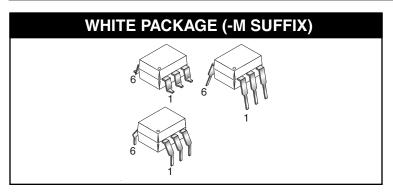
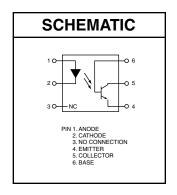
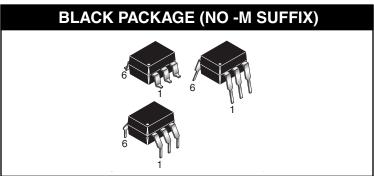


4N25	4N26	4N27	4N28	4N35	4N36
4N37	H11A1	H11A2	H11A3	H11A4	H11A5







DESCRIPTION

The general purpose optocouplers consist of a gallium arsenide infrared emitting diode driving a silicon phototransistor in a 6-pin dual in-line package.

FEATURES

- Also available in white package by specifying -M suffix, eg. 4N25-M
- UL recognized (File # E90700)
- VDE recognized (File # 94766)
 - Add option V for white package (e.g., 4N25V-M)
 - Add option 300 for black package (e.g., 4N25.300)

APPLICATIONS

- Power supply regulators
- · Digital logic inputs
- · Microprocessor inputs



Parameter	Symbol	Value	Units	
TOTAL DEVICE				
Storage Temperature	T _{STG}	-55 to +150	°C	
Operating Temperature	T _{OPR}	-55 to +100	°C	
Wave solder temperature (see page 14 for reflow solder profiles)	T _{SOL}	260 for 10 sec	°C	
Total Device Power Dissipation @ T _A = 25°C	P _D	250	m\\\/	
Derate above 25°C	'D	3.3 (non-M), 2.94 (-M)	- mW	
EMITTER				
DC/Average Forward Input Current	IF	100 (non-M), 60 (-M)	mA	
Reverse Input Voltage	V _R	6	٧	
Forward Current - Peak (300µs, 2% Duty Cycle)	I _F (pk)	3	Α	
LED Power Dissipation @ T _A = 25°C	P _D	150 (non-M), 120 (-M)	mW	
Derate above 25°C	'D	2.0 (non-M), 1.41 (-M)	mW/°C	
DETECTOR				
Collector-Emitter Voltage	V _{CEO}	30	V	
Collector-Base Voltage	V _{CBO}	70	V	
Emitter-Collector Voltage	V _{ECO}	7	٧	
Detector Power Dissipation @ T _A = 25°C	В	150	mW	
Derate above 25°C	P _D	2.0 (non-M), 1.76 (-M)	mW/°C	



4N25	4N26	4N27	4N28	4N35	4N36
4N37	H11A1	H11A2	H11A3	H11A4	H11A5

ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise specified)

INDIVIDUAL COMPONENT CHARACTERISTICS						
Parameter	Test Conditions	Symbol	Min	Тур*	Max	Unit
EMITTER						
Input Forward Voltage	(I _F = 10 mA)	V_{F}		1.18	1.50	V
Reverse Leakage Current	(V _R = 6.0 V)	I _R		0.001	10	μΑ
DETECTOR						
Collector-Emitter Breakdown Voltage	$(I_C = 1.0 \text{ mA}, I_F = 0)$	BV_CEO	30	100		V
Collector-Base Breakdown Voltage	$(I_C = 100 \mu A, I_F = 0)$	BV _{CBO}	70	120		V
Emitter-Collector Breakdown Voltage	$(I_E = 100 \mu A, I_F = 0)$	BV _{ECO}	7	10		V
Collector-Emitter Dark Current	$(V_{CE} = 10 \text{ V}, I_F = 0)$	I _{CEO}		1	50	nA
Collector-Base Dark Current	(V _{CB} = 10 V)	I _{CBO}			20	nA
Capacitance	(V _{CE} = 0 V, f = 1 MHz)	C _{CE}		8		pF

