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4N25, 4N26, 4N27, 4N28, 4N35, 4N36, 4N37, 4N38
H11A1, H11A2, H11A3, H11A4, H11A5
DC Input 6-Pin DMC-Isolator®
Phototransistor Optocoupler

Features

- High isolation 5000 VRMS
- Patented coplanar structure DMC-Isolator®
- DC input with transistor output
- Operating Temperature range - 55 °C to 110 °C
- External Creepage ≥ 7.4mm
- Distance Through Isolation ≥ 0.4mm
- Clearance Distance ≥ 7.5mm (S/SL Type)
- Clearance Distance ≥ 8.0mm (M Type)
- RoHS and REACH Compliance
- Halogen Free Compliance (Optional)
- MSL class 1
- Regulatory Approvals
  - ✓ UL - UL1577 (E364000)
  - ✓ VDE - EN60747-5-5(VDE0884-5)
  - ✓ CQC – GB4943.1, GB8898 (14001105802)
  - ✓ IEC62368 (FI/41119)

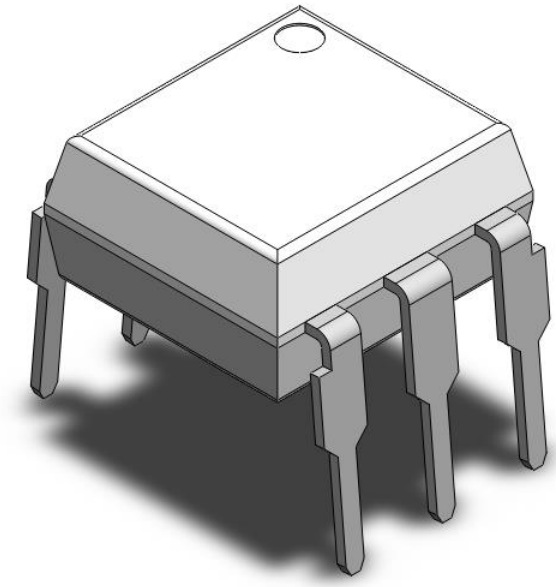
Description

The 4N25, 4N26, 4N27, 4N28, 4N35, 4N36, 4N37, 4N38, H11A1, H11A2, H11A3, H11A4, H11A5 series consist of a photo transistor optically coupled to an Infrared-emitting diode in a 6-lead DIP DMC-Isolator® package with different lead forming options.

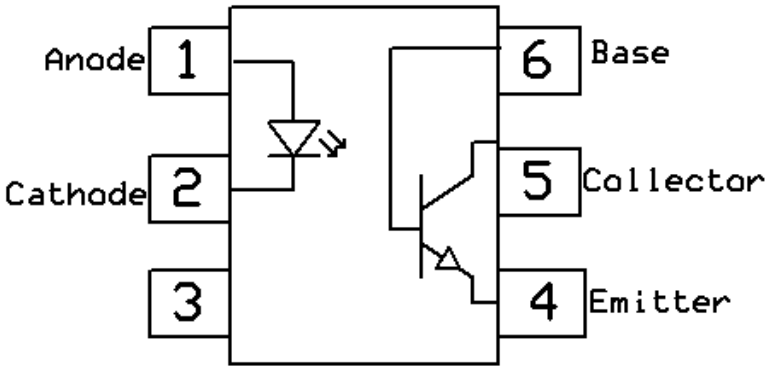
Applications

- Microprocessor system interface
- Computer peripheral interface
- Switch mode power supplies

Package Outline



Schematic



Note: Different bending options available. See package dimension.

Absolute Maximum Ratings T_A = 25°C, unless otherwise specified

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. In addition, extended exposure to stresses above the recommended operating conditions may affect device reliability. The absolute maximum ratings are stress ratings only.

Symbol	Parameters	Ratings	Units	Notes
V_{ISO}	Isolation voltage (AC, 1 minute, 40 ~ 60% R.H.)	5000	V_{RMS}	
T_{OPR}	Operating temperature	-55 ~ +110	°C	
T_{STG}	Storage temperature	-55 ~ +150	°C	
T_{SOL}	Soldering temperature (For 10 seconds)	260	°C	
Emitter				
I_F	Forward current	60	mA	
$I_{F(TRANS)}$	Peak transient current (≤1μs P.W,300pps)	1	A	
V_R	Reverse voltage	6	V	
P_D	Power dissipation	100	mW	
Detector				
P_D	Power dissipation	150	mW	
B_{VCEO}	Collector-Emitter Breakdown Voltage	80	V	
B_{VCBO}	Collector-Base Breakdown Voltage	80	V	
B_{VECO}	Emitter-Collector Breakdown Voltage	7	V	
B_{VEBO}	Emitter-Base Breakdown Voltage	7	V	

Electrical Characteristics T_A = 25°C, unless otherwise specified

Emitter Characteristics

Symbol	Parameters	Test Conditions	Min	Typ	Max	Units	Notes
V_F	Forward voltage	I_F=10mA		1.24	1.4	V	
I_R	Reverse Current	V_R = 6V	-	-	5	μA	
C_{IN}	Input Capacitance	f= 1MHz	-	45	-	pF	

Detector Characteristics

Symbol	Parameters		Test Conditions	Min	Typ	Max	Units	Notes
B_{VCEO}	Collector-Emitter Breakdown		I_C= 0.1mA	80	-	-	V	
B_{VECO}	Emitter-Collector Breakdown		I_E= 0.1mA	7	-	-	V	
B_{VCBO}	Collector-Base Breakdown		I_C= 0.1mA	80	-	-	V	
B_{VEBO}	Emitter-Base Breakdown		I_E= 0.1mA	7	-	-	V	
I_{CEO}	Collector-Emitter Dark Current	4N25,4N26,4N27,4N28 H11A1,A2,A3,A4,A5	V_{CE}= 10V, I_F=0mA	-	-	50	nA	
		4N35,4N36,4N37,4N38	V_{CE}=60V, I_F=0mA	-	-	50	nA	
I_{CBO}	Collector-Base Dark Current		V_{CB}= 10V, I_F=0mA	-	-	20	nA	

