

## Description

The HL1341A/AC/MF/BF/DL are 1.3 μm InGaAsP distributed feedback (DFB) laser diodes with a double heterostructure. They are suitable as light sources for high-bit-rate long distance optical fiber communication systems and various other types of optical equipment.

## Features

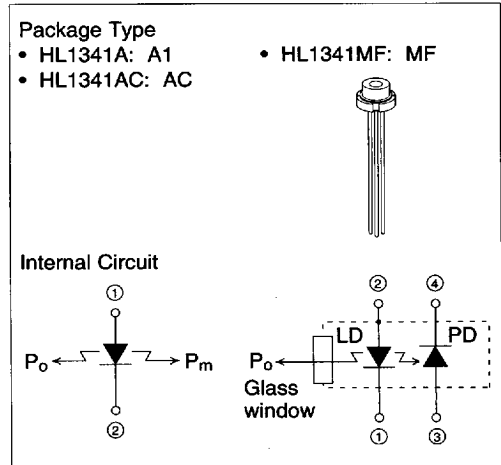
- Long wavelength oscillation:  
 $\lambda_p = 1290$  to  $1330$  nm
- Room temperature 5 mW CW operation (A/AC/MF)
- High output:  
 $P_f = 1.0$  mW (CW, pulse operation) (BF/DL)
- Dynamic single mode to side mode ratio  $Sr = 35$  dB (typ)
- Built-in monitor photo diode (MF/BF/DL)
- High speed pulse response:  
 $t_r, t_f \leq 0.5$  ns (A/AC/MF)

## Fiber Specifications (BF, DL only)

Mode field diameter:  $10.0 \pm 1.0$  μm  
 Cutoff wavelength: 1.10 to 1.20 μm  
 Core diameter: 10 μm  
 External diameter: 125 μm  
 Jacket diameter: 900 μm  
 Fiber length: More than 500 mm

## Absolute Maximum Ratings ( $T_C = 25^\circ\text{C}$ )

Item		Symbol	Rated Value	Unit
Optical output power	HL1341A/AC/MF	$P_O$	5	mW
Fiber optical output power	HL1341BF/DL	$P_f$	1.0	mW
LD reverse voltage		$V_R$ (LD)	2	V
PD reverse voltage	HL1341MF/BF/DL	$V_R$ (PD)	15	V
PD forward current		$I_F$ (PD)	1	mA
Cooler current	HL1341BF/DL	$I_C$	1.4	A
Operating temperature		$T_{opr}$	0 to +60	°C
Storage temperature	HL1341A/AC	$T_{stg}$	0 to +80	°C
	HL1341MF		-40 to +80	
	HL1341BF/DL		-40 to +70	



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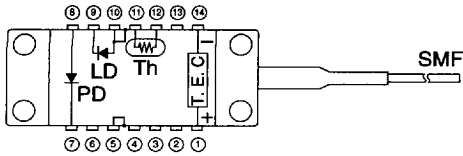
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# HL1341A/AC/MF/BF/DL

## Pin Connections (Bottom view)

### • HL1341BF



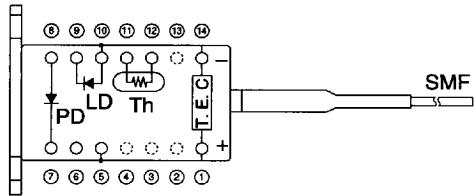
LD: Laser diode  
 PD: Photodiode  
 Th: Thermistor  
 T. E. C.: T. E. cooler  
 SMF: Single-mode fiber

- ① T.E.C. anode
- ② N. C.
- ③ N. C.
- ④ N. C.
- ⑤ Case
- ⑥ N. C.
- ⑦ PD cathode
- ⑧ PD anode
- ⑨ LD cathode
- ⑩ LD anode (case)
- ⑪ Thermistor
- ⑫ Thermistor
- ⑬ N. C.
- ⑭ T. E. C. cathode

### Package Type

• HL1341BF: BF

### • HL1341DL



LD: Laser diode  
 PD: Photodiode  
 Th: Thermistor  
 T. E. C.: T. E. cooler  
 SMF: Single-mode fiber

