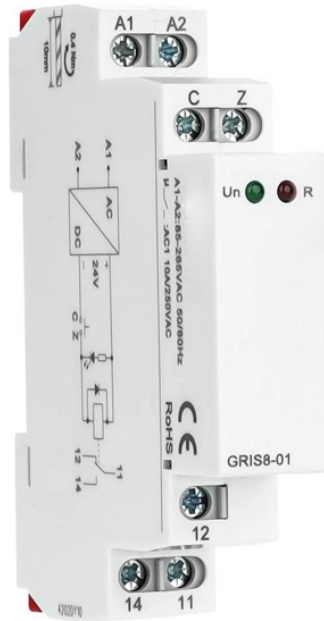


# Advantages of APD fiber optic communication



## Overview

Owing to their high sensitivity, low noise, and fast response, APDs have been widely used in optical communications, lidars, and other sensing technologies. Advantages: Low noise, cost-effective, suitable for short-range applications (e. Avalanche. Despite their numerous benefits, avalanche photodiodes also have some limitations: Temperature dependence: APDs are sensitive to temperature changes, which can affect their performance. Temperature variations can influence the avalanche multiplication factor and lead to increased noise. Here, SNR is  $S/N = \text{Power from the photocurrent/photo detector's power} + \text{Amplifier noise power}$  For. This curve is temperature dependent. APDs belong to a category of photodetectors that can sense incident light signals and convert them into enlarged electrical outputs via avalanche gain.

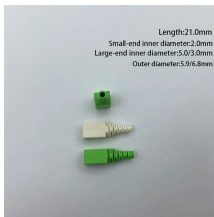
## Advantages of APD fiber optic communication



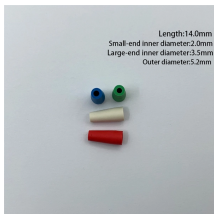
The telecommunications industry represents the largest market segment driving demand for low NEP photodetectors operating at 1550 nm wavelength. Fiber optic communication systems ...



Owing to their high sensitivity, low noise, and fast response, APDs have been widely used in optical communications, lidars, and other sensing ...



Fiber-optic communication systems: APDs are used as receivers in long-haul and high-speed optical communication networks. Their ability to detect low-level light signals makes them ...



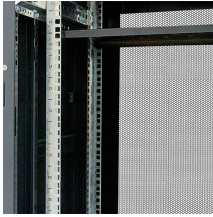
Discover how Avalanche Photo Diodes (APDs) enhance optical transceiver performance in 5G, data centers & PON networks. Learn key benefits & applications.



In fiber-optic communication systems, the light is changed into electrical signals using a single component like avalanche photodiode or APD. In the avalanche process, charge carriers are ...



In the realm of fiber optic communication, photodetectors, or photodiodes play a pivotal role in converting optical signals into electrical data. As a core component of optical transceiver ...



Avalanche photodiodes (APDs) are the photo detector of choice for long-haul fiber optic communication systems because of their high sensitivity and high internal gain.



Fiber Optic Communication: APDs can amplify faint received signals for better data transmission, especially for long-distance communication where light signals become weaker.



Despite these challenges, the advantages of using an APD for a long-haul fiber optic communication system, especially with a weak signal, outweigh the disadvantages, making it a valuable component ...



In the past decade, the performance of APDs for optical fiber communication systems has improved as a result of improvements in materials and the development of advanced device structures. This paper ...



Owing to their high sensitivity, low noise, and fast response, APDs have been widely used in optical communications, lidars, and other sensing technologies. For instance, in self-driving ...

Introduction Working Principle Key Features Applications Particle Physics Research Advantages and Limitations Future Developments Conclusion

Avalanche photodiodes (APDs) are semiconductor devices that are specifically designed to convert light into electrical signals with high speed and sensitivity. These photodiodes are commonly used in a wide range of applications, such as fiber-optic communication systems, LIDAR, medical imaging, and particle physics research. This article provides a... See more on electricity-magnetism

