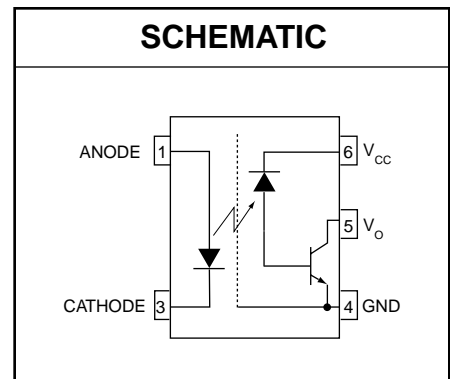
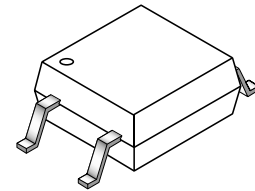
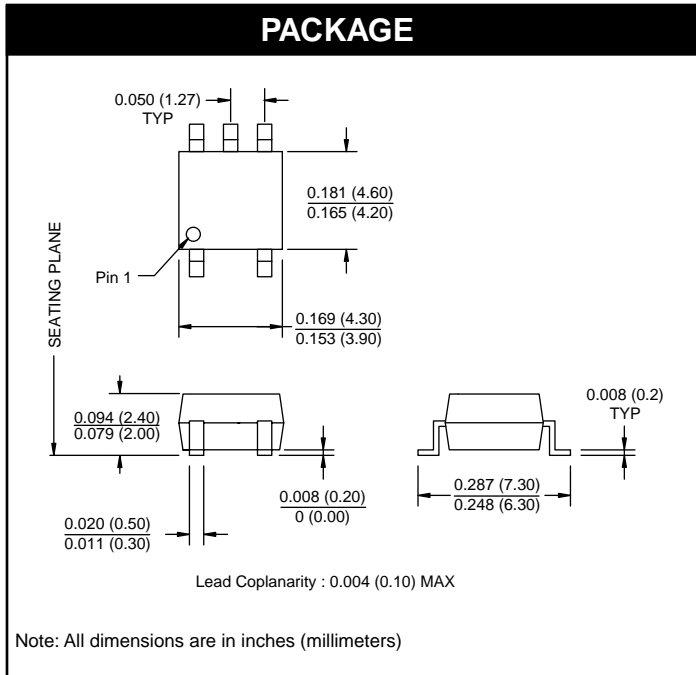


FODM452

FODM453



DESCRIPTION

The FODM452 and FODM453 optocouplers consist of an AlGaAs LED optically coupled to a high speed photodetector transistor. The devices are housed in a compact 5-pin mini flat package for optimum mounting density. The FODM453 features a high CMR rating for optimum common mode transient immunity.

FEATURES

- Compact 5-pin mini flat package
- High speed-1 MBit/s
- Superior CMR-15kV/μs at V_{CM} = 1500V (FODM453)
- Performance guaranteed over temperature (0–70°C)
- U.L. recognized (File # E90700)
- VDE0884 recognized (File # 136480)
 - Ordering option V, e.g., FODM452V

APPLICATIONS

- Line receivers
- Pulse transformer replacement
- Output interface to CMOS-LSTTL-TTL
- Wide bandwidth analog coupling

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ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$ unless otherwise specified)			
Parameter	Symbol	Value	Units
Storage Temperature	T_{STG}	-40 to +125	$^\circ\text{C}$
Operating Temperature	T_{OPR}	-40 to +85	$^\circ\text{C}$
EMITTER			
DC/Average Forward Input Current	I_F (avg)	25	mA
Peak Forward Input Current (50% duty cycle, 1 ms P.W.)	I_F (pk)	50	mA
Peak Transient Input Current - ($\leq 1 \mu\text{s}$ P.W., 300 pps)	I_F (trans)	1.0	A
Reverse Input Voltage	V_R	5	V
Input Power Dissipation (No derating required over specified operating temp range)	P_D	45	mW
DETECTOR			
Average Output Current	I_O (avg)	8	mA
Peak Output Current	I_O (pk)	16	mA
Supply Voltage	V_{CC}	-0.5 to 30	V
Output Voltage	V_O	-0.5 to 20	V
Output power dissipation (No derating required over specified operating temp range)	P_D	100	mW