- ① T.E.C. anode
- ② —
- ③ —
- ④ —
- ⑤ Case
- ⑥ N. C.
- ⑦ PD cathode
- ⑧ PD anode
- ⑨ LD cathode
- ⑩ LD anode (case)
- ⑪ Thermistor
- ⑫ Thermistor
- ⑬ —
- ⑭ T. E. C. cathode

### Package Type

• HL1341DL: DL

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234 1

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## Optical and Electrical Characteristics ( $T_C = 25^\circ\text{C}$ )

Item		Symbol	Min	Typ	Max	Unit	Test Conditions
Threshold current		$I_{th}$	—	25	50	mA	
Optical output power	HL1341A/AC/MF	$P_O$	5	—	—	mW	Kink free
			2.5	—	—		$I_F = I_{th} + 20 \text{ mA}$
Fiber optical output power	HL1341BF/DL	$P_f$	1	—	—	mW	Kink free
			0.5	—	—		$I_F = I_{th} + 20 \text{ mA}$
Monitor output	HL1341A/AC	$P_m$	1	—	—	mW	$I_F = I_{th} + 20 \text{ mA}$
Lasing Wave-length	HL1341A/AC/MF	$\lambda_p$	1290	1310	1330	nm	$P_O = 3 \text{ mW}$
	HL1341BF/DL		1290	1310	1330		$P_f = 0.5 \text{ mW}$
Side mode suppression ratio	HL1341A/AC/MF	$S_r$	30	35	—	dB	$P_O = 3 \text{ mW}$
	HL1341BF/DL		30	35	—		$P_f = 0.5 \text{ mW}$
Beam divergence (parallel)	HL1341A/AC/MF	$\theta_{//}$	—	30	—	deg.	$P_O = 3 \text{ mW}$ , FWHM
Beam divergence (perpendicular)	HL1341A/AC/MF	$\theta_{\perp}$	—	40	—	deg.	$P_O = 3 \text{ mW}$ , FWHM
Rise time		$t_r$	—	—	0.5	ns	$I_{bias} = I_{th}$ 10 to 90 %
Fall time		$t_f$	—	—	0.5	ns	$I_{bias} = I_{th}$ 90 to 10 %
PD dark current	HL1341MF/BF/DL	$I_{DARK}$	—	—	350	nA	$V_R (PD) = 5 \text{ V}$
Monitor current	HL1341MF	$I_S$	50	—	—	$\mu\text{A}$	$V_R (PD) = 5 \text{ V}$ , $P_O = 3 \text{ mW}$
	HL1341BF/DL		50	—	—		$V_R (PD) = 5 \text{ V}$ , $P_f = 0.5 \text{ mW}$
PD capacitance	HL1341MF/BF/DL	$C_t$	—	10	20	pF	$V_R (PD) = 5 \text{ V}$ , $f = 1 \text{ MHz}$
Photosensitivity saturation bias voltage	HL1341MF/BF/DL	$V_{R(S)}$	—	—	2	V	
Cooling capacity	HL1341BF/DL	$\Delta T$	40	—	—	$^\circ\text{C}$	$P_f = 0.5 \text{ mW}$ , $T_C = 60^\circ\text{C}$
Cooler current		$I_C$	—	—	1.4	A	$\Delta T = 40^\circ\text{C}$
Cooler voltage		$V_C$	—	—	1.8	V	$\Delta T = 40^\circ\text{C}$
Thermistor resistance		$R_{TM}$	—	10	—	k $\Omega$	

