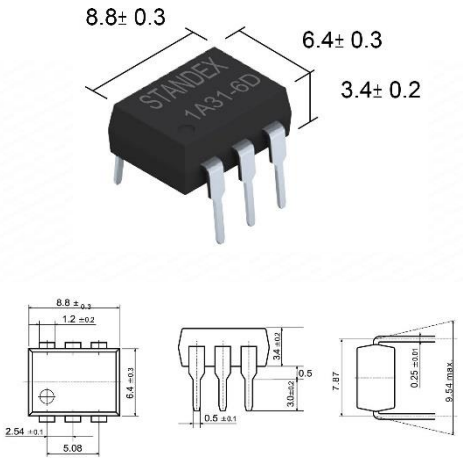
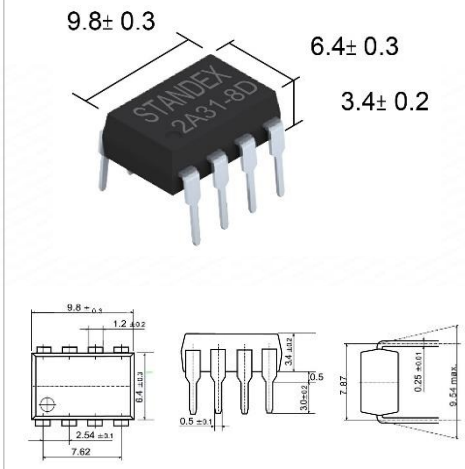


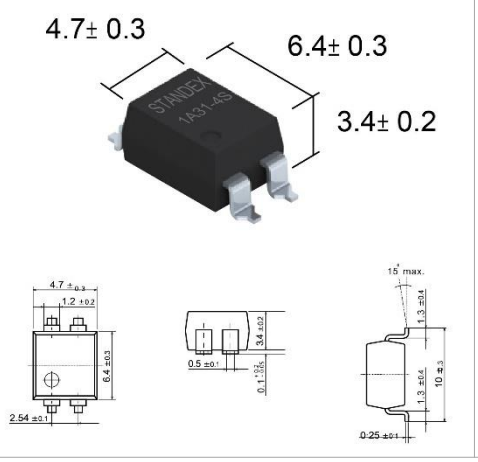
DIP8



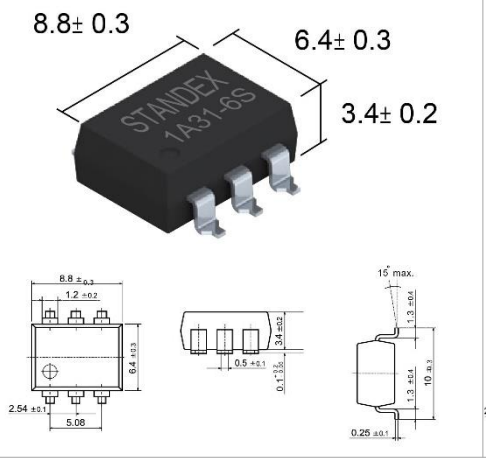
31 Series Photo-MOSFET Relay

Photo-MOSFET Relay Dimensions (Tolerances acc. to ISO 2768-mp)

SMD4



SMD6



SMD8

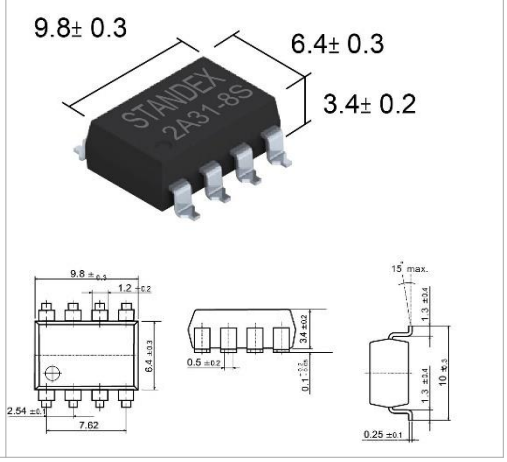
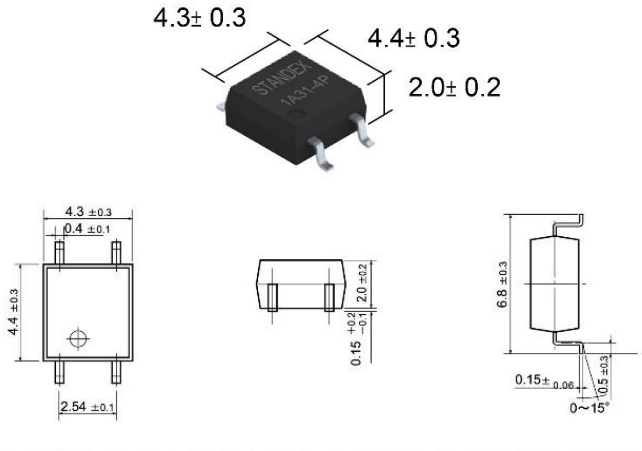


