EV3W2424A-O-01A

3W, 24V V_{IN}, Isolated Power Module Evaluation Board

DESCRIPTION

The EV3W2424A-O-01A is an evaluation board designed to demonstrate the capabilities of MID3W2424A, an unregulated, 3kV_{RMS}, isolated DC/DC converter designed for 24V ± 10% input voltage (V_{IN}) applications. The MID3W2424A supports up to 3W of output power (P_{OUT}). Due to its excellent common-mode transient immunity (CMTI) performance, the device is suitable for powering IGBT or silicon carbide (SiC) MOSFET gate drivers that require fast switching speed.

The MID3W2424A features various protections including input over-voltage protection (OVP), over-current protection (OCP), short-circuit protection (SCP), and over-temperature protection (OTP). It also integrates soft start (SS) to control inrush current.

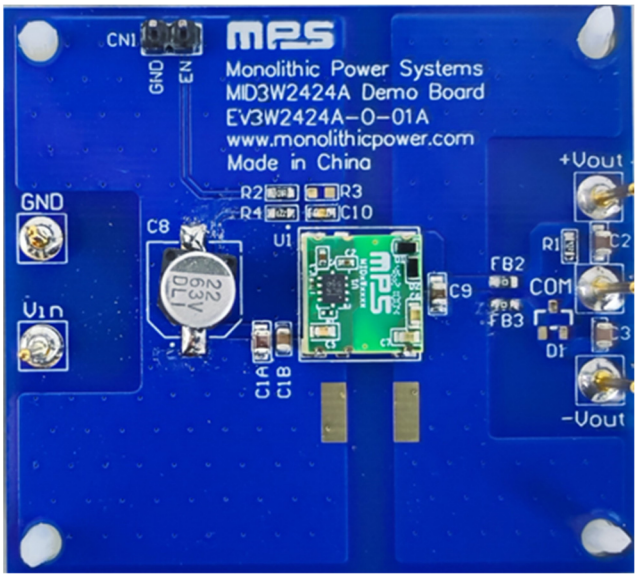
The MID3W2424A is available in a low-profile LGA-6 (10mmx10mm) package.

PERFORMANCE SUMMARY

Specifications are at T_A = 25°C, unless otherwise noted.

Parameters	Conditions	Value
Input voltage (V_{IN}) range		10.8V to 26.4V
Output voltage (V_{OUT})	V_{IN} = 24V, I_{OUT} = 5mA to 125mA	25.1V to 26.3V
Maximum output current (I_{OUT})	V_{IN} = 21.6V to 26.4V	125mA
Typical efficiency	V_{IN} = 24V, V_{OUT} = 25.1V, I_{OUT} = 125mA	86.8%
Peak efficiency	V_{IN} = 24V, V_{OUT} = 25.1V, I_{OUT} = 125mA	86.8%
Switching frequency (f_{SW})		500kHz

EV3W2424A-O-01A EVALUATION BOARD



LxWxH (7cmx5cmx1.1cm)

Board Number	MPS IC Number
EV3W2424A-O-01A	MID3W2424AGO-3U

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QUICK START GUIDE

1. To configure the evaluation board for automatic start-up, connect the VIN pin to the EN pin via R4. The automatic start-up threshold (V_{IN_ON}) and shut-down threshold (V_{IN_OFF}) can be calculated with Equation (1):

$$V_{IN_ON/OFF} = V_{EN_ON/OFF}\left(1 + \frac{R4}{R3}\right) \quad (1)$$

   Where the enable thresholds of V_{EN_ON} and V_{EN_OFF} are 1.2V and 0.8V, respectively. It is recommended to select resistors ranging between a couple of kΩ and tens of kΩ.
2. If the external enable function is required, then remove R4 (see Figure 1 on page 3).
3. Preset the power supply (V_{IN}) between 10.8V and 26.4V, then turn the power supply off.
4. Connect the power supply terminals to:
   a. Positive (+): VIN
   b. Negative (-): GND
5. Connect the load terminals to:
   a. Positive (+): +VOUT
   b. Negative (-): -VOUT
6. Turn the power supply on.
7. If the external enable function is used, pull the EN pin above 1.2V to turn the converter on, or pull EN below 0.8V to turn it off.
8. Make the necessary measurements using the evaluation board.
9. To shut down the device when the external enable function is used, pull EN down below 0.8V, then turn the power supply off.

