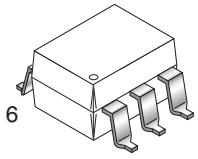
FAIRCHILD
SEMICONDUCTOR®

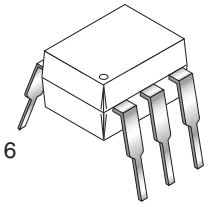
PHOTOTRANSISTOR OPTOCOUPLERS

H11AV1-M H11AV1A-M H11AV2-M H11AV2A-M

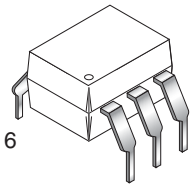
PACKAGE OUTLINE



H11AV1S-M, H11AV2S-M

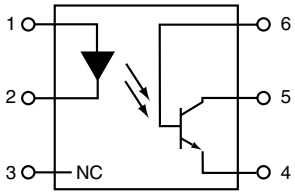


H11AV1-M, H11AV2-M



H11AV1A-M, H11AV2A-M

SCHEMATIC



PIN 1. ANODE
2. CATHODE
3. NO CONNECTION
4. EMITTER
5. COLLECTOR
6. BASE

DESCRIPTION

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

FEATURES

- H11AV1 and H11AV2 feature 0.3" input-output lead spacing
- H11AV1A and H11AV2A feature 0.4" input-output lead spacing
- UL recognized (File #E90700, Vol. 2)
- VDE recognized (File #102497)
  - Add option V (e.g., H11AV1AV-M)

APPLICATIONS

- Power supply regulators
- Digital logic inputs
- Microprocessor inputs

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ABSOLUTE MAXIMUM RATINGS (T_A = 25°C unless otherwise specified)			
Parameter	**Symbol**	**Value**	**Units**
TOTAL DEVICE			
Storage Temperature	T_{STG}	-40 to +150	°C
Operating Temperature	T_{OPR}	-40 to +100	°C
Wave solder temperature (see page 9 for reflow solder profiles)	T_{SOL}	260 for 10 sec	°C
Total Device Power Dissipation @ T_A = 25°C	P_D	250	mW
Derate above 25°C		2.94	mW/°C
EMITTER			
DC/Average Forward Input Current	I_F	60	mA
Reverse Input Voltage	V_R	6	V
LED Power Dissipation @ T_A = 25°C	P_D	120	mW
Derate above 25°C		1.41	mW/°C
DETECTOR			
Collector-Emitter Voltage	V_{CEO}	70	V
Collector-Base Voltage	V_{CBO}	70	V
Emitter-Collector Voltage	V_{ECO}	7	V
Detector Power Dissipation @ T_A = 25°C	P_D	150	mW
Derate above 25°C		1.76	mW/°C

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

INDIVIDUAL COMPONENT CHARACTERISTICS

Parameter	Test Conditions	Symbol	Min	Typ*	Max	Unit
EMITTER						
Input Forward Voltage (I_F = 10 mA)	T_A = 25°C	V_F	0.8	1.18	1.5	V
	T_A = -55°C		0.9	1.28	1.7	
	T_A = 100°C		0.7	1.05	1.4	
Reverse Leakage Current	(V_R = 6.0 V)	I_R			10	µA
DETECTOR						
Collector-Emitter Breakdown Voltage	(I_C = 1.0 mA, I_F = 0)	BV_{CEO}	70	100		V
Collector-Base Breakdown Voltage	(I_C = 100 µA, I_F = 0)	BV_{CBO}	70	120		V
Emitter-Collector Breakdown Voltage	(I_E = 100 µA, I_F = 0)	BV_{ECO}	7	10		V
Collector-Emitter Dark Current	(V_{CE} = 10 V, I_F = 0)	I_{CEO}		1	50	nA
Collector-Base Dark Current	(V_{CB} = 10 V)	I_{CBO}		0.5		nA
Capacitance	(V_{CE} = 0 V, f = 1 MHz)	C_{CE}		8		pF

ISOLATION CHARACTERISTICS

Characteristic	Test Conditions	Symbol	Min	Typ*	Max	Units
Input-Output Isolation Voltage	(f = 60 Hz, t = 1 sec)	V_{ISO}	7500			Vac(pk)
Isolation Resistance	(V_{I-O} = 500 VDC)	R_{ISO}	10^{11}			Ω
Isolation Capacitance	(V_{I-O} = 0 V, f = 1 MHz)	C_{ISO}		0.2	2	pF

Note
* Typical values at T_A = 25°C

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TRANSFER CHARACTERISTICS (T_A = 25°C Unless otherwise specified.)