Photo-MOSFET Relay Dimensions (Tolerances acc. to ISO 2768-mp)

SOP4



SOP8

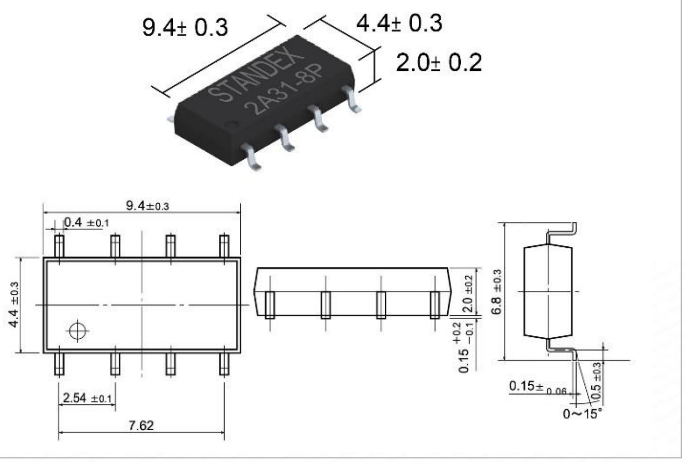
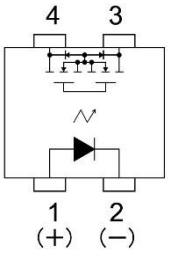


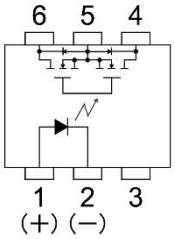
Photo MOSFET Relay Pin-Out (Top View)

4 PIN



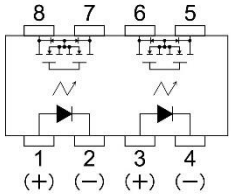
1:Anode (LED)
2:Cathode (LED)
3,4:Drain (MOS FET)

6 PIN



1:Anode (LED)
2:Cathode (LED)
3:NC
4,6:Drain (MOS FET)
5:Source (MOS FET)

8 PIN

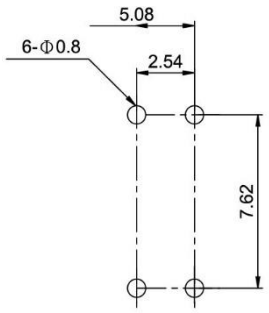


1,3:Anode (LED)
2,4:Cathode (LED)
5,6,7,8:Drain (MOS FET)

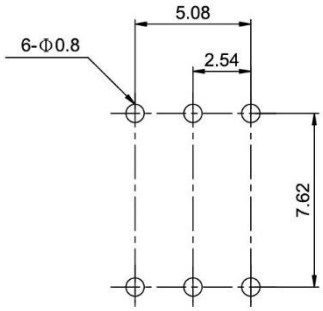
31 Series Photo-MOSFET Relay

Photo MOSFET Relay Recommended PCB Pad Layout (Tolerances acc. to ISO 2768-mp)

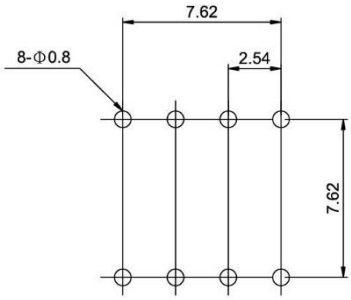
DIP4 (Bottom View)