ELECTRICAL CHARACTERISTICS ($T_A = 0$ to 70°C Unless otherwise specified)						
INDIVIDUAL COMPONENT CHARACTERISTICS						
Parameter	Test Conditions	Symbol	Min	Typ**	Max	Unit
EMITTER						
Input Forward Voltage	($I_F = 16 \text{ mA}$, $T_A = 25^\circ\text{C}$)	V_F		1.60	1.7	V
	($I_F = 16 \text{ mA}$)				1.8	
Input Reverse Breakdown Voltage	($I_R = 10 \mu\text{A}$)	B_{VR}	5.0			V
Temperature coefficient of forward voltage	($I_F = 16 \text{ mA}$)	$(\Delta V_F / \Delta T_A)$		-1.8		mV/ $^\circ\text{C}$
DETECTOR						
Logic high output current	($I_F = 0 \text{ mA}$, $V_O = V_{CC} = 5.5 \text{ V}$) ($T_A = 25^\circ\text{C}$)	I_{OH}		.001	0.5	μA
	($I_F = 0 \text{ mA}$, $V_O = V_{CC} = 15 \text{ V}$) ($T_A = 25^\circ\text{C}$)			.001	1	
	($I_F = 0 \text{ mA}$, $V_O = V_{CC} = 15 \text{ V}$)				50	
Logic low supply current	($I_F = 16 \text{ mA}$, $V_O = \text{Open}$) ($V_{CC} = 15 \text{ V}$)	I_{CCL}		100	200	μA
Logic high supply current	($I_F = 0 \text{ mA}$, $V_O = \text{Open}$, $V_{CC} = 15 \text{ V}$) ($T_A = 25^\circ\text{C}$)	I_{CCH}		0.05	1	μA
	($I_F = 0 \text{ mA}$, $V_O = \text{Open}$) ($V_{CC} = 15 \text{ V}$)				2	

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

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TRANSFER CHARACTERISTICS ($T_A = 0$ to 70°C Unless otherwise specified)						
Parameter	Test Conditions	Symbol	Min	Typ**	Max	Unit
COUPLED Current transfer ratio	(Note 1) $T_A = 25^\circ\text{C}$ $V_{OL}=0.4\text{V}$ ($I_F = 16\text{ mA}$, $V_{CC} = 4.5\text{ V}$)	CTR	20		50	%
	$V_{OL}=0.5\text{V}$		15			
Logic low output voltage output voltage	($I_F = 16\text{ mA}$, $I_O = 3\text{ mA}$) ($V_{CC} = 4.5\text{ V}$, $T_A = 25^\circ\text{C}$)	V_{OL}			0.4	V
	($I_F = 16\text{ mA}$, $I_O = 2.4\text{ mA}$) ($V_{CC} = 4.5\text{ V}$)				0.5	

