MGJ1 SIP Series

5.2kVDC Isolated 1W Gate Drive DC-DC Converters

Murata Power Solutions

FEATURES

- Optimised bipolar output voltages for IGBT/ Mosfet, SiC & GaN gate drives
- Reinforced insulation to UL62368-1 recognised
- ANSI/AAMI ES60601-1, 1 MOPP/2 MOOPs pending
- 5.2kVDC isolation test voltage 'Hi Pot Test'
- Ultra low isolation capacitance
- 5V, 12V, 15V & 24V inputs
- +6V/-3V, +15V/-3V, +15V/-5V, +15V/-9V, +18V/-2.5V & +20V/-5V outputs
- Operation to 105°C
- Characterised CMTI >200kV/µS
- Continuous barrier withstand voltage 2.4kVDC
- Characterised partial discharge performance

PRODUCT OVERVIEW

The MGJ1 SIP series of DC-DC converters is ideal for powering 'high side' and 'low side' gate drive circuits for IGBT/Mosfet, SiC & GaN gate drives in bridge circuits. A choice of asymmetric output voltages allows optimum drive levels for best system efficiency and EMI. The MGJ1 SIP series is characterised for high isolation and dv/dt requirements commonly seen in bridge circuits used in motor drives and inverters, while the MGJ1 SIP high operating temperature rating and construction gives long service life and reliability.

SELECTION GUIDE

Order Code	Nominal Input Voltage	Output Voltage 1	Output Voltage 2	Output Current 1	Output Current 2	Input Current at Rated Load	Output 1 Load Regulation (Typ)	Output 1 Load Regulation (Max)	Output 2 Load Regulation (Typ)	Output 2 Load Regulation (Max)
	V	V	V	mA			%			
MGJ1D050603SC	5	6	-3	111	111	260	0.7	1.5	25	30
MGJ1D052005SC	5	20	-5	40	40	280	5.0	8.0	0.5	1.0
MGJ1D120603SC	12	6	-3	111	111	110	0.4	1.5	16	25
MGJ1D121503SC	12	15	-3	55.6	55.6	100	4.0	8.0	0.5	1.0
MGJ1D121505SC	12	15	-5	50	50	100	5.0	8.0	0.5	1.0
MGJ1D121802SC	12	18	-2.5	48.8	48.8	100	4.0	7.0	0.5	1.0
MGJ1D122005SC	12	20	-5	40	40	110	4.0	9.0	0.5	1.0
MGJ1D151509SC	15	15	-9	41.7	41.7	85	5.0	9.0	0.5	1.0
MGJ1D152005SC	15	20	-5	40	40	85	4.0	9.0	0.5	1.0
MGJ1D241503SC	24	15	-3	55.6	55.6	55	4.0	7.0	0.5	1.0
MGJ1D241505SC	24	15	-5	50	50	55	4.0	8.0	0.5	1.0
MGJ1D241509SC	24	15	-9	41.7	41.7	55	5.0	9.0	0.5	1.0
MGJ1D241802SC	24	18	-2.5	48.8	48.8	55	3.0	7.0	0.5	1.0
MGJ1D242005SC	24	20	-5	40	40	55	4.0	8.0	0.5	1.0

SELECTION GUIDE (Continued)

Order Code	Ripple & Noise (Typ)[2]	Ripple & Noise (Max)[2]	Efficiency (Min)	Efficiency (Typ)	Isolation Capacitance	MTTF[1] MIL.	MTTF[1] Tel.
	mVp-p		%		pF	kHrs	
MGJ1D050603SC	20	50	73	77	3	3620	108788
MGJ1D052005SC	20	50	67	71.5	3	2626	62618
MGJ1D120603SC	20	50	74	79	3	3200	103610
MGJ1D121503SC	20	50	76	79.5	3	3893	144172
MGJ1D121505SC	20	50	77	80	3	3707	136596
MGJ1D121802SC	20	50	75	78	3	3477	133403
MGJ1D122005SC	20	50	75	78	3	3331	128852
MGJ1D151509SC	20	50	74	78	3	3693	131693
MGJ1D152005SC	20	50	74	78	3	3226	137002
MGJ1D241503SC	20	50	71	76	3	3012	85564
MGJ1D241505SC	20	50	72	76	3	2546	72774
MGJ1D241509SC	20	50	69	74	3	2532	63241
MGJ1D241802SC	20	50	69	74	3	2465	64642
MGJ1D242005SC	20	50	69	74	3	2453	63535

For full details go to www.murata.com/en-global/products/power/rohs

1. Calculated using MIL-HDBK-217 and Telecordia SR-332 calculation model with nominal input voltage at full load.
2. See ripple & noise test method.