ISOLATION CHARACTERISTICS						
Characteristic	Test Conditions	Symbol	Min	Тур*	Max	Units
Input-Output Isolation Voltage	(Non '-M', Black Package) (f = 60 Hz, t = 1 min)	V	5300			Vac(rms)
Imput-Output isolation voltage	('-M', White Package) (f = 60 Hz, t = 1 sec)	V _{ISO}	7500			Vac(pk)
Isolation Resistance	$(V_{I-O} = 500 \text{ VDC})$	R _{ISO}	10 ¹¹			Ω
Isolation Capacitance	$(V_{I-O} = \&, f = 1 MHz)$			0.5		pF
Isolation Capacitance	('-M' White Package)	C _{ISO}		0.2	2	pF

Note

^{*} Typical values at $T_A = 25$ °C



DC Characteristic	Test Conditions	Symbol	Device	Min	Typ*	Max	Unit
			4N35 4N36 4N37	100			
			H11A1	50			
			H11A5	30			
	$(I_F = 10 \text{ mA}, V_{CE} = 10 \text{ V})$	CTR	4N25 4N26 H11A2 H11A3	20			%
Current Transfer Ratio, Collector to Emitter			4N27 4N28 H11A4	10			70
	$(I_F = 10 \text{ mA}, V_{CE} = 10 \text{ V}, T_A = -55^{\circ}\text{C})$		4N35 4N36 4N37	40			
	$(I_F = 10 \text{ mA}, V_{CE} = 10 \text{ V}, T_A = +100^{\circ}\text{C})$		4N35 4N36 4N37	40			
	$(I_C = 2 \text{ mA}, I_F = 50 \text{ mA})$		4N25 4N26 4N27 4N28			0.5	
Collector-Emitter Saturation Voltage		V _{CE (SAT)}	4N35 4N36 4N37			0.3	٧
	$(I_C = 0.5 \text{ mA}, I_F = 10 \text{ mA})$		H11A1 H11A2 H11A3 H11A4 H11A5			0.4	
AC Characteristic Non-Saturated Turn-on Time	$(I_F = 10 \text{ mA}, V_{CC} = 10 \text{ V}, R_L = 100\Omega)$ (Fig.20)	T _{ON}	4N25 4N26 4N27 4N28 H11A1 H11A2 H11A3 H11A4 H11A5		2		μs
Non Saturated Turn-on Time	$(I_C = 2 \text{ mA}, V_{CC} = 10 \text{ V}, R_L = 100\Omega)$ (Fig.20)	T _{ON}	4N35 4N36 4N37		2	10	μs



4N25	4N26	4N27	4N28	4N35	4N36
4N37	H11A1	H11A2	H11A3	H11A4	H11A5

AC Characteristic	Test Conditions	Symbol	Device	Min	Тур*	Max	Unit
Turn-off Time	$(I_F = 10 \text{ mA}, V_{CC} = 10 \text{ V}, R_L = 100\Omega)$ (Fig.20)	T _{OFF}	4N25 4N26 4N27 4N28 H11A1 H11A2 H11A3 H11A4 H11A5		2		μs
	$(I_C = 2 \text{ mA}, V_{CC} = 10 \text{ V}, R_L = 100\Omega)$ (Fig.20)		4N35 4N36 4N37		2	10	

^{*} Typical values at $T_A = 25^{\circ}C$



 4N25
 4N26
 4N27
 4N28
 4N35
 4N36

 4N37
 H11A1
 H11A2
 H11A3
 H11A4
 H11A5

TYPICAL PERFORMANCE CURVES

Fig. 1 LED Forward Voltage vs. Forward Current (Black Package)

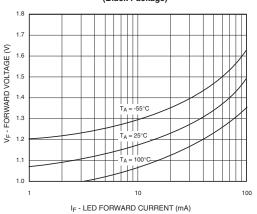


Fig.3 Normalized CTR vs. Forward Current (Black Package)

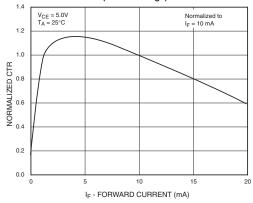


Fig. 5 Normalized CTR vs. Ambient Temperature (Black Package)

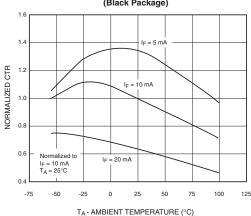


Fig. 2 LED Forward Voltage vs. Forward Current (White Package)