Electrical Characteristics T_A = 25°C, unless otherwise specified (Continued)

Transfer Characteristics

Symbol	Parameters		Test Conditions	Min	Typ	Max	Units	Notes
CTR	Current Transfer Ratio	4N35, 4N36, 4N37	I_F= 10mA, V_{CE}= 10V	100	-	-	%	
		4N25,4N26, 4N38, H11A2, H11A3		20	-	-		
		4N27, 4N28, H11A4		10	-	-		
		H11A1		50	-	-		
		H11A5		30	-	-		
$V_{CE(SAT)}$	Collector-Emitter Saturation Voltage	4N25,4N26, 4N27,4N28	I_F= 50mA, I_C= 2mA	-	-	0.5	V	
		4N35,4N36,4N37	I_F= 10mA, I_C= 0.5mA	-	-	0.3		
		H11A1,H11A2, H11A3,H11A4,H11A5		-	-	0.4		
		4N38	I_F= 20mA, I_C= 4mA	-	-	1.0		
R_{IO}	Isolation Resistance		V_{IO}= 500V_{DC}	$1x10^{11}$			Ω	
C_{IO}	Isolation Capacitance		f= 1MHz		0.25		pF	

Switching Characteristics

Symbol	Parameters		Test Conditions	Min	Typ	Max	Units	Notes
t_{on}	Turn On Time	4N25,4N26,4N27,4N28 H11A1,A2,A3,A4,A5	I_F= 10mA, V_{CC}= 10V, R_L= 100Ω	-	4.3	9.8	μs	
		4N35,4N36,4N37,4N38	I_c= 2mA, V_{CC}= 10V, R_L= 100Ω	-	9.8	11.5		
t_{off}	Turn Off Time	4N25,4N26,4N27,4N28 H11A1,A2,A3,A4,A5	I_F= 10mA, V_{CC}= 10V, R_L= 100Ω	-	3.9	9.8	μs	
		4N35,4N36,4N37,4N38	I_c= 2mA, V_{CC}= 10V, R_L= 100Ω	-	6.9	11.5		

