

Description

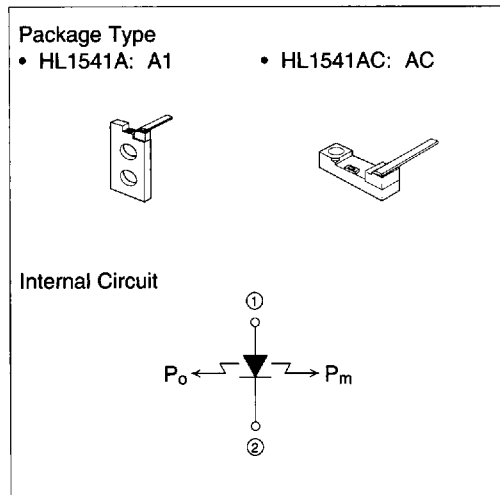
The HL1541A/AC/BF/DL/DM are 1.55 μm band laser diodes.

Features

- The HL1541A/AC are packaged in chip carrier type miniature packages, and are appropriate for incorporating in modules.
- The HL1541BF is packaged in a butterfly-type package with attached fiber optics cable and has a Peltier cooler, and the HL1541DL is packaged in a DIP package with attached fiber optics cable and also has a Peltier cooler. Thus these models provide stable operation.
- The HL1541DM is packaged in a thin form DIP package with attached fiber optics cable, and is appropriate for application miniaturization.
- Wavelength output $\lambda_p = 1530$ to 1570 nm
- Side mode suppression ration S_r : 35 dB (Typ.)
- Fast pulse response: $t_r = 0.2$ ns, $t_f = 0.3$ ns (Typ.)

Fiber Specifications (HL1541BF/DL/DM)

Mode field diameter: 10.0 ± 1.0 μm
 Cutoff wavelength: 1.10 to 1.20 μm
 Core diameter: 10 μm
 Outer diameter: 125 μm
 Jacket diameter: 900 μm
 Fiber length: over 500 mm

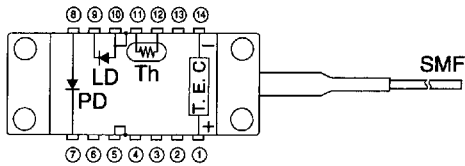


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HL1541A/AC/BF/DL/DM

Pin Connections (Bottom view)

• HL1541BF



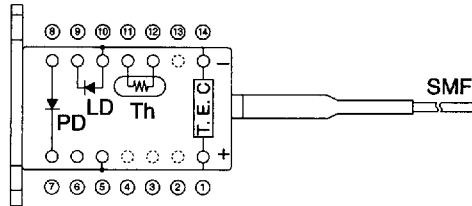
LD: Laser diode
 PD: Photodiode
 Th: Thermistor
 T. E. C.: T. E. cooler
 SMF: Single-mode fiber

- 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

- HL1541BF: BF

• HL1541DL



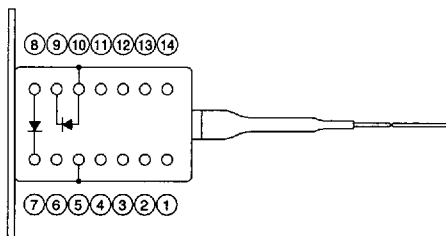
LD: Laser diode
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- ① T.E.C. anode
- ② —
- ③ —
- ④ —
- ⑤ Case
- ⑥ N. C.
- ⑦ PD cathode
- ⑧ PD anode
- ⑨ LD cathode
- ⑩ LD anode (case)
- ⑪ Thermistor
- ⑫ Thermistor
- ⑬ —
- ⑭ T. E. C. cathode

Package Type

- HL1541DL: DL

• HL1541DM



Package Type

- HL1541DM: DM

- ① N. C.
- 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 N. C.
- ⑫ N. C.
- ⑬ N. C.
- ⑭ N. C.