** All Typicals at $T_A = 25^\circ\text{C}$

SWITCHING CHARACTERISTICS ($T_A = 0$ to 70°C unless otherwise specified., $V_{CC} = 5\text{ V}$)							
Parameter	Test Conditions	Symbol	Device	Min	Typ**	Max	Unit
Propagation delay time to logic low	($R_L = 1.9\text{ k}\Omega$, $I_F = 16\text{ mA}$) (Note 2) (Fig. 9) $T_A = 25^\circ\text{C}$	T_{PHL}			0.40	0.8	μs
	($R_L = 1.9\text{ k}\Omega$, $I_F = 16\text{ mA}$) (Note 2) (Fig. 9)					1.0	μs
Propagation delay time to logic high	($R_L = 1.9\text{ k}\Omega$, $I_F = 16\text{ mA}$) (Note 2) (Fig. 9) $T_A = 25^\circ\text{C}$	T_{PLH}			0.35	0.8	μs
	($R_L = 1.9\text{ k}\Omega$, $I_F = 16\text{ mA}$) (Note 2) (Fig. 9)					1.0	μs
Common mode transient immunity at logic high	($I_F = 0\text{ mA}$, $V_{CM} = 10\text{ V}_{P-P}$ $R_L = 1.9\text{ k}\Omega$) (Note 3) (Fig. 10) $T_A = 25^\circ\text{C}$	$ CM_H $	FODM452	5	15		$\text{KV}/\mu\text{s}$
	($I_F = 0\text{ mA}$, $V_{CM} = 1500\text{ V}_{P-P}$) $T_A = 25^\circ\text{C}$, ($R_L = 1.9\text{ k}\Omega$) (Note 3) (Fig. 10)		FODM453	15	40		$\text{KV}/\mu\text{s}$
Common mode transient immunity at logic low	($I_F = 16\text{ mA}$, $V_{CM} = 10\text{ V}_{P-P}$ $R_L = 1.9\text{ k}\Omega$) (Note 3) (Fig. 10) $T_A = 25^\circ\text{C}$	$ CM_L $	FODM452	5	15		$\text{KV}/\mu\text{s}$
	($I_F = 16\text{ mA}$, $V_{CM} = 1500\text{ V}_{P-P}$) ($R_L = 1.9\text{ k}\Omega$) ($T_A = 25^\circ\text{C}$)(Note 3) (Fig. 10)		FODM453	15	40		$\text{KV}/\mu\text{s}$
Bandwidth	$R_L = 100\Omega$	BW			3		MHz

** All Typicals at $T_A = 25^\circ\text{C}$

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ISOLATION CHARACTERISTICS ($T_A = 0$ to 70°C Unless otherwise specified)						
Characteristics	Test Conditions	Symbol	Min	Typ**	Max	Unit
Withstand insulation test voltage	(RH \leq 50%, $T_A = 25^\circ\text{C}$) (Note 4) (t = 1 min.)	V_{ISO}	3750			V_{RMS}
Capacitance (input to output)	(Note 4) (f = 1 MHz)	$C_{\text{I-O}}$		0.2		pF

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

Notes

1. Current Transfer Ratio is defined as a ratio of output collector current, I_O , to the forward LED input current, I_F , times 100%.
2. The 1.9 k Ω load represents 1 TTL unit load of 1.6 mA and 5.6 k Ω pull-up resistor.
3. Common mode transient immunity in logic high level is the maximum tolerable (positive) dV_{cm}/dt on the leading edge of the common mode pulse signal V_{CM} , to assure that the output will remain in a logic high state (i.e., $V_O > 2.0\text{ V}$). Common mode transient immunity in logic low level is the maximum tolerable (negative) dV_{cm}/dt on the trailing edge of the common mode pulse signal, V_{CM} , to assure that the output will remain in a logic low state (i.e., $V_O < 0.8\text{ V}$).
4. Device is considered a two terminal device: Pins 1, and 3 are shorted together and Pins 4, 5, and 6 are shorted together.