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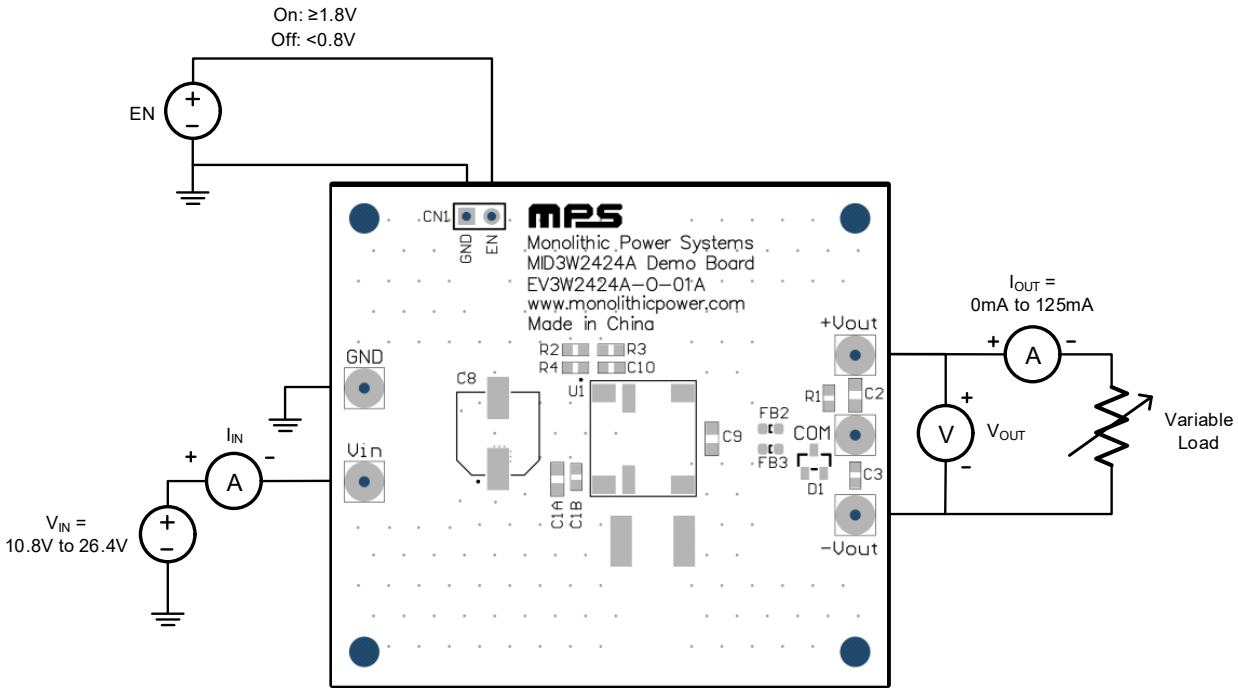

Figure 1: Measurement Equipment Set-Up

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EVALUATION BOARD SCHEMATIC

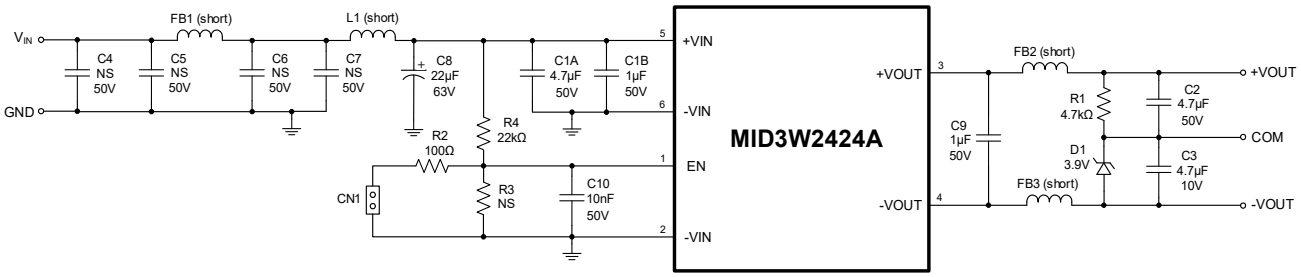

Figure 2: Evaluation Board Schematic (1)

Note:

1) The COM output node can be used as the ground reference when evaluating the MID3W2424A's performance in gate driver applications that require bipolar biasing.