DC Characteristic	Test Conditions	Symbol	Device	Min	Typ*	Max	Unit
Current Transfer Ratio, Collector to Emitter	(I_F = 10 mA, V_{CE} = 10 V)	CTR	H11AV1 H11AV1A	100		300	%
			H11AV2 H11AV2A	50			
Collector-Emitter Saturation Voltage	(I_C = 2 mA, I_F = 20 mA)	$V_{CE\ (SAT)}$	All			0.4	V
AC Characteristic							
Non-Saturated Turn-on Time	(I_C = 2 mA, V_{CC} = 10 V, R_L = 100Ω) (Fig. 11)	T_{ON}	All			15	µs
Non Saturated Turn-off Time	(I_C = 2 mA, V_{CC} = 10 V, R_L = 100Ω) (Fig. 11)	T_{ON}	All			15	µs

* Typical values at T_A = 25°C

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TYPICAL PERFORMANCE CURVES

Fig. 1 LED Forward Voltage vs. Forward Current

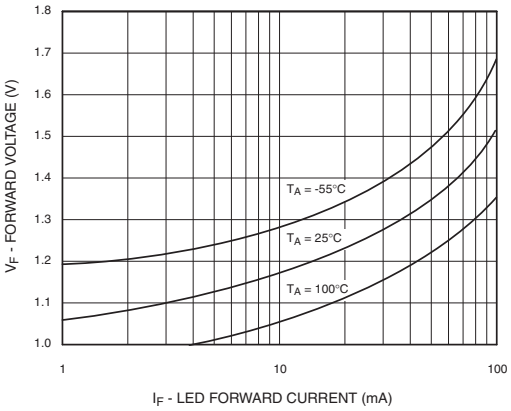


Fig. 2 Normalized CTR vs. Forward Current

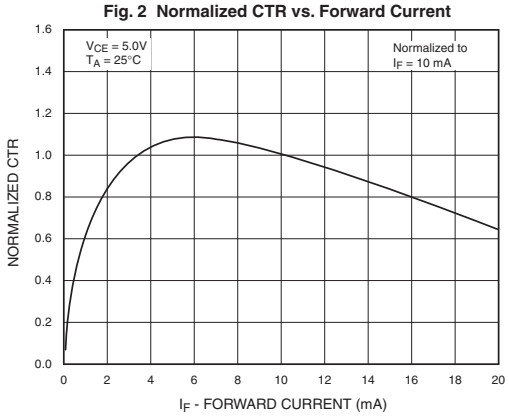


Fig. 3 Normalized CTR vs. Ambient Temperature

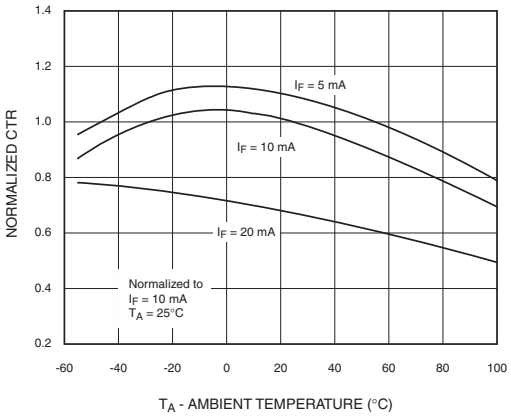


Fig. 4 CTR vs. RBE (Unsaturated)

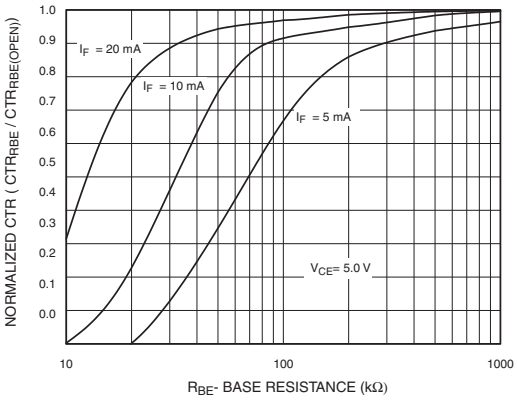


Fig. 5 CTR vs. RBE (Saturated)