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TYPICAL PERFORMANCE CURVES

Fig. 1 Input Forward Current vs Forward Voltage

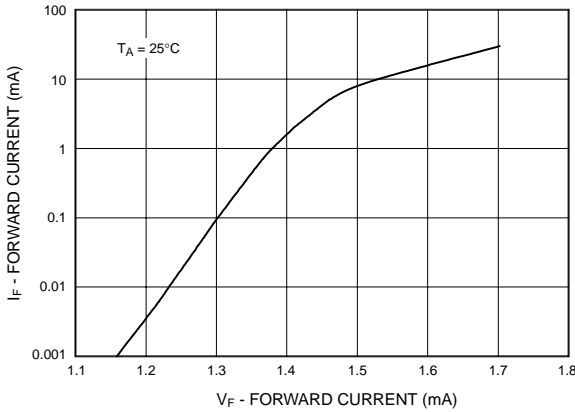


Fig. 2 Normalized Current Transfer Ratio vs. Input Current

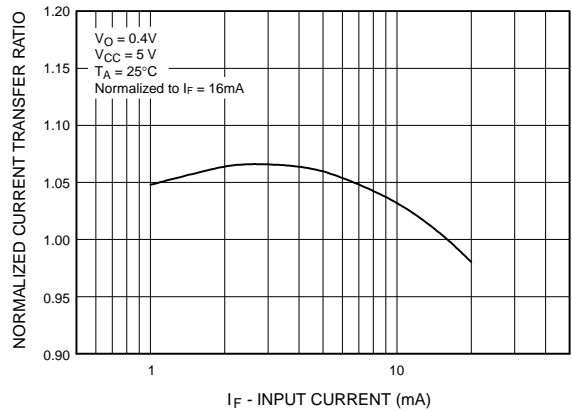


Fig. 3 Normalized Current Transfer Ratio vs. Ambient Temperature

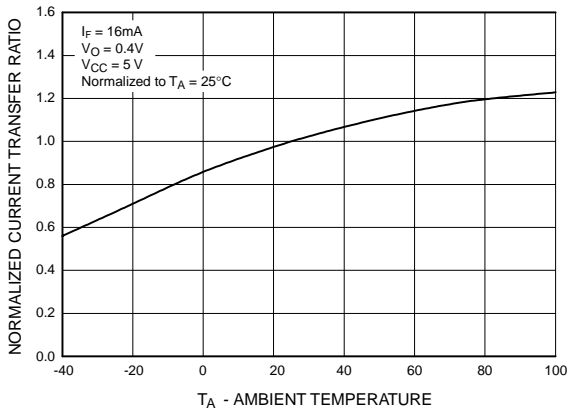


Fig. 4 Logic High Output Current vs. Ambient Temperature

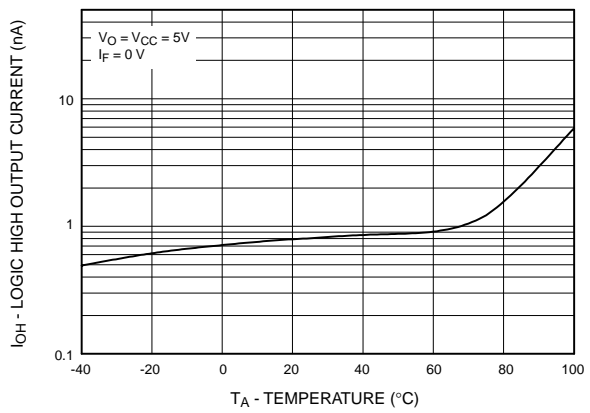


Fig. 5 DC and Pulsed Transfer Characteristics

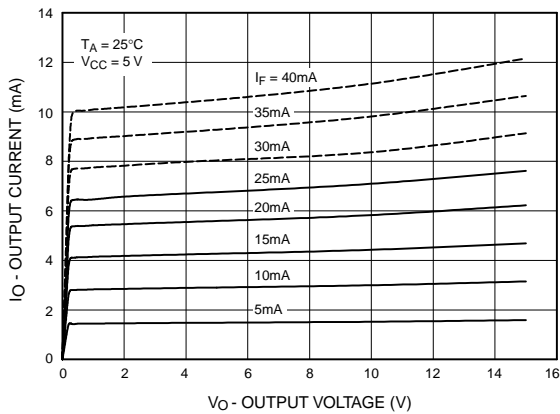
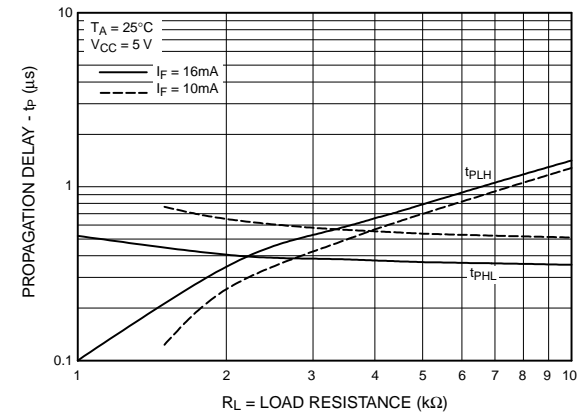