#b\_results li.b\_ans.b\_mop.b\_mopb,#b\_results li.b\_ans.b\_nonfirststopb{border-radius:6px;box-shadow:0 0 0 1px rgba(0,0,0,.05);margin-top:12px;margin-bottom:10px;padding:15px 19px 10px}#b\_results li.b\_ans.b\_mop.b\_mopb .b\_sideBleed{margin-left:-19px;margin-right:-19px}#b\_results .b\_vidAns{border-radius:6px;box-shadow:0 0 0 1px rgba(0,0,0,.05);padding:16px 20px;gap:10px;background:#fff}@charset "UTF-8";#b\_results .b\_ans.b\_vidAns{box-shadow:none!important;padding:var(--smtc-gap-between-content-medium) 0!important;background:var(--bing-smtc-background-ctrl-fade-on-image-stop-0)}#b\_results #serpvidans.vsacf .mc\_vtvc,#b\_results #serpvidans.vsacf .mc\_vtvc\_th,#b\_results #serpvidans.vsacf .cico,#b\_results #serpvidans.vsacf .mc\_vtvc\_htb,#b\_results #serpvidans.vsacf .vrhc,#b\_results #serpvidans.vsacf .vrhcp,#b\_results #serpvidans.vsacf .vrhtc,#b\_results #serpvidans.vsacf .vrhtpc{border-radius:var(--mai-smtc-corner-card-default)}#b\_results #serpvidans.vsacf .mmlist .mc\_vtvc,#b\_results #serpvidans.vsacf .mmlist .mc\_vtvc .mc\_vtvc\_meta{margin:0}#b\_results #serpvidans.vsacf .mmlist .mc\_vtvc .mc\_vtvc\_meta .mc\_vtvc\_meta\_channel,#b\_results #serpvidans.vsacf .mmlist .mc\_vtvc .mc\_vtvc\_meta .mc\_vtvc\_meta\_row\_channel{color:var(--smtc-foreground-content-neutral-primary)}#serpvidans.vsacf,#serpvidans.vsacf .expctn .expbody,#serpvidans.vsacf .mmlist{display:flex;flex-direction:column;gap:var(--smtc-gap-between-content-medium)}#serpvidans.vsacf .cico{height:auto}#serpvidans.vsacf .mc\_vtvc\_ban\_lo{top:0;right:auto}#serpvidans.vsacf .mc\_cwvc .mc\_vtvc .mc\_vtvc\_meta,#serpvidans.vsacf .mmlist .mc\_vtvc .mc\_vtvc\_meta{height:auto;padding:var(--smtc-gap-between-content-xx-small) 0 var(--smtc-gap-between-content-xx-small) var(--smtc-gap-between-content-medium);display:flex;flex-direction:column;justify-content:space-between}#serpvidans.vsacf .mc\_cwvc .mc\_vtvc .mc\_vtvc\_meta .mc\_vtvc\_title,#serpvidans.vsacf .mmlist .mc\_vtvc .mc\_vtvc\_meta .mc\_vtvc\_title{color:var(--smtc-ctrl-link-foreground-brand-rest);font:var(--bing-smtc-text-global-body2);height:auto;display:-webkit-box;-webkit-line-clamp:2;-webkit-box-orient:vertical}#serpvidans.vsacf .mc\_cwvc .mc\_vtvc .mc\_vtvc\_meta .mc\_vtvc\_meta\_block\_area,#serpvidans.vsacf .mc\_cwvc .mc\_vtvc .mc\_vtvc\_meta .mc\_vtvc\_meta\_block,#serpvidans.vsacf .mmlist .mc\_vtvc .mc\_vtvc\_meta .mc\_vtvc\_meta\_block\_area,#serpvidans.vsacf .mmlist .mc\_vtvc .mc\_vtvc\_meta .mc\_vtvc\_meta\_block{display:flex;flex-direction:column;gap:var(--smtc-padding-ctrl-text-side)}#serpvidans.vsacf .mc\_cwvc .mc\_vtvc .mc\_vtvc\_meta .mc\_vtvc\_meta\_block\_area .mc\_vtvc\_meta\_row,#serpvidans.vsacf .mc\_cwvc .mc\_vtvc .mc\_vtvc\_meta .mc\_vtvc\_meta\_block .mc\_vtvc\_meta\_row,#serpvidans.vsacf .mmlist .mc\_vtvc .mc\_vtvc\_meta .mc\_vtvc\_meta\_block .mc\_vtvc\_meta\_row,#serpvidans.vsacf .mmlist .mc\_vtvc .mc\_vtvc\_meta .mc\_vtvc\_meta\_block .mc\_vtvc\_meta\_row{color:var(--