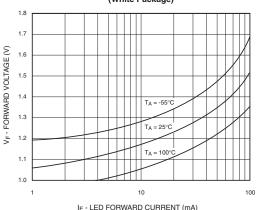


Fig.4 Normalized CTR vs. Forward Current (White Package)

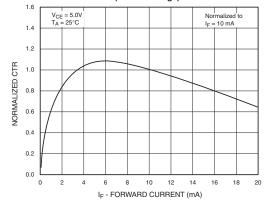
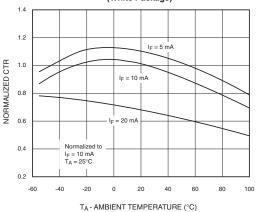
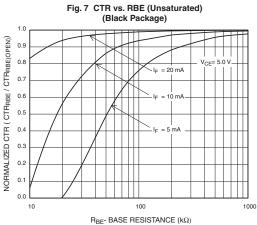


Fig. 6 Normalized CTR vs. Ambient Temperature (White Package)





4N25 4N37 4N26 H11A1 4N27 H11A2 4N28 H11A3 4N35 H11A4 4N36 H11A5





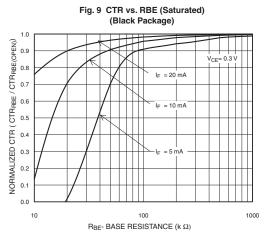


Fig. 10 CTR vs. RBE (Saturated) (White Package)

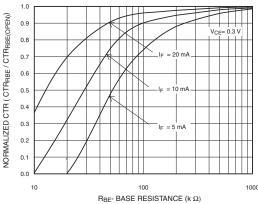


Fig. 11 Collector-Emitter Saturation Voltage vs Collector Current (Black Package)

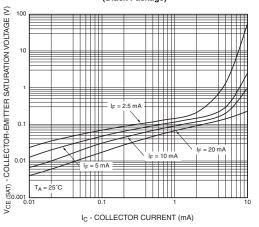
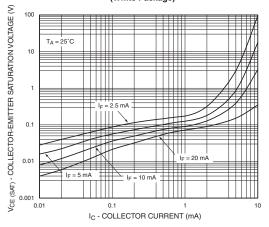


Fig. 12 Collector-Emitter Saturation Voltage vs Collector Current (White Package)





4N25 4N37 4N26 H11A1 4N27 H11A2 4N28 H11A3 4N35 H11A4 4N36 H11A5

Fig. 13 Switching Speed vs. Load Resistor (Black Package)

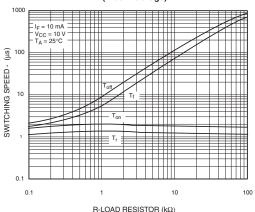


Fig. 14 Switching Speed vs. Load Resistor (White Package)

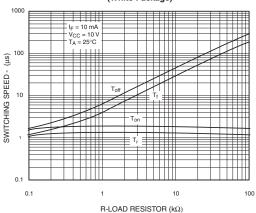


Fig. 15 Normalized t_{on} vs. R_{BE} (Black Package)

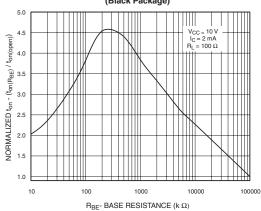


Fig. 16 Normalized t_{on} vs. R_{BE} (White Package)

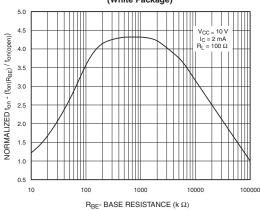


Fig. 17 Normalized toff vs. R_{BE}

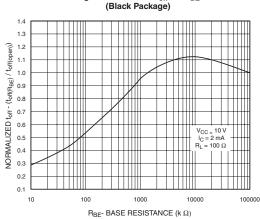
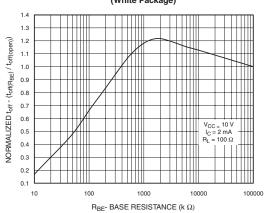


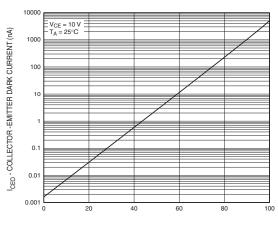
Fig. 18 Normalized t_{off} vs. R_{BE} (White Package)





