

**PRODUCT OVERVIEW**

The PWD5 series of PE/E converters is ideal for powering ‘high side’ and ‘low side’ gate drive circuits for SP and WPs in bridge circuits. A choice of asymmetric output voltages allows optimum drive levels for best system efficiency. The PWD5 series is characterised for high isolation requirements commonly seen in bridge circuits used in motor drives and inverters, while the PWD5 industrial grade temperature rating and construction gives long service life and reliability.



**FEATURES**

- Patent pending
- Optimised bipolar output voltages for SP & WP gate drives
- Reinforced insulation to BC25478 recognised
- WD isolation test voltage ‘Hi Pot Test’
- Ultra low coupling capacitance
- Surface mount package style
- 5V, 12V, 15V & 24V inputs
- +10V/-9V, +10V/-5V & +20V/-5V outputs
- Operation to 105oC
- Short circuit protection<sup>4</sup>
- Thermal protection<sup>5</sup>
- Characterised partial discharge performance
- PW link voltage WDP

**SELECTION GUIDE**

Order Code (1)	INPUT		OUTPUT 1				OUTPUT 2				Ripple & Noise		Efficiency		Isolation	
	Voltage (V)	Current (mA)	Voltage (V)	Current (mA)	Load Regulation (%)	Voltage (V)	Current (mA)	Load Regulation (%)	Current (mA)	Typ	Max	Typ	Max	Min	Typ	Capacitance (pF)
					Typ <sup>2</sup>	Max <sup>3</sup>			Typ	Max	Typ	Max				
PWGD258774	3	12	-3	30	30	120	12	35	94	35	5	12	1	6	2	
PWGD284532	3	12	-3	30	30	120	12	35	93	35	5	12	1	6	3	
PWGD741316	3	12	-6	40	40	110	12	34	95	35	3	10	1	6	1	
PWGD,24582	3	15	-3	42	42	220	15	50	250	30	5	9	0	4	3	
PWGD756244	5	9	-15	50	45	320	19	47	310	55	6	16	0	3	3	
PWGD785415	5	21	-19	54	48	120	18	43	190	60	9	11	0	6	1	
PWGD789512	5	15	-8	47	58	189	18	45	124	45	5	16	1	9	2	
PWGD924122	9	25	-20	58	60	87	12	57	89	55	8	15	0	12	3	
PWGD258774	9	13	-15	60	40	85	10	54	85	40	10	12	2	21	2	
PWGD781214	12	14	-9	50	40	87	12	65	120	45	12	12	3	54	3	
PWGD213698	15	20	-11	55	35	98	10	65	98	78	9	15	2	12	1	
PWGD214569	12	25	-15	65	35	214	18	61	247	58	17	13	5	15	0	

1. Components are supplied in tape and reel packaging, please refer to package specification section. Orderable part numbers are MGJ1D051505MPC-R7 (80 pieces per reel), or MGJ1D051505MPC-R13 (400 pieces per reel).  
 2. Calculated using MIL-HDBK-217 FN2 and Telcordia SR-332 calculation model with nominal input voltage at full load.  
 3. See ripple & noise test method.  
 4. Please refer to short circuit application notes.

**INPUT CHARACTERISTICS**

Parameter	Conditions	Min.	Typ.	Max.	Units
Voltage range	Continuous operation, 5V input types	mA p-p	S	76	V
	Continuous operation, 12V input types	mA p-p	S	67	V
	Continuous operation, 15V input types	mA	SS	67	V
	Continuous operation, 24V input types	mA	S	67	V
Input short circuit current ISC	5V input types	mA	S	7	mA
	12/15V input types	mA p-p	S	mA p-p	mA
	24V input types	mA	S	mA p-p mA p-p	mA
Input short circuit current ISC	5V input types	mA	12	mA p-p	mA p-p
	12V input types	mA p-p	12	mA p-p	mA p-p
	15V input types	mA	12	mA p-p	mA p-p
	24V input types	mA p-p	12	mA p-p	mA p-p