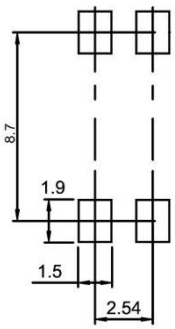
DIP6 (Bottom View)



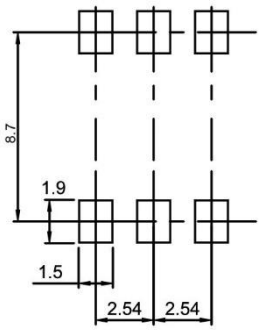
DIP8 (Bottom View)



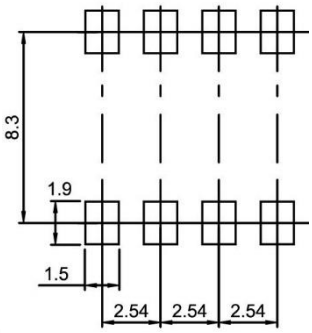
SMD4 (Top View)



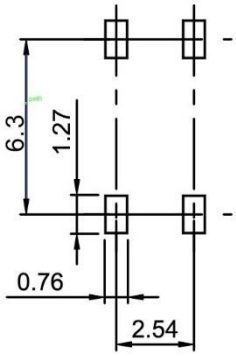
SMD6 (Top View)



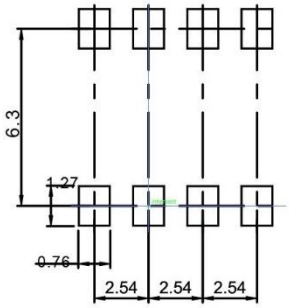
SMD8 (Top View)



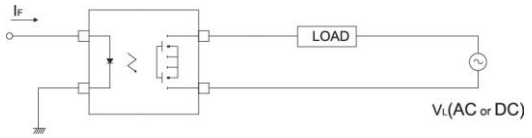
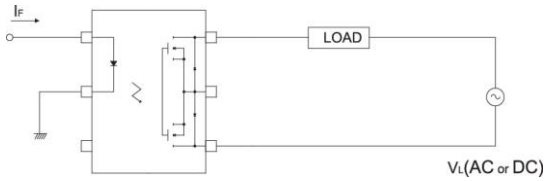
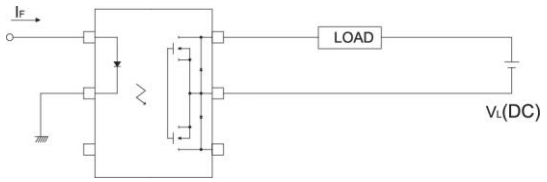
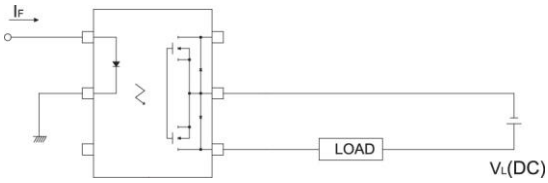
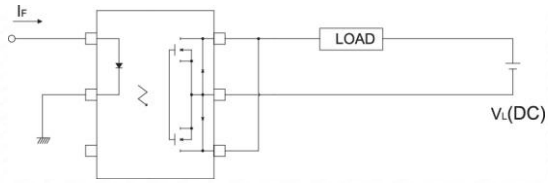
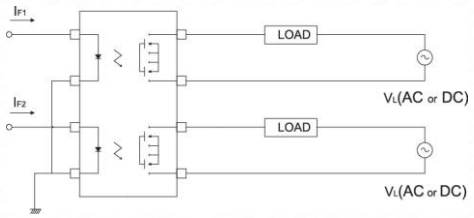
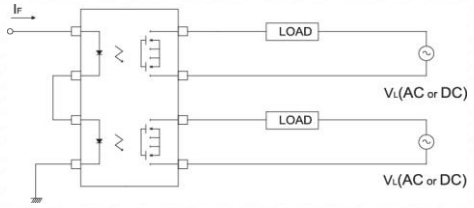
SOP4 (Top View)



SOP8 (Top View)



