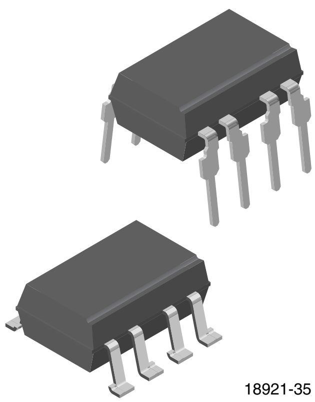
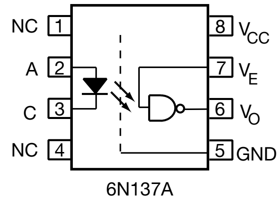
High Speed Optocoupler, 10 MBd





Truth Table (Positive Logic)

LED	ENABLE	OUTPUT
ON	H	L
OFF	H	H
ON	L	H
OFF	L	H
ON	NC	L
OFF	NC	H

DESCRIPTION

The 6N137A is single channel 10 MBd optocouplers utilizing a high efficient input LED coupled to a very high speed integrated photo-detector logic gate with a strobable output. This detector features an open collector. The internal shield provides a guaranteed common mode transient immunity of 1 kV/µs. The use of a 0.1 µF bypass capacitor connected between pin 5 and 8 is recommended.

AGENCY APPROVALS

(Parts are certified under base model 6N137A)

- UL1577 file number: E52744, double protection
- cUL tested to CSA 22.2 bulletin 5A
- DIN EN 60747-5-5 (VDE 0884-5), available with option 1
- CQC GB8898, GB4943.1

FEATURES

- CMR performance of 1 kV/µs
- High speed: 10 MBd typical
- LSTTL/TTL compatibility
- Low input current capability: 5 mA
- Material categorization:
  For definitions of compliance please see www.vishay.com/doc?99912

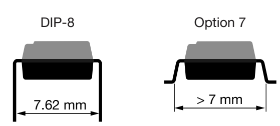
APPLICATIONS

- Microprocessor system interface
- PLC, ATE input/output isolation
- Computer peripheral interface
- Digital fieldbus isolation: CC-link, DeviceNet, profibus, SDS
- High speed A/D and D/A conversion
- AC plasma display panel level shifting
- Multiplexed data transmission
- Digital control power supply
- Ground loop elimination

ORDERING INFORMATION

6	N	1	3	7	A	-	X	0	0	#	T

PART NUMBER (6N137A) — PACKAGE OPTION (X00#) — TAPE AND REEL (T)



AGENCY CERTIFIED/PACKAGE	CMR (V/µs)
UL, cUL, CQC	**1000**
DIP-8	6N137A
SMD-8, option 7	6N137A-X007T
VDE, UL, cUL, CQC	**1000**
DIP-8	6N137A-X001
SMD-8, option 7	6N137A-X017T

Note

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

ABSOLUTE MAXIMUM RATINGS (T_{amb} = 25 °C, unless otherwise specified)				
PARAMETER	**TEST CONDITION**	**SYMBOL**	**VALUE**	**UNIT**
INPUT				
Average forward current		I_F	20	mA
Reverse input voltage		V_R	5	V
Enable input voltage		V_E	V_{CC} + 0.5 V	V
Enable input current		I_E	5	mA
Output power dissipation		P_{diss}	35	mW
OUTPUT				
Supply voltage	1 min maximum	V_{CC}	7	V
Output current		I_O	50	mA
Output voltage		V_O	7	V
Output power dissipation		P_{diss}	85	mW
COUPLER				
Isolation test voltage	t = 1 min	V_{ISO}	5000	V_{RMS}
Storage temperature		T_{stg}	- 55 to + 125	°C
Operating temperature		T_{amb}	- 40 to + 85	°C
Solder reflow temperature (1)	5 s		260	°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 (SMD). Refer to wave profile for soldering conditions for through hole devices (DIP).