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EV3W2424A-O-01A BILL OF MATERIALS

Qty	Ref	Value	Description	Package	Manufacturer	Manufacturer PN
1	C10	10nF	Ceramic capacitor, 50V, X7R	0603	Murata	GRM188R71H103KA01D
2	C1A, C2	4.7µF	Ceramic capacitor, 50V, X7S	0805	Murata	GRM21BC71H475KE11L
1	C1B	1µF	Ceramic capacitor, 50V, X7R	0603	Taiyo Yuden	UMK107AB7105KA-T
1	C3	4.7µF	Ceramic capacitor, 10V, X7S	0603	Murata	GRM185C81A475ME11D
2	C4, C5	NS				
2	C6, C7	NS				
1	C8	22µF	Aluminium electrolytic capacitor, 63V	Radial, Can - SMD	Panasonic	EEE-HA1J220P
1	C9	1µF	Ceramic capacitor, 50V, X7R	0805	AVX Corporation	08051C105K4Z2A
1	D1	3.9V	Zener diode, ±5%, 250mW	SOT-23-3	Nexperia	BZX84-C3V9,215
3	FB1, FB2, FB3	0Ω	Film resistor, 1%	0603	Yageo	RC0603FR-070RL
1	L1	0Ω	Film resistor, 1%	0805	Yageo	RC0805FR-070RL
1	R1	4.7kΩ	Film resistor, 1%	0603	Yageo	RC0603FR-074K7L
1	R2	100Ω	Film resistor, 1%	0603	Yageo	RC0603FR-07100RL
1	R3	NS				
1	R4	22k	Film resistor, 5%	0603	Yageo	RC0603JR-0722KL
1	CN1	2.54mm	Vertical connector, 2-position	Through Hole	Wurth	61300211121
5	+VOUT, COM, GND, VIN, -VOUT	1mm	Connector	Through Hole	Any	
1	U1	MID3W2424A	3W, 24V, isolated power module for IGBT/SiC bias supply	LGA-6 (10mmx 10mm)	MPS	MID3W2424AGO-3U

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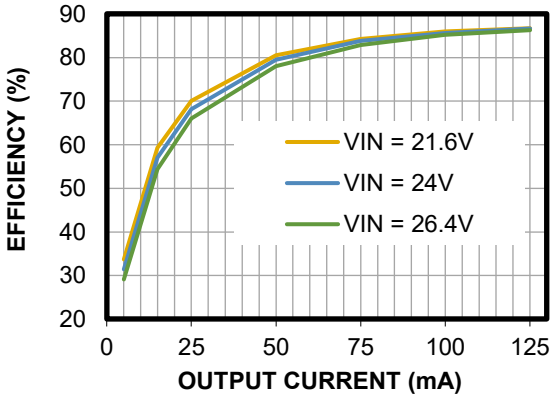
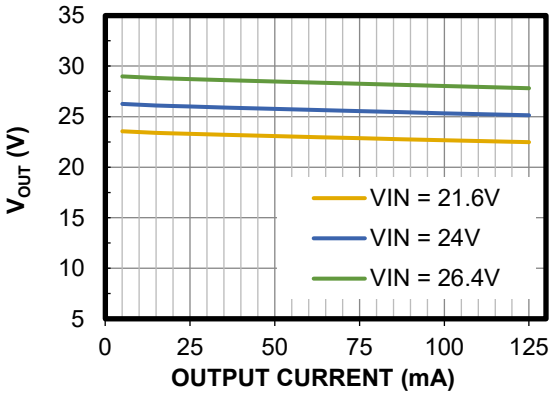
EVB TEST RESULTS

Performance curves and waveforms are tested on the evaluation board. V_{IN} = 24V, T_A = 25°C, unless otherwise noted.