31 Series Photo-MOSFET Relay

Photo-MOSFET Relay Load Connection Method			
TYPE	LOAD	CONNECTION	FEATURE
4-PIN	AC OR DC		Control bi-directional signal
6-PIN	AC OR DC		Control bi-directional signal
	DC		On-Resistance is 1/2 of connection 1 2-Make-contacts (Source Common)
			
	DC		On-Resistance is 1/2 of connection 2
8-PIN	AC OR DC		2 inputs and 2 outputs
			1 input and 2 outputs

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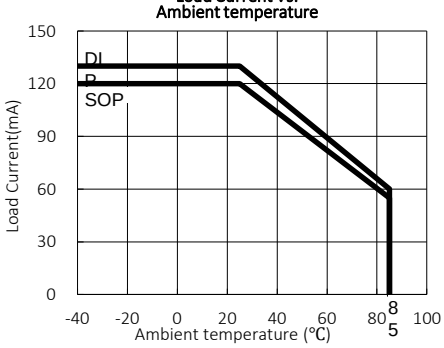
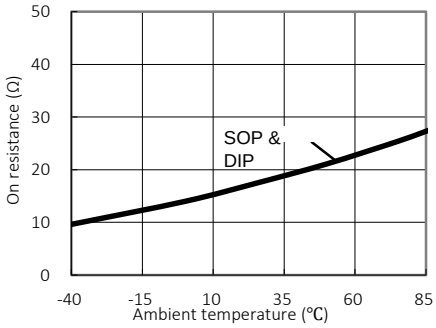
31 Series Photo-MOSFET Relay

Photo MOSFET Relay Reference Data

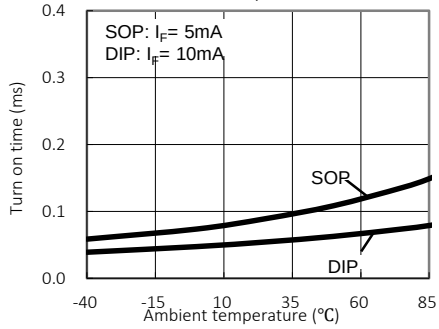
Load Current Vs. Ambient temperature



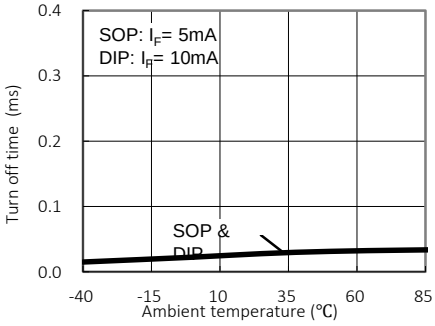
On resistance Vs. Ambient temperature



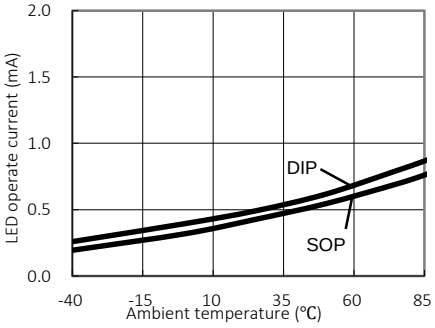
Turn on time Vs. Ambient temperature



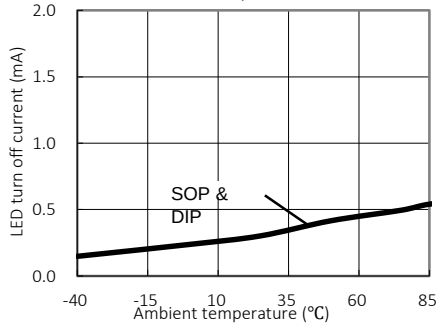
Turn off time Vs. Ambient temperature



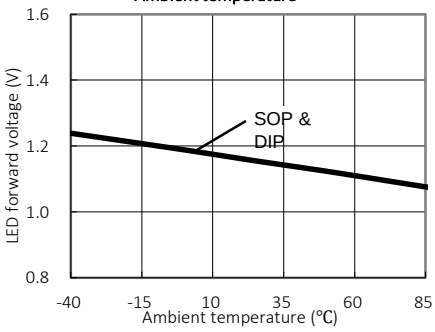
LED operate current Vs. Ambient temperature



