SMT POWER INDUCTORS

For Texas Instrument Swift Series of DC/DC Converters TPS54672, TPS54610, TPS54810 and TPS54910

NEW!

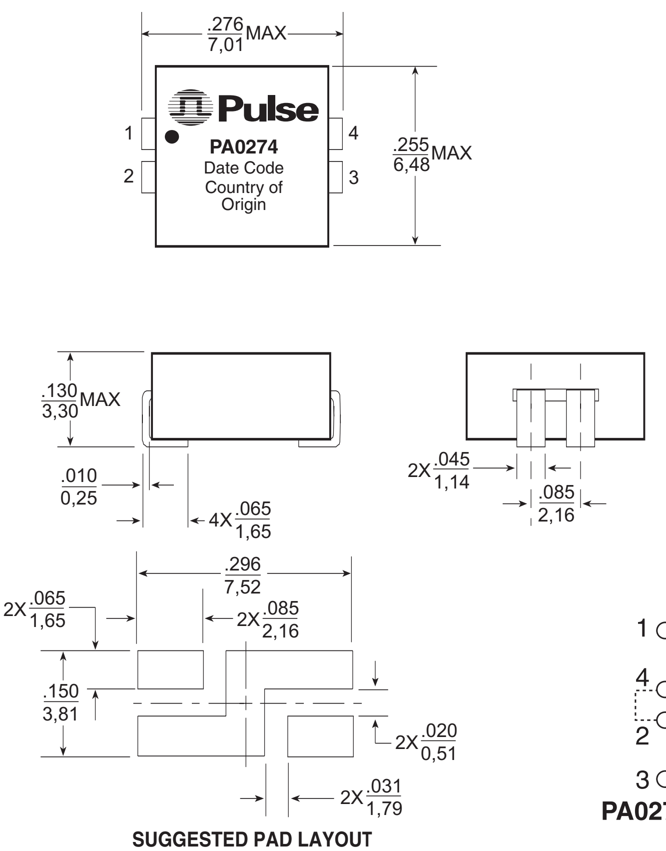
- **Height:** .130"/.177" Max (PA0274/PA0277)
- **Footprint:** .28" x .26" (PA0274), .34" x .25" (PA0277)
- **Current Range:** up to 12 A
- **Inductance Values:** 475 nH and 600 nH
- **Maximum Energy Storage Density:** 2280 μJ/in^3
- **Frequency Range:** up to 2 MHz

Electrical Specifications @ 25°C — Operating Temperature -40°C to +100°C

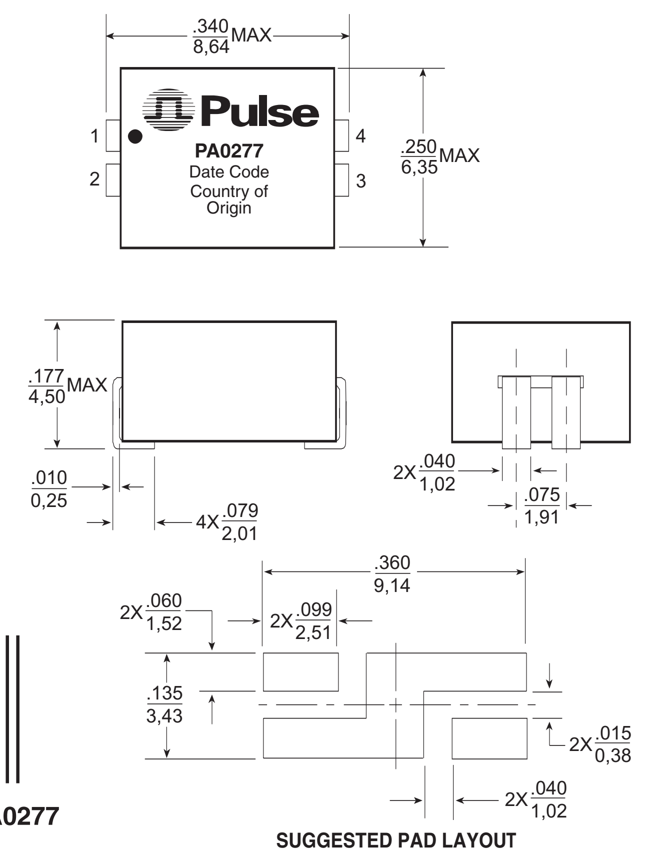
Part Number	Inductance @ Irated (nH ±20%)	Irated [1] (ADC)	DCR (#1-3) (mΩ) TYP	DCR (#1-3) (mΩ) MAX	Inductance @ 0 ADC (nH ±20%)	Saturation Current [2] 25°C	Saturation Current [2] 125°C	Heating Current [3] (A)	Trise Factor [4] K0	Core Loss [4] Factor K1	Core Loss [4] Factor K2
PA0274	475	6.0	1.6	1.76	700	7	4.8	12	1.40	.00638	.24632
PA0277	600	10.7	2.3	2.53	700	12.6	8	12	2.04	.01276	.13196