Fig. 6 Propagation Delay vs. Load Resistance



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TYPICAL PERFORMANCE CURVES

Fig. 7 Propagation Delay vs. Ambient Temperature

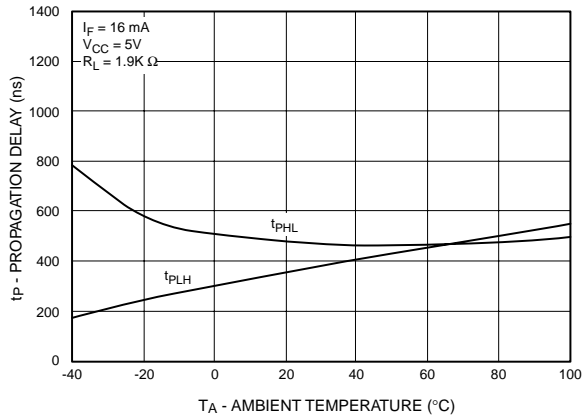
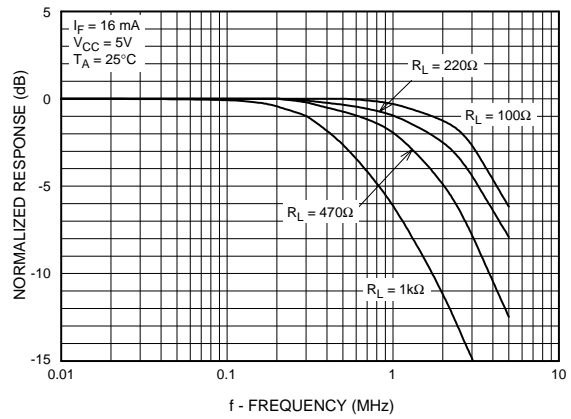


Fig. 8 Frequency Response



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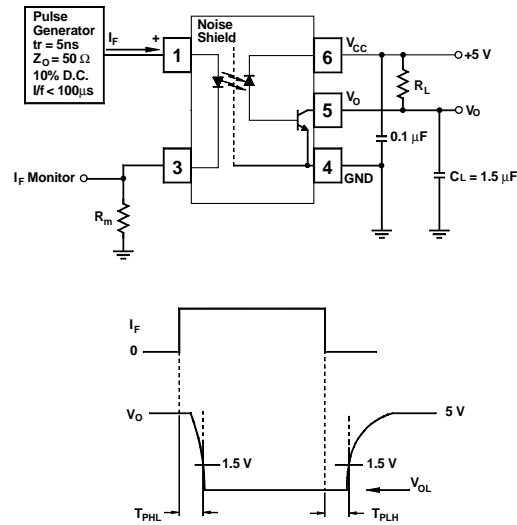