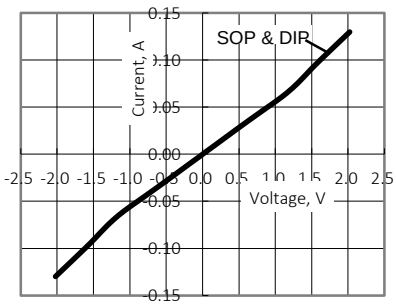
LED turn off current Vs. Ambient temperature



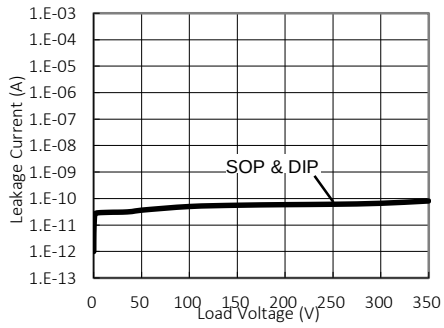
LED forward voltage Vs. Ambient temperature



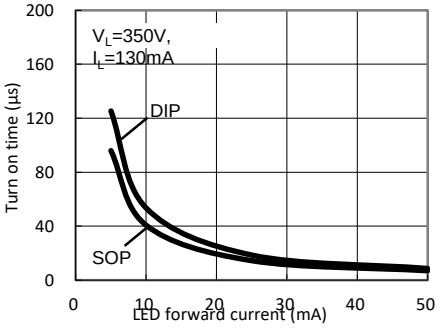
Current Vs. voltage characteristics of output at MOS portion



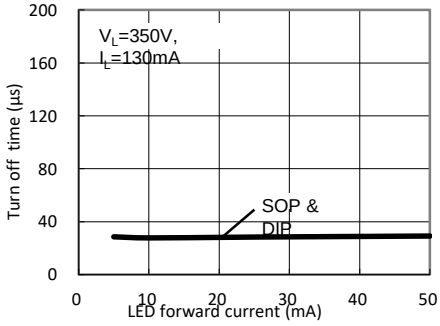
Off state leakage Current Vs. load voltage



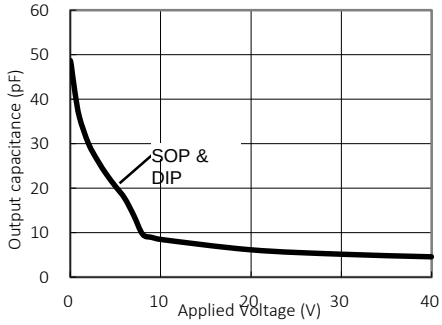
Turn on time Vs. LED forward current characteristics