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.mc_vtvc_meta .mc_vtvc_meta_block_area .mc_vtvc_meta_row
.mc_vtvc_meta_row_channel::before,#serpvidans.vsacf .mmlist .mc_vtvc
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.mc_vtvc_meta_row_channel::before{content:" · "}#serpvidans.vsacf .mc_cwvc
.mc_vtvc .mc_vtvc_meta .mc_vtvc_meta_block_area
.mc_vtvc_meta_pubdate,#serpvidans.vsacf .mc_cwvc .mc_vtvc .mc_vtvc_meta
.mc_vtvc_meta_block .mc_vtvc_meta_pubdate,#serpvidans.vsacf .mmlist .mc_vtvc
.mc_vtvc_meta .mc_vtvc_meta_block_area
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.expbody>#ans_ss_dlg+.b_title{display:block}.vsacf .b_title{padding-left:0}.vsacf
.b_title .mmtitle{font:var(--bing-smtc-text-global-subtitle1-strong);margin-
bottom:0}.vsacf .b_title .mmtitle a::after{content:"";margin:5px 5px 0 0;border-
top:2px solid var(--smtc-foreground-content-neutral-primary);border-right:2px solid
var(--smtc-foreground-content-neutral-primary);background-size:7px 7px;width:7px;h
eight:7px;transform:rotate(45deg);display:inline-block;margin-
left:4px}#serpvidans.vsacf .b_title .mmtitle{margin-bottom:0}#serpvidans.vsacf
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primary)}#serpvidans.vsacf .cardless.mmlist .mc_vtvc_con_rc,#serpvidans.vsacf
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.vsb_tr_c.va_tt{margin:0}#serpvidans.vsacf .vtbc .mv_vtvc_play,#serpvidans.vsacf
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nsionBtnText{font:var(--bing-smtc-text-global-caption1-strong);color:var(--bing-smtc-
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.mc_vtvc_meta_channel{color:#111}#b_results .b_ans.b_vidAns .mmlist .mc_vtvc
.mc_vtvc_meta .mc_vtvc_meta_row_channel,#b_results .b_ans.b_vidAns .mmlist
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top: -0px; } .mmlist .mc_vtvc .mc_vtvc_title { height: 44px; line-height: 22px; margin-
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height: 40px; } .mmlist .mc_vtvc .vtmu, .mmlist .mc_vtvc .vtpl { bottom: 120px; }
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rest);line-height:0;margin:0;position:relative;border-radius:6px;overflow:hidden}.mc_
vtvc.noshadow{box-shadow:none}.mc_vtvc_con_rc{border-radius:6px;overflow:hidde-
n;position:relative}.mc_vtvc>a{color:#71777d;display:block;text-

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decoration:none;width:100%}.mc_vtvc>a:focus-visible::after{outline:2px solid var(--s
mtc-ctrl-focus-outer-stroke);width:100%;height:100%;content:";outline-offset:-2px;po
sition:absolute;top:0;left:0}.mc_vtvc_th{background-
color:#d5d5d5;position:relative}.mc_vtvc_th .cico{border-radius:0}.mc_vtvc_ban_lo,.
mc_vtvc_ban_up{position:absolute;vertical-align:middle}.mc_vtvc_ban_lo{bottom:0}.
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n:absolute;display:inline-block;z-index:1}.mc_vtvc_act_sep{border-top:1px solid
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ottom:0;left:0;right:0}.mc_vtvc_ht{width:100%;padding:0 16px;line-height:16px;colo
r:#fff;text-decoration:underline;word-break:break-word;box-sizing:border-box;vertical
-align:middle;text-align:center}.mc-vtvc_th_live_b{background-
color:#c80000;color:#fff;display:inline-block;padding:2px 8px;font:11px/14px Arial;b
order-radius:2px;text-transform:uppercase;height:15px;width:26px;position:absolute;
left:8px;top:110px}.isvctrl .isv .mc_vtvc_ban_up{left:0;right:initial}.mc_vtvc_ban_lo,.
mc_vtvc_ban_up{right:0}.vt_text.b_lRight .b_lLeft{margin:0 0 0 1px;height:14px;line-
height:14px;padding:2px 8px;background:rgba(0,0,0,.75);border-radius:2px;font-weig
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.vtpl{bottom:163px}.vsarf .mc_vtvc .vtmu,.vsarf .mc_vtvc .vtpl{bottom:122px}.svarh
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%3D%22none%22%20xmlns%3D%22http%3A%2F%2F%2F2000%2Fsvg%22%3E%0D
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209.62986%2012%2010.3524%2012%2011.4997V20.5C12%2021.6472%2013.2355