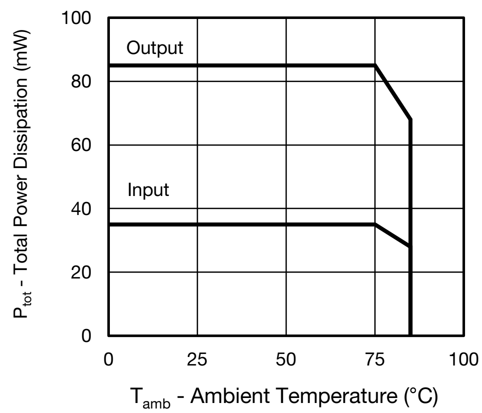


Fig. 1 - Total Power Dissipation vs. Ambient Temperature

RECOMMENDED OPERATING CONDITIONS					
PARAMETER	**TEST CONDITION**	**SYMBOL**	**MIN.**	**MAX.**	**UNIT**
Operating temperature		T_{amb}	- 40	85	°C
Supply voltage		V_{CC}	4.5	5.5	V
Input current low level		I_{FL}	0	250	μA
Input current high level		I_{FH}	5	15	mA
Logic high enable voltage		V_{EH}	2	V_{CC}	V
Logic low enable voltage		V_{EL}	0	0.8	V
Output pull up resistor		R_L	330	4K	Ω
Fanout	R_L = 1 kΩ	N		5	-

ELECTRICAL CHARACTERSITCS (T_{amb} = 25 °C, unless otherwise specified)						
PARAMETER	**TEST CONDITION**	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
INPUT						
Input forward voltage	I_F = 10 mA	V_F		1.35	1.7	V
Input forward voltage temperature coefficient	I_F = 10 mA	$\Delta V_F/\Delta T$		- 1.2		mV/K
Input reverse voltage	I_R = 10 μA	BV_R	5			V
Input threshold current	V_E = 2 V, V_{CC} = 5.5 V, I_{OL} (sinking) = 13 mA	I_{TH}		1.8	5	mA
Input capacitance	f = 1 MHz, V_F = 0 V	C_I		28		pF
OUTPUT						
High level supply current	V_E = 0.5 V, I_F = 0 mA	I_{CCH}		8	10	mA
	$V_E = V_{CC}$, I_F = 10 mA			5.8		
Low level supply current	V_E = 0.5 V, I_F = 0 mA	I_{CCL}		10	13	mA
	$V_E = V_{CC}$, I_F = 10 mA			8		
High level enable current	V_E = 2 V	I_{EH}		- 0.6	- 1.6	mA
Low level enable current	V_E = 0.5 V	I_{EL}		- 0.9	- 1.6	mA
High level enable voltage		V_{EH}	2			V
Low level enable voltage		V_{EL}			0.8	V
High level output current	V_E = 2 V, V_{CC} = 5.5 V, V_O = 5.5 V, I_F = 250 μA	I_{OH}		0.02	100	μA
Low level output voltage	V_E = 2 V, V_{CC} = 5.5 V, I_F = 5 mA, I_{OL} (sinking) = 13 mA	V_{OL}		0.13	0.60	V
Collector emitter capacitance	f = 1 MHz, T_{amb} = 25 °C	C_{IO}		4		pF
COUPLER						
Coupling capacitance	f = 1 MHz, T_{amb} = 25 °C	C_{IO}		0.9		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.

SWITCHING CHARACTERISTICS						
PARAMETER	**TEST CONDITION**	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
Propagation delay time to high output level	R_L = 350 Ω, C_L = 15 pF	t_{PLH}	25	45	75 (1)	ns
Propagation delay time to low output level	R_L = 350 Ω, C_L = 15 pF	t_{PHL}	25	32	75 (1)	ns
Pulse width distortion	R_L = 350 Ω, C_L = 15 pF	$\|t_{PHL} - t_{PLH}\|$		13	35	ns
Propagation delay skew	R_L = 350 Ω, C_L = 15 pF	t_{PSK}		16	40	ns
Output rise time (10 % to 90 %)	R_L = 350 Ω, C_L = 15 pF	t_r		27		ns
Output fall time (90 % to 10 %)	R_L = 350 Ω, C_L = 15 pF	t_f		10		ns
Propagation delay time of enable from V_{EH} to V_{EL}	R_L = 350 Ω, C_L = 15 pF, V_{EL} = 0 V, V_{EH} = 3 V	t_{ELH}		47		ns
Propagation delay time of enable from V_{EL} to V_{EH}	R_L = 350 Ω, C_L = 15 pF, V_{EL} = 0 V, V_{EH} = 3 V	t_{EHL}		24		ns