Typical Characteristic Curves *T_A = 25°C, unless otherwise specified*

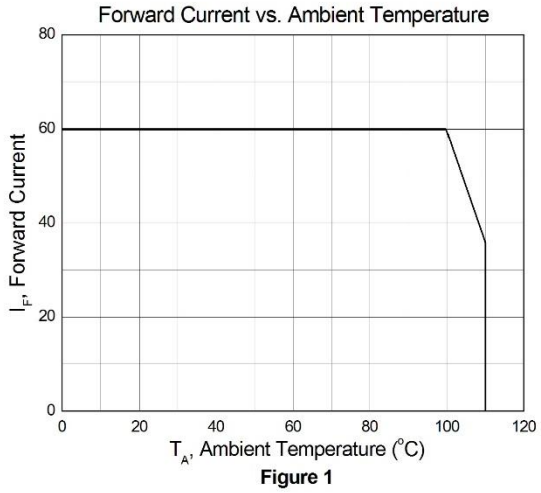


Figure 1

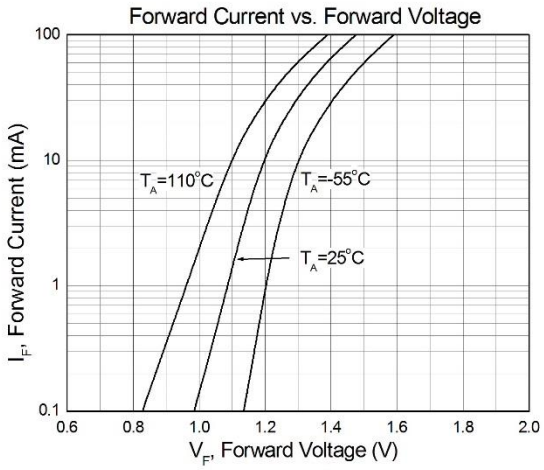


Figure 2

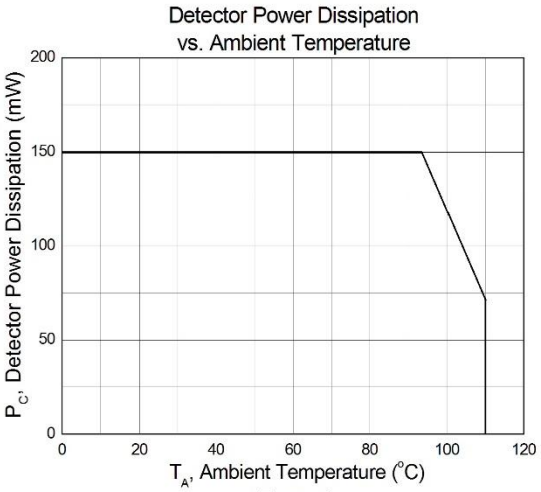


Figure 3

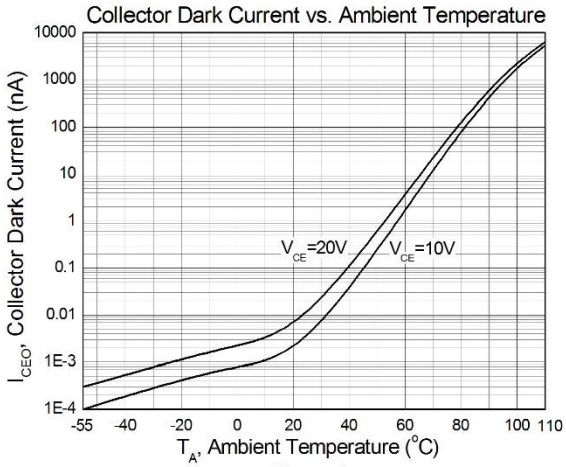


Figure 4

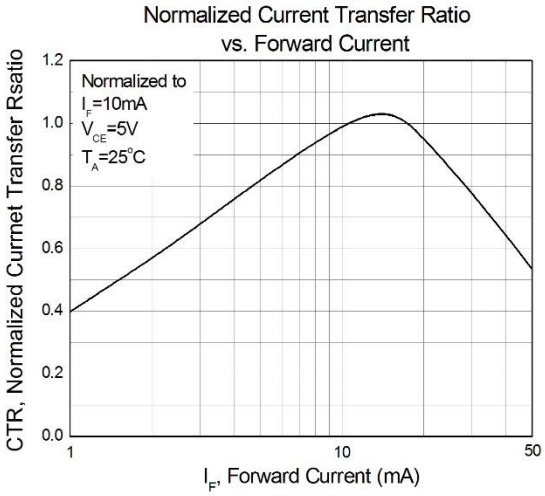


Figure 5

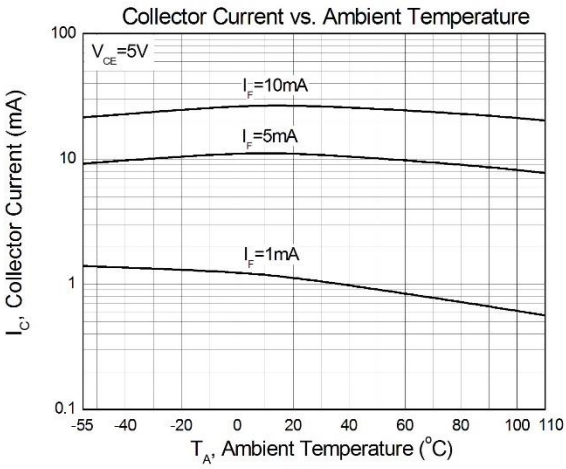


Figure 6

Typical Characteristic Curves *T_A = 25°C, unless otherwise specified (Continued)*

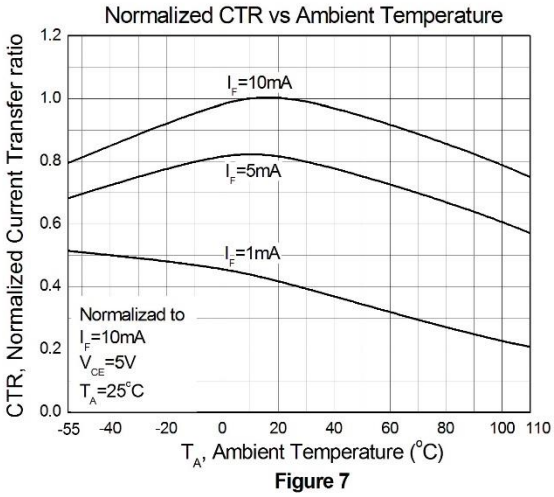


Figure 7

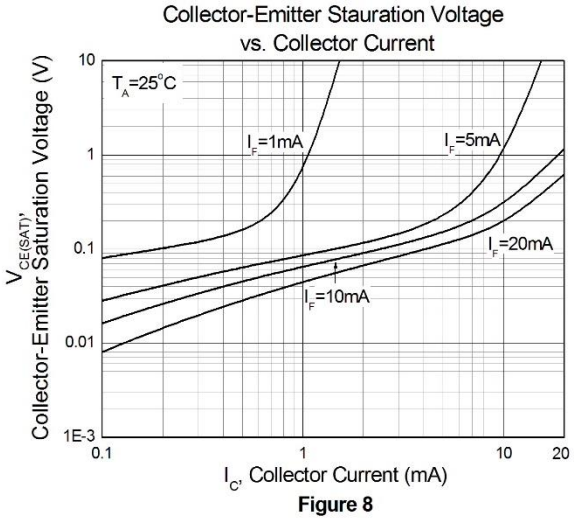
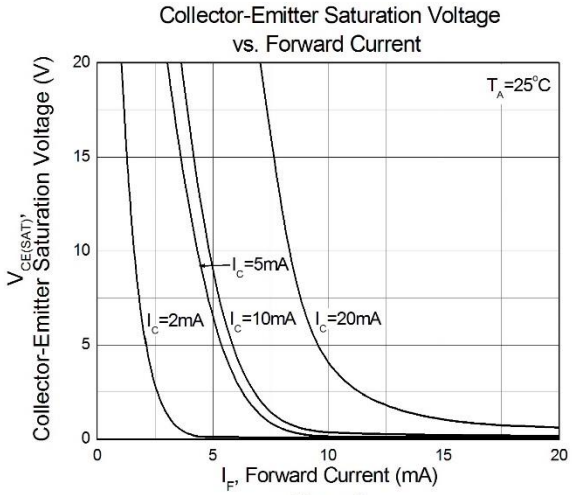


Figure 8



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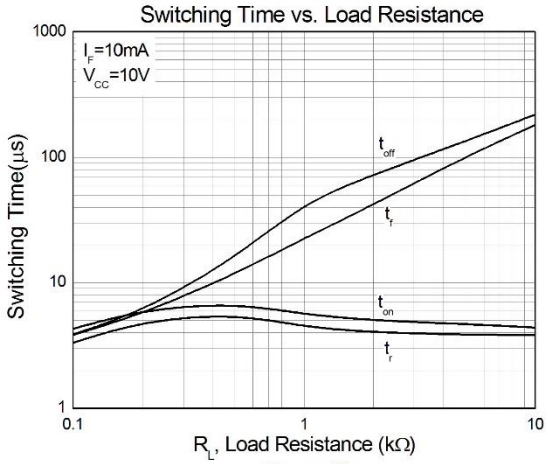