**ISOLATION CHARACTERISTICS**

Parameter	Conditions	Min.	Typ.	Max.	Units
Isolation test voltage	Production tested for 3 second	500	45	KK	VDC
	Qualification tested for 1 minute	500	45	-	VDC
Resistance	Viso= 1000VDC	500	45	-	GΩ

**OUTPUT CHARACTERISTICS**

Parameter	Conditions	Min.	Typ.	Max.	Units
Rated Power	Continuous operation	54	A	70	SS
Voltage Set Point Accuracy	Continuous operation	45	A	70	SS
Line regulation	WP2 High VIN to low VIN OP1	45	A	70	%/%
	High VIN to low VIN OP2	45	A	70	

**GENERAL CHARACTERISTICS**

Parameter	Conditions	Min.	Typ.	Max.	Units
Switching frequency	5V input types	10	4	SS	kHz
	12/15V input types	10	4	SS	
	24V input types	10	4	A	

**TEMPERATURE CHARACTERISTICS**

Parameter	Conditions	Min.	Typ.	Max.	Units
Specification	5V input types	-50	-	105	°C
Storage		-50	-	105	
Product Temperature above ambient	5V input types	-50	-	-	
	12V input types	-	A	-	
	15V input types	45	A	100	
	24V input types	-45	SS	120	
Cooling	Free air convection	50	S	110	

**ABSOLUTE MAXIMUM RATINGS**

Parameter	Product Code	Value	Units
Input voltage VIN	654321	All output types	V

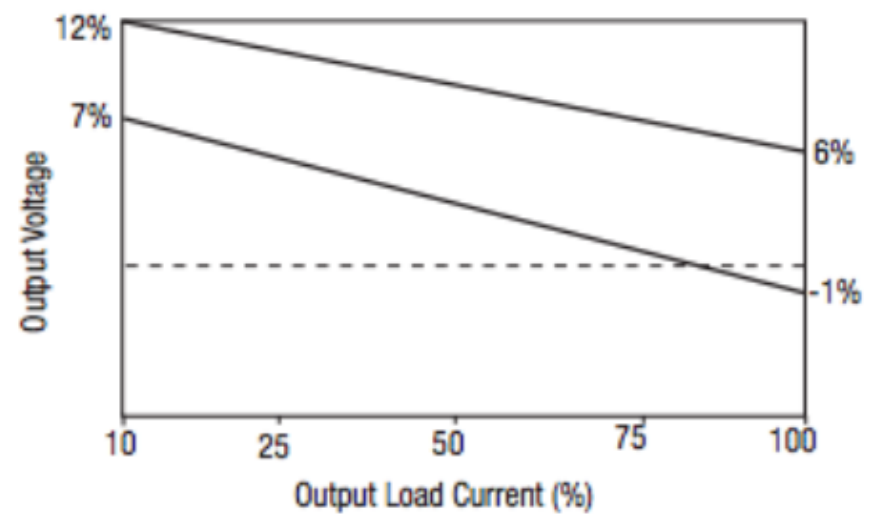
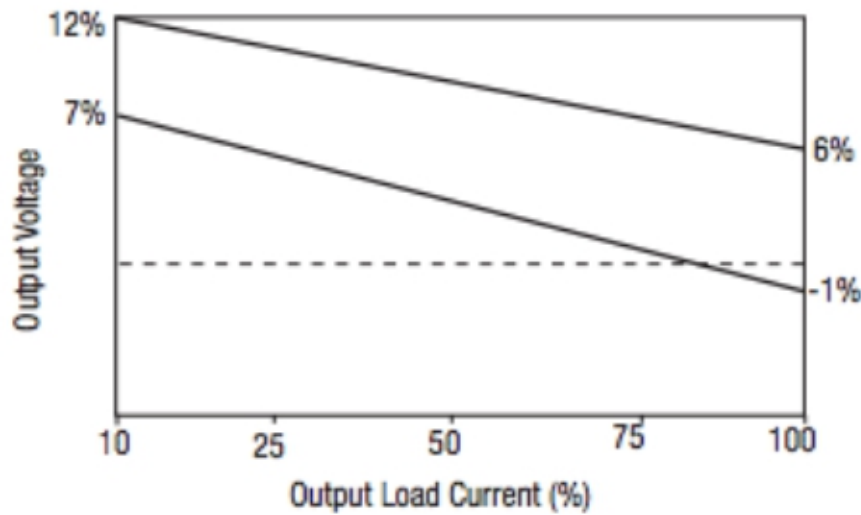
**POSITIVE OUTPUT VOLTAGE TOLERANCE ENVELOPES**