Efficiency vs. Output Current

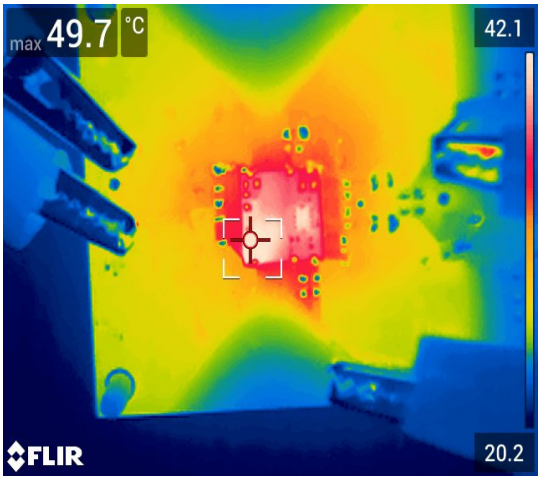


Output Voltage vs. Output Current



Thermal Performance

I_{OUT} = 0.125A, no forced airflow, T_{MAX} = 49.7°C



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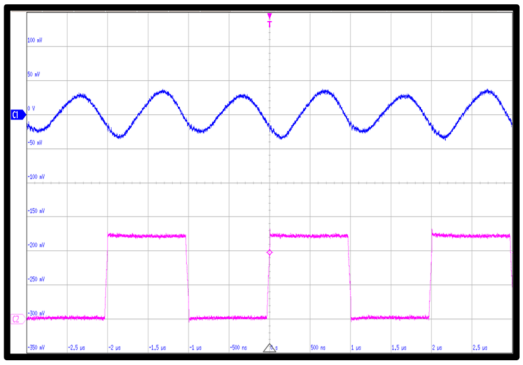
EVB TEST RESULTS *(continued)*

Performance curves and waveforms are tested on the evaluation board. V_{IN} = 24V, I_{OUT} = 125mA, T_A = 25°C, unless otherwise noted.