Figure 10

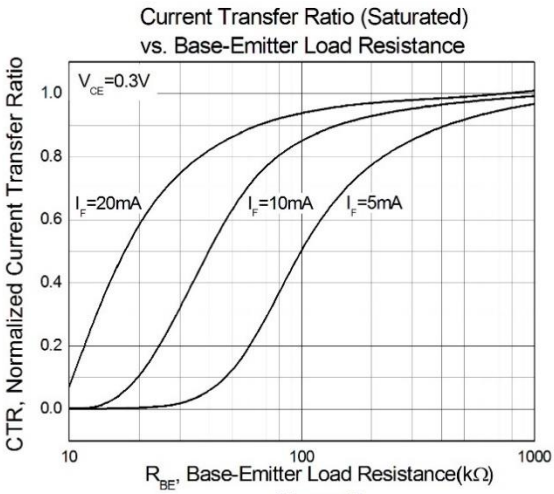


Figure 11

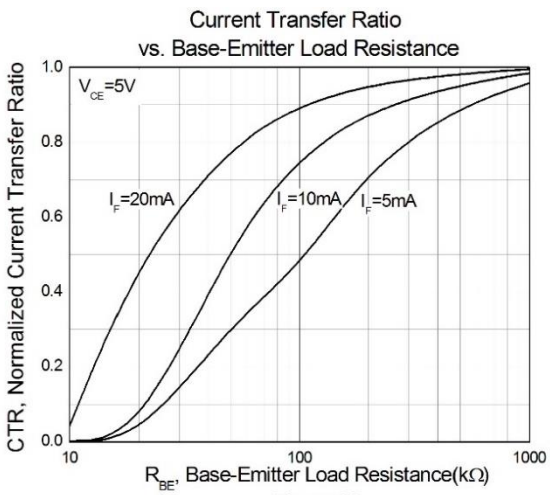


Figure 12

Typical Characteristic Curves *T_A = 25°C, unless otherwise specified (Continued)*

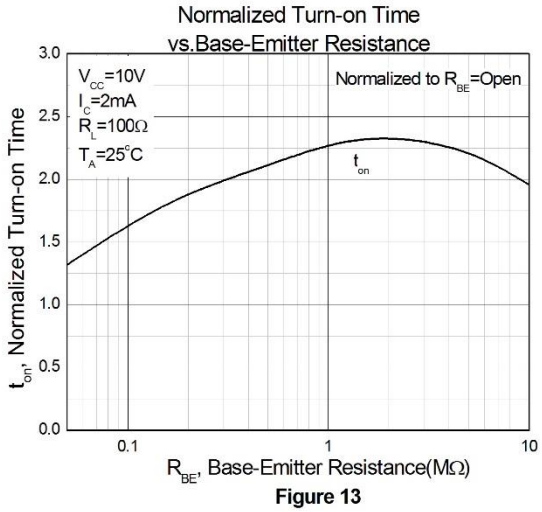


Figure 13

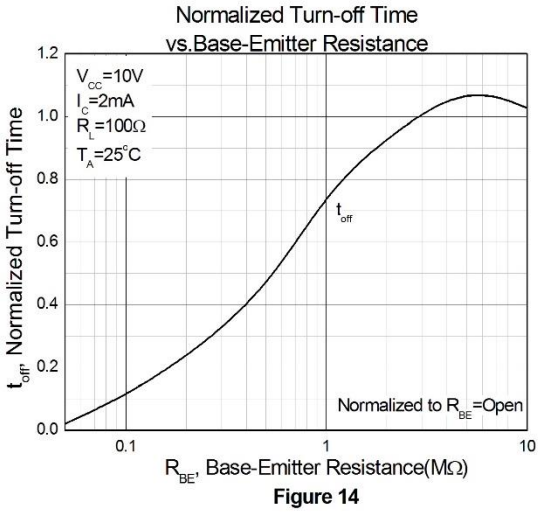
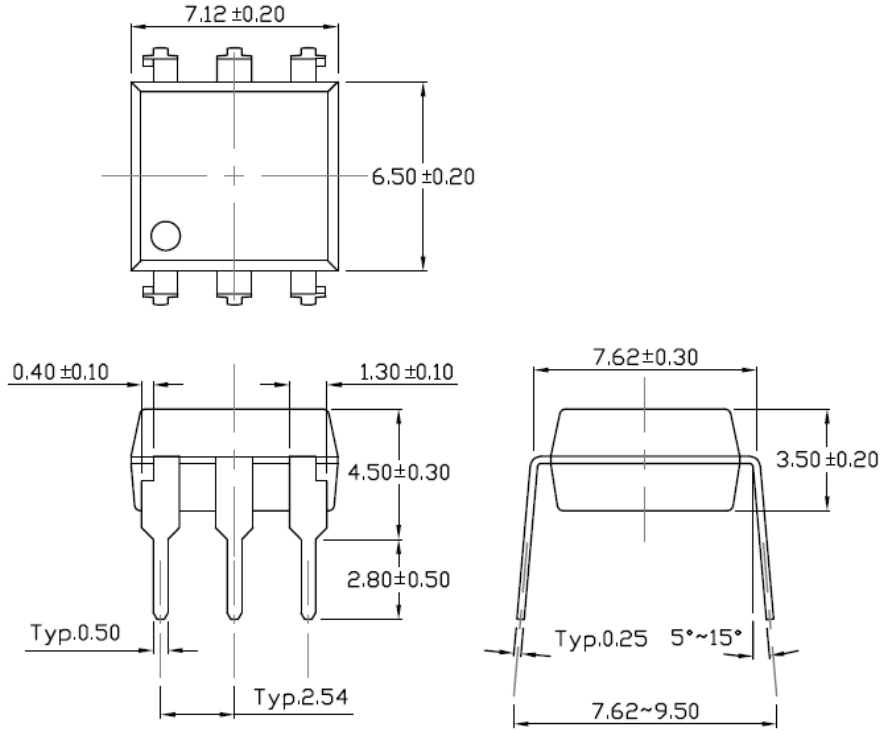