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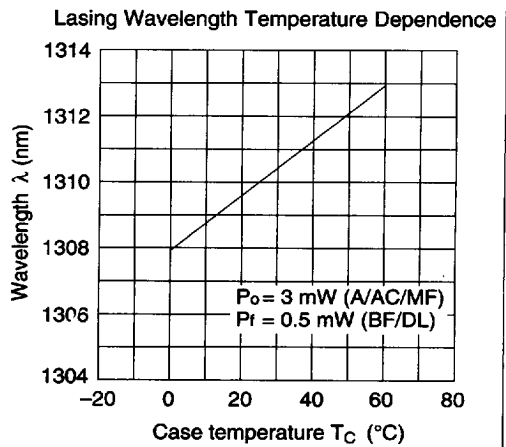
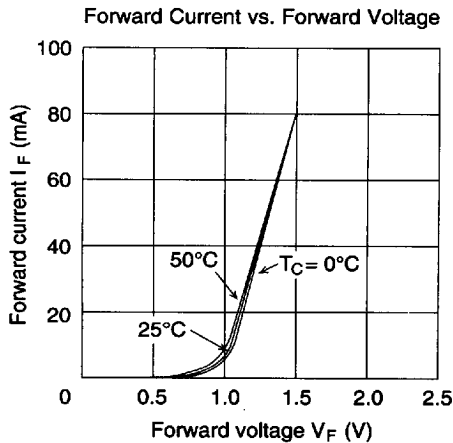
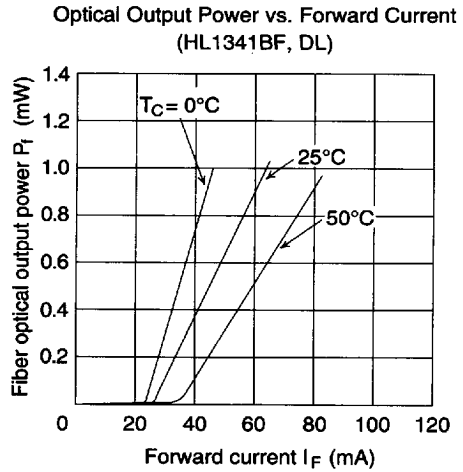
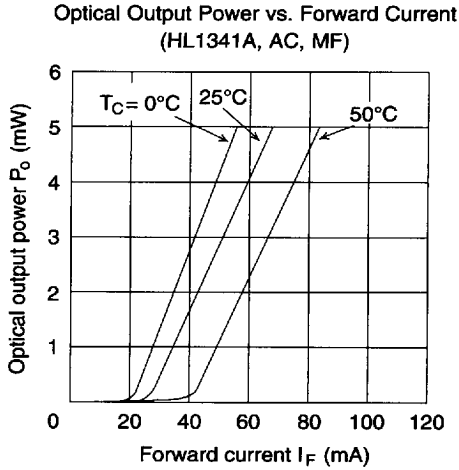
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# HL1341A/AC/MF/BF/DL

## Typical Characteristic Curves



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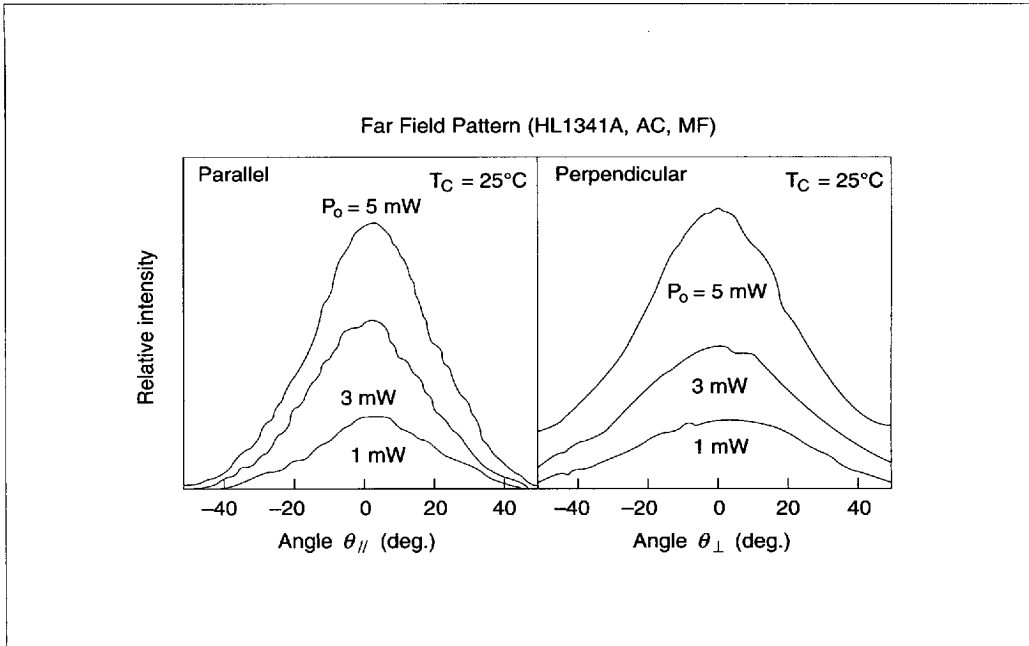
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Typical Characteristic Curves (cont.)