Notes

- Over recommended temperature (T_{amb} = - 40 °C to + 85 °C), V_{CC} = 5 V, I_F = 7.5 mA, unless otherwise specified. Typical values applies to V_{CC} = 5 V, T_{amb} = 25 °C

(1) A JEDEC registered data for 6N137A

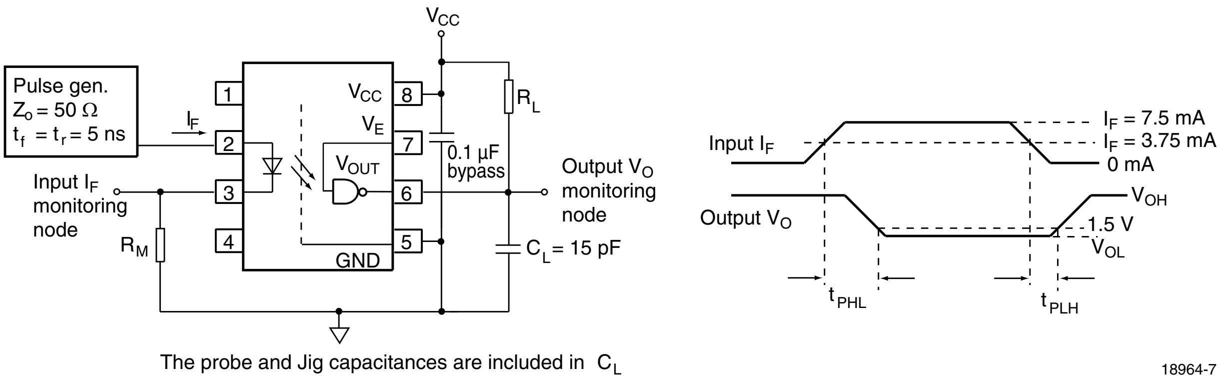


Fig. 2 - Test Circuit for t_{PLH}, t_{PHL}, t_r, and t_f

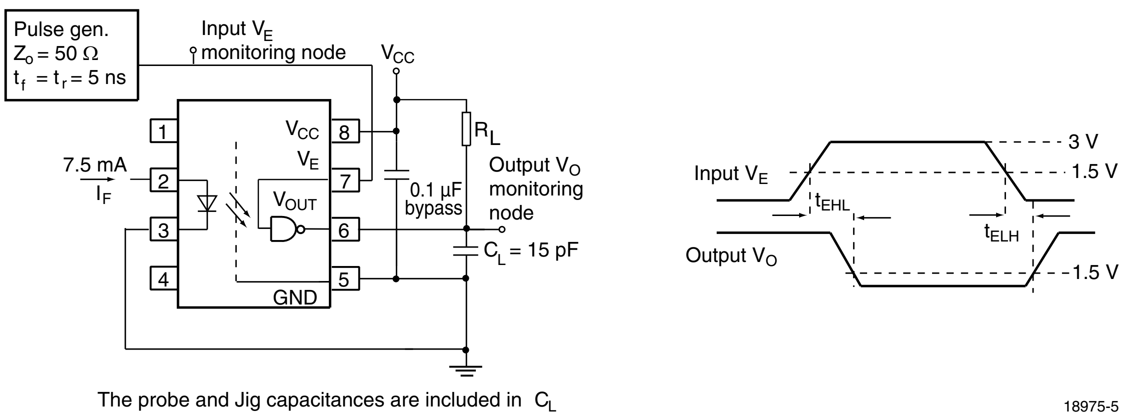


Fig. 3 - Test Circuit for t_{EHL}, and t_{ELH}

COMMON MODE TRANSIENT IMMUNITY						
PARAMETER	**TEST CONDITION**	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
Logic high common mode transient immunity (1)(3)	$\lvert V_{CM}\rvert$ = 50 V, V_{CC} = 5 V, I_F = 0 mA, $V_{O(min.)}$ = 2 V, R_L = 350 Ω, T_{amb} = 25 °C	$\lvert CM_H\rvert$	1000			V/µs
Logic low common mode transient immunity (2)(3)	$\lvert V_{CM}\rvert$ = 50 V, V_{CC} = 5 V, I_F = 7.5 mA, $V_{O(min.)}$ = 0 V, R_L = 350 Ω, T_{amb} = 25 °C	$\lvert CM_L\rvert$	1000			V/µs

Notes

(1) CM_H is the maximum tolerable rate of rise of the common mode voltage to assure that the output will remain in a high logic state (i.e. V_O > 2.0 V)

(2) CM_L is the maximum tolerable rate of fall of the common mode voltage to assure that the output will remain in a low logic state (i.e. V_O > 0.8 V)

(3) No external pull up is required for a high logic state on the enable input. If the enable pin in not used, trying it to V_{CC}.

