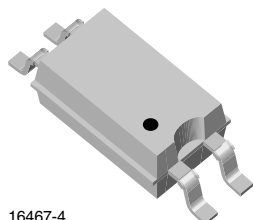
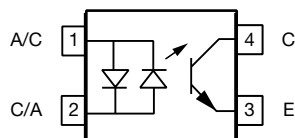


Optocoupler, Phototransistor Output, AC Input, Low Input Current, SSOP-4, Half Pitch, Mini-Flat Package



16467-4



FEATURES

- High CTR with low input current
- Low profile package (half pitch)
- High collector emitter voltage, $V_{CEO} = 80\text{ V}$
- Isolation test voltage, 3750 V_{RMS}
- Low coupling capacitance
- High common mode transient immunity
- Compliant to RoHS Directive 2002/95/EC and in accordance to WEEE 2002/96/EC


RoHS
COMPLIANT

DESCRIPTION

The VOS628A series has a GaAs infrared emitting diode emitter, which is optically coupled to a silicon planar phototransistor detector, and is incorporated in a 4-pin 50 mil lead pitch mini-flat package.

It features a high current transfer ratio at low input current, low coupling capacitance, and high isolation voltage.

The coupling devices are designed for signal transmission between two electrically separated circuits.

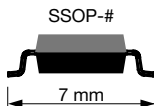
APPLICATIONS

- Telecom
- Industrial controls
- Battery powered equipment
- Office machines
- Programmable controllers

AGENCY APPROVALS

- UL1577, file no. E76222 system code M, double protection (pending)
- cUL CSA 22.2 bulletin 5A, double protection (pending)
- DIN EN 60747-5-2 (pending) (VDE 0884)/DIN EN 60747-5-5 available with option 1
- BSI: EN 60065:2002 (pending), EN 60950-1:2006 (pending)
- FIMKO

ORDERING INFORMATION

<div> <div>V O S 6 2 8 A - # X 0 0 1 T</div> <div> PART NUMBER CTR BIN PACKAGE OPTION TAPE AND REEL </div> </div>										
AGENCY CERTIFIED/PACKAGE		CTR (%)								
		$\pm 1\text{ mA}$								
UL, cUL, BSI		63 to 125	100 to 200		160 to 320					
SSOP-4, 50 mil pitch		VOS628A-2T	VOS628A-3T		VOS628A-4T					
UL, cUL, BSI, VDE		63 to 125	100 to 200		160 to 320					
SSOP-4, 50 mil pitch		-	VOS628A-3X001T		-					

Note

- Additional options may be possible, please contact sales office.



ABSOLUTE MAXIMUM RATINGS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)				
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
INPUT				
Power dissipation		P_{diss}	100	mW
Forward current		I_F	60	mA
OUTPUT				
Collector emitter voltage		V_{CE}	80	V
Emitter collector voltage		V_{EC}	7	V
Collector current		I_C	50	mA
	$t_p/T = 0.5$, $t_p < 10\text{ ms}$	I_C	100	mA
Power dissipation		P_{diss}	150	mW
COUPLER				
Isolation test voltage between emitter and detector		V_{ISO}	3750	V_{RMS}
Isolation resistance	$V_{IO} = 500\text{ V}$, $T_{amb} = 25\text{ }^{\circ}\text{C}$	R_{IO}	$\geq 10^{12}$	Ω
	$V_{IO} = 500\text{ V}$, $T_{amb} = 100\text{ }^{\circ}\text{C}$	R_{IO}	$\geq 10^{11}$	Ω
Storage temperature range		T_{stg}	- 40 to + 125	$^{\circ}\text{C}$
Ambient temperature range		T_{amb}	- 40 to + 110	$^{\circ}\text{C}$
Junction temperature		T_j	125	$^{\circ}\text{C}$
Soldering temperature ⁽¹⁾	max. 10 s, dip soldering distance to seating plane $\geq 1.5\text{ mm}$	T_{sld}	260	$^{\circ}\text{C}$

Notes

- Stresses in excess of the absolute maximum ratings can cause permanent damage to the device. Functional operation of the device is not implied at these or any other conditions in excess of those given in the operational sections of this document. Exposure to absolute maximum ratings for extended periods of the time can adversely affect reliability.