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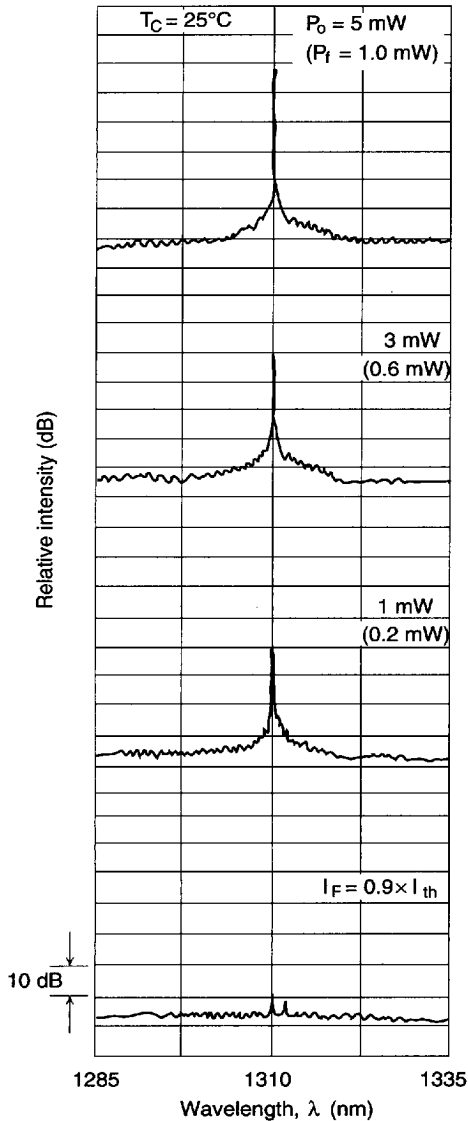
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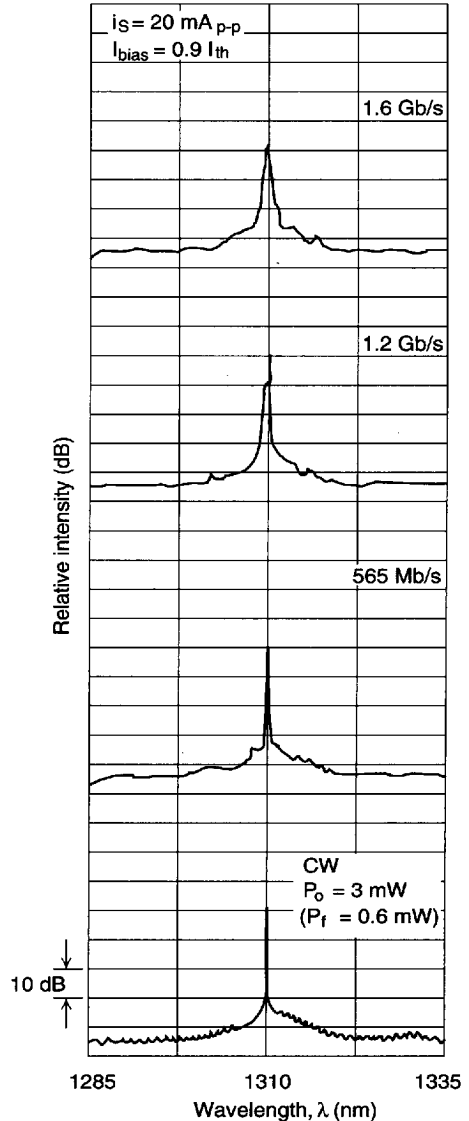
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## Typical Characteristic Curves (cont.)