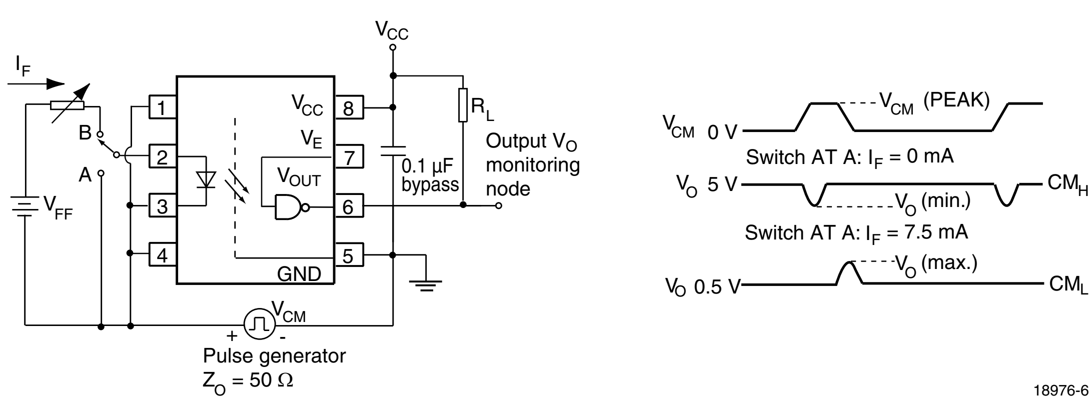


Fig. 4 - Test Circuit for Common Mode Transient Immunity

SAFETY AND INSULATION RATINGS				
PARAMETER		**SYMBOL**	**VALUE**	**UNIT**
MAXIMUM SAFETY RATINGS				
Output safety power		P_{SO}	600	mW
Input safety current		I_{si}	230	mA
Safety temperature		T_S	175	°C
Comparative tracking index		CTI	175	
INSULATION RATED PARAMETERS				
Maximum withstanding isolation voltage		V_{ISO}	5000	V_{RMS}
Maximum transient isolation voltage		V_{IOTM}	6000	V_{peak}
Maxium repetitive peak isolation voltage		V_{IORM}	630	V_{peak}
Insulation resistance	T_{amb} = 25 °C, V_{DC} = 500 V	R_{IO}	10^{12}	Ω
Isolation resistance	T_{amb} = 100 °C, V_{DC} = 500 V	R_{IO}	10^{11}	Ω
Climatic classification (according to IEC 68 part 1)			40/85/21	
Environment (pollution degree in accordance to DIN VDE 0109)			2	
Maximum creepage			7	mm
Clearance			7	mm
Insulation thickness			0.4	mm

Note

- As per DIN EN 60747-5-5, §7.4.3.8.2, this optocoupler is suitable for "safe electrical insulation" only within the safety ratings. Compliance with the safety ratings shall be ensured by means of prodective circuits.

TYPICAL CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)