Fig. 9 Switching Time Test Circuit

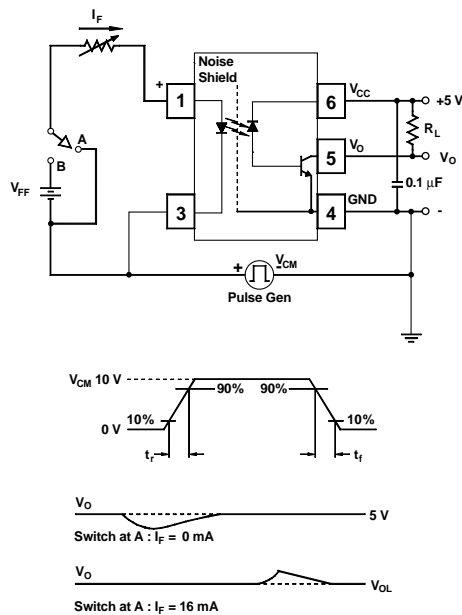
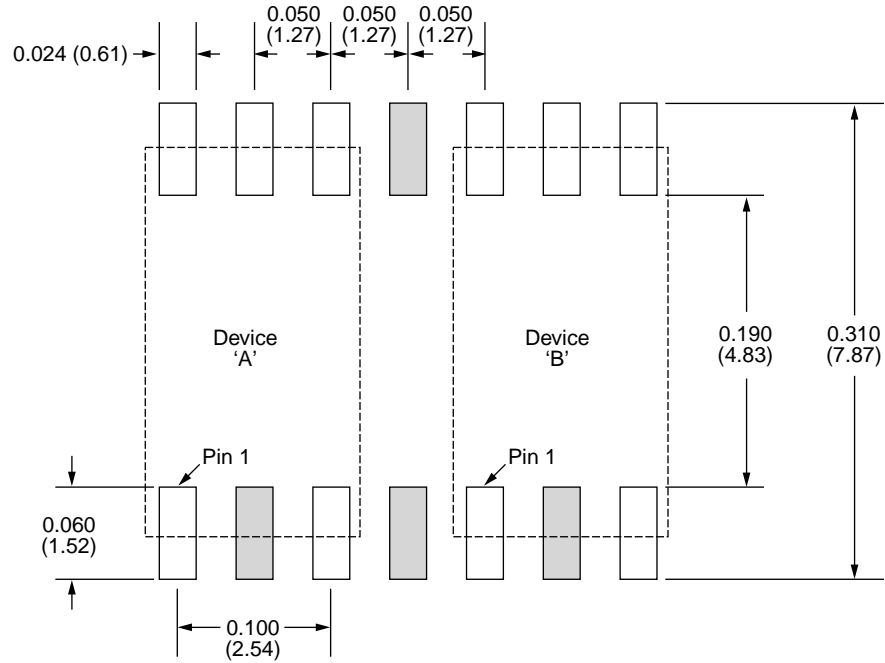


Fig. 10 Common Mode Immunity Test Circuit

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FOOTPRINT DRAWING FOR PCB LAYOUT



End Stacking Configuration

Dimensions in inches (mm)

■ Utilized Solder Pad

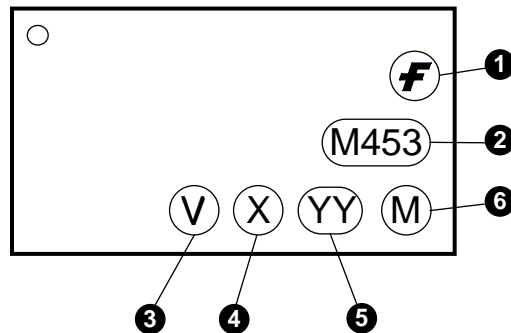
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ORDERING INFORMATION

Option	Description
R1	Tape and Reel (500 per reel)
R2	Tape and Reel (2500 per reel)
V	VDE0884
R1V	VDE0884, Tape and Reel (500 per reel)
R2V	VDE0884, Tape and Reel (2500 per reel)

