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FOD8163, FOD8163T

3.3 V / 5 V, 10 Mbit/sec, Logic Gate Optocoupler in



FOD8163, FOD8163T — 3.3 V / 5 V, 10 Mbit/sec, Logic Gate Optocoupler in Stretched Body SOP 6-Pin

Truth Table

LED	V_O
Off	HIGH
On	LOW

Pin Definitions

Pin #	Name	Description
1	ANODE	Anode
2	NC	Not Connected
3	CATHODE	Cathode
4	GND	Output Ground
5	V_O	Output Voltage
6	V_{CC}	Output Supply Voltage

Pin Configuration

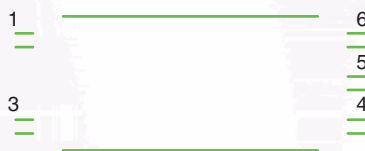


Figure 3. Pin Configuration

Safety and Insulation Ratings

As per DIN EN/IEC60747-5-5, this optocoupler is suitable for “safe electrical insulation” only within the safety limit data. Compliance with the safety ratings shall be ensured by means of protective circuits.

Parameter	Characteristics	
	FOD8163	FOD8163T
	< 150 V _{RMS}	I-IV
Installation Classifications per DIN VDE 0110/1.89 Table 1, For Rated Mains Voltage	< 300 V _{RMS}	I-IV
	< 450 V _{RMS}	I-III
	< 600 V _{RMS}	I-III
Climatic Classification	40/100/21	40/100/21
Pollution Degree (DIN VDE 0110/1.89)	2	2
Comparative Tracking Index	175	175

Symbol	Parameter	Value		Unit
		FOD8163	FOD8163T	
V _{PR}	Input-to-Output Test Voltage, Method B, V _{IORM} × 1.875 = V _{PR} , 100% Production Test with t _m = 1 s, Partial Discharge < 5 pC	1,671	2,137	V _{peakpeak}
	Input-to-Output Test Voltage, Method A, V _{IORM} × 1.6 = V			

Absolute Maximum Ratings

Stresses exceeding the absolute maximum ratings may damage the device. The device may not function or be operable above the recommended operating conditions and stressing the parts to these levels is not recommended. In addition, extended exposure to stresses above the recommended operating conditions may affect device reliability. The absolute maximum ratings are stress ratings only. $T_A = 25^\circ\text{C}$ unless otherwise specified.

Symbol	Parameter	Value	Unit
T_{STG}	Storage Temperature	-40 to +125	$^\circ\text{C}$
T_{OPR}	Operating Temperature	-40 to +100	$^\circ\text{C}$
T_J	Junction Temperature	-40 to +125	$^\circ\text{C}$
T_{SOL}	Lead Solder Temperature (Refer to Reflow Temperature Profile)	260 for 10 sec	$^\circ\text{C}$
Input Characteristics			
I_F	Average Forward Input Current	25	mA
V_R	Reverse Input Voltage	5.0	V
PD_I	Input Power Dissipation ⁽¹⁾	45	mW
Output Characteristics			
V_{CC}	Supply Voltage	0 to 7.0	V
V_O	Output Voltage	-0.5 to $V_{\text{CC}} + 0.5$	V
I_O	Average Output Current	50	mA
PD_O	Output Power Dissipation ⁽¹⁾	85	mW

Note:

1. No derating required up to 100°C .

Recommended Operating Conditions

The Recommended Operating Conditions table defines the conditions for actual device operation. Recommended operating conditions are specified to ensure optimal performance to the datasheet specifications. Fairchild does not recommend exceeding them or designing to absolute maximum ratings.

Symbol	Parameter	Min.	Max.	Unit
T_A	Ambient Operating Temperature	-40	+100	$^\circ\text{C}$
V_{CC}	Supply Voltages ⁽²⁾	3.0	5.5	V
V_{FL}	Logic Low Input Voltage	0	0.8	V
I_{FL}	Logic Low Input Current		250	A
I_{FH}	Logic High Input Current	6.0	15	mA
N	Fan Out (at $R_L = 1\text{ k } \Omega$)		5	TTL loads
R_L	Output Pull-up Resistor	330	4000	

Note:

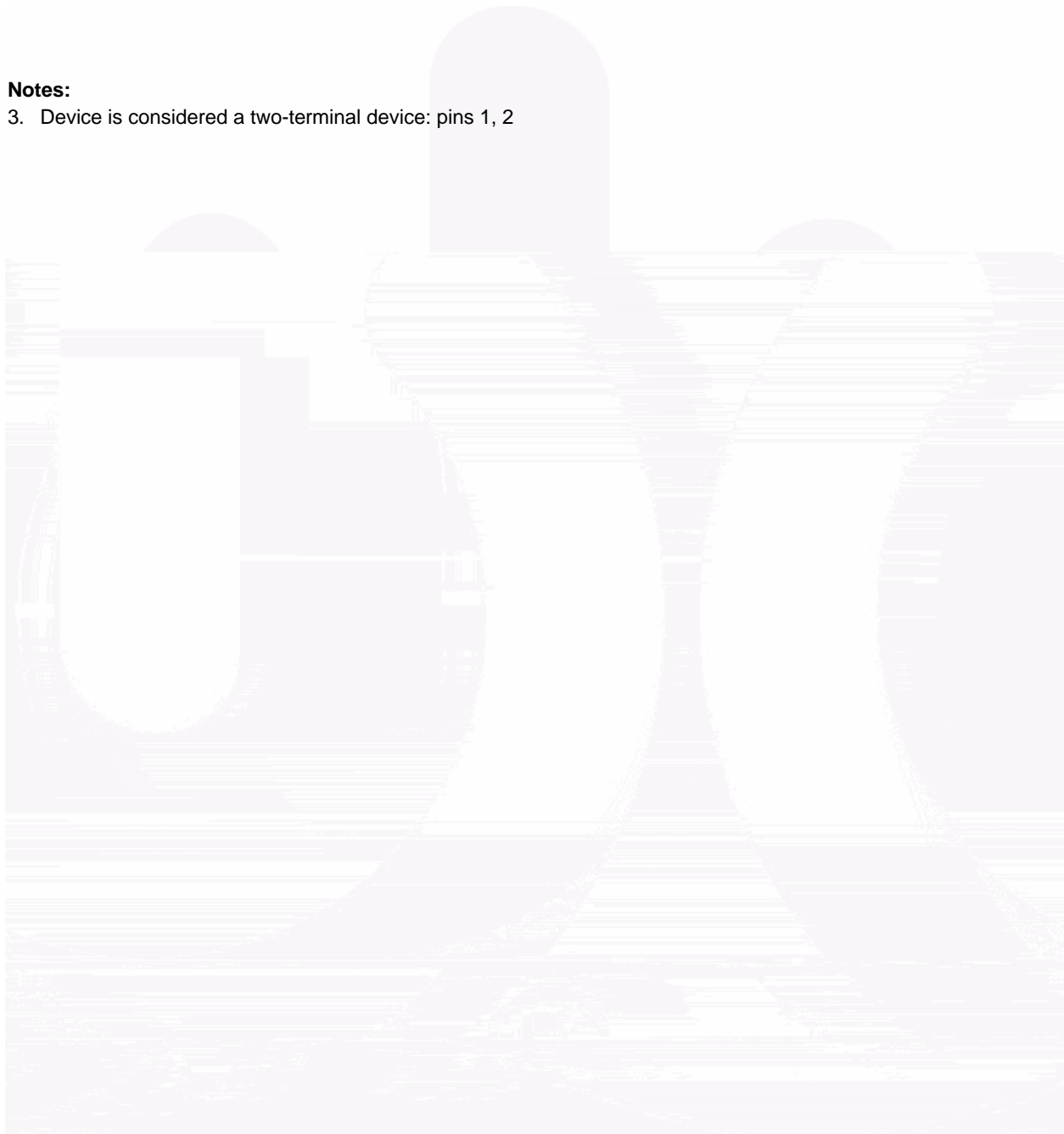
2. 0.1 μF bypass capacitor must be connected between pins 4 and 6.

Isolation Characteristics

Apply over all recommended conditions, typical value is measured at $T_A = 25^\circ\text{C}$.

Notes:

3. Device is considered a two-terminal device: pins 1, 2



Switching Characteristics

Apply over all recommended conditions; $T_A = -40^\circ\text{C}$ to $+100^\circ\text{C}$, $3.3\text{ V} \leq V_{CC} \leq 5\text{ V}$, $I_F = 6.0\text{ mA}$; unless otherwise specified. Typical value is measured at $T_A = 25^\circ\text{C}$ and $V_{CC} = 3.3\text{ V}$.