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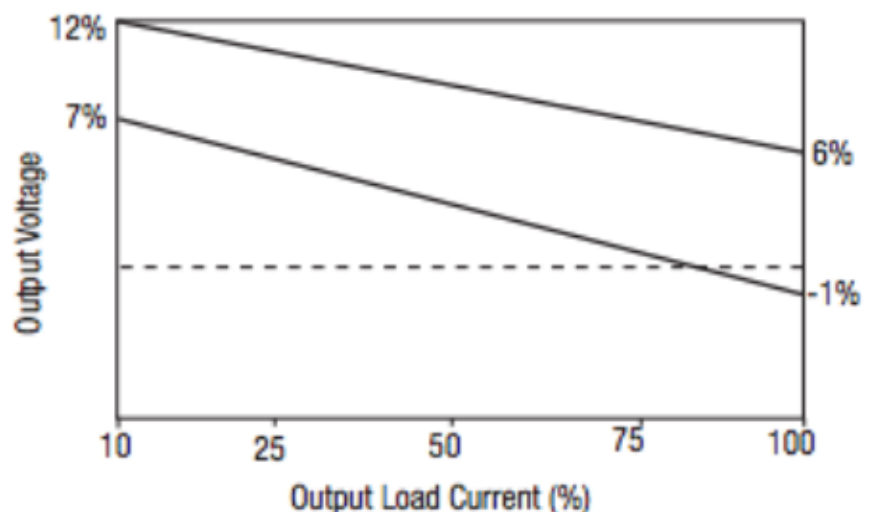
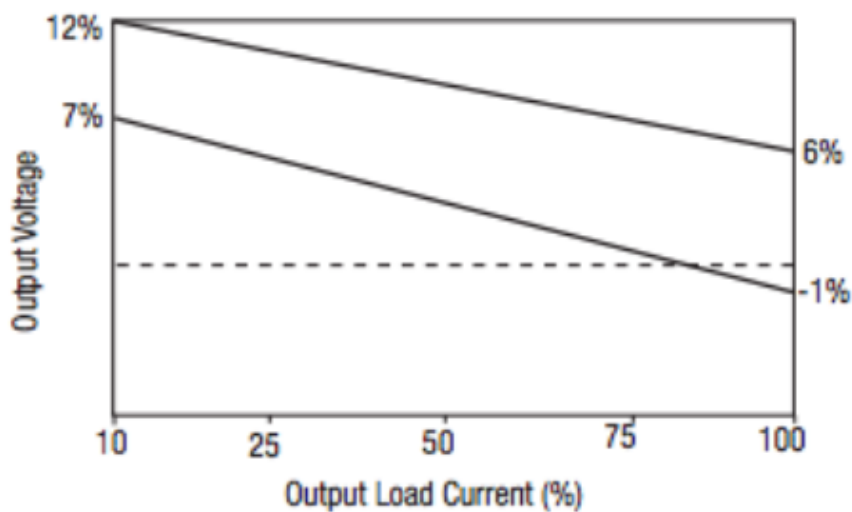
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The voltage tolerance envelopes show typical load regulation characteristics for this product series. The tolerance envelope is the maximum output voltage variation due to changes in output loading and set point accuracy.