⁽¹⁾ Refer to reflow profile for soldering conditions for surface mounted devices.

ELECTRICAL CHARACTERISTICS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)							
PARAMETER	TEST CONDITION	PART	SYMBOL	MIN.	TYP.	MAX.	UNIT
INPUT							
Forward voltage	$I_F = \pm 5\text{ mA}$		V_F		1.16	1.5	V
Capacitance	$V_R = 0\text{ V}$, $f = 1\text{ MHz}$		C_O		25		pF
OUTPUT							
Collector emitter leakage current	$V_{CE} = 10\text{ V}$		I_{CEO}		10	200	nA
Collector emitter capacitance	$V_{CE} = 5\text{ V}$, $f = 1\text{ MHz}$		C_{CE}		7		pF
COUPLER							
Collector emitter saturation voltage	$I_C = 0.32\text{ mA}$, $I_F = \pm 1\text{ mA}$	VOS628A-2	V_{CEsat}		0.25	0.4	V
	$I_C = 0.5\text{ mA}$, $I_F = \pm 1\text{ mA}$	VOS628A-3	V_{CEsat}		0.25	0.4	V
	$I_C = 0.8\text{ mA}$, $I_F = \pm 1\text{ mA}$	VOS628A-4	V_{CEsat}		0.25	0.4	V
Coupling capacitance			C_C		0.25		pF

Note

- Minimum and maximum values are testing requirements. Typical values are characteristics of the device and are the result of engineering evaluation. Typical values are for information only and are not part of the testing requirements.

CURRENT TRANSFER RATIO ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)							
PARAMETER	TEST CONDITION	PART	SYMBOL	MIN.	TYP.	MAX.	UNIT
I_C/I_F	$I_F = \pm 1\text{ mA}$, $V_{CE} = 5\text{ V}$	VOS628A-2	CTR	63		125	%
		VOS628A-3	CTR	100		200	%
		VOS628A-4	CTR	160		320	%

SWITCHING CHARACTERISTICS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Turn on time	$V_{CC} = 5\text{ V}$, $I_C = 2\text{ mA}$, $R_L = 100\text{ }\Omega$	t_{on}		6		μs
Rise time	$V_{CC} = 5\text{ V}$, $I_C = 2\text{ mA}$, $R_L = 100\text{ }\Omega$	t_r		3.5		μs
Turn off time	$V_{CC} = 5\text{ V}$, $I_C = 2\text{ mA}$, $R_L = 100\text{ }\Omega$	t_{off}		5.5		μs
Fall time	$V_{CC} = 5\text{ V}$, $I_C = 2\text{ mA}$, $R_L = 100\text{ }\Omega$	t_f		5		μs

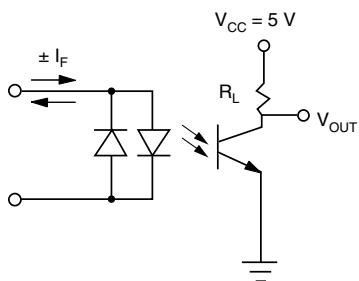


Fig. 1 - Test Circuit

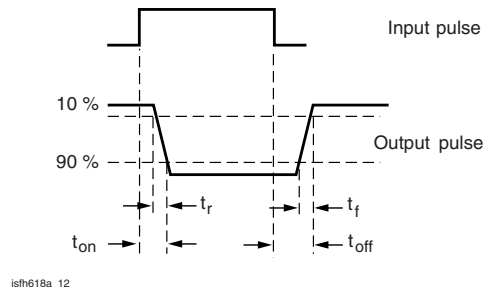


Fig. 2 - Test Circuit and Waveforms

SAFETY AND INSULATION RATINGS						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Climatic classification (according to IEC 68 part 1)				40/110/21		
Comparative tracking index		CTI	175		399	
V_{IOTM}			6000			V_{peak}
V_{IORM}			707			V_{peak}
P_{SO}					265	mW
I_{SI}					130	mA
T_{SI}					150	$^{\circ}\text{C}$
Creepage distance			5			mm
Clearance distance			5			mm
Insulation thickness	Reinforce rated, per IEC 60950 2.10.5.1		0.4			mm

Note

- As per IEC 60747-5-2, §7.4.3.8.1, this optocoupler is suitable for “safe electrical insulation” only within the safety ratings. Compliance with the safety ratings shall be ensured by means of protective circuits.