All specifications typical at T_A=25°C, nominal input voltage and rated output current unless otherwise specified.

INPUT CHARACTERISTICS					
Parameter	Conditions	Min.	Typ.	Max.	Units
Voltage range	Continuous operation, 5V input types	4.5	5	5.5	V
	Continuous operation, 12V input types	10.8	12	13.2	
	Continuous operation, 15V input types	13.5	15	16.5	
	Continuous operation, 24V input types	21.6	24	26.4	
Input reflected ripple	MGJ1D050603SC & MGJ1D052005SC		20		mApk-pk
	All other types		10		
Short circuit input current	MGJ1D050603SC		65		mA
	MGJ1D120603SC		25		
	MGJ1D052005SC		80		
	MGJ1D1215XXSC, MGJ1D121802SC & MGJ1D122005SC		25		
	MGJ1D15XXXXSC		20		
	MGJ1D24XXXXSC		15		

GENERAL CHARACTERISTICS					
Parameter	Conditions	Min.	Typ.	Max.	Units
Switching frequency	MGJ1D050603SC		40		kHz
	MGJ1D052005SC		60		
	MGJ1D120603SC, MGJ1D121503SC, MGJ1D121505SC & MGJ1D121802SC		55		
	MGJ1D122005SC & MGJ1D15XXXXSC		65		
	MGJ1D24XXXXSC		70		

OUTPUT CHARACTERISTICS						
Parameter	Conditions		Min.	Typ.	Max.	Units
Rated Power	T_A=-40ºC to 105ºC			1.00		W
Voltage Set Point Accuracy	See tolerance envelopes					
Line regulation	MGJ1D050603SC & MGJ1D120603SC	OP1		0.10	0.30	%/%
		OP2		3.20	4.00	
	MGJ1DXX2005SC	OP1		1.30	1.40	
		OP2		0.25	0.50	
	MGJ1DXX1503SC & MGJ1DXX1802SC	OP1		1.20	1.30	
		OP2		0.25	0.50	
	MGJ1DXX1505SC	OP1		1.40	1.50	
		OP2		0.25	0.50	
	MGJ1DXX1509SC	OP1		1.60	1.70	
		OP2		0.25	0.50	

ISOLATION CHARACTERISTICS						
Parameter			Min.	Typ.	Max.	Units
Isolation test voltage		Production tested for 1 second		5200		VDC
		Qualification tested for 1 minute		5200		
Resistance		Viso = 1000VDC	1			GΩ
Continuous barrier withstand voltage		Non-safety barrier application		2400		VDC
Safety standard	UL62368-1	Reinforced		300		Vrms
		Basic/supplementary		600		
	ANSI/AAMI ES60601-1[1]	1 MOOP		300		
		2 MOOP/1 MOPP		200		

1. ANSI/AAMI ES60601-1 recognition is currently pending for the MGJ1DxxxxxxSC variants.

TEMPERATURE CHARACTERISTICS					
Parameter	Conditions	Min.	Typ.	Max.	Units
Specification	All output types	-40		105	°C
Storage		-50		125	
Case Temperature above ambient	All other types		15		
	MGJ1D052005SC, MGJ1D241509SC, MGJ1D241802SC & MGJ1D242005SC		20		
Cooling	Free air convection				

ABSOLUTE MAXIMUM RATINGS	
Input voltage V_{IN}, MGJ1D05xxxxSC	7V
Input voltage V_{IN}, MGJ1D12xxxxSC	15V
Input voltage V_{IN}, MGJ1D15xxxxSC	18V
Input voltage V_{IN}, MGJ1D24xxxxSC	28V
Short-circuit protection	Continuous, automatic recovery
Lead temperature 1mm from case for 10 seconds	260°C
Wave Solder	Wave Solder profile not to exceed the profile recommended in IEC 61760-1 Section 6.1.3. Please refer to application notes for further information.

TECHNICAL NOTES

ISOLATION VOLTAGE

'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 SIP series of DC-DC converters are all 100% production tested at 5.2kVDC for 1 second and have been qualification tested at 5.2kVDC for 1 minute.

The MGJ1 SIP series is recognised by Underwriters Laboratory, please see safety approval section for more information. When the insulation in the MGJ1 SIP series is not used as a safety barrier, i.e. provides functional isolation only, continuous or switched voltages across the barrier up to 2.4kV are sustainable. This is established by measuring the partial discharge Inception voltage in accordance with IEC 60270. Please contact Murata for further information.