MARKING INFORMATION

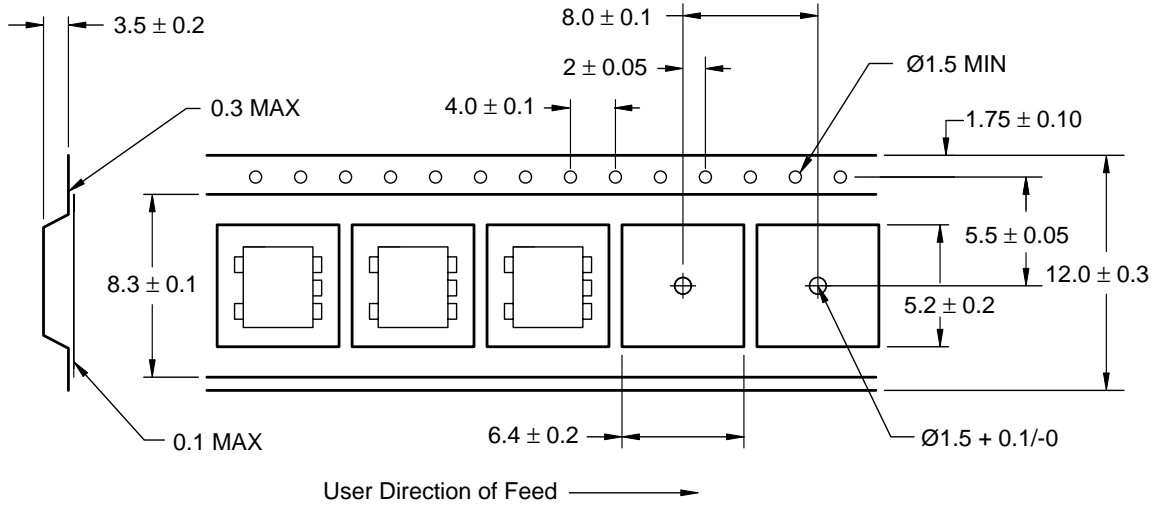


Definitions	
1	Fairchild logo
2	Device number
3	VDE mark (Note: Only appears on parts ordered with VDE option – See order entry table)
4	One digit year code, e.g., '3'
5	Two digit work week ranging from '01' to '53'
6	Assembly package code

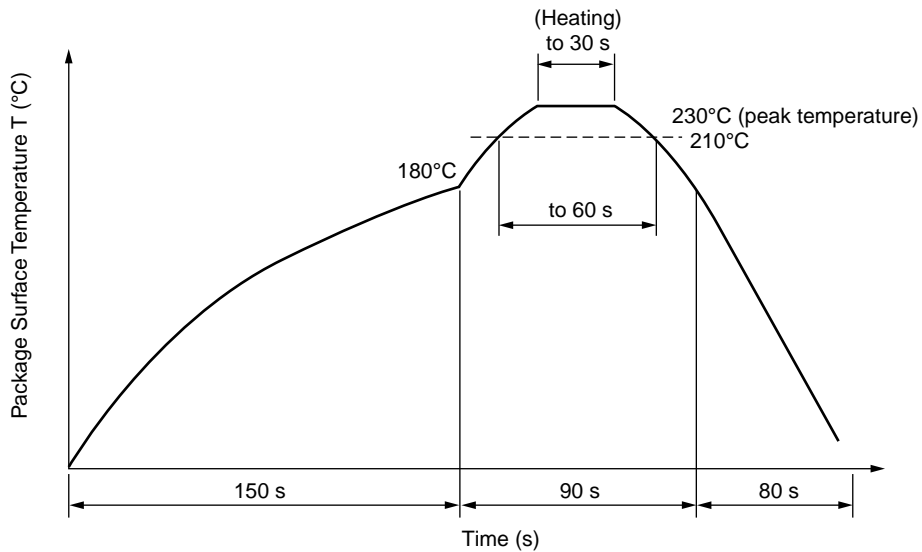
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Carrier Tape Specifications



Reflow Profile



- Peak reflow temperature: 230°C (package surface temperature) for 30 seconds
- Time of temperature higher than 210°C: 60 seconds or less
- One time soldering reflow is recommended

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2. 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.