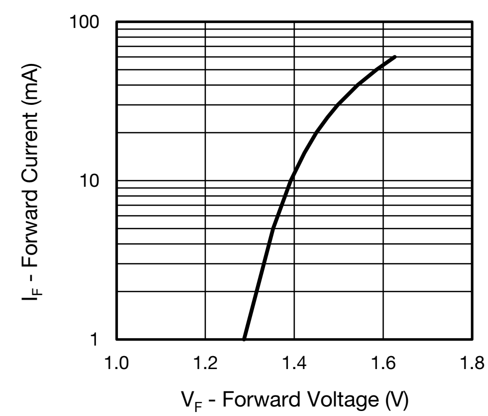


Fig. 5 - Diode Forward Current vs. Forward Voltage

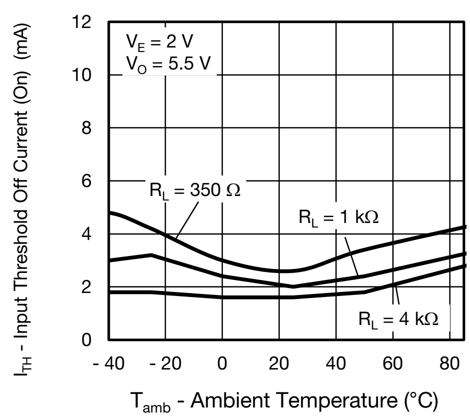


Fig. 7 - Input Threshold Off Current vs. Ambient Temperature

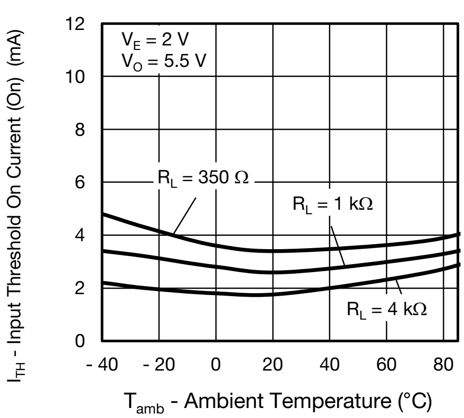


Fig. 6 - Input Threshold On Current vs. Ambient Temperature

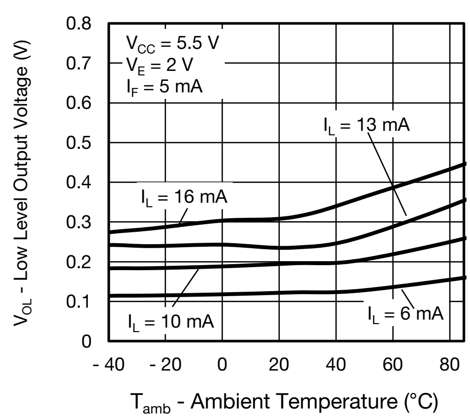


Fig. 8 - Low Level Output Voltage vs. Ambient Temperature

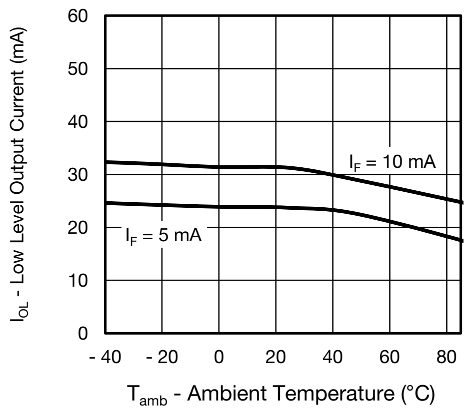


Fig. 9 - Low Level Output Current vs. Ambient Temperature

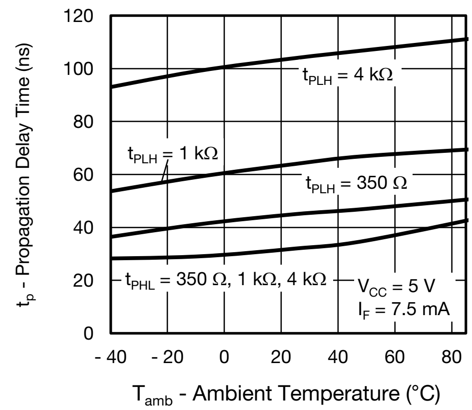


Fig. 12 - Propagation Delay Time vs. Ambient Temperature