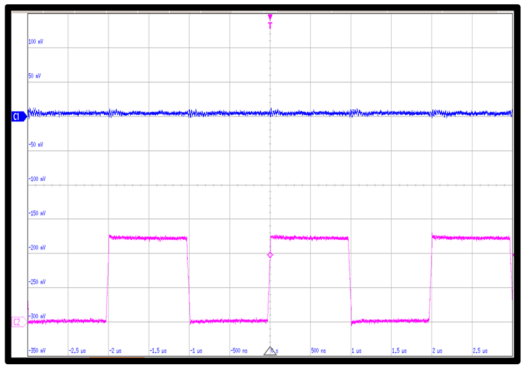
Steady State

I_{OUT} = 0.125A

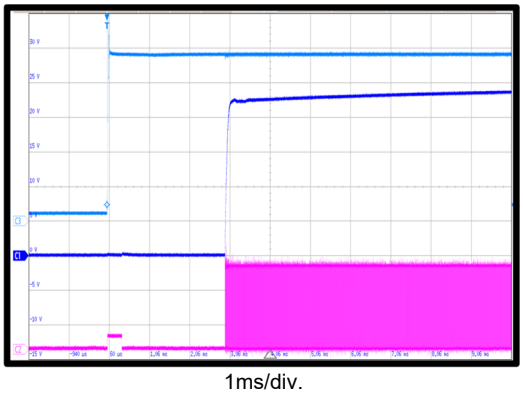


Steady State

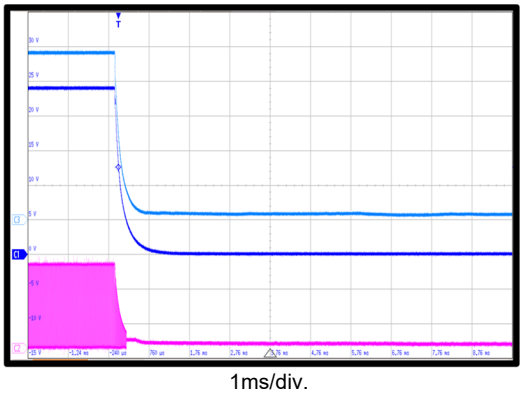
I_{OUT} = 0A



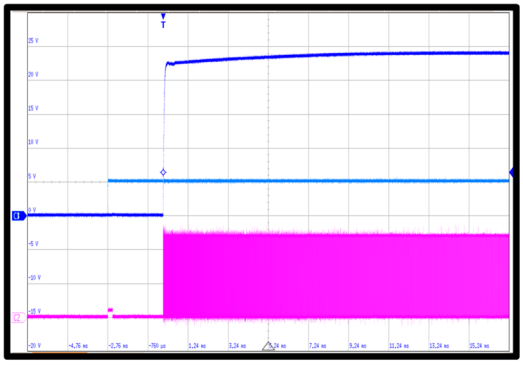
Start-Up through VIN



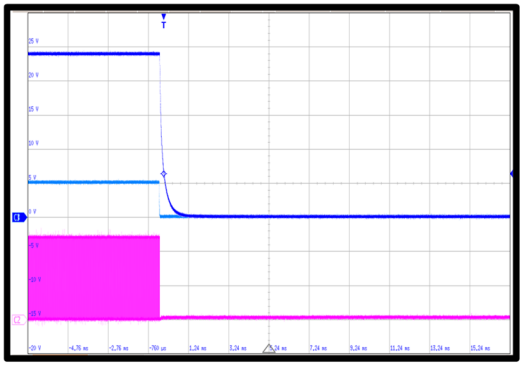
Shutdown through VIN



Start-Up through EN



Shutdown through EN



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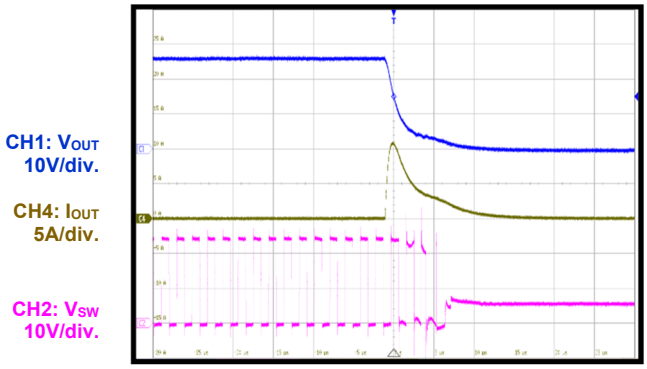
EVB TEST RESULTS *(continued)*

Performance curves and waveforms are tested on the evaluation board. V_{IN} = 24V, I_{OUT} = 125mA, T_A = 25°C, unless otherwise noted.

Output Short Entry

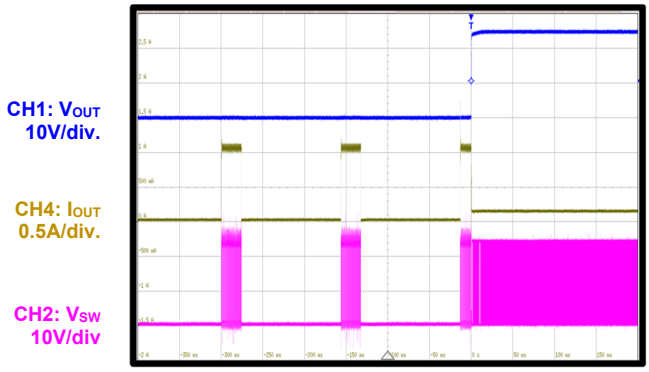
Load switched from 0.125A to short



5µs/div.

Output Short Recovery

Load switched from short to 0.125A



50ms/div.