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D%22white%22%20fill-
opacity%3D%220.9%22%2F%3E%0D%0A%3C%2Fsvg%3E)}.mmlist
.mc_vtvc{margin:10px 1px 0}.mmlist .mc_vtvc_con_rc{display:flex}.cardless .mmlist
.mc_vtvc_con_rc{height:112px}.mmlist .mc_vtvc .mc_vtvc_meta{display:flex;flex-
direction:column;justify-content:space-between;margin:0 10px 4px
12px;padding:0}.mmlist .mc_vtvc_title{font-weight:400;font-size:16px;height:44px;li
ne-height:22px;margin-bottom:0;margin-top:0;color:unset}.mmlist
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.mc_vtvc_meta_block_area{height:unset}.mmlist .mc_vtvc .vtmu,.mmlist .mc_vtvc
.vtpl{bottom:8px}.cardless .mmlist .mc_vtvc{box-shadow:none}.cardless.mmlist
.mc_vtvc_center_play{width:32px;height:32px}.cardless.mmlist .mc_vtvc_title{font-
size:16px;color:unset}.cardless.mmlist .mc_vtvc_meta_row{line-
height:20px}.cardless.mmlist .mc_vtvc_meta_pubdate{padding-
bottom:2px;color:#666}.cardless.mmlist .mc_vtvc_th,.cardless.mmlist .mc_vtvc_th
.cico,.cardless.mmlist .mc_vtvc_th div.rms_img{border-radius:6px}.cardless.mmlist
.mc_vtvc_th{height:111px}.cardless.mmlist .mc_vtvc_htc{border-radius:6px;overflow
:hidden}#serpvidans.vasac.cardless{box-shadow:none}.cardless.mmlist
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weight:normal}.mmlist .mc_vtvc: hover .mc_vtvc_title{text-decoration:underline}.mc_
vtvc_meta{box-sizing:border-box;display:inline-block;line-height:18px;position:relativ
e;width:100%}.mc_vtvc_meta_block{bottom:0;position:absolute;width:100%}.mc_vtvc
c_meta_row{line-height:16px;font-size:11px;height:17px;overflow:hidden;text-
overflow:ellipsis;white-space:nowrap}.mc_vtvc_meta_row a{display:inline-
block}.mc_vtvc_meta_row a: hover{text-decoration:underline}.mc_vtvc_meta_block_a
rea{position:relative}.mc_vtvc_meta_block,.mc_vtvc_meta_block
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h-of-type(n+2)::before{content:" · "}.mc_vtvc_meta_row
.mc_vtvc_meta_row_channel::before{content:" > "}.mc_vtvc_kmt_title{line-height:18p
x;padding-bottom:4px;font-weight:bold;color:#00809d;text-transform:uppercase;font-
size:11px}.mc_vtvc_kmt,.mc_vtvc_con_rc.onhov .wkmt
.mc_vtvc_meta_row,.mc_vtvc_con_rc.onhov .wkmt
.tibc_tt{display:none}.mc_vtvc_con_rc.onhov .wkmt .mc_vtvc_title{max-
height:18px;margin-bottom:18px;overflow:hidden}.mc_vtvc_con_rc.onhov.mmsts
.mc_vtvc_title{visibility:hidden}.mc_vtvc_con_rc.onhov
.mc_vtvc_kmt{display:block}.mc_vtvc_kmt_content .b_factrow{line-height:17px;font-
size:11px;max-height:34px;overflow:hidden;text-overflow:ellipsis;padding:0 16px 0
0;color:#444}.mc_vtvc_meta .mc_vtvc_kmt_title{line-height:18px}.mc_vtvc_title:hov
er{text-decoration:none}.mc_vtvc_meta_pubdate{color:#444;padding-bottom:3px}.
mc_vtvc_meta_channel{color:#444}.mc_vtvc_meta_w,.mc_vplvc_meta_w{position:rel
ative}.mc_vtvc_meta_bg_w,.mc_vplvc_meta_bg_w{height:100%;width:100%;overflo
w:hidden;position:absolute;top:0}.mc_vtvc_meta_bg_w .cico,.mc_vplvc_meta_bg_w
.cico{border-radius:0;overflow:visible}.dg_u .mm_vidch_th_c{overflow:visible}.dg_u
.mm_vidch_th_bg_img{margin-
top:-20px}.emptyStyleForDebuggingPurpose{top:0}.mc_vtvc_meta_w
.mc_vtvc_meta{background:rgba(255,255,255,.75)}.mc_vtvc_meta_bg_w