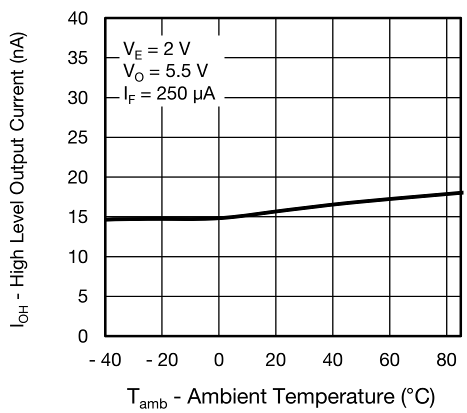


Fig. 10 - High Level Output Current vs. Ambient Temperature

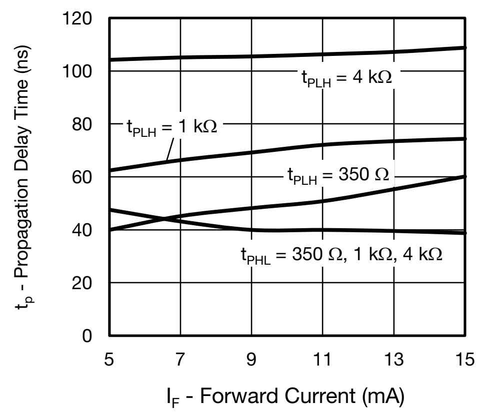


Fig. 13 - Propagation Delay Time vs. Diode Forward Current

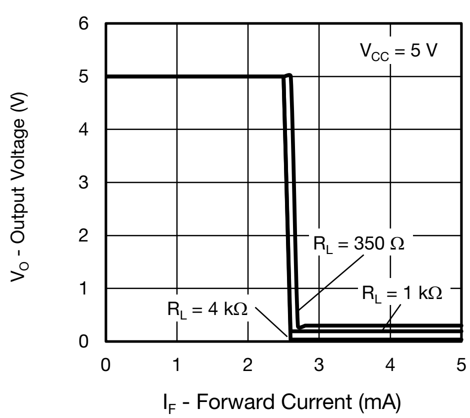


Fig. 11 - Output Voltage vs. Diode Forward Current

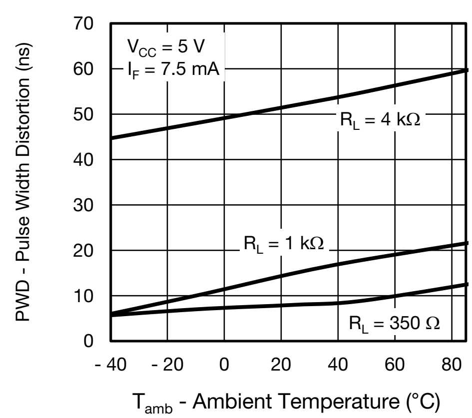


Fig. 14 - Pulse Width Distortion vs. Ambient Temperature

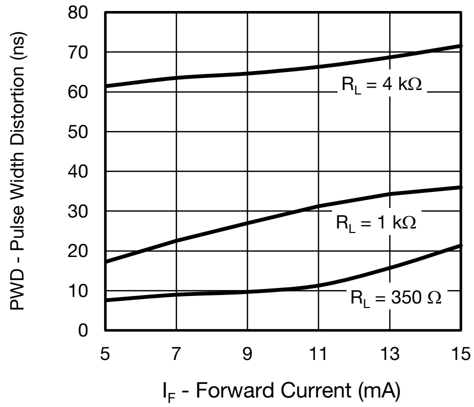


Fig. 15 - Pulse Width Distortion vs. Diode Input Current

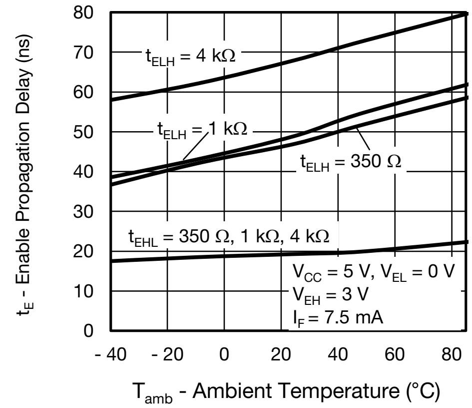


Fig. 17 - Enable Propagation Delay vs. Ambient Temperature

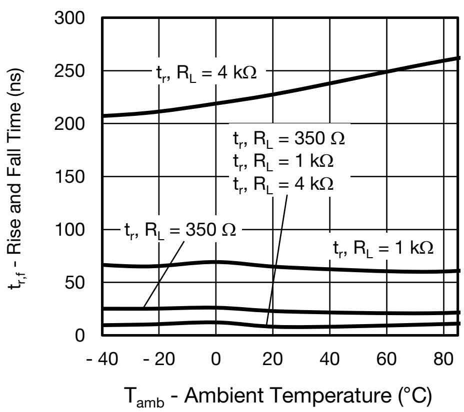


