



across T1 reduce the generation of conducted EMI so that a single common mode choke (L1), a small X-capacitor (C3) and two small Y-capacitors (C1 and C2) at the input allow the supply to meet EN55022B limits with more than 12 dB $\mu$ V of margin. A combination RCD-Zener clamp (R3, C5, D6 and VR1) limits the peak drain-node voltage to below the 700 V rating of the integrated MOSFET.

If JP3 is removed, an external variable resistor (R20) adjusts the voltage across R12 and therefore, the output voltage. The externally supplied motor speed regulating voltage (3.6 to 10 VDC) changes the voltage at the node of R12 and VR2, which effectively adjusts the output voltage. Diode D12 blocks reverse current flow through R19 if the external adjustment voltage is less than about 3.6 VDC.

### Key Design Points

- The externally supplied voltage adjusts the motor speed as follows:  $\leq 3.6$  V sets the output voltage to about 12 V (the highest motor speed) and  $\geq 7$  V sets the output voltage to about 2 V (the lowest motor speed).
- If the resistive speed control circuit is to be used, jumper J3 must be removed from the PCB.
- If the motor is stopped externally for more than 30 ms, U1's latching shutdown function activates, and MOSFET switching latches off until AC input power is removed and reapplied. If latching shutdown is not needed, the function can be disabled and the parts count reduced by not installing D5, C7, R5 and R6.

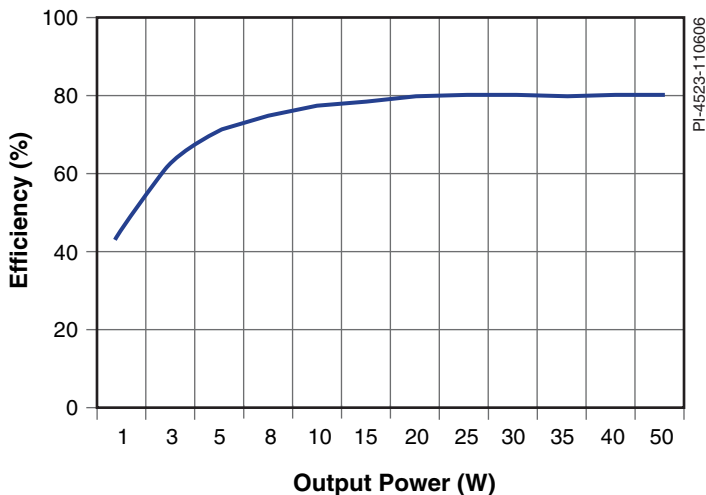


Figure 2. Efficiency Across Extended Motor Load Range.

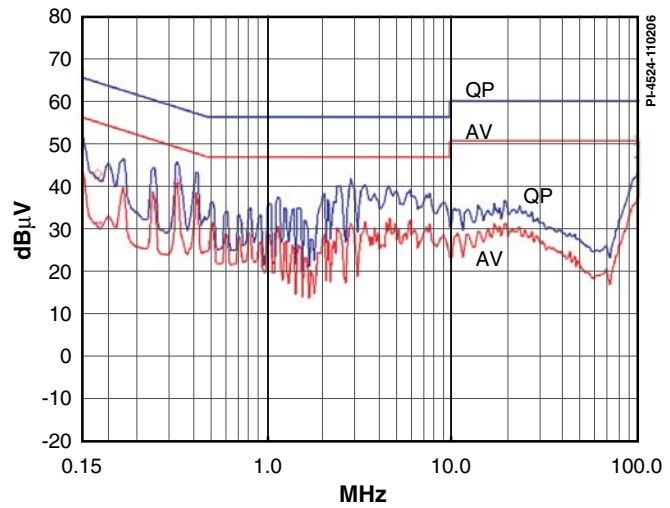


Figure 3. Conducted EMI: 230 VAC in,  $I_{OUT} = 4$  A (48 W).

### Transformer Parameters

<b>Core Material</b>	PC40EE25-Z
<b>Bobbin</b>	EE25 Vertical
<b>Winding Details</b>	1/2 Primary: 19T, 2 x 31 AWG Bias: 5T, 2 x 29 AWG Secondary: 4T, 4 x 23 AWG Shield: 7T, 4 x 23 AWG 1/2 Primary: 19T, 2 x 31 AWG
<b>Winding Order</b>	1/2 Primary (2-3), Bias (5-4), Secondary (9,10-7,8), Shield (1-NC), 1/2 Primary (3-1)
<b>Primary Inductance</b>	145 $\mu$ H
<b>Leakage Inductance</b>	5.4 $\mu$ H
<b>Primary Resonant Frequency</b>	3.4 MHz (minimum)

Table 1. Transformer Parameters. AWG = American Wire Gauge, TIW = Triple Insulated Wire, NC = No Connection, FL = Flying Lead.

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