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Part

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

Item		Symbol	Rated Value	Unit
Optical output power	HL1541A/AC	P_O	5	mW
Fiber optical output power	HL1541BF/DL	P_f	1.0	mW
	HL1541DM		1.2	
LD reverse voltage		V_R (LD)	2	V
PD reverse voltage	HL1541BF/DL/DM	V_R (PD)	15	V
PD forward current		I_F (PD)	1	mA
Cooler current	HL1541BF/DL	I_C	1.4	A
Operating temperature	HL1541A/AC/BF/DL	T_{opr}	0 to +60	$^\circ\text{C}$
	HL1541DM		0 to +50	
Storage temperature	HL1541A/AC	T_{stg}	0 to +80	$^\circ\text{C}$
	HL1541BF/DL		-40 to +70	
	HL1541DM		-40 to +60	

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

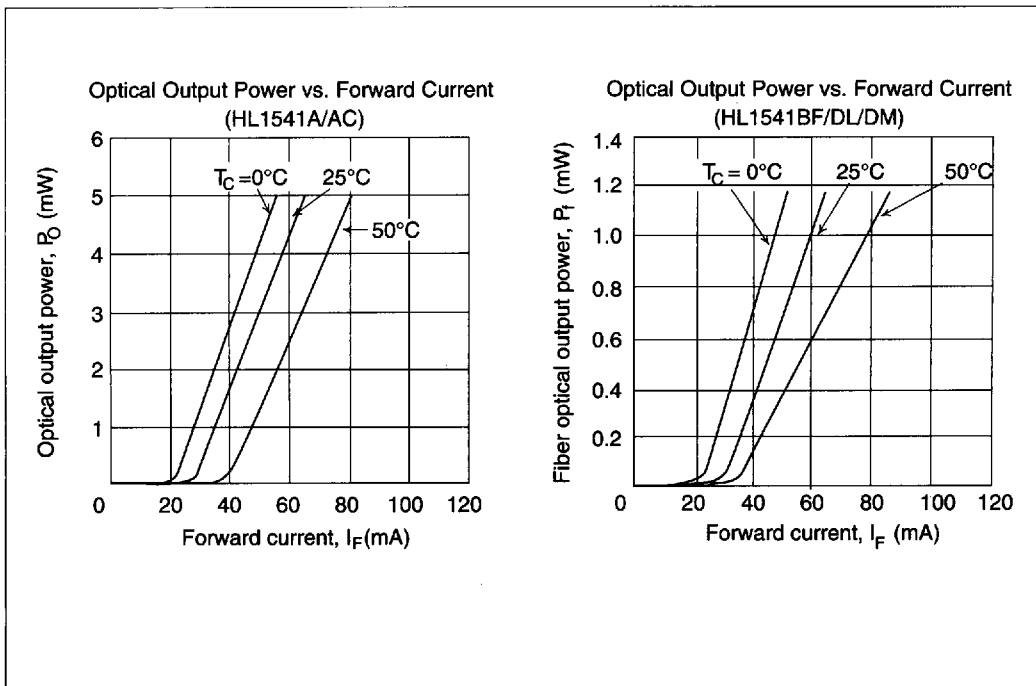
Item		Symbol	Min	Typ	Max	Unit	Test Conditions
Threshold current		I_{th}	—	25	50	mA	
Optical output power	HL1541A/AC	P_O	5	—	—	mW	Kink free
			1.5	—	—		$I_F = I_{th} + 20 \text{ mA}$
Fiber optical output power	HL1541BF/DL	P_f	1.0	—	—	mW	Kink free
			0.3	—	—		$I_F = I_{th} + 20 \text{ mA}$
			1.2	—	—		Kink Free
	HL1541DM		0.3	—	—		$I_F = I_{th} + 20 \text{ mA}$
Monitor output	HL1541A/AC	P_m	0.5	—	—	mW	$I_F = I_{th} + 20 \text{ mA}$
Lasing Wave-length	HL1541A/AC	λ_p	1530	1550	1570	nm	$P_O = 3 \text{ mW}$
	HL1541BF/DL/DM		1530	1550	1570		$P_f = 0.5 \text{ mW}$
Side mode suppression ratio	HL1541A/AC	S_r	30	35	—	dB	$P_O = 3 \text{ mW}$
	HL1541BF/DL/DM		30	35	—		$P_f = 0.5 \text{ mW}$
Beam divergence (parallel)	HL1541A/AC	$\theta_{//}$	—	30	—	deg.	$P_O = 3 \text{ mW}$, FWHM
Beam divergence (perpendicular)	HL1541A/AC	θ_{\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 %