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img,.mc_vtvc_meta_bg_w .mc_vtvc_cb_w{filter:blur(25px);transform:scale(1.2)}body
{--video-metadata-channel-color:#3c3c3c}body.b_dark{--video-metadata-channel-
color:unset}.vsarf .mc_vtvc_meta_pubdate{color:unset}.vsarf
.mc_vtvc_meta_channel{color:var(--video-metadata-channel-color)}.vsarf .mc_vtvc
.mc_vtvc_meta_w .mc_vtvc_title,.vsarf .mc_vtvc .mc_vtvc_meta_w .mc_vtvc_title
strong{font-weight:bold}.vsarf .mc_vtvc_meta_w .mc_vtvc_meta_row{font-
size:13px}.emptyStyleForDebuggingPurpose{top:0}.vsarf .mc_vtvc_th .cico{height:1
32px}.emptyStyleForDebuggingPurpose{top:0}.emptyStyleForDebuggingPurpose{to
p:0}.emptyStyleForDebuggingPurpose{top:0}.emptyStyleForDebuggingPurpose{top:0
}.emptyStyleForDebuggingPurpose{top:0}.emptyStyleForDebuggingPurpose{top:0
}.emptyStyleForDebuggingPurpose{top:0}.vtbc .mv_vtvc_play{display:inline-block;p
osition:absolute;bottom:8px;left:9px;height:8px;width:7px;background:url(data:imag
e/png;base64,iVBORw0KGgoAAAANSUgAAUgAAAAcAAAAIBAMAAADHKvg1AAAAIVBMVE
X//////////9/gMdvAAAACnRSTIMAETNEVWalmbvuo4D1oAAAAB9JR
EFUCB1jmMoABKuaQcSqQhCxKgFGgLhNQIkpQAwA8zkLyQAI6F0AAAASUVORK5CYII=
)}.vtbc .mv_vtvc_play_ext{background:url(/rp/Lp38sn_O4jegSK0IHxZVxyp-yKQ.png)
-172px -31px;display:inline-
block;height:8px;width:12px;position:absolute;bottom:8px;left:6px}.vtbc .pivot{heigh
t:20px;width:8px;min-width:8px}.mc_bc_w{height:18px;padding:8px;text-
align:right}.mc_bc{background-color:rgba(0,0,0,.75);padding:2px 8px;line-height:14p
x;color:#fff;display:inline-block;vertical-align:middle;border-radius:2px;font-
weight:bold}.mc_bc_w .pivot{text-align:center;margin-right:1px;height:14px}.vsarr
.mmgrid .mc_bc_w .mc_bc{background-color:rgba(0,0,0,.75);opacity:1}.mmsi{height
:16px;width:16px;position:relative;top:5px;padding-right:var(--smtc-gap-between-con
tent-xx-small)}.mmsi-microsoftnews,.mmsi-msn{top:3px}.vrhdata{display:none}.m
mgrid>div{width:197px;display:inline-block;margin-right:8px;margin-bottom:8px;box-
shadow:0 0 0 1px rgba(0,0,0,.05);position:relative;vertical-
align:top;overflow:hidden;white-space:normal;border-radius:6px}.vsarr
.mmgrid>div,.vsarr1stbig .mmgrid>div{margin-right:8px;margin-
bottom:8px}#serpvidansrr .mc_vtvc .mc_vtvc_meta{height:auto}#serpvidansrr
.mc_vtvc .mc_vtvc_title{display:-webkit-box;-webkit-line-clamp:2;-webkit-box-
orient:vertical}.mmgrid .mc_tc{border:0}.vsa .mmgrid>div:nth-child(3n){margin-
right:0}.vsa .b_moreLink{padding-top:4px}#serpvidansrr .mc_vtvc_meta_row{line-
height:18px;font-size:100%;height:17px}.vsarr .mmgrid>div:nth-child(2n){margin-
right:0}#serpvidansrr .mc_vtvc .vtmu,#serpvidansrr .mc_vtvc
.vtpl{bottom:128px}.vsarr1stbig .mmgrid>div:nth-child(2){margin-
right:0}#serpvidansrr.uipolish .mc_vtvc_meta_pubdate,#serpvidansrr.uipolish
.mc_vtvc_meta_channel,#serpvidansrr.uipolish #vidans2 .b_videocard
.video_metadata .video_source{color:#767676}#serpvidansrr #vidans2 .b_videocard
.video_metadata_container,#serpvidansrr #vidans2 .b_videocard
.video_metadata_container .video_metadata>h3{width:100%}@media(max-
width:1362.9px){#serpvidansrr
.mmgrid>div{width:168px;height:206px}#serpvidansrr .mmgrid>div
.cico,#serpvidansrr .mmgrid>div .cico
.rms_img{width:168px;height:100px}#serpvidansrr .mc_vtvc
.mc_vtvc_meta{padding:12px}#serpvidansrr .mc_vtvc
.mc_vtvc_title{height:32px;line-height:16px;margin-bottom:16px}#serpvidansrr