4N25	4N26	4N27	4N28	4N35	4N36
4N37	H11A1	H11A2	H11A3	H11A4	H11A5

Fig. 19 Dark Current vs. Ambient Temperature



T_A - AMBIENT TEMPERATURE (°C)

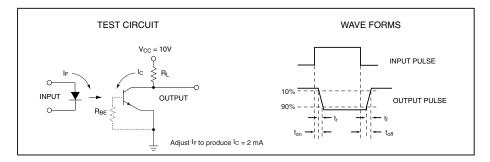


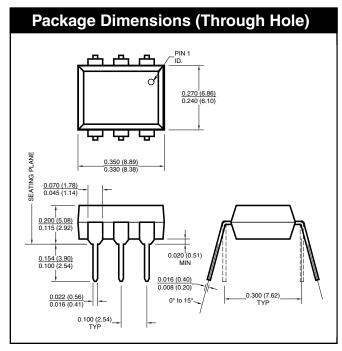
Figure 20. Switching Time Test Circuit and Waveforms

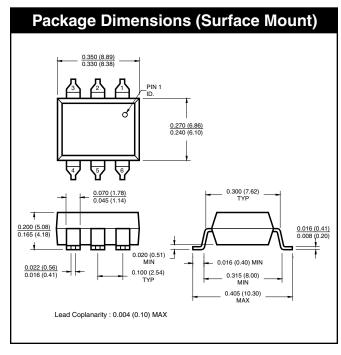


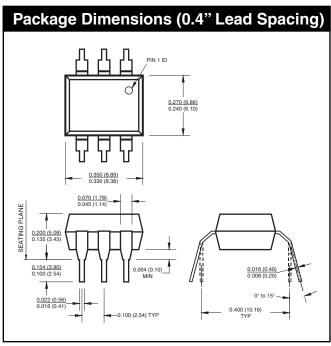
 4N25
 4N26
 4N27
 4N28
 4N35
 4N36

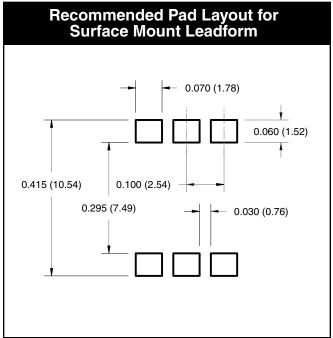
 4N37
 H11A1
 H11A2
 H11A3
 H11A4
 H11A5

Black Package (No -M Suffix)









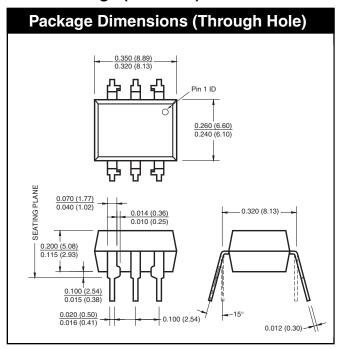
NOTE All dimensions are in inches (millimeters)

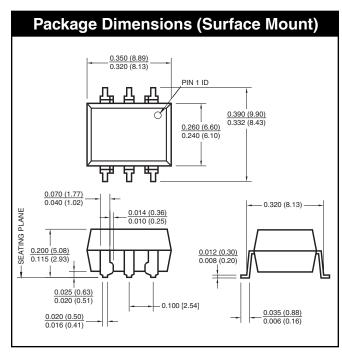


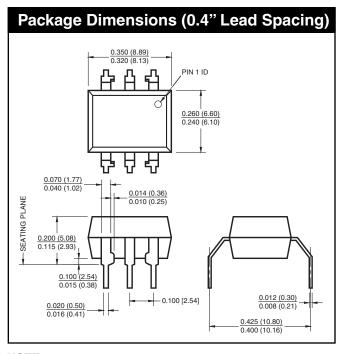
 4N25
 4N26
 4N27
 4N28
 4N35
 4N36

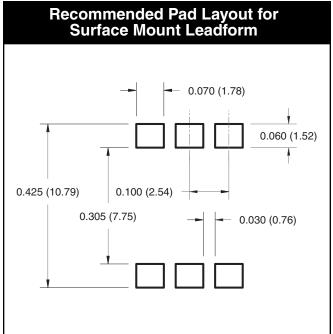
 4N37
 H11A1
 H11A2
 H11A3
 H11A4
 H11A5