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit	Figure
Data Rate		$R_L = 350$			10	Mbit/sec	
t_{PHL}	Propagation Delay to Logic Low Output	$R_L = 350$, $C_L = 15\text{ pF}$		42	80	ns	11, 13, 16
t_{PLH}	Propagation Delay to Logic High Output	$R_L = 350$, $C_L = 15\text{ pF}$		53	90	ns	11, 13, 16
PWD	Pulse Width Distortion, $ t_{PHL} - t_{PLH} $	$R_L = 350$, $C_L = 15\text{ pF}$		11	35	ns	12, 14, 16
t_{PSK}	Propagation Delay Skew	$R_L = 350$, $C_L = 15\text{ pF}$ ⁽⁵⁾			40	ns	
t_R	Output Rise Time (10% to 90%)	$R_L = 350$, $C_L = 15\text{ pF}$		20		ns	15, 16
t_F	Output Fall Time (90% to 10%)	$R_L = 350$, $C_L = 15\text{ pF}$		10		ns	15, 16
$ CM_H $	Common-Mode Transient Immunity at Output High	$I_F = 0\text{ mA}$, $V_O > 2\text{ V}$, $V_{CM} = 1500\text{ V}$ ⁽⁶⁾	20	40		kV/ s	17
$ CM_L $	Common-Mode Transient Immunity at Output Low	$I_F = 6.0\text{ mA}$, $V_O < 0.8\text{ V}$, $V_{CM} = 1500\text{ V}$ ⁽⁶⁾	20	40		kV/ s	17

Notes:

- t_{PSK} is equal to the magnitude of the worst-case difference in t_{PHL} and/or t_{PLH} between any two units from the same manufacturing date code that are operated at same case temperature ($\pm 5^\circ\text{C}$), at same operating conditions, with equal loads ($R_L = 350$, $C_L = 15\text{ pF}$), and with an input rise time less than 5 ns.
- Common-mode transient immunity at output HIGH is the maximum tolerable positive dV_{CM}/dt on the leading edge of the common-mode impulse signal, V_{CM} , to assure that the output remains HIGH. Common-mode transient immunity at output LOW is the maximum tolerable negative dV_{CM}/dt on the trailing edge of the common pulse signal, V_{CM} , to assure that the output remains LOW.

Typical Performance Characteristics

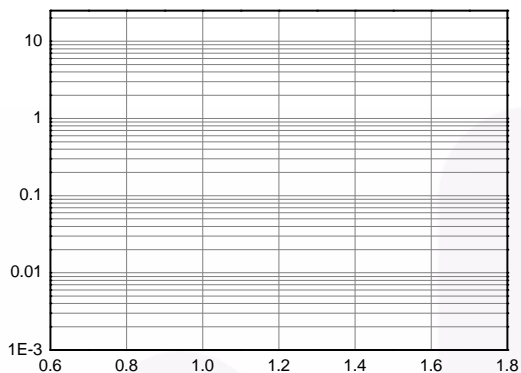


Figure 4. Input LED Current vs. Forward Voltage

Figure 5. Threshold Input Current vs. Ambient Temperature

Figure 6. Logic Low Output Voltage vs. Ambient Temperature

Figure 7. Logic High Output Current vs. Ambient Temperature

Figure 8. Logic Low Output Supply Current vs. Ambient Temperature

Figure 9. Logic High Output Supply Current vs. Ambient Temperature

Typical Performance Characteristics (Continued)