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.mc_vtvc .mc_vtvc_meta_block_area{height:34px}#serpvidansrr
.mc_vtvc_meta_row{line-height:15px;font-size:13px;height:15px}#serpvidansrr
.mc_vtvc_meta_pubdate{padding-bottom:4px}#serpvidansrr .mc_vtvc
.vtmu,#serpvidansrr .mc_vtvc .vtpl{bottom:114px}#serpvidansrr #vidans2
.b_videocard .videoPlayer,#serpvidansrr #vidans2 .b_videocard .videoPlayer
.cico,#serpvidansrr #vidans2 .b_videocard .videoPlayer .cico .rms_img{width:343px!i
mportant;height:194px!important;margin-right:0}}@media(max-
width:1274.9px){#serpvidansrr
.mmgrid>div{width:124px;height:164px}#serpvidansrr .mmgrid>div
.cico,#serpvidansrr .mmgrid>div .cico
.rms_img{width:124px;height:76px}#serpvidansrr .mc_vtvc
.mc_vtvc_meta{padding:8px}#serpvidansrr .mc_vtvc .mc_vtvc_title{height:32px;line-
height:16px;margin-bottom:12px}#serpvidansrr .mc_vtvc
.mc_vtvc_meta_block_area{height:28px}#serpvidansrr .mc_vtvc_meta_row{line-
height:13px;font-size:11px;height:13px}#serpvidansrr
.mc_vtvc_meta_pubdate{padding-bottom:2px}#serpvidansrr .mc_vtvc
.vtmu,#serpvidansrr .mc_vtvc .vtpl{bottom:96px}#serpvidansrr #vidans2
.b_videocard .videoPlayer,#serpvidansrr #vidans2 .b_videocard .videoPlayer
.cico,#serpvidansrr #vidans2 .b_videocard .videoPlayer .cico .rms_img{width:256px!i
mportant;height:144px!important;margin-right:0}#serpvidansrr .maskthumb
.mc_bc_w{padding:8px 4px 4px 8px}}#serpvidansrr.withsplitline .mmgrid>div:nth-
last-child(1),#serpvidansrr.withsplitline .mmgrid>div:nth-last-child(2){margin-
bottom:24px}#serpvidansrr.withsplitline .mmgrid{border-bottom:1px solid
#ecec;#margin-bottom:16px}#serpvidansrr #vidans2 .b_videocard
.video_metadata{max-width:auto;padding:12px 16px}#serpvidansrr #vidans2
.b_videocard{margin-bottom:12px;box-shadow:0 0 1px rgba(0,0,0,.05),0 2px 3px
rgba(0,0,0,.1);border-radius:6px}#serpvidansrr .b_rich{padding-top:0}#serpvidansrr
#vidans2 .videoPlayer{border-radius:6px 6px 0 0;overflow:hidden}#serpvidansrr
#vidans2 .b_videocard .video_metadata>h3{white-space:nowrap;overflow:hidden;te
xt-overflow:ellipsis;-webkit-line-clamp:1;line-height:15px;height:15px;font-size:13px;c
olor:#000;margin-bottom:20px;font-family:var(--bing-smtc-text-style-default-regular-
font-family);font-style:normal;display:block}#serpvidansrr.vsarr1stbig #vidans2
.b_videocard .video_metadata .actionmenu{display:none}#serpvidansrr #vidans2
.b_videocard .video_summary,#serpvidansrr #vidans2 .b_videocard
.video_source{line-height:15px}#serpvidansrr #vidans2 .b_videocard .videoPlayer
.vtbc{right:0}.vrhc line.nhvpv .pffvi,.vrhc line.nhvpv[data-tps="S"] .pffvt,.vrhc
line.nhvpv[data-tps="M"] .pffvt,.vrhc line.nhvpv[data-tps="L"] .pffvt{display:inline-
flex}.vrhc line.nhvpv .vrhvc.pffv .vrhol{display:none}.vrhc line.nhvpv .vrhvc.pffv .play
er_ol{background:var(--mai-smtc-background-ctrl-on-image-
hover);transition:background-color .5s;display:flex;align-items:center;justify-content:c
enter;padding:var(--smtc-gap-between-content-x-small);gap:var(--smtc-gap-between-
content-x-small);box-sizing:border-box}.mc_vtvc_th img{transition:all var(--smtc-
duration-medium-01) var(--bing-smtc-animation-ease-default)}.nhvpv+.mc_vtvc_th i
mg{transform:scale(1.1)}.smtplayerhtml5{height:100%;width:100%;overflow:hidden
}.smtplayerhtml5 video{min-height:100%;min-width:100%}.smtplayerhtml5 .videopl
aying{background-color:#000}.smtplayerhtml5.hide{display:none}.pffvt{display:no
ne;color:var(--mai-smtc-foreground-ctrl-on-image-rest);font:var(--bing-smtc-text-