Output Power Dependence of Lasing Spectrum  
(HL1341BF/DL)



Frequency Dependence of Lasing Spectrum  
(HL1341BF/DL)



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238

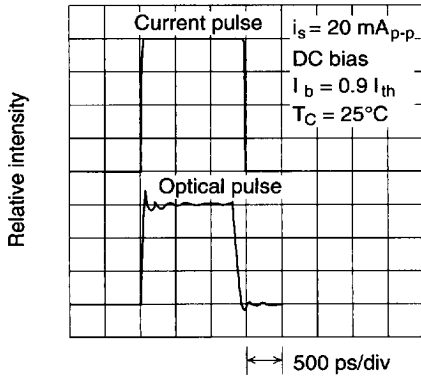
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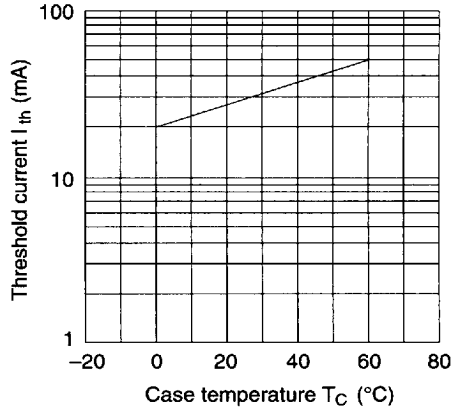
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Typical Characteristic Curves (cont.)

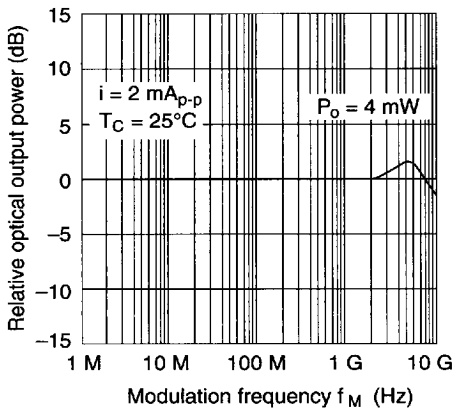
Pulse Response Characteristics (LD)



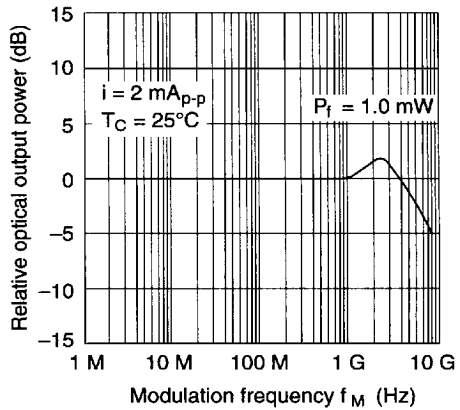
Threshold Current vs. Case Temperature



Frequency Response Characteristics (HL1341A, AC, MF)



Frequency Response Characteristics (HL1341BF)



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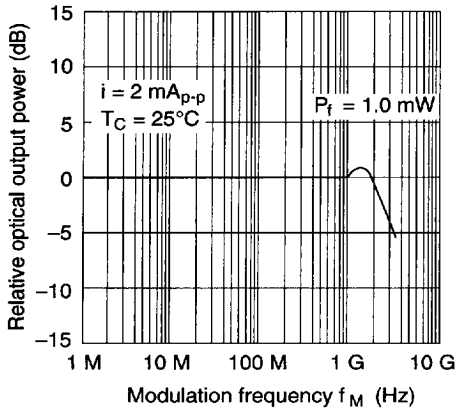
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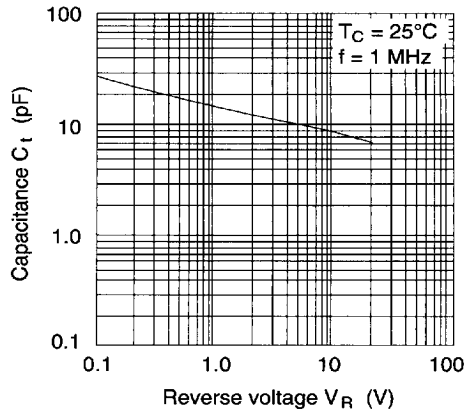
# HL1341A/AC/MF/BF/DL