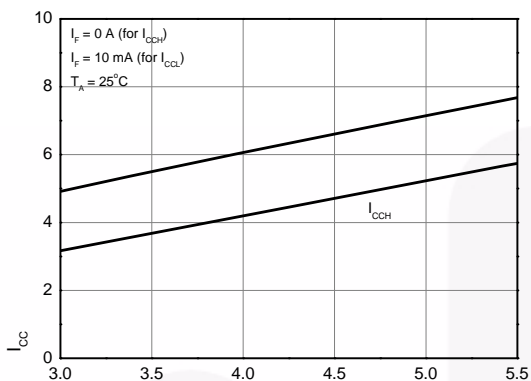


Figure 10. Output Supply Current vs. Output Supply Voltage

Figure 11. Propagation Delay vs. Ambient Temperature

Figure 12. Pulse Width Distortion vs. Ambient Temperature

Figure 13. Propagation Delay vs. Input LED Current

Figure 14. Pulse Width Distortion vs. Input LED Current

Figure 15. Rise Time and Fall Time vs. Ambient Temperature

Reflow Profile

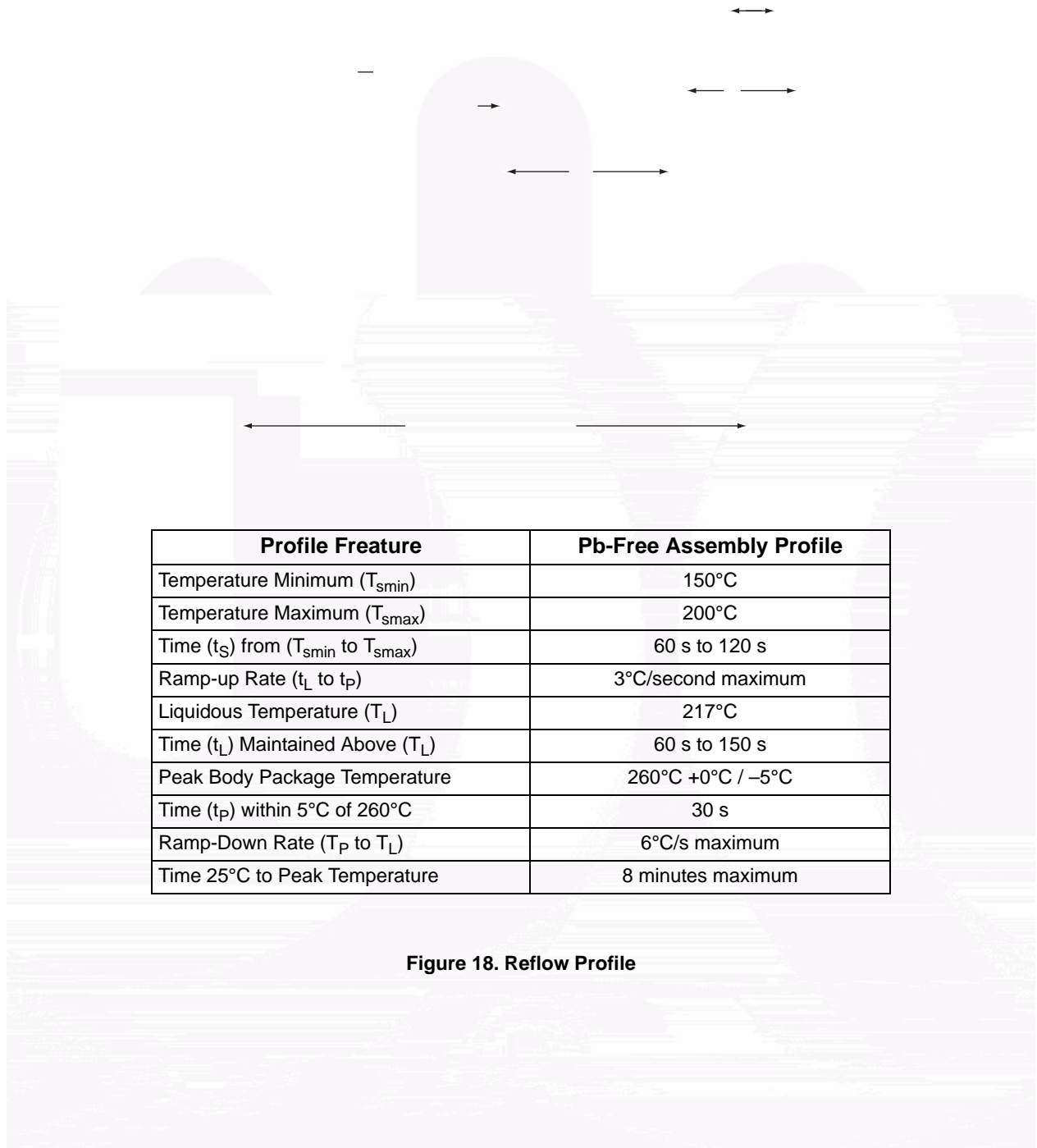


Figure 18. Reflow Profile

Ordering Information

Part Number	Package	Packing Method
FOD8163	Stretched Body SOP 6-Pin	Tube (100 units per tube)
FOD8163R2	Stretched Body SOP 6-Pin	Tape and Reel (1,000 units per reel)

All packages are lead free per JEDEC: J-STD-020B standard.

Marking Information



NOTES: UNLESS OTHERWISE SPECIFIED

- A) NO STANDARD APPLIES TO THIS PACKAGE
- B) ALL DIMENSIONS ARE IN MILLIMETERS.
- C) DIMENSIONS DO NOT INCLUDE BURRS OR MOLD FLASH, AND TIE BAR EXTRUSION.
- D) DIMENSIONING AND TOLERANCING PER ASME Y14.5M-2009.
- E) DRAWING FILE NAME: MKT-M06BREV1



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- E) DRAWING FILE NAME: MKT-M06CREV1