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global-subtitle2-strong)}.pffvi{mask:url(/rp/ui07wU6K7FR_inzG7DRbP1i8fGo.svg)
center no-repeat;mask-size:12px;background:var(--bing-smtc-background-card-on-im
age-default);width:20px;height:20px;flex-shrink:0;align-self:flex-start}[data-tps="L"]
.pffvt{font:var(--bing-smtc-text-global-subtitle2-strong)}[data-tps="L"]
.pffvi{width:22px;height:22px;mask-size:16px}[data-tps="S"] .pffvt{font-
size:0}[data-tps="S"] .pffvi{width:24px;height:24px;mask-size:24px;align-
self:center}.hvpv.h5s .pffvt{display:inline-flex}.hvpv.h5s .vrhtc.pffv
.vrhol{display:none}.hvpv.h5s .vrhtc.pffv .player_ol{background:var(--mai-smtc-
background-ctrl-on-image-hover);transition:background-color .5s;display:flex;align-ite
ms:center;justify-content:center;padding:var(--smtc-gap-between-content-x-small);ga
p:var(--smtc-gap-between-content-x-small);box-sizing:border-box}.pffvt{text-
decoration:underline}.vrhcp .vrhol{position:absolute;width:100%;height:35px;max-h
eight:35px;bottom:0;left:0;padding:0;background:none;display:block;z-
index:9}.vrhcp .vrhol.hide,.vrhcp .vrhol .hide{display:none}.vrhot{white-space:nowra
p;text-overflow:ellipsis;overflow:hidden;display:inline-block;position:absolute;max-wid
th:240px;height:18px;line-height:14px;margin-left:8px;top:10px;left:0;right:0;border-
radius:2px;padding-right:8px}.vrhot div{display:inline-block}.vrhot nt{color:#fff;font-
size:11px;font-weight:bold;background-color:rgba(0,0,0,.75);padding:2px 8px;margin-
left:0;top:0;box-sizing:border-box;position:relative}.vrhc .ricons{position:absolute;rig
ht:8px;top:10px;left:auto;bottom:auto;height:18px;display:inline-
block;cursor:pointer}.vrhol.icons_1 .vrhot{margin-right:27px}.vrhol.icons_2
.vrhot{margin-right:49px}.vrhol.icons_3 .vrhot{margin-right:79px}.vrhol .vrhot
nt,.vsb_tr_chd .vrhol.icons_1 .vrhot{margin-
right:0}.vpb{position:absolute;display:block;bottom:0;left:0;height:4px}.vpb
div{position:absolute}.vpb nt{width:0;background:#fff}.vpb
nt.test{display:none}.vpb.back{background-color:#999}.vrhcp
.vrhol.npb{height:36px;max-height:36px}.vrhol .vadda{width:22px;height:18px;padd
ing:0;margin-right:0;margin-left:2px;bottom:0;position:relative;display:inline-block;z-
index:1;background:rgba(0,0,0,.75);border-radius:2px;overflow:hidden}.vrhol
.vadda.hide{display:none}.vrhol .vadda .mc_vfaa{margin:3px 5px}.ricons
.vol{float:left}.ricons .adultFlag{float:right}.vol{width:22px;height:18px;bottom:0;m
argin-left:1px;margin-right:1px;position:relative;display:inline-block}.vol.hide,.vol
.hide{display:none}.vol .bg{background:rgba(0,0,0,.75);border-
radius:2px}.vol.bg,.vol nt{position:absolute;bottom:0}.vol .vol.bg.volnb{border-
radius:0 0 2px 2px}.vol .volsliderHandle.bg{border-radius:2px 2px 0 0}.vol nt .volslid
erHandle{height:70px;display:none;width:22px;float:left;bottom:18px;position:absolu
te;display:block}.vol nt .volsliderHandle.hide{display:none}.volsliderHandle
.vsb{height:54px;width:4px;background-color:#999;margin:9px auto
8px;position:relative;display:block;border-radius:2px}.volsliderHandle
.vsh{height:6px;width:14px;padding:9px 7px 9px 7px;margin:0
-12px;display:block;position:absolute;top:30px}.volsliderHandle
.vsh.hide{display:none}.volsliderHandle .vshi{height:4px;width:14px;background-
color:#fff;border-radius:2px}.volMuteIcon{width:16px;height:14px;margin:2px 4px;fl
oat:left}.volMuteHandle{width:22px;height:18px}.vo{background:url(/rp/ffZxBXEIP9
WYOO0jhTaElyLhEVU.svg) no-repeat}.vm{background:url(/rp/fsX-
ZVd03wB2TL0vmQjxSp4U9vs.svg) no-
repeat}.vl{background:url(/rp/YXYMPC1Rry_XJGc7Yg8IR4B2eEs.svg) no-