## Typical Characteristic Curves (cont.)

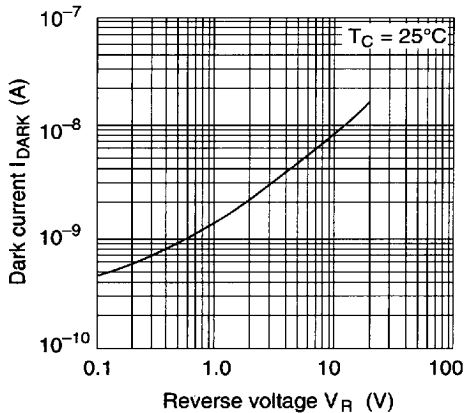
Frequency Response Characteristics  
(HL1341DL)



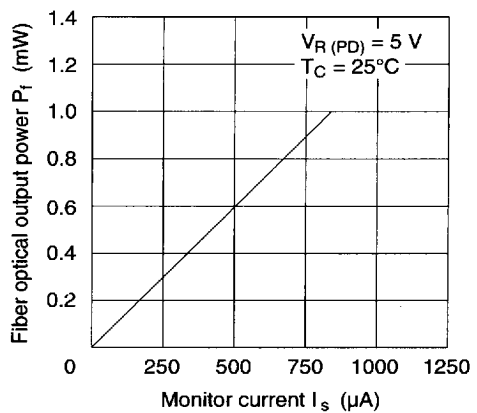
Capacitance vs. Reverse Voltage (PD)  
(HL1341BF, DL)



Dark Current vs. Reverse Voltage  
(HL1341BF, DL)



Fiber Optical Output Power vs. Monitor Current  
(HL1341BF, DL)



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240

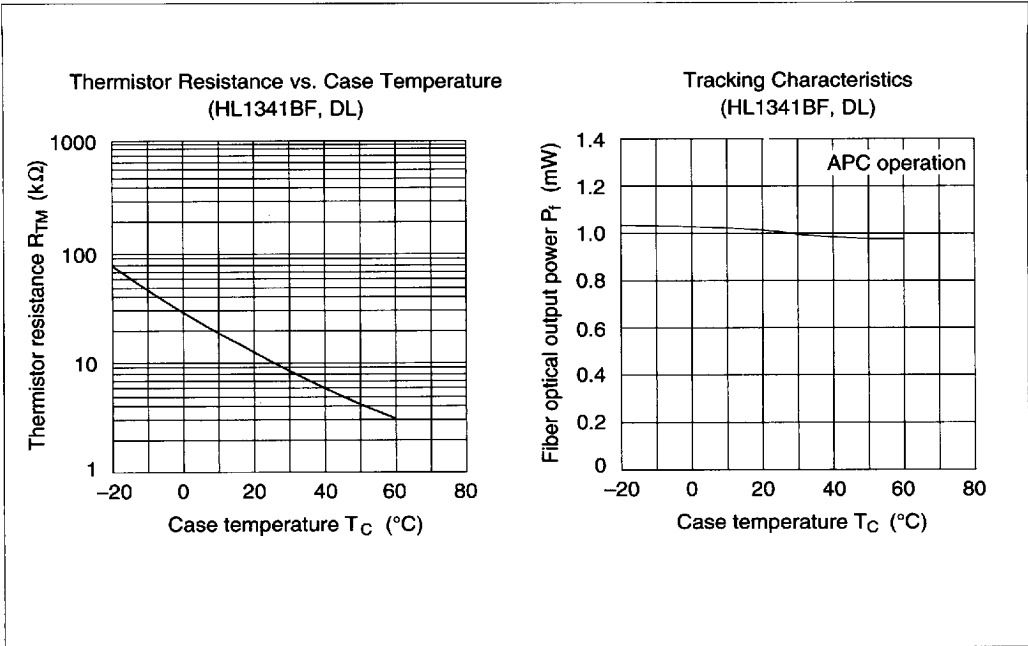
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Typical Characteristic Curves (cont.)



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