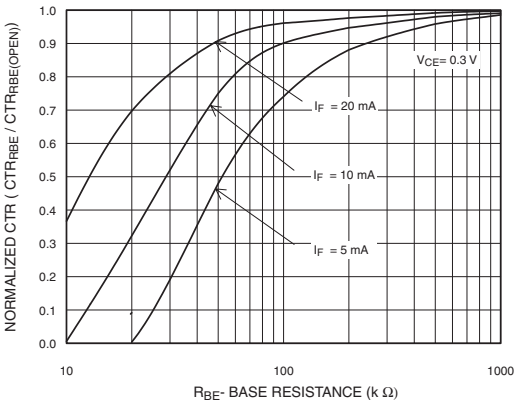
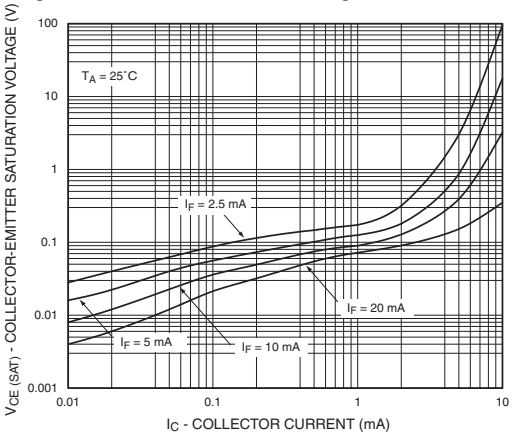


Fig. 6 Collector-Emitter Saturation Voltage vs Collector Current



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Fig. 7 Switching Speed vs. Load Resistor