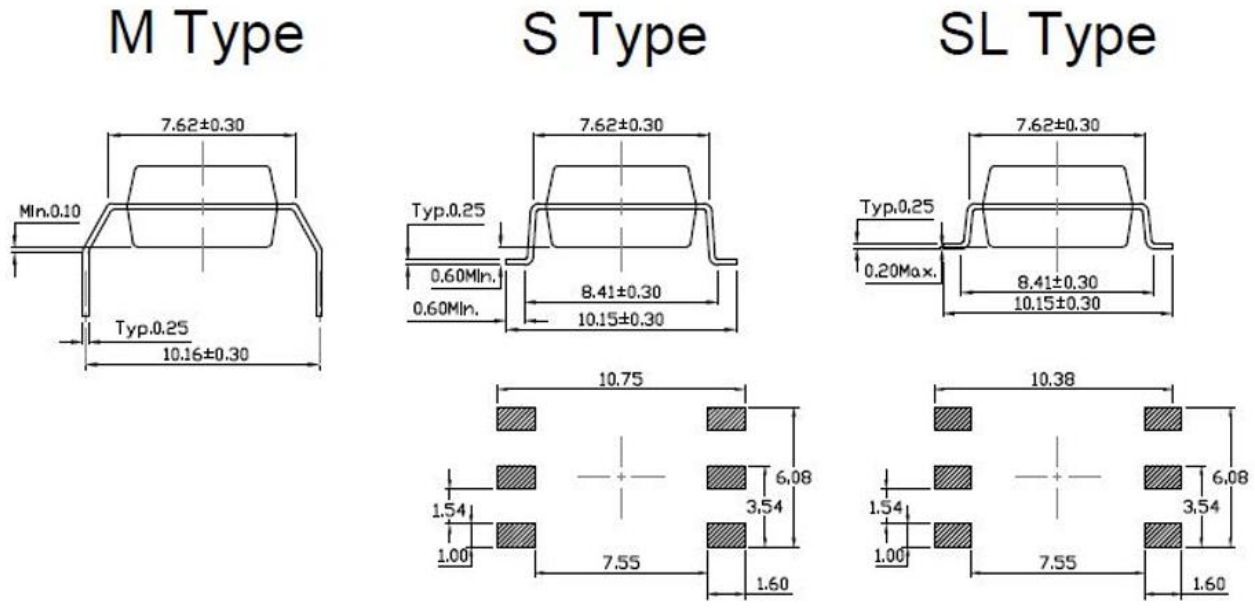
Figure 14

Package Dimension *Dimensions in mm unless otherwise stated*

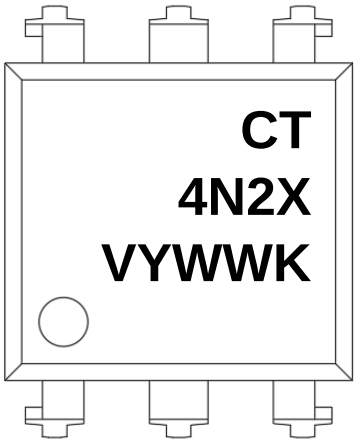
Standard DIP – Through Hole



Forming Option

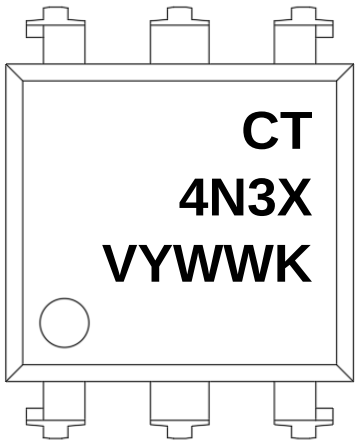


Marking Information



Note:

CT : Denotes “CT Micro”
4N2X : Part Number (X=5,6,7 or 8)
V : VDE Safety Mark Option (Blank or V)
Y : One Digit Year Code
WW : Two Digit Work Week
K : Manufacturing Code



Note:

CT : Denotes “CT Micro”
4N3X : Part Number (X=5,6,7 or 8)
V : VDE Safety Mark Option (Blank or V)
Y : One Digit Year Code
WW : Two Digit Work Week
K : Manufacturing Code

Note:

CT : Denotes “CT Micro”
H11AX: Part Number (X=1,2,3,4 or 5)
V : VDE Safety Mark Option (Blank or V)
Y : One Digit Year Code
WW : Two Digit Work Week
K : Manufacturing Code

Ordering Information

4N2X(V)(Y)(Z)-G, 4N3X(V)(Y)(Z)-G

X = Part Number (X=5,6,7 or 8)
V = VDE Safety Mark Option (Blank or V)
Y = Lead Form Option (Blank, M, S or SL)
Z = Tape and Reel Option (Blank, T1 or T2)
G = Material Option (G: Halogen Free, Blank: Non-Halogen Free)