HL1541A/AC/BF/DL/DM

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

Item	Symbol	Min	Typ	Max	Unit	Test Conditions
PD dark current	HL1541BF/DL/DM I_{DARK}	—	—	350	nA	$V_{\text{R (PD)}} = 5 \text{ V}$
Monitor current	HL1541BF/DL/DM I_{S}	50	—	—	μA	$V_{\text{R (PD)}} = 5 \text{ V}$, $P_{\text{O}} = 0.5 \text{ mW}$
PD capacitance	HL1541BF/DL/DM C_{t}	—	10	20	pF	$V_{\text{R (PD)}} = 5 \text{ V}$, $f = 1 \text{ MHz}$
Photosensitivity saturation bias voltage	HL1541BF/DL/DM $V_{\text{R (S)}}$	—	—	2	V	
Cooling capacity	HL1541BF/DL ΔT	40	—	—	$^\circ\text{C}$	$P_{\text{f}} = 0.5 \text{ mW}$, $T_{\text{C}} = 60^\circ\text{C}$
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	—	$\text{k}\Omega$	

Typical Characteristic Curves



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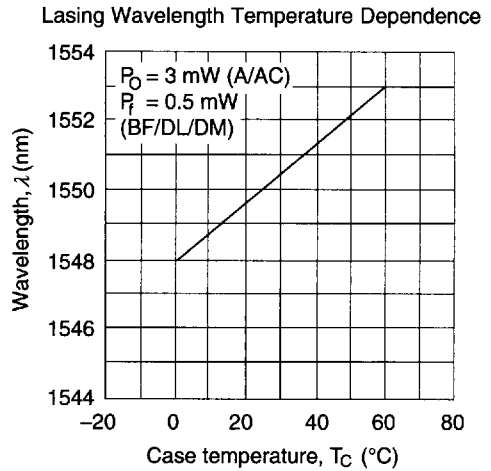
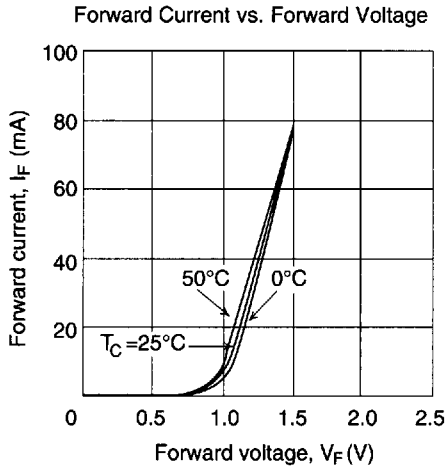
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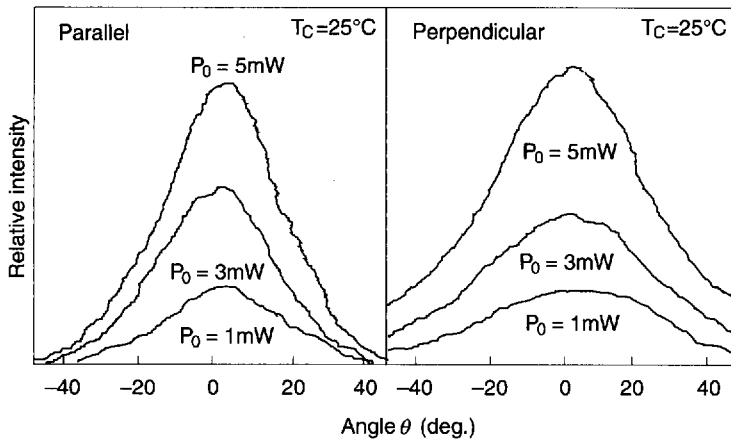
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Typical Characteristic Curves (cont.)



