

Image File Formats in Photography: The Ultimate Guide

JPEG, RAW, HEIF, PSD, DNG – photographers deal with an array of image file formats, and it can get very confusing, very fast.

To help you better understand your different photography format options and to ensure that you pick the right file type for each situation, we've put together this comprehensive guide. And I promise: By the time you're done reading, you'll be able to select the perfect file format with ease.

What are image file formats?

When you take a photo using a digital camera, your camera records image data, which then needs to be stored on your memory card, your computer, and/or your external hard drives. Each image file format is simply a different way of structuring that image data – so that your images can be easily stored, viewed, transferred, edited, and copied across devices.

Now, different file formats offer various benefits and drawbacks. Some formats are designed to compress image data so that you obtain a small image file, some are designed to save editing layers, and others are designed to be compatible across platforms. While I delve into the most commonly used formats in greater detail below, here's a quick list:

- JPEG
- HEIF
- TIFF
- RAW
- DNG
- PNG
- GIF
- BMP
- PSD

Choosing the right file format is *essential*. If you select the wrong file format for the job, it can be a critical mistake (depending on the level of quality and post-processing you require).

Key photography image formats

In this section, I take you through all the essential file formats used by photographers, starting with:

JPEG

JPEG stands for “Joint Photographic Experts Group,” and it’s probably the best known out of all the image file formats. The JPEG is what many cameras set as their default output, so if you’ve never adjusted your camera’s image quality options, it’s what you’re probably using.

JPEGs are compressed at the moment of capture; therefore, when you take a JPEG, you instantly lose some image detail (and consequently store a lower-quality image). A benefit of this compression, however, is file size: JPEG is many times smaller than alternative formats (such as RAW and TIFF, discussed below). Therefore, you can generally store thousands of JPEGs on a single memory card, and you can quickly transfer JPEGs from your camera to your phone or computer.

Another big benefit of JPEGs is that they can be displayed on pretty much every browser and operating system you’ll ever encounter. You can share JPEGs over email, chat, and social media, and you’ll never run into compatibility issues.

Some cameras have options for different JPEG quality levels (e.g., low, medium, and high). The better the quality, the less compression the camera will perform on the image – though all JPEGs do feature *some* compression.

Generally speaking, JPEGs should be used:

- When the photos are intended for personal use, for social media, albums, and small prints (and are not intended for large prints)
- When you don’t intend to enhance or edit the photos much in post-production
- For sharing images via email or messaging apps

JPEG benefits

- The small file size means that more images can be stored on a single memory card
- You get quicker file transfer times
- JPEGs are easily displayed

JPEG drawbacks

- Loss of quality due to image compression
- Less opportunity for image manipulation in photo-editing software

HEIF

HEIF, or *High Efficiency Image Format*, is the newest file type on this list; the format was designed in 2015 and was soon implemented by Apple to store iPhone photos.

HEIF image files are smaller than JPEGs yet offer similar or even increased quality. In other words, HEIF files take up less space than JPEGs, yet they look equally good. Therefore, the HEIF format offers a lightweight JPEG alternative that’s perfect for rapid image transfer and efficient storage.

Unfortunately, HEIF files are far less universal than JPEGs. They cannot be easily displayed by internet browsers, which makes them a poor option for image sharing on social media and portfolio websites. And while HEIFs can be processed by a few editing programs – including Lightroom, Photoshop, Affinity, and GIMP – many programs cannot handle HEIFs, which severely limits their usefulness.

HEIF benefits

- Smaller than JPEGs
- Relatively high-quality file storage

HEIF drawbacks

- Limited compatibility

TIFF

TIFF stands for “Tagged Image File Format,” and it’s another file type that’s commonly used in the photography industry. (For instance, TIFFs are generally requested by publishers). TIFFs can be smoothly converted to JPEGs, so even if the end file format will be a JPEG, many photographers prefer to edit a TIFF.

TIFF files are usually uncompressed, so they’re extremely high quality and offer the opportunity for extensive post-processing. You can make powerful tonal adjustments and do stunning color grades to your TIFF files – but because TIFFs are feature zero compression, they are much bigger and take up a lot of space both on your memory card and on your computer.

Not all cameras offer the option to shoot in TIFF, but some do offer TIFF as their highest-quality image format. Note that TIFFs can be displayed on some – but not all! – browsers.

TIFF benefits

- You can make extensive adjustments in editing software
- TIFFs let you print at the highest quality and at much larger sizes

TIFF drawbacks

- Much bigger file sizes (so more storage is needed)
- Longer transfer and loading times due to file size

RAW

These days, most cameras offer the option to shoot in RAW, including mirrorless models, DSLRs, and even smartphones.