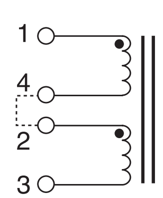
Mechanicals

PA0274



PA0277





PA0274 & PA0277

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Notes from Tables

1. The rated current as listed is either 85% of the saturation current or the heating current depending on which value is lower.
2. The saturation current is the current which causes the inductance to drop by 30% at the stated ambient temperatures (25°C and 125°C). This current is determined by placing the component in the specified ambient environment and applying a short duration pulse current (to eliminate self-heating effects) to the component.
3. The heating current is the dc current which causes the temperature of the part to increase by approximately 40°C. This current is determined by mounting the component on a PCB with .25" wide, 2 oz. equivalent copper traces, and applying the current to the device for 30 minutes with no forced air cooling.
4. In high volt*time applications additional heating in the component can occur due to losses in the inductor which may neccessitate derating the current in order to limit the temperature rise of the component. In order to determine the approximate total losses (or temperature rise) for a given application both copper losses and core losses should be taken into account.

Estimated Temperature Rise:

$$\textbf{Trise} = \left[\frac{Coreloss\ (mW) + DCRloss\ (mW)}{K0}\right]^{.833} \ (°C)$$

$$\textbf{Coreloss} = K1 * \left(Fsw(kHz)\right)^{1.6688} * (K2 * dI)^{2.17}\ (mW)$$

$$\textbf{DCRloss} = Irms^2 * DCR(m\Omega)\ \ (mW)$$

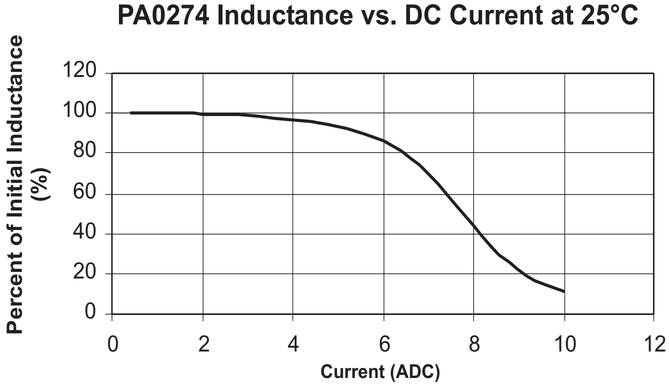
$$\textbf{Irms} = \left[IDC^2 + \left[\frac{dI}{2}\right]^2\right]^{½}\ (Arms)$$

Fsw(kHz) = *switching frequency (kHz)*

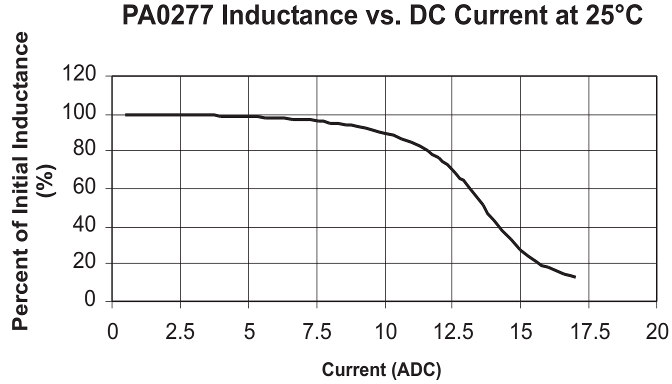
dI = *delta I across the component (A)*

The temperature of the component (ambient temperature + temperature rise) should be within the listed operating temperature range.

PA0274 Inductance vs. DC Current at 25°C



PA0277 Inductance vs. DC Current at 25°C



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