REPEATED HIGH-VOLTAGE ISOLATION TESTING

It is well known that repeated high-voltage isolation testing of a barrier component can actually degrade isolation capability, to a lesser or greater degree depending on materials, construction and environment. We therefore strongly advise against repeated high voltage isolation testing, but if it is absolutely required, that the voltage be reduced by 20% from specified test voltage.

SAFETY APPROVAL

ANSI/AAMI ES60601-1

The MGJ1 SIP series is pending recognition by Underwriters Laboratory (UL) to ANSI/AAMI ES60601-1 and provides 1 MOOP (Mean Of Operator Protection) based on a working voltage of 300Vrms or 2 MOOP and 1 MOPP (Mean Of Patient Protection) based on a working voltage of 200Vrms, between Primary and Secondary.

File number E202895 applies.

UL62368-1

The MGJ1 SIP series is recognised by Underwriters Laboratory (UL) to UL62368-1 for reinforced insulation to a working voltage of 300Vrms or basic insulation to a working voltage of 600Vrms.

File number E151252 applies.

Creepage and clearance 6mm
Working altitude 5000m

Fusing

The MGJ1 SIP series of converters are not internally fused so to meet the requirements of UL an anti-surge input line fuse should always be used with ratings as defined below.
MGJ1D05xxxxSC: 430mA
MGJ1D12xxxxSC: 170mA
MGJ1D15xxxxSC: 140mA
MGJ1D24xxxxSC: 90mA

All fuses should be UL recognised and rated to 125VDC.

RoHS COMPLIANCE INFORMATION

RoHS COMPLIANT

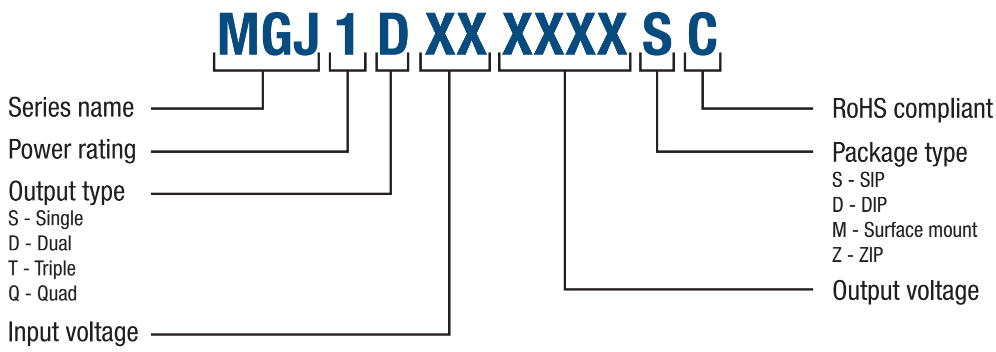
This series is compatible with RoHS soldering systems with a peak wave solder temperature of 260ºC for 10 seconds. Please refer to application notes for further information. The pin termination finish on this product series is Tin Plate, Hot Dipped over Matte Tin with Nickel Preplate. The series is backward compatible with Sn/Pb soldering systems. For further information, please visit www.murata.com/en-global/products/power/rohs

ENVIRONMENTAL VALIDATION TESTING

The following tests have been conducted on this product series, as part of our design verification process. The datasheet characteristics specify user operating conditions for this series, please contact Murata if further information about the tests is required.