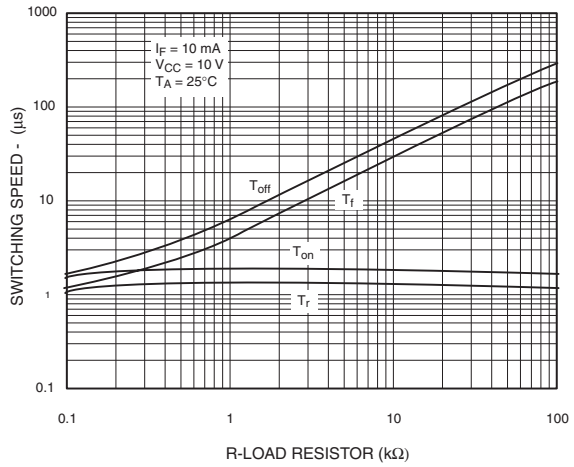


Fig. 8 Normalized t_{on} vs. R_{BE}

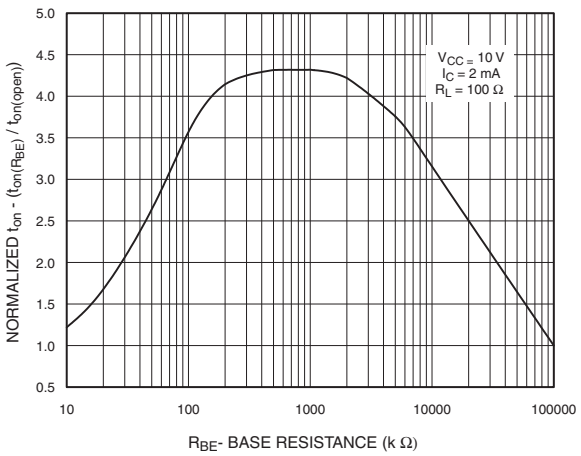


Fig. 9 Normalized t_{off} vs. R_{BE}

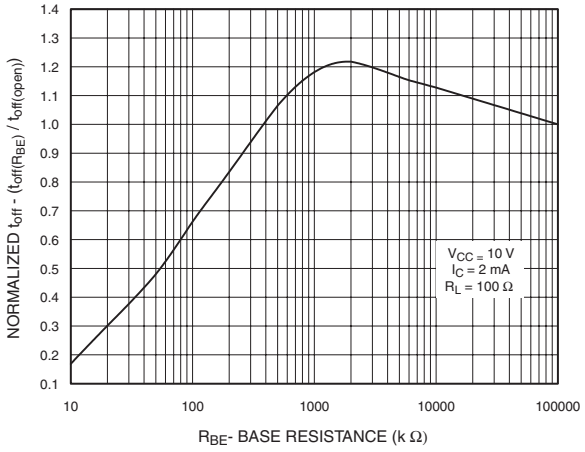
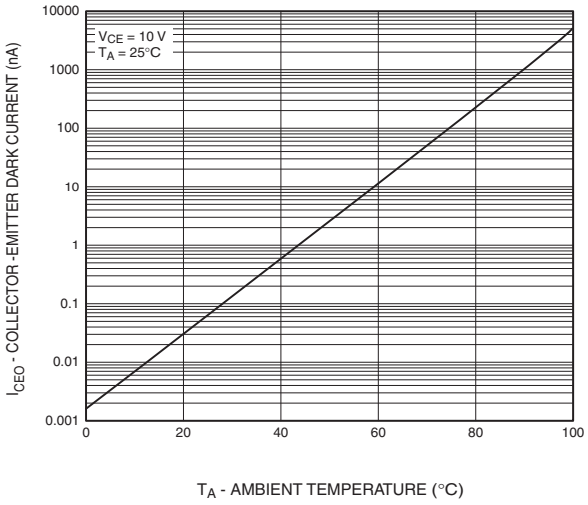


Fig. 10 Dark Current vs. Ambient Temperature



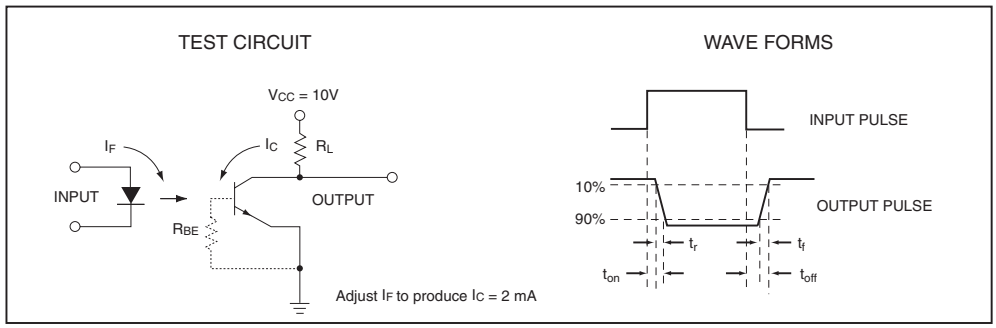
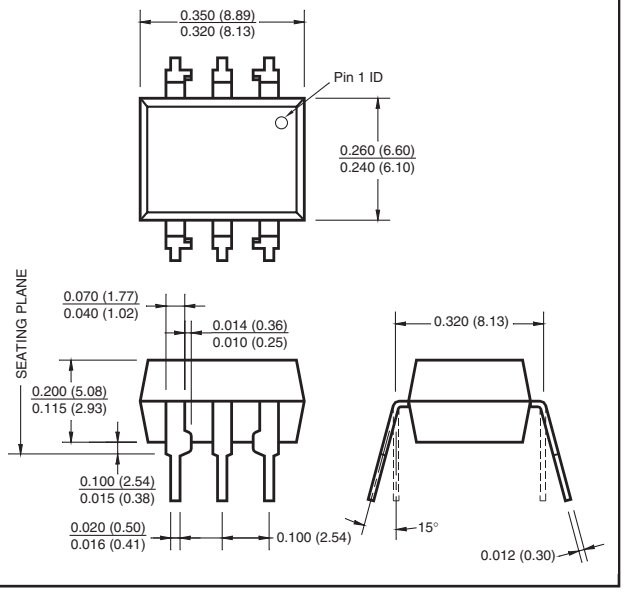