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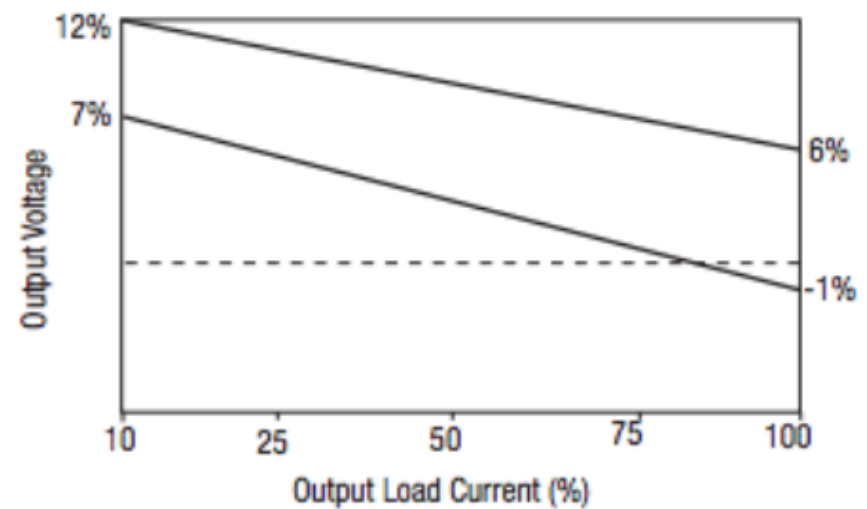
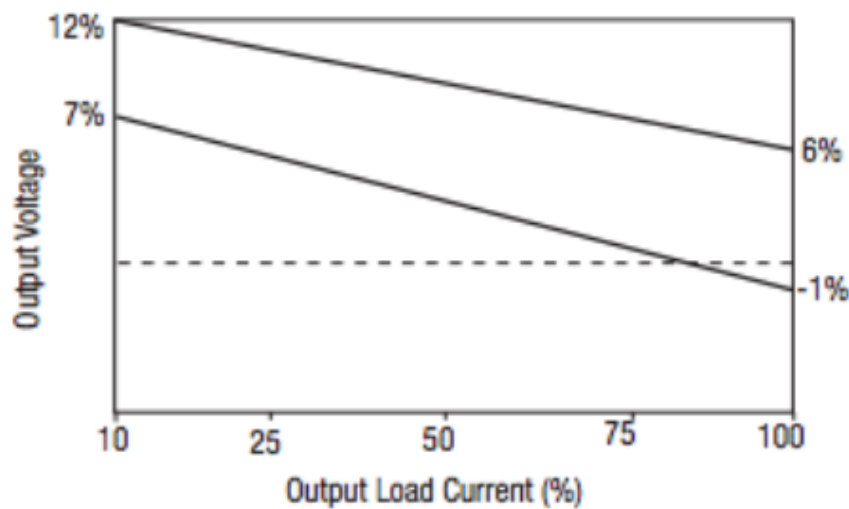
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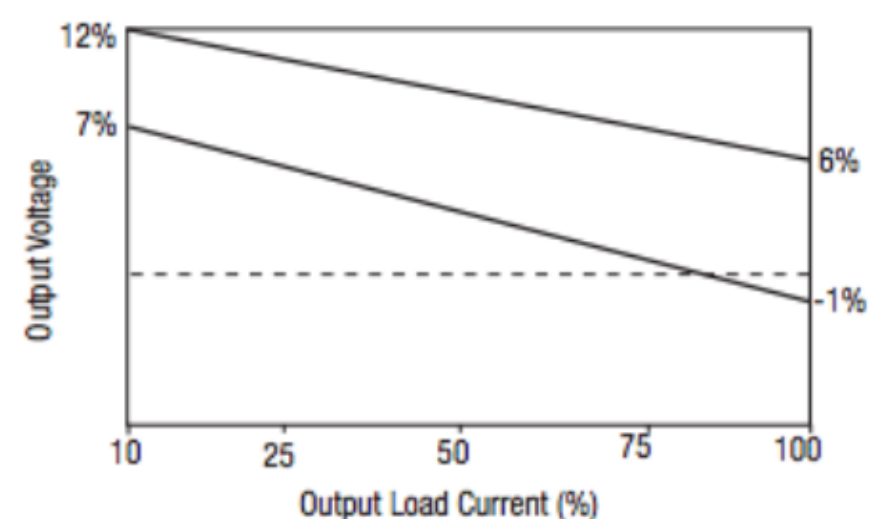
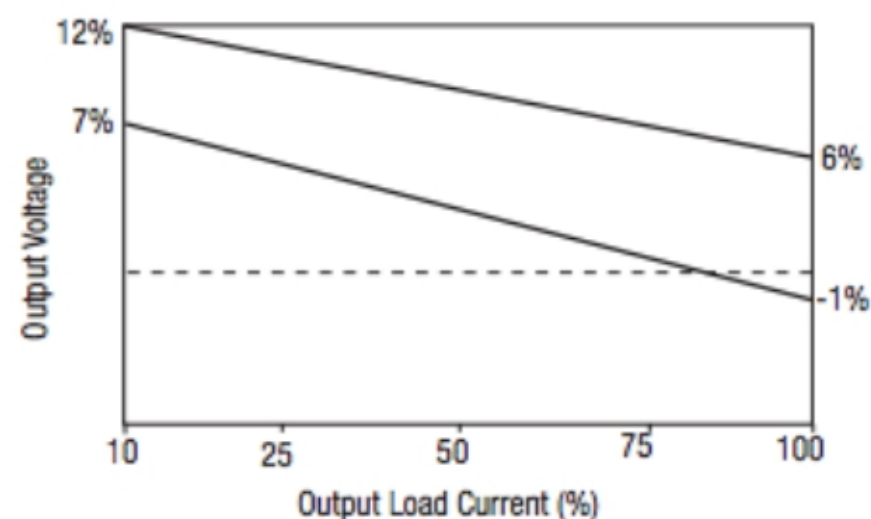
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**TECHNICAL NOTES**