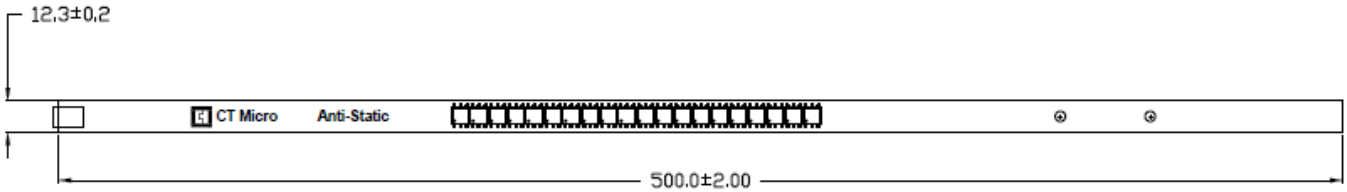
H11AX(V)(Y)(Z)-G

X = Part Number (1,2,3,4 or 5)
V = VDE Safety Mark Option (Blank or V)
Y = Lead Form Option (Blank, M, S or SL)
Z = Tape and Reel Option (Blank, T1 or T2)
G = Material Option (G: Halogen Free, Blank: Non-Halogen Free)

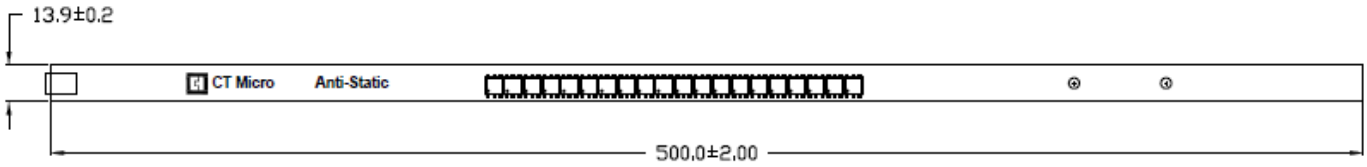
Option	***Description***	***Quantity***
None	Standard 6 Pin Dip	50Units/Tube
M	Wide Lead Forming	50Units/Tube
S(T1)	Surface Mount Lead Forming – With Option A Taping	1000 Units/Reel
S(T2)	Surface Mount Lead Forming – With Option B Taping	1000 Units/Reel
SL(T1)	Surface Mount Lead Forming (Low Profile) – With Option A Taping	1000 Units/Reel
SL(T2)	Surface Mount Lead Forming (Low Profile) – With Option B Taping	1000 Units/Reel

Carrier Specifications *Dimensions in mm unless otherwise stated*

Tube Option Standard DIP

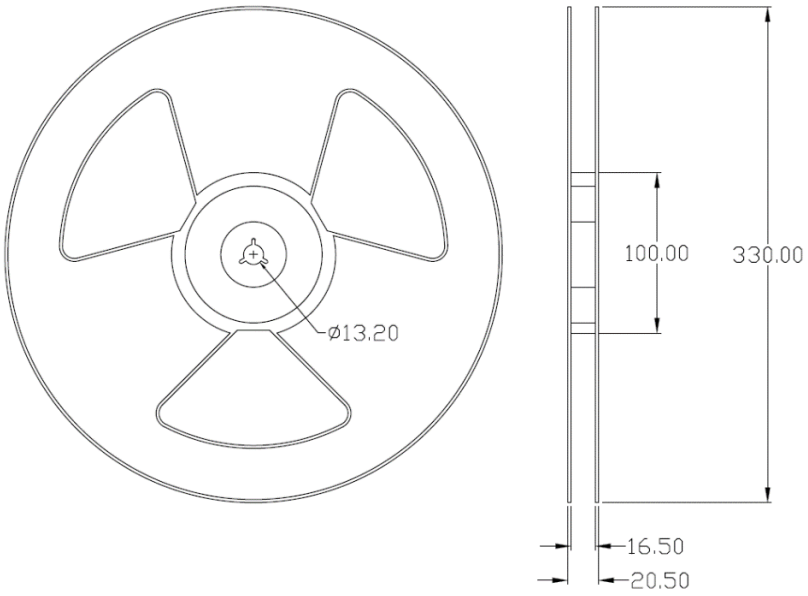


Tube Option M Type



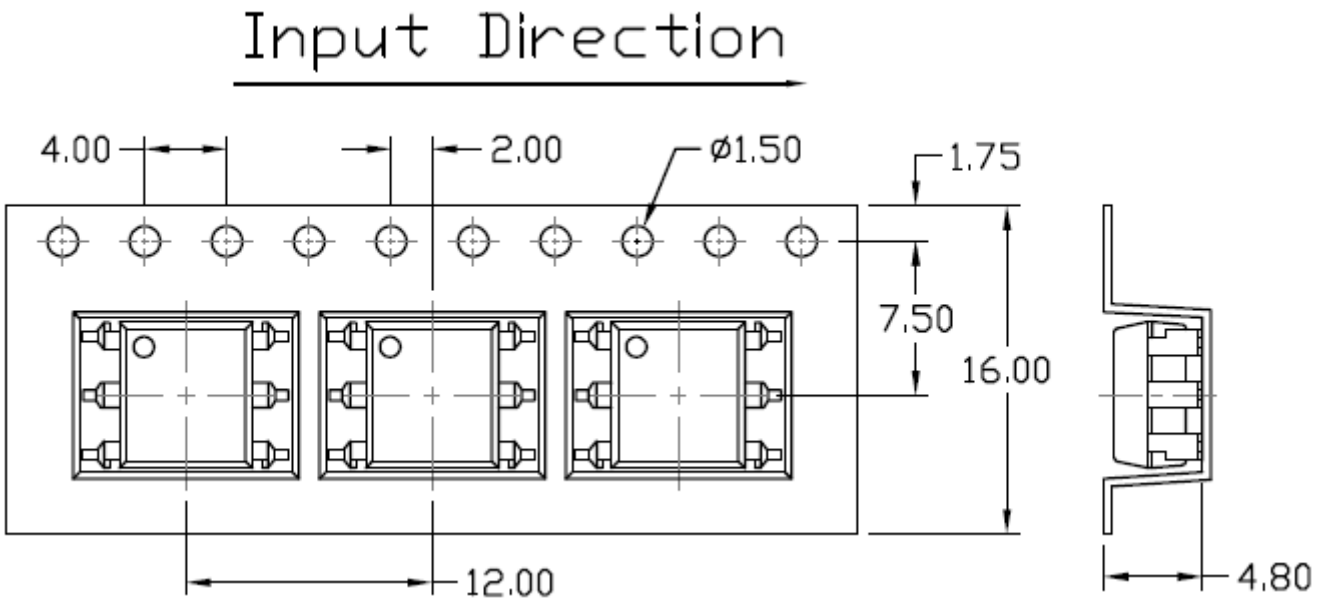
Reel Dimension *All dimensions are in mm, unless otherwise stated*