White Package (-M Suffix)









NOTEAll dimensions are in inches (millimeters)

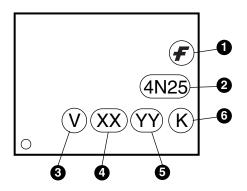


4N25	4N26	4N27	4N28	4N35	4N36
4N37	H11A1	H11A2	H11A3	H11A4	H11A5

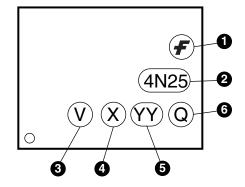
ORDERING INFORMATION

Order Entry Identifier		
Black Package (No Suffix)	White Package (-M Suffix)	Option
.S	S	Surface Mount Lead Bend
.SD	SR2	Surface Mount; Tape and reel
.W	Т	0.4" Lead Spacing
.300	V	VDE 0884
.300W	TV	VDE 0884, 0.4" Lead Spacing
.3S	SV	VDE 0884, Surface Mount
.3SD	SR2V	VDE 0884, Surface Mount, Tape & Reel

MARKING INFORMATION



Black Package, No Suffix

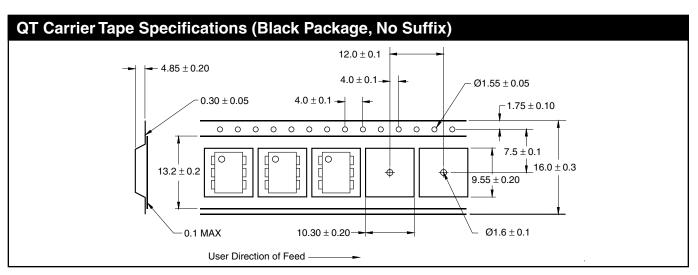


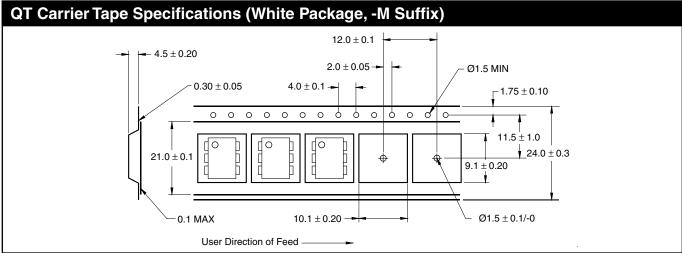
White Package, -M Suffix

Definiti	ions
1	Fairchild logo
2	Device number
3	VDE mark (Note: Only appears on parts ordered with VDE option – See order entry table)
4	One or two digit year code Two digits for black package parts, e.g., '03' One digit for white package parts, e.g., '3'
5	Two digit work week ranging from '01' to '53'
6	Assembly package code

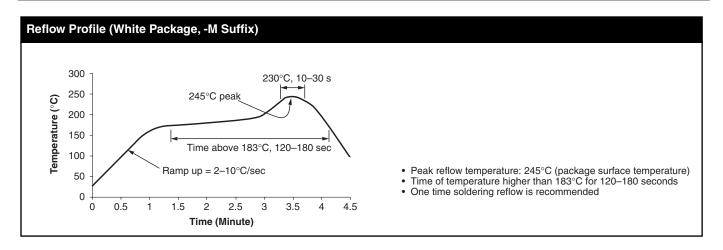
^{*}Note – Parts built in the white package (M suffix) that do not have the 'V' option (see definition 3 above) that are marked with date code '325' or earlier are marked in the portrait format.

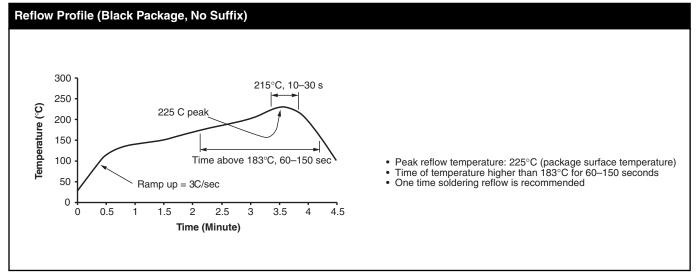














4N25	4N26	4N27	4N28	4N35	4N36
4N37	H11A1	H11A2	H11A3	H11A4	H11A5

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- A critical component in 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.