'Hi Pot Test', 'Flash Tested', 'Withstand Voltage', 'Proof Voltage', 'Dielectric Withstand Voltage' & 'Isolation Test Voltage' are all terms that relate to the same thing, a test voltage, applied for a specified time, across a component designed to provide electrical isolation, to verify the integrity of that isolation. Murata Power Solutions MGJ1 series of PE/E converters are all 100% production tested at PW Gate for 3 second and have been qualification tested at PW Gate for 1 minute. A question commonly asked is, "What is the continuous voltage that can be applied across the part in normal operation?" When the insulation in the MGJ1 series is not used as a safety barrier, i.e. provides functional isolation only, continuous or switched voltages across the barrier up to 3kV are sustainable. Long term reliability testing at these voltages continues. Peak Inception voltages measured were in excess of 3kV when testing for partial discharge in accordance with IEC 60270. Please contact Murata for further information. The MGJ1 series is pending recognition by Underwriters Laboratory to 250 Vrms Reinforced Insulation, please see safety approval section below.

**SAFETY APPROVAL**

ANSI/AAMI ES60601-1 The MGJ1 series is pending recognition by Underwriters Laboratory (UL) to ANSI/AAMI ES60601-1 and provides 2 MOPP (Means Of Patient Protection) based upon a working voltage of 250 Vrms max, between Primary and Secondary. UL 60950 The MGJ1 series has been recognised by Underwriters Laboratory (UL) to UL 60950 for reinforced insulation to a working voltage of 250Vrms with a maximum measured product operating temperature of 105°C. Creepage and clearance 9mm.

**APPLICATION NOTES**

The minimum load to meet datasheet specification is 10% of the full rated load across the specified input voltage range. Lower than 10% minimum loading will result in an increase in output voltage, which may rise to typically 1.25 times the specified output voltage if the output load falls to less than 5%.