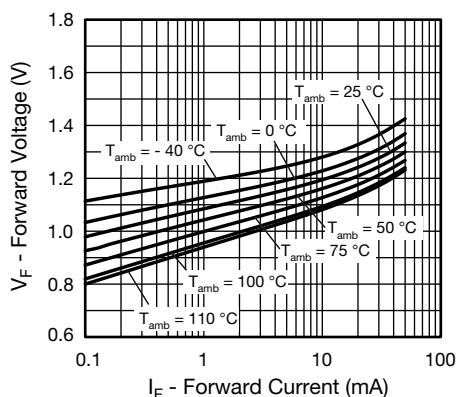
TYPICAL CHARACTERISTICS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)


Fig. 3 - Forward Voltage vs. Forward Current

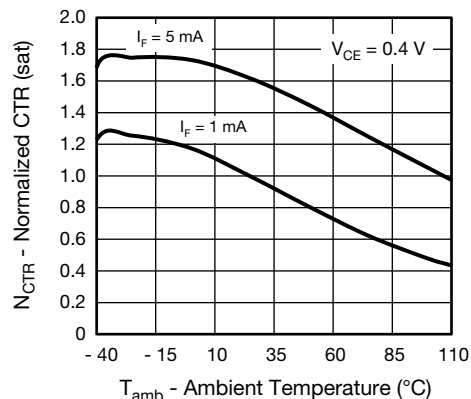


Fig. 6 - Normalized CTR (sat) vs. Ambient Temperature

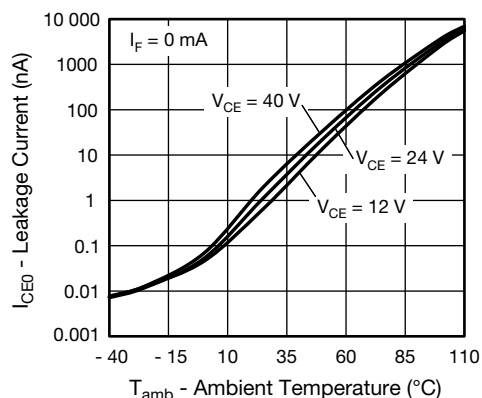


Fig. 4 - Leakage Current vs. Ambient Temperature

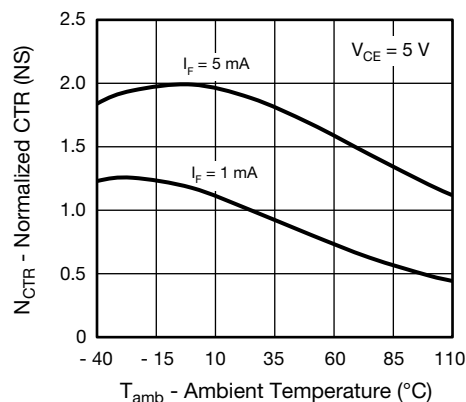


Fig. 7 - Normalized CTR (NS) vs. Ambient Temperature

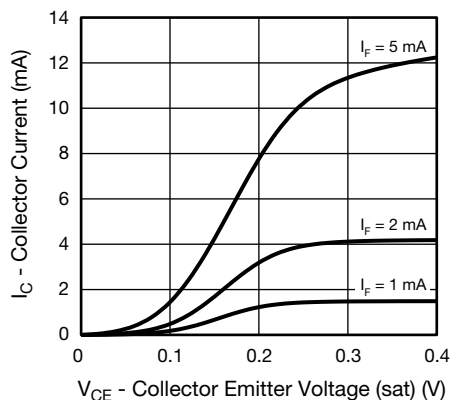
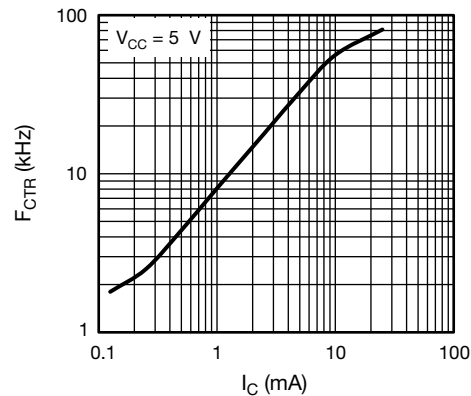