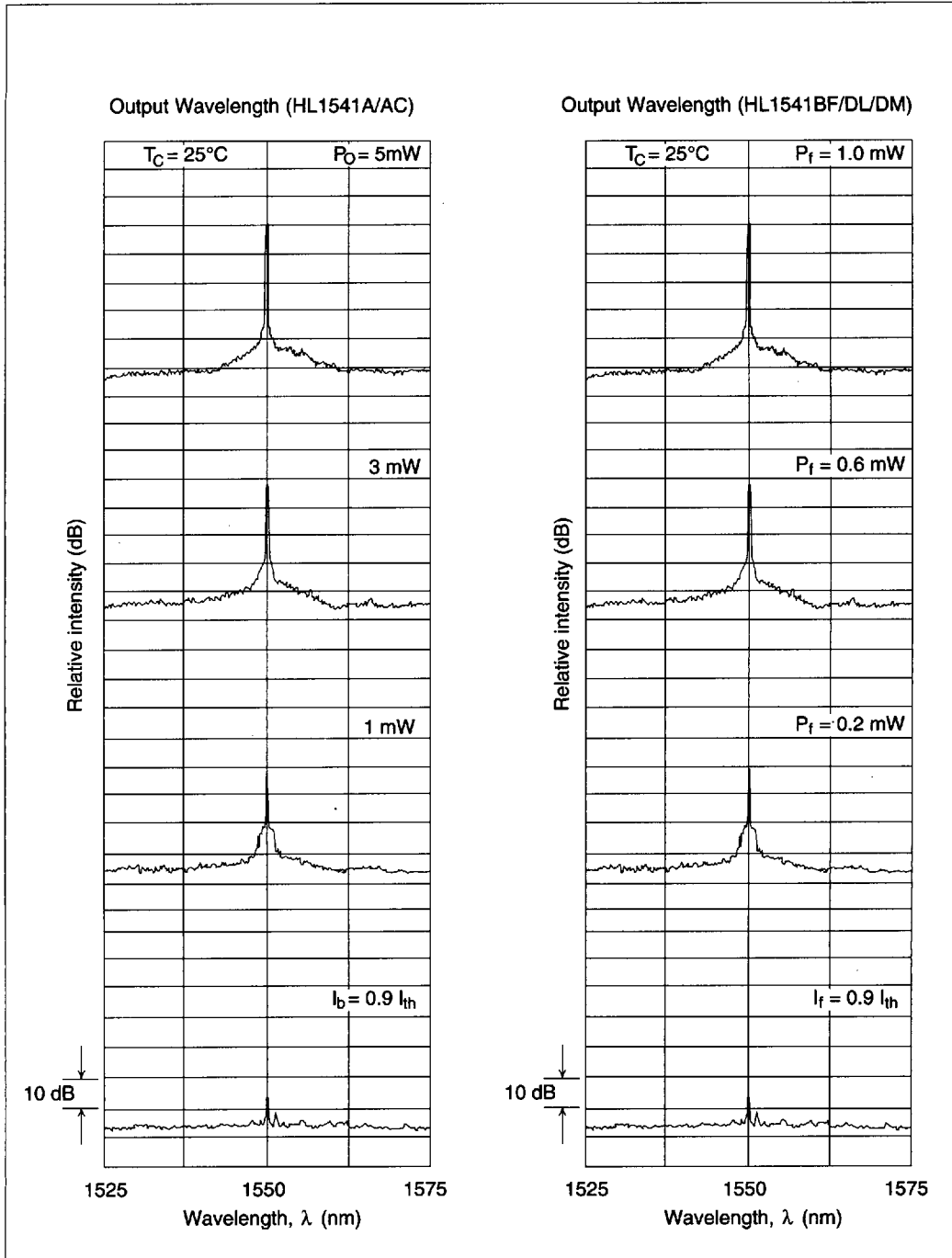
For Field Pattern (HL1541A/AC)



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HL1541A/AC/BF/DL/DM

Typical Characteristic Curves (cont.)



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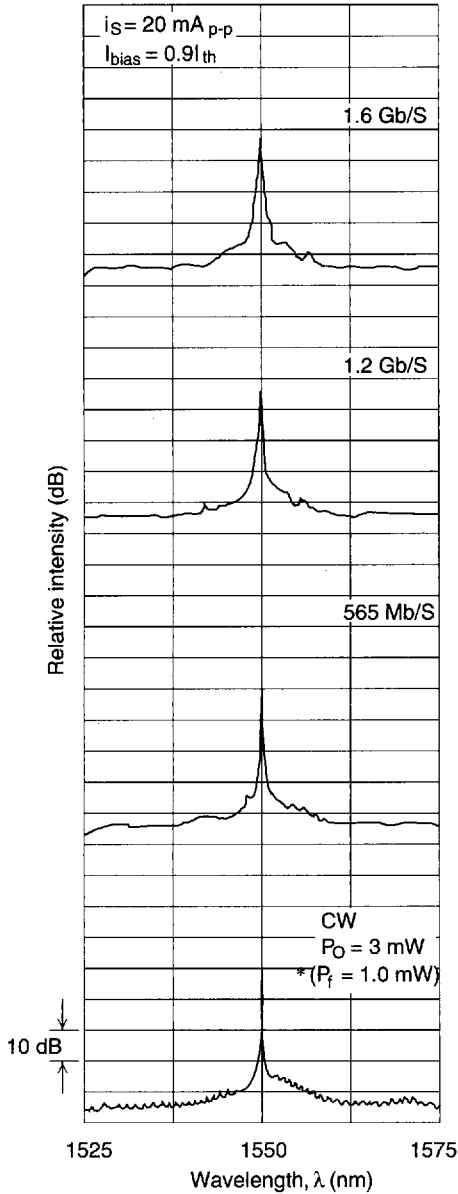
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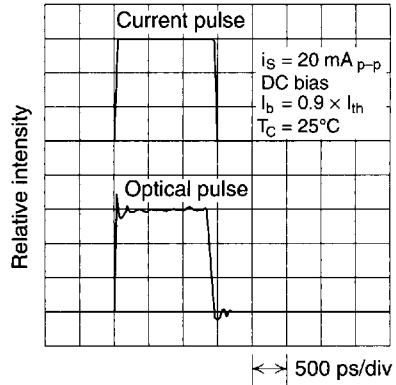
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Typical Characteristic Curves (cont.)

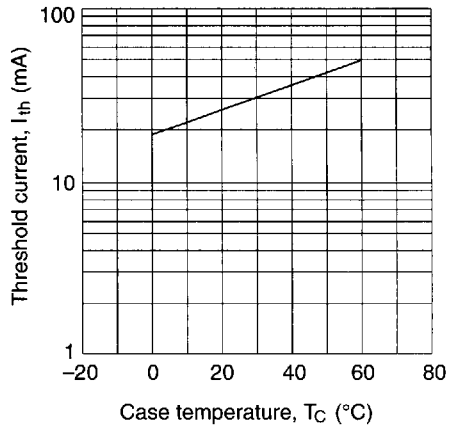
Spectral Frequency Dependence
(*:HL1541BF/DL/DM)



Pulse Response Characteristics



Threshold Current vs. Case Temperature

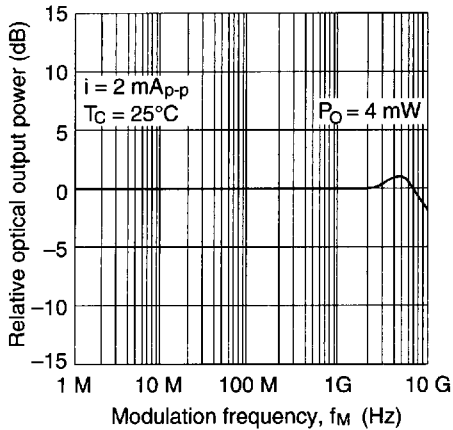


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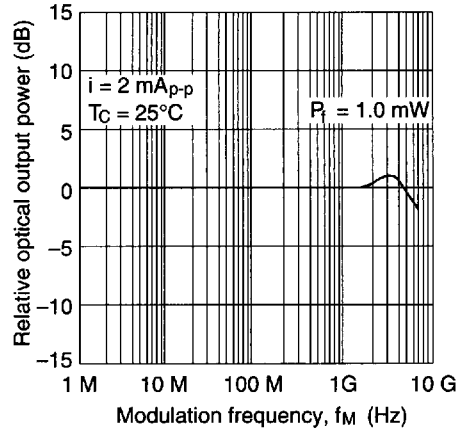
HL1541A/AC/BF/DL/DM

Typical Characteristic Curves (cont.)

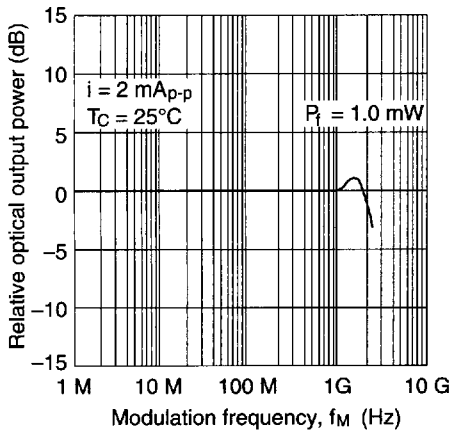
Frequency Response Characteristics
(HL1541A/AC)



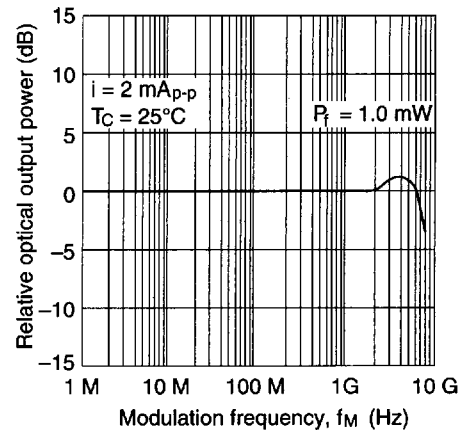
Frequency Response Characteristics
(HL1541BF)



Frequency Response Characteristics
(HL1541DL)



Frequency Response Characteristics
(HL1541DM)



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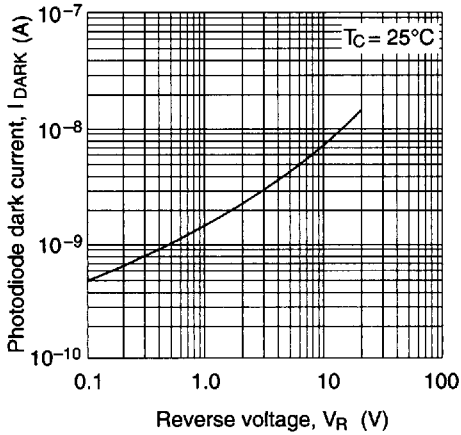
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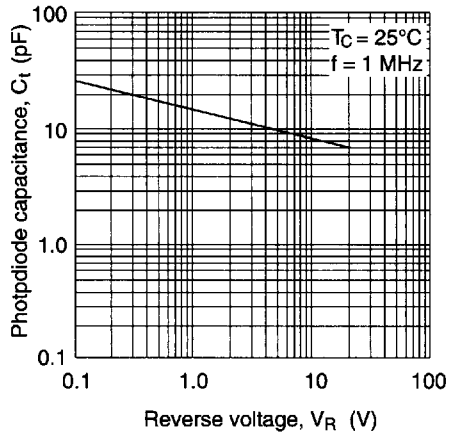
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Typical Characteristic Curves (cont.)

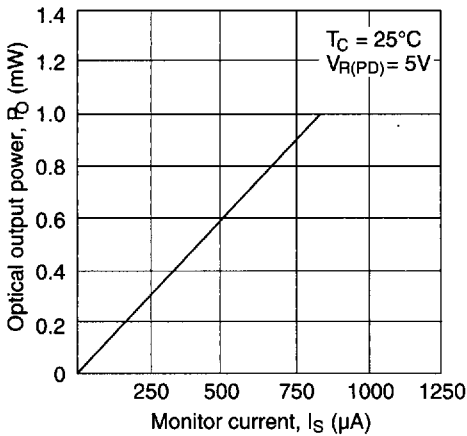
Dark Current vs. Reverse Voltage
(HL1541BF/DL/DM)



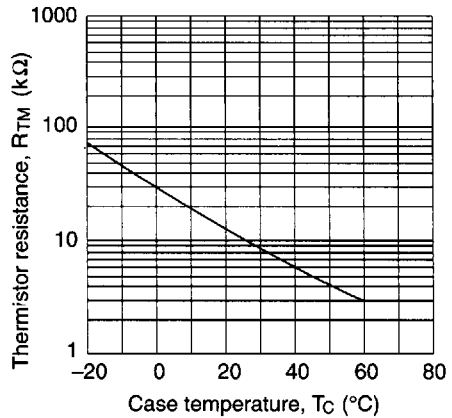
Capacitance vs. Reverse Voltage
(HL1541BF/DL/DM)



Optical Output Power vs. Monitor Current
(HL1541BF/DL/DM)



Thermistor Resistance vs. Case Temperature
(HL1541BF/DL)



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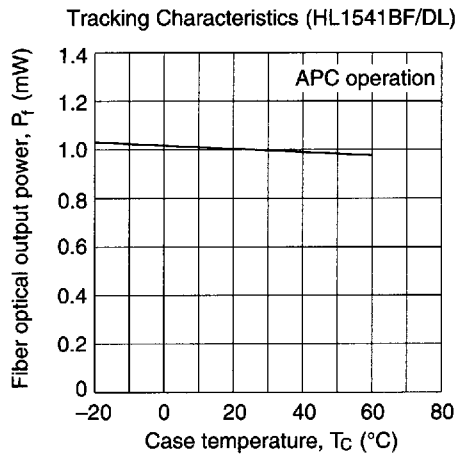
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Typical Characteristic Curves (cont.)



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