RAW files store all of the information originally captured by the camera – which means that adjustments to white balance, exposure, contrast, saturation, and sharpness can all be easily applied in image-editing software after the photo has been taken.

Like TIFFs, RAW files are very large and take up significant space. Unlike TIFFs, RAW files are *not* displayable on browsers or even computer desktops; to view a RAW file, you must use special processing software such as Lightroom, Capture One, or ON1 Photo RAW.

Simply put, RAW is the best option if you want to create the highest-quality files, so it's the option preferred by most professional photographers. And it's important to note that if you *don't* use RAW files, then your camera will automatically adjust your images at the time of capture (and these adjustments will permanently alter the files).

Photographing in RAW requires plenty of memory cards, not to mention considerable post-processing time. It also requires some basic knowledge of image-editing software such as Adobe Lightroom because – see above! – files will have to be edited and converted before they can be printed, shared online, etc.

RAW benefits

- Image quality is outstanding
- Extensive post-processing options

RAW drawbacks

- Significant time is needed to convert and edit photos
- Bigger file sizes require more storage and longer post-processing times

DNG

These days, just about every camera uses a different proprietary format to capture RAW files. Even cameras from the same manufacturer often use different formats, which means that image editing software must be able to read a huge range of file types.

As a result, editing software providers face a challenge: They must manage and continuously provide updates for their programs so they can read each and every RAW file format.

Enter the DNG.

The DNG, or Digital Negative, was created by Adobe in an attempt to provide a standard RAW file that can be used by all manufacturers and cameras.

The DNG is offered as a main RAW file format or as an alternative to the manufacturer's native RAW format. One of the problems with keeping images in the original RAW format is that, several years from now, you may struggle to access these files because they are specific to cameras and manufacturers. But if you convert your files to Adobe DNGs, they'll be future-proof.

The DNG conversion does add another step in your post-processing workflow, which takes extra time. However, editing software such as Lightroom can convert large batches of files to DNGs so that you don't need to manually convert each image.

DNG benefits

- Can be accessed by image-processing software such as Lightroom and Photoshop
- Possibly the safer long-term option because it guards against future incompatibilities

DNG drawbacks

- If your camera cannot create DNGs automatically, it takes extra time to convert camera RAW files to DNGs

PNG

Designed in the '90s as an improvement on the GIF file format, PNG files are reasonably small, relatively high quality, and displayable on browsers – so they're ideal for internet use.

PNGs are compressed in a lossless format and therefore retain plenty of detail for viewing and editing. But unlike many other file formats, high-quality PNGs don't require lots of storage space; this is useful on the internet because you want images to load quickly.

The other benefit of PNG files is that they allow for partial and total transparency, which is ideal for overlays and logos.

PNG benefits

- Lossless compression offers good image quality, which isn't compromised when editing
- PNGs can maintain transparency, which is important for graphics such as overlays and logos

PNG drawbacks

- File size is larger than JPEGs

GIF

Like PNGs, GIFs are perfect for internet use. Lossless compression means that files are small but image quality is not sacrificed, and GIF supports transparency (though it doesn't support partial transparency, so the GIF format isn't ideal for graphics). GIF also allows for animation.

However, GIF files can only contain a maximum of 256 colors. Therefore, GIF is not the best choice for photos, but rather for images with a limited color palette.

GIF benefits

- The small file size makes the GIF file format ideal for web use
- Files can contain animation

GIF drawbacks

- Limited colors make GIF a poor choice for photos
- GIFs don't support partial transparency (e.g., drop shadows)

BMP

The BMP is another lossless file format; it was invented by Microsoft, initially for use on the Windows platform. However, BMPs are now recognized by Mac programs, too.

BMPs are on the larger side as color data is saved for each individual pixel without compression. As a result, BMPs produce a high-quality file that is great for printing but not ideal for sharing photos on the web.

BMP benefits

- Can be used for printing
- Images are very high quality

BMP drawbacks

- The large file size requires a lot of storage

PSD

The PSD is used by Adobe Photoshop to save data. The big advantage of the PSD is that it allows you to store edits using individual layers rather than on the image itself.

This makes PSDs ideal if you need to extensively manipulate your original photo in Photoshop. PSDs offer plenty of flexibility because layers can be added, removed, or edited at any time without affecting the original photo. And if you save an image as a PSD, you can always open it later and re-access editing layers.

But remember:

Once a layered PSD file is flattened (this essentially merges all of the layers), it can't be undone. So if there's a chance you might want to rework some layers later on, make sure you save your file as an unflattened PSD first.

PSD benefits

- Ability to manipulate images on separate layers
- Once the image is edited, it can be re-saved as any other file format

PSD drawbacks

- Layered files can be incredibly large due to all of the additional data