Test	Standard	Condition
Temperature cycling	JEDEC JESD22-A104	200 cycles in a dual zone chamber from -40 (+5/-10)°C to 105 (+10/-5)°C. 15mins dwell at each (inclusive of ramps). 2 cycles per hour.
Humidity bias	JEDEC JESD22-A101	85°C ± 2°C, 85% ± 5% R.H. for >1000 hours.
High temperature storage life	JEDEC JESD22-A103, Condition A	125°C (+10/-0°C) for ≥1000 hours.
Vibration	MIL-STD-883 Method 2007, Condition A	1.5mm pk-pk / 20g pk min, 20-2000-20Hz, 4 sweeps in each of 3 mutually perpendicular axes at 3 oct/min.
Shock	MIL-STD-883 Method 2002, Condition A	500g 1.0ms half sine, 5 shocks in each direction of 3 mutually perpendicular axis.
ESD	JEDEC JESD22-A114	HBM 8.0kV.
Bump	IEC Class 4M5 of ETS 300 019-2-4	Shock Spectrum Type II, 6mS duration, $250m/s^2$ 500 bumps in 6 directions.
Solderability	EIA/IPC/JEDEC J-STD-002, Test A and A1	SnPb (Test A) For leaded solderability the parts are conditioned in a steam ager for 8 hours ±15 min. at a temperature of 93°C ±3°C. Dipped in solder at 245°C ±5°C for 5 (+0/-0.5) seconds. Pb-free (Test A1) For lead free solderability the parts are conditioned in a steam ager for 8 hours ± 15 min. at a temperature of 93°C ±3°C. Dipped in solder at 255°C ±5°C for 5 (+0/-0.5) seconds.
Solder heat	JEDEC JESD22-B106	The test sample is subjected to a molten solder bath at 270°C ±5°C for 7 (+2/-0) seconds.
Solder heat (hand)	MIL-STD-202 Method 210, Condition A	The soldering iron is heated to 350°C ±10°C and applied to the terminations for a duration of 4 to 5 seconds.
Solvent cleaning	Resistance to cleaning agents	Solvent – Novec 71IPA & Topklean EL-20A. Pulsed ultrasonic immersion 45°C - 60°C.
Solvent Resistance	MIL-STD-883 Method 2015	Separate samples subjected to IPA cleaning.
Lead Integrity (Adhesion)	MIL-STD-883 Method 2025	Leads are bent through 90º until a fracture occurs.
Lead Integrity (Fatigue)	MIL-STD-883 Method 2004, Condition B_2	The leads are bent to an angle of 15º. Each lead is subjected to 3 cycles.
Lead Integrity (Tension/Pull)	MIL-STD-883 Method 2004, Condition A_1	Pull of 0.227kg applied for 30 seconds. The force is then increased until the pins snap.
Aqueous wash	Resistance to wash process	Parts washed in an aqueous/ultrasonic process, in a suitable chemical for 30 mins at a controlled temperature. Followedby a towns water wash at low pressure and a demineralised water wash at low pressure. Dried in a vacuum oven.

PART NUMBER STRUCTURE



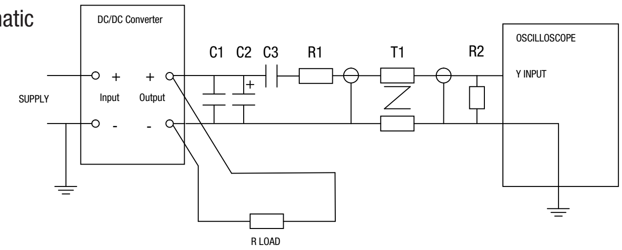
CHARACTERISATION TEST METHODS

Ripple & Noise Characterisation Method

Ripple and noise measurements are performed with the following test configuration.

C1	1µF X7R multilayer ceramic capacitor, voltage rating to be a minimum of 3 times the output voltage of the DC-DC converter
C2	10µF tantalum capacitor, voltage rating to be a minimum of 1.5 times the output voltage of the DC-DC converter with an ESR of less than 100mΩ at 100kHz
C3	100nF multilayer ceramic capacitor, general purpose
R1	450Ω resistor, carbon film, ±1% tolerance
R2	50Ω BNC termination
T1	3T of the coax cable through a ferrite toroid
RLOAD	Resistive load to the maximum power rating of the DC-DC converter. Connections should be made via twisted wires
Measured values are multiplied by 10 to obtain the specified values.	

Differential Mode Noise Test Schematic



APPLICATION NOTES

Minimum load

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 1.5 times the specified output voltage if the output load falls to 0%.

Gate Drive Applications Advisory Note

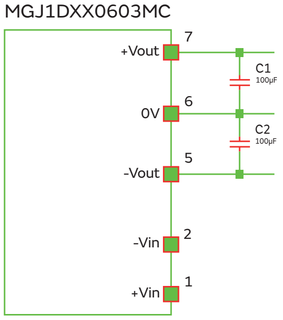
For general guidance for product usage in gate drive applications please refer to "gate drive application notes".

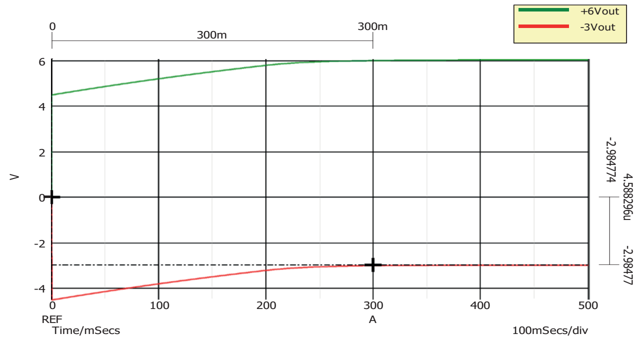
MGJ1DXX0603MC Capacitive loading and start up

The typical start up for single output variants, using a 56uF capacitor is 5mS. The start up behaviour of the +Vout and -Vout rails of a dual output DC-DC using a divider network depends significantly on the additional capacitance added to the outputs. This is because the two capacitors behave as a capacitive divider. If the two capacitors