Fig. 16 - Rise And Fall Time vs. Ambient Temperature

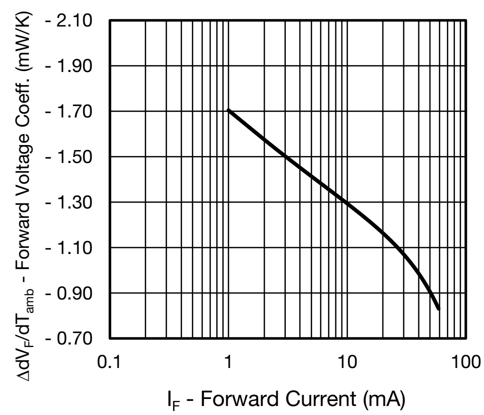
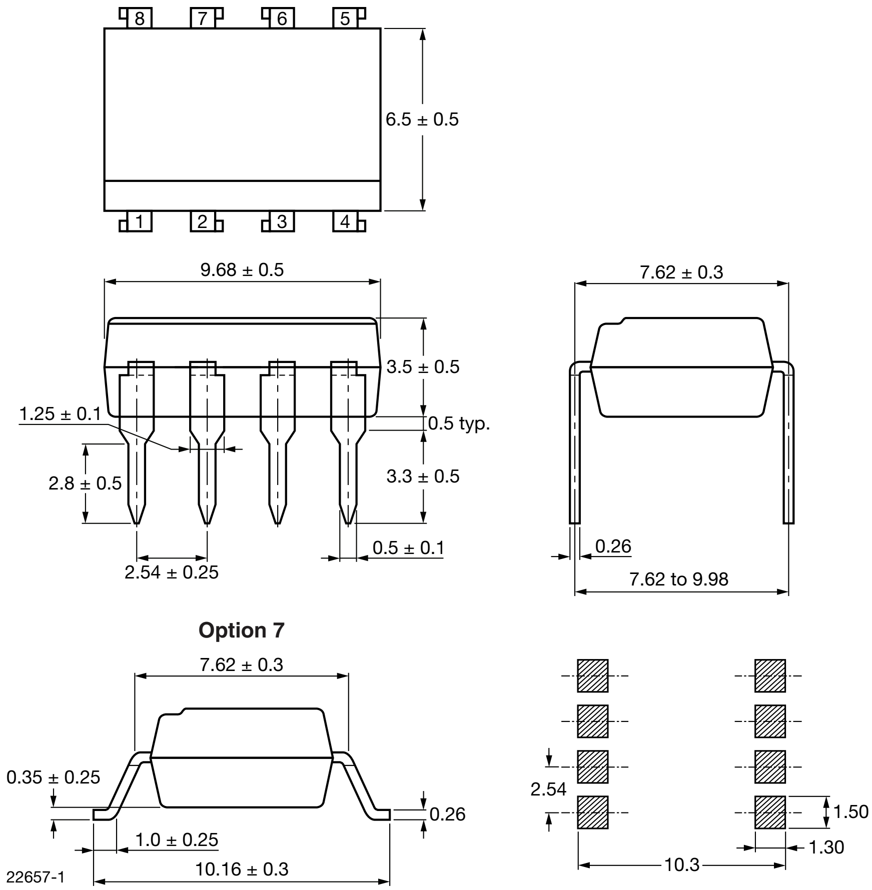
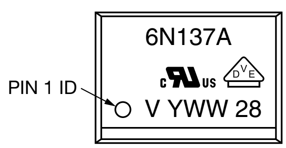


Fig. 18 - Forward Voltage Coefficient vs. Forward Current

PACKAGE DIMENSIONS in millimeters



PACKAGE MARKING



Notes

- VDE logo is only marked on option 1 parts. Option information is not marked on the part.
- Tape and reel suffix (T) is not part of the package marking.

PACKING INFORMATION

DEVICE PER TUBE OR REEL		
UNITS/TUBE	TUBES/BOX	UNITS/BOX
50	40	2000

TAPE AND REEL PACKAGING FOR OPTION 7 (dimensions in millimeters)