Option S(T1/T2) & SL(T1/T2)

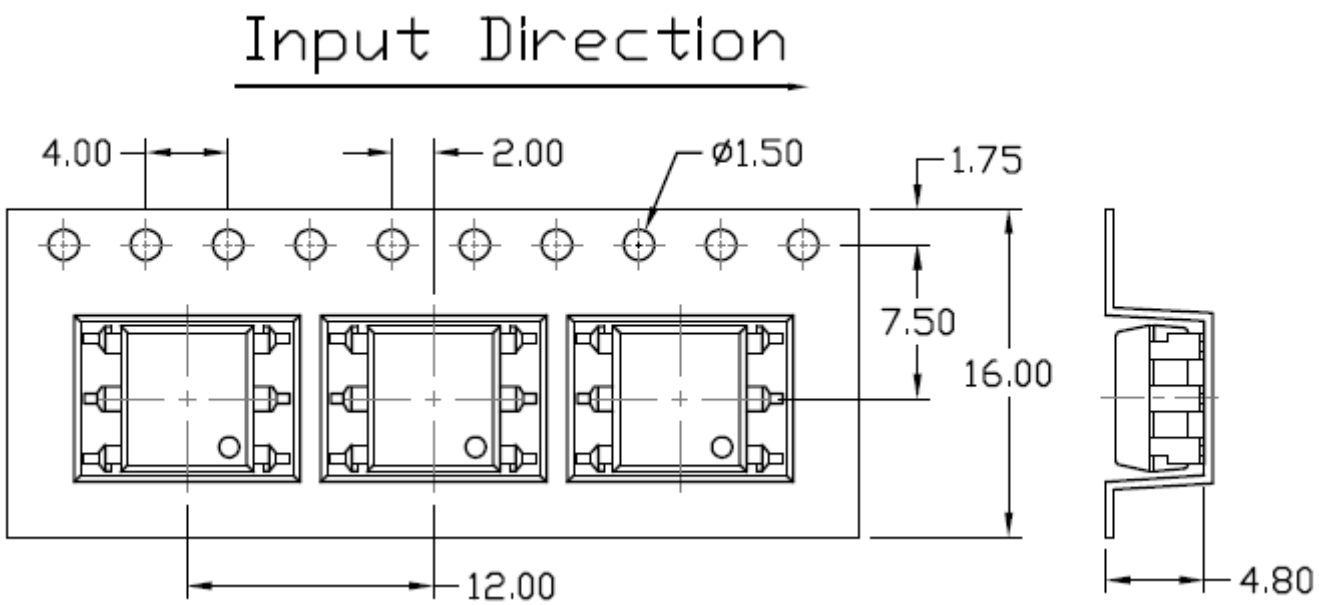


Carrier Tape Specifications *Dimensions in mm unless otherwise stated*

Option S (T1) & SL (T1)



Option S (T2) & SL (T2)

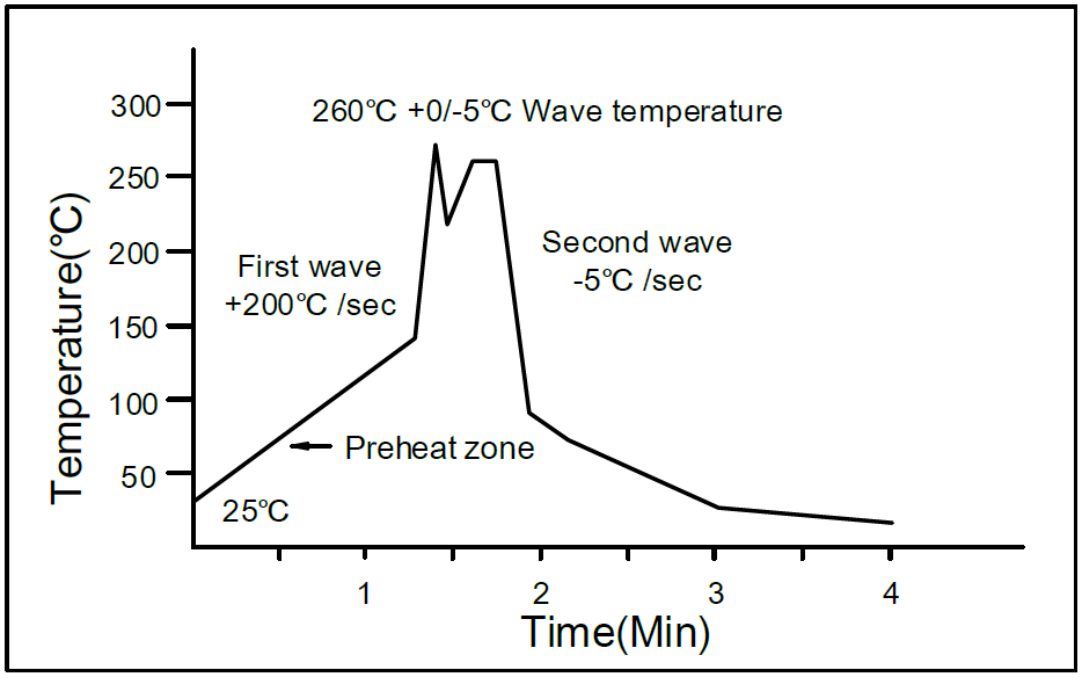


Solderability spec (follow the JEDEC standard JESD22-B102)

Reflow Soldering: Immersed surface, other than the end of pin as cut-surface, must be covered by solder.
Solder-Bath: More than 95% of the electrode must be covered with solder.