Fig. 5 - Collector Current vs. Collector Emitter Voltage (sat)


Fig. 8 - F_{CTR} vs. I_C

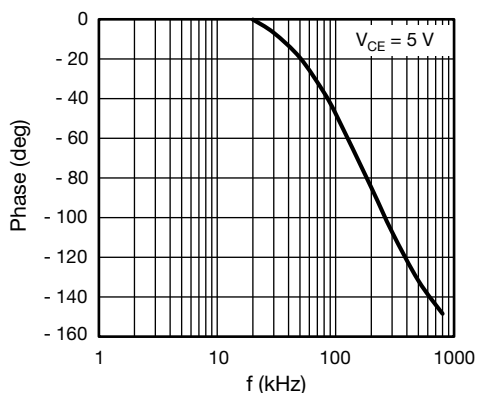
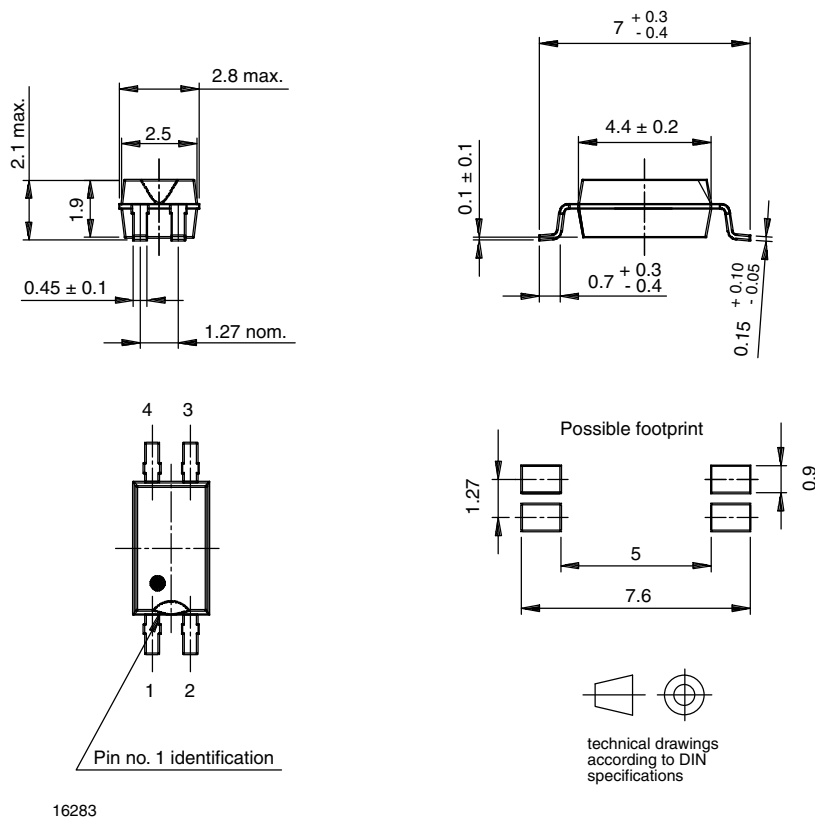
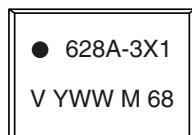


Fig. 9 - F_{CTR} vs. Phase Angle

PACKAGE DIMENSIONS in millimeters



PACKAGE MARKING (example)



Notes

- Only option 1 is reflected in the package marking, it is indicated by the characters "X1".
- Tape and reel suffix (T) is not part of the package marking.



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