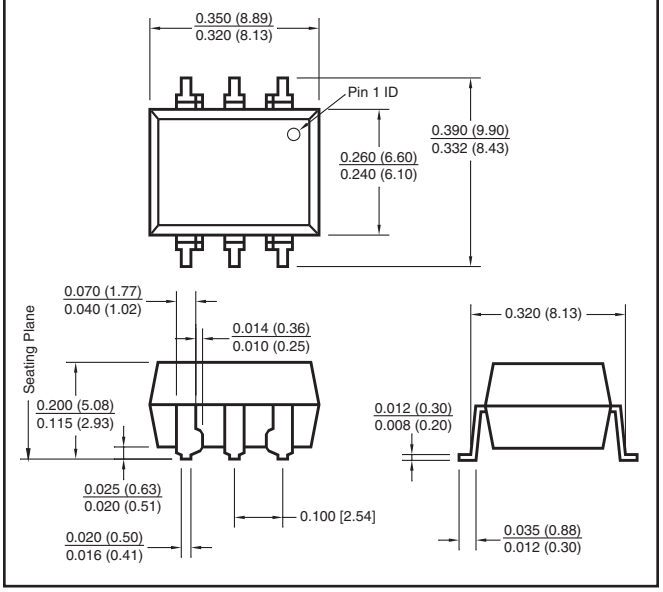
Figure 11. Switching Time Test Circuit and Waveforms

H11AV1-M H11AV1A-M H11AV2-M H11AV2A-M

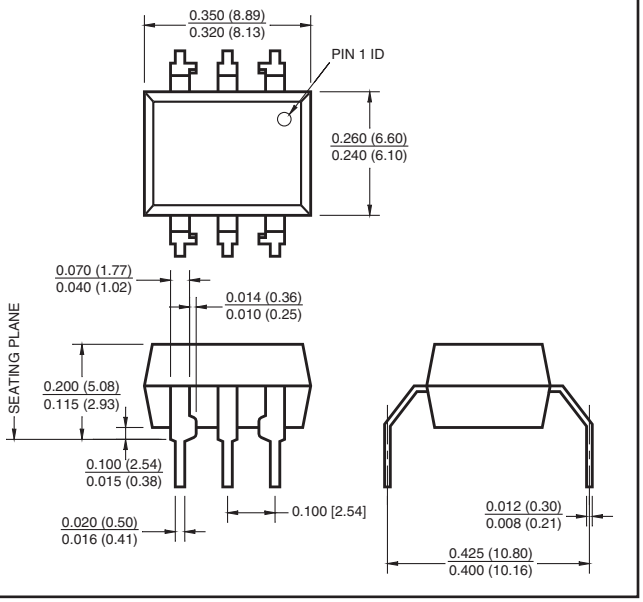
Package Dimensions (Through Hole)



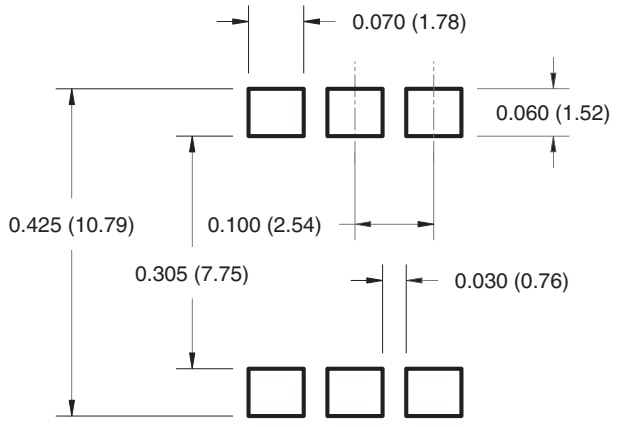
Package Dimensions (Surface Mount)



Package Dimensions (0.4” Lead Spacing)



Recommended Pad Layout for Surface Mount Leadform



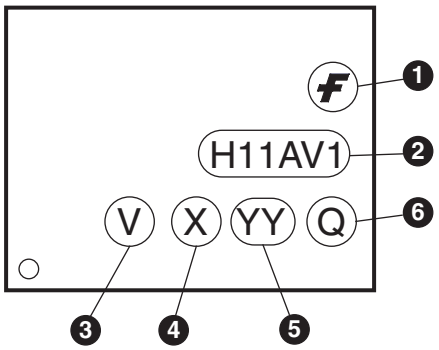
NOTE
All dimensions are in inches (millimeters)