Turn off time Vs. LED forward current characteristics



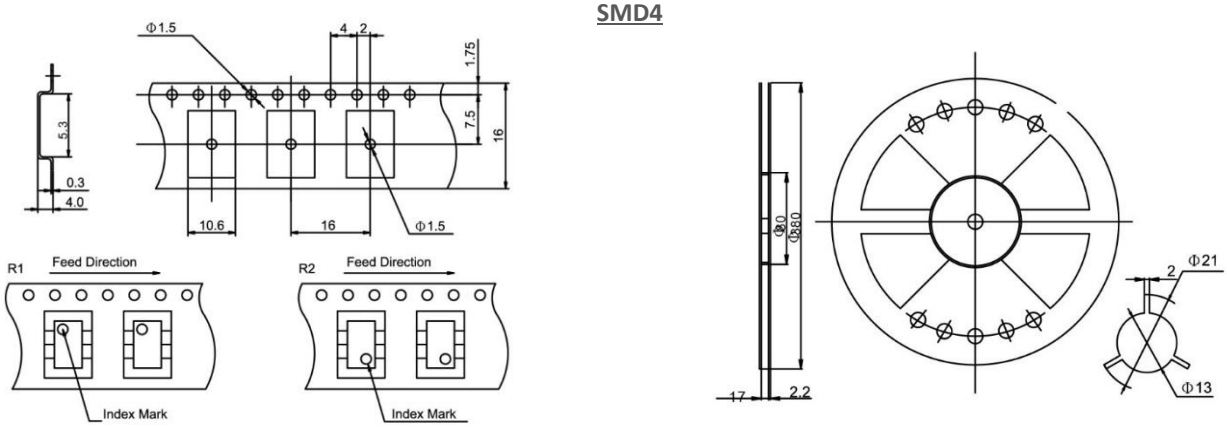
Output capacitance Vs. applied voltage



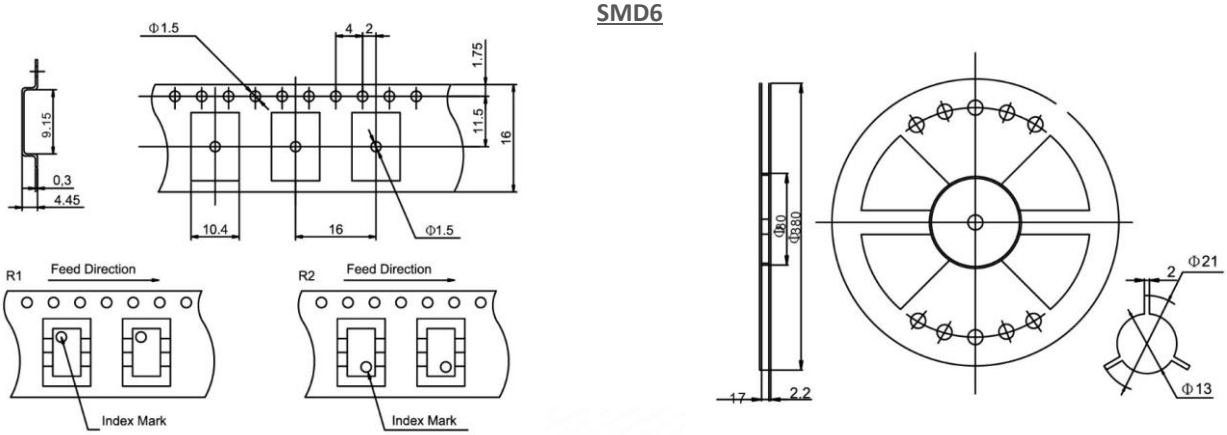
31 Series Photo-MOSFET Relay

Photo MOSFET Relay Tape & Reel Packaging (1,000 pcs per reel)