Wave soldering (follow the JEDEC standard JESD22-A111)

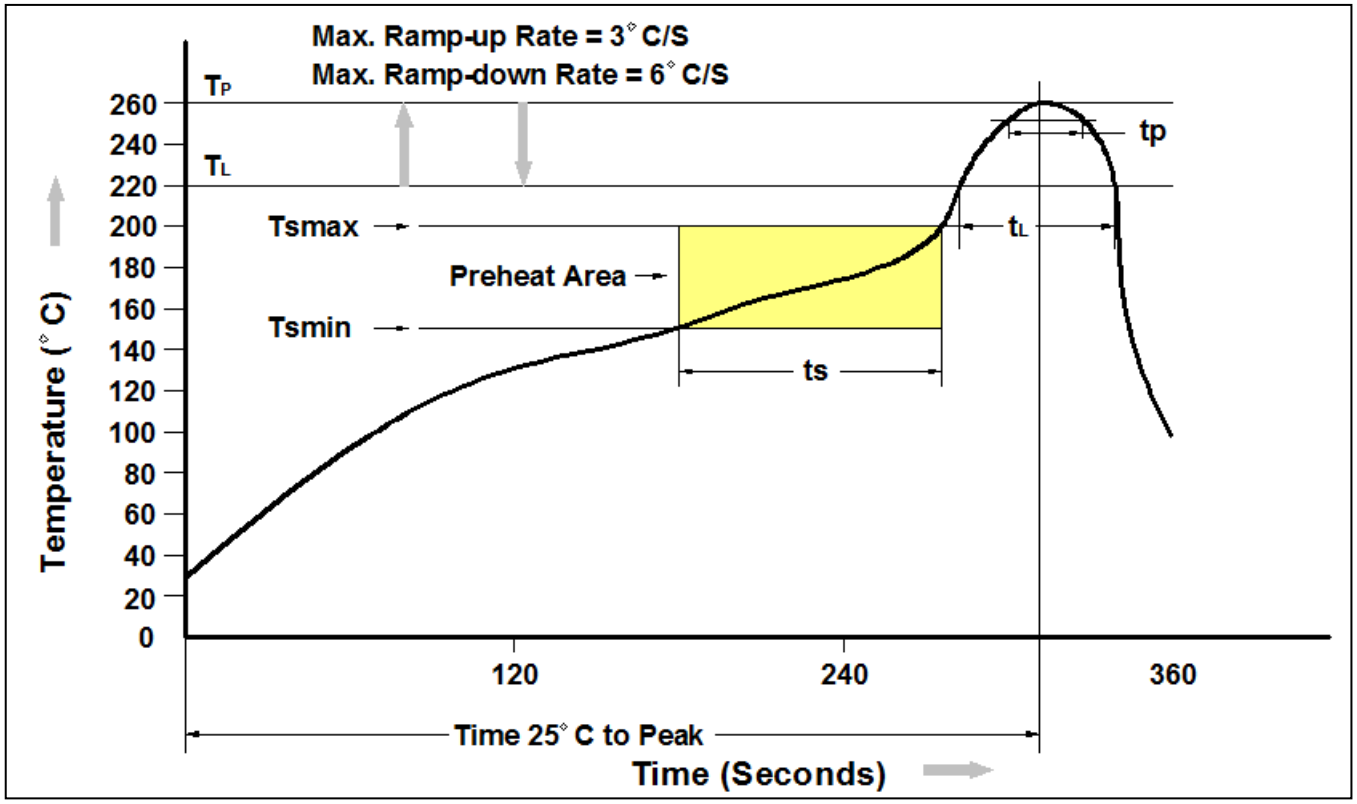
One time soldering is recommended within the condition of temperature.
Temperature: 260+0/-5˚C.
Time: 10 sec.
Preheat temperature: 25 to 140˚C.
Preheat time: 30 to 80 sec.



Iron Soldering (follow the standard MIL-STD 202G, Method 210F)

Allow single lead soldering in every single process.
One time soldering is recommended.
Temperature: 350±10˚C
Time: 5 sec max.

Reflow Profile (follow the JEDEC standard J-STD-020)



Profile Feature	Pb-Free Assembly Profile
Temperature Min. (Tsmin)	150°C
Temperature Max. (Tsmax)	200°C
Time (ts) from (Tsmin to Tsmax)	60-120 seconds
Ramp-up Rate (t_L to t_P)	3°C/second max.
Liquidous Temperature (T_L)	217°C
Time (t_L) Maintained Above (T_L)	60 – 150 seconds
Peak Body Package Temperature	260°C +0°C / -5°C
Time (t_P) within 5°C of 260°C	30 seconds
Ramp-down Rate (T_P to T_L)	6°C/second max
Time 25°C to Peak Temperature	8 minutes max.

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1. *Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body, or (b) support or sustain life, or (c) whose failure to perform when properly used in accordance with instruction for use provided in the labelling, can be reasonably expected to result in significant injury to the user.*
2. *A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.*