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ORDERING INFORMATION

Order Entry Identifier		
Order Entry Identifier	**Option**	**Example**
S	Surface Mount Lead Bend	H11AV1S-M
SR2	Surface Mount; Tape and reel	H11AV1SR2-M
N/A	0.4" Lead Spacing	H11AV1A-M
V	VDE 0884	H11AV1V-M
N/A	VDE 0884, 0.4" Lead Spacing	H11AV1AV-M
SV	VDE 0884, Surface Mount	H11AV1SV-M
SR2V	VDE 0884, Surface Mount, Tape & Reel	H11AV1SR2V-M

MARKING INFORMATION



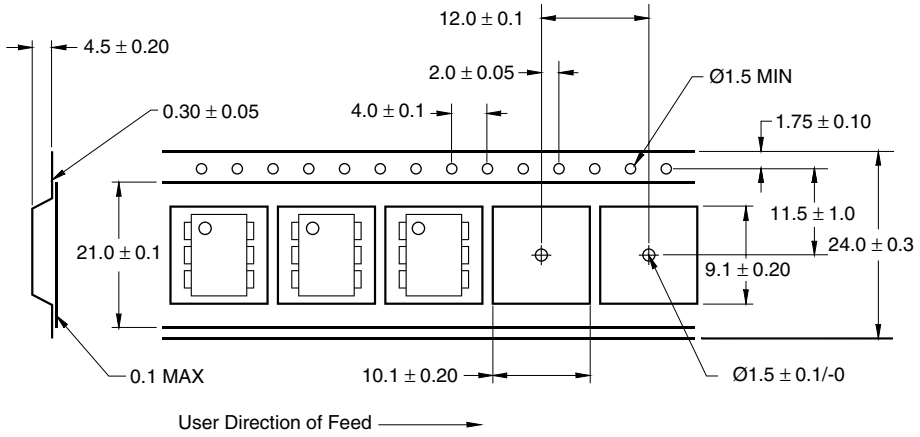
White Package

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 • One digit for white package parts, e.g., '3'
5	Two digit work week ranging from '01' to '53'
6	Assembly package code

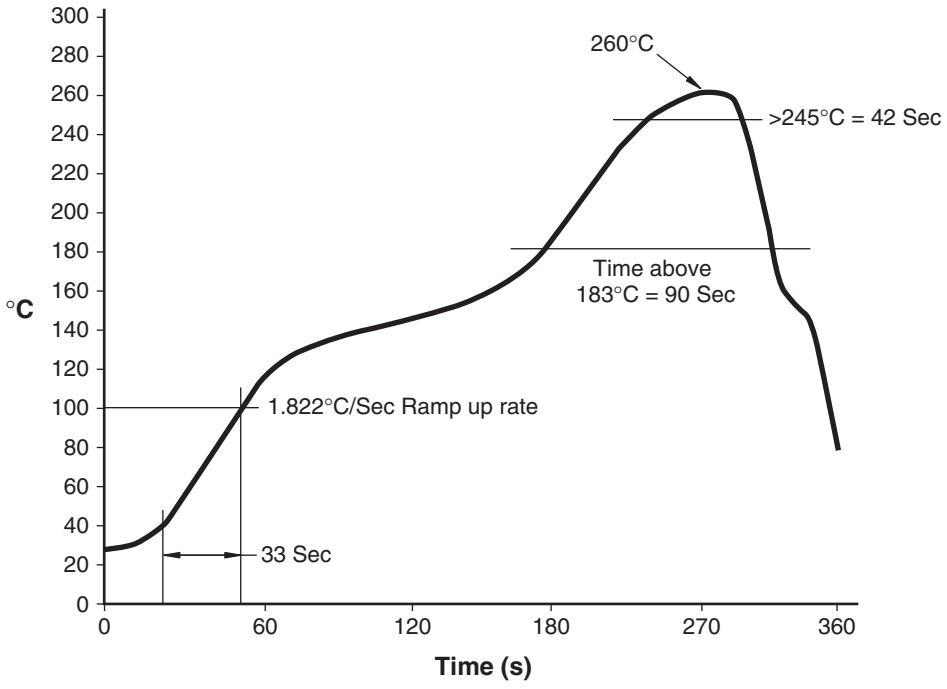
*Note – Parts built in the white package (M suffix) that do not have the 'V' option (see definition 3 above) that are marked with date code '325' or earlier are marked in the portrait format.

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Carrier Tape Specifications



Reflow Profile



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