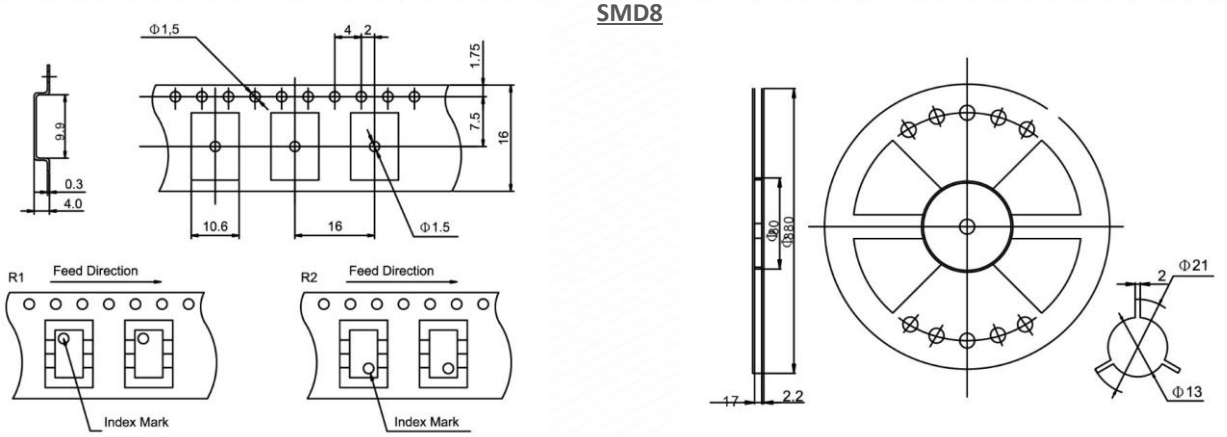
SMD4



SMD6



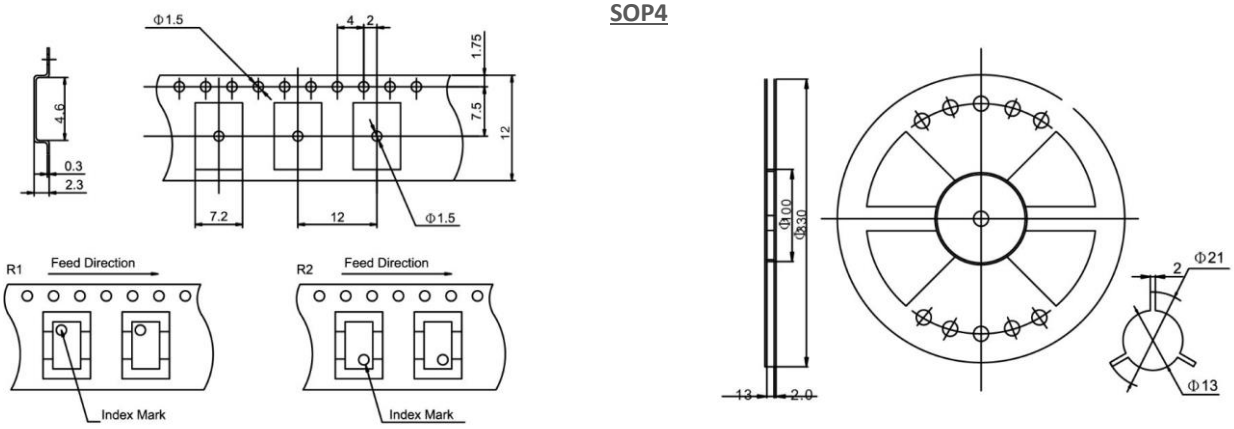
SMD8



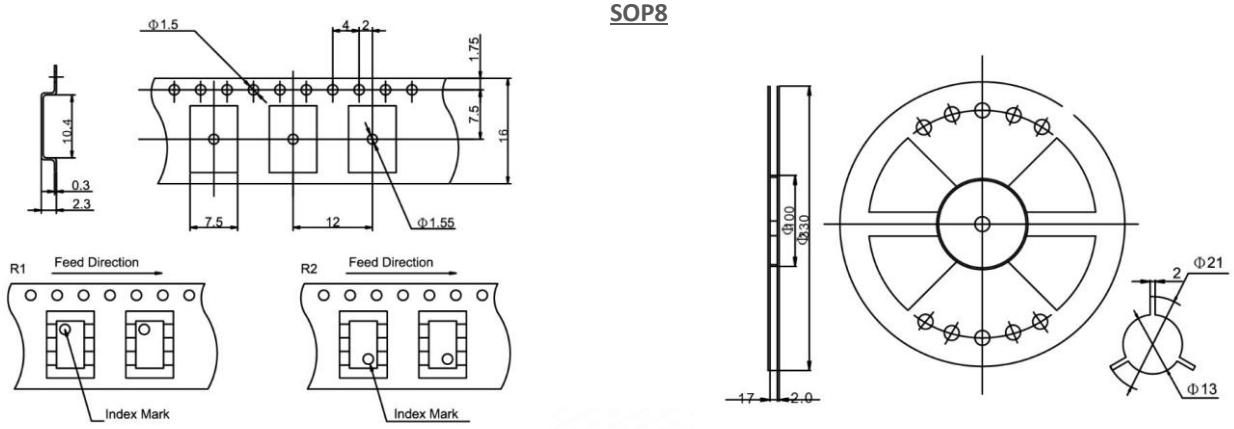
31 Series Photo-MOSFET Relay

Photo MOSFET Relay Tape & Reel Packaging (1,000 pcs per reel)

SOP4



SOP8



Glossary Options	
D	DIP (Dual-In-Line Package)
S	SMD (Surface Mount Design)
P	SOP (Small-Outline Package)
Q	AEC-Q101 / High Temperature
R	Reinforced Isolation

Please note: All technical specifications in this series datasheet refer to the standard product range. Modifications in the sense of technical progress are reserved. For general information only. For more specific information, please consult the product datasheet, available upon request.

This series datasheet could contain technical inaccuracies or typographical errors. Changes are periodically made to the information herein. These changes will be incorporated in future revisions.

For deviating values, latest specifications and product details, please contact your nearest sales office.

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