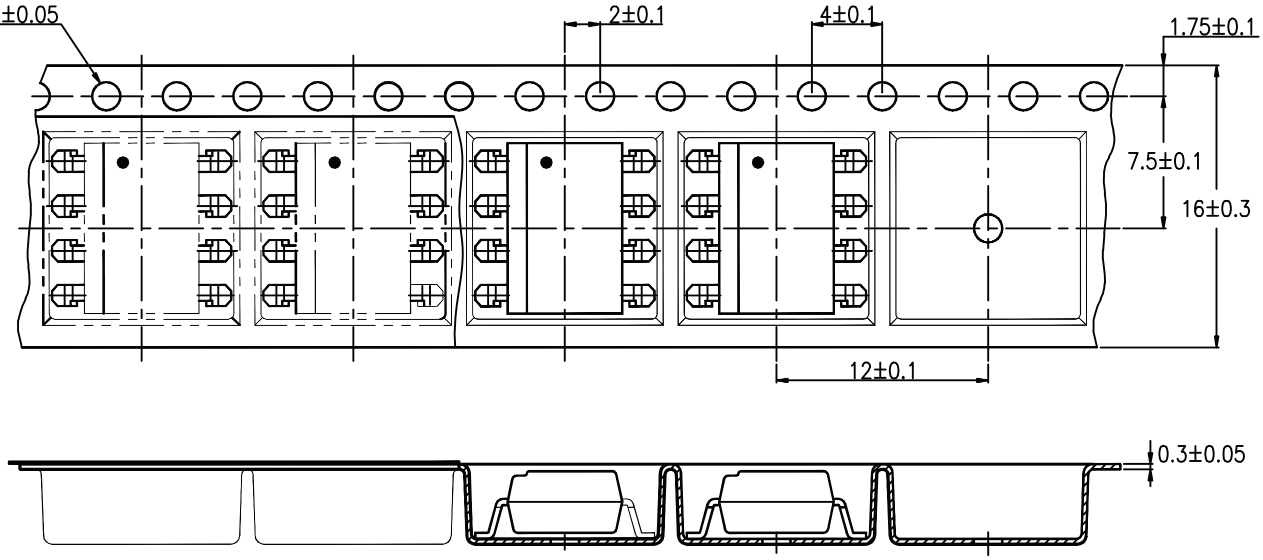


Fig. 19 - Reel Dimensions (1000 units per reel)

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Vishay Intertechnology, Inc. hereby certifies that all its products that are identified as RoHS-Compliant fulfill the definitions and restrictions defined under Directive 2011/65/EU of The European Parliament and of the Council of June 8, 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment (EEE) - recast, unless otherwise specified as non-compliant.

Please note that some Vishay documentation may still make reference to RoHS Directive 2002/95/EC. We confirm that all the products identified as being compliant to Directive 2002/95/EC conform to Directive 2011/65/EU.

Vishay Intertechnology, Inc. hereby certifies that all its products that are identified as Halogen-Free follow Halogen-Free requirements as per JEDEC JS709A standards. Please note that some Vishay documentation may still make reference to the IEC 61249-2-21 definition. We confirm that all the products identified as being compliant to IEC 61249-2-21 conform to JEDEC JS709A standards.

LifeElectronics
Живое партнерство

ООО «ЛайфЭлектроникс» "LifeElectronics" LLC

ИНН 7805602321 КПП 780501001 Р/С 40702810122510004610 ФАКБ "АБСОЛЮТ БАНК" (ЗАО) в г.Санкт-Петербурге К/С 30101810900000000703 БИК 044030703

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С конца 2013 года компания активно расширяет линейку поставок компонентов по направлению коаксиальный кабель, кварцевые генераторы и конденсаторы (керамические, пленочные, электролитические), за счёт заключения дистрибьюторских договоров

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- *Специальные условия для постоянных клиентов.*
- *Подбор аналогов.*
- *Поставку компонентов в любых объемах, удовлетворяющих вашим потребностям.*

- *Приемлемые сроки поставки, возможна ускоренная поставка.*
- *Доставку товара в любую точку России и стран СНГ.*
- *Комплексную поставку.*
- *Работу по проектам и поставку образцов.*
- *Формирование склада под заказчика.*

- *Сертификаты соответствия на поставляемую продукцию (по желанию клиента).*
- *Тестирование поставляемой продукции.*
- *Поставку компонентов, требующих военную и космическую приемку.*
- *Входной контроль качества.*
- *Наличие сертификата ISO.*

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- *Регистрацию проекта у производителя компонентов.*
- *Техническую поддержку проекта.*
- *Защиту от снятия компонента с производства.*
- *Оценку стоимости проекта по компонентам.*
- *Изготовление тестовой платы монтаж и пусконаладочные работы.*

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