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PCB LAYOUT

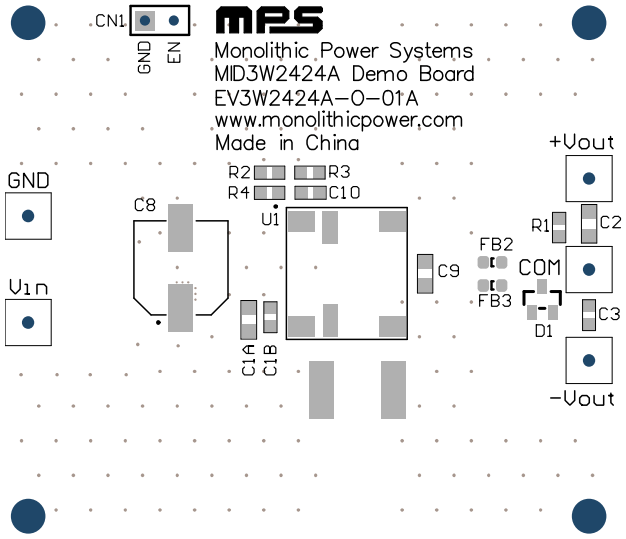

Figure 3: Top Silk

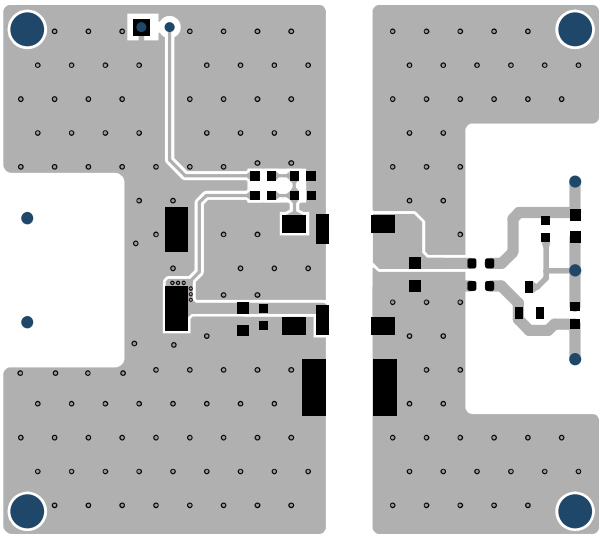

Figure 4: Top Layer

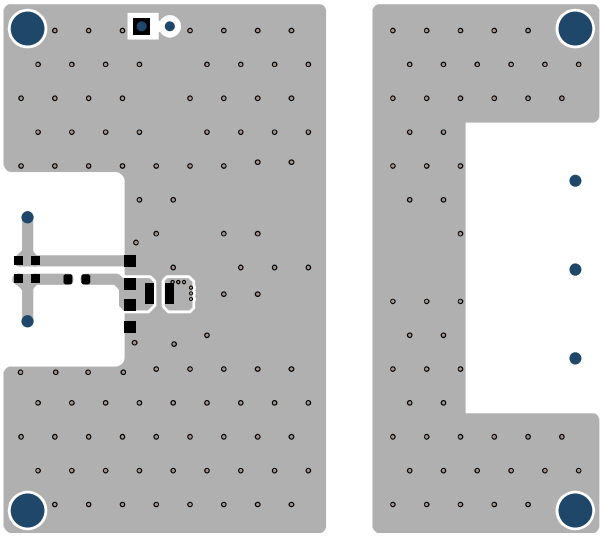

Figure 5: Bottom Layer

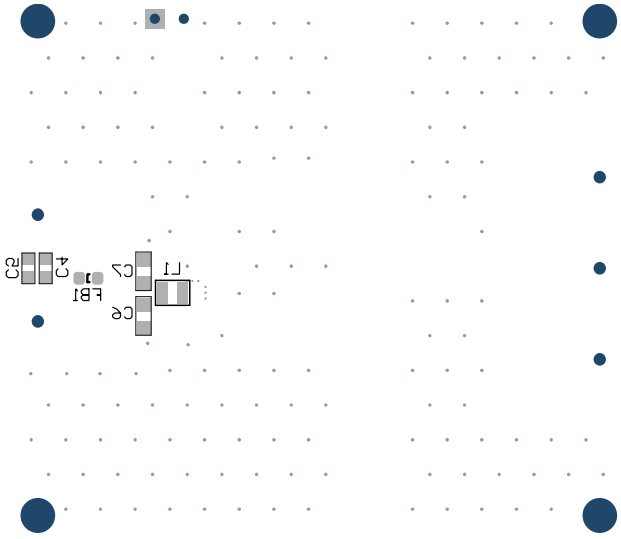

Figure 6: Bottom Silk

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REVISION HISTORY

Revision #	Revision Date	Description	Pages Updated
1.0	3/11/2025	Initial Release	-

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