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repeat}.vf{background:url(/rp/NosrIR4amKTs1zYxWy3laZN3HRk.svg) no-
repeat}@media(forced-colors:active){.vol{forced-color-adjust:none}}.vrhc line
.vt_vp,.vrhc.popout .vt_vp,.vrhc.mousefollow .vt_vp{position:absolute;bottom:0;borde
r:hidden;padding:0;top:0;left:0;z-index:3}.vrhtc .hide{display:none}.vrh_clc
.vt_vp,.vrh_clc .vrhtc .vrhi,.vrh_clc .player_ol{cursor:pointer}.vrh_clc .cico{border-
radius:0}.vrhtc{border:hidden;top:0;left:0;padding:0}.vrhc.mousefollow
.vrhtc,.vrhc.popout .vrhtc{background-color:#999}.vrhtpc.load
.player_ol{background:url(/rp/J_o2maogFDeUOsovPJL-ofEuxJ4.gif) center center no-
repeat}.vrhc line .vrhtc .vrhi,.vrhc.popout .vrhtc .vrhi,.vrhc.mousefollow .vrhtc .vrhi{p
osition:absolute!important;border:hidden;z-index:2;padding:0;left:0;top:0}.player_ol{
position:absolute;width:100%;height:100%;bottom:0;border:hidden;z-
index:7}.vrhc.popout,.vrhc line,.vrhc.mousefollow{border-radius:6px;overflow:hidden
;display:table-row-group;background:none}.vrhc.popout,.vrhc.mousefollow{z-
index:4;box-shadow:0 4px 4px rgba(0,0,0,.1),0 2px 80px rgba(0,0,0,.2)}.vrhc line{z-
index:1;margin:0}.vrhc.popout,.vrhc
line{position:absolute;top:0}.vrhc.popout{border:1px solid #fff}.vrhc.mousefollow{p
osition:fixed}.vrhcp{position:relative;top:0;left:0;display:table-row}.vrhcp
.vrhtc{position:relative;overflow:hidden}.vrhc.hide{display:none}@keyframes
vh_fadein{from{opacity:0}to{opacity:1}}.vrhc:not(.hide){animation:vh_fadein
250ms}.vrhc line img{color:transparent}.vrhc line.fullsize{height:100%}.vrhc,.vrhc:h
over,.vrhc:link,.vrhc:active,.vrhc:visited{color:#000;text-decoration:none}.vrhc.vrh_c
lc{cursor:pointer}a.hover-anchor{display:block;height:100%;width:100%;text-
decoration:none}.vrhstat{height:0;overflow:hidden}

```

## Contact Us

For more information, pricing, or custom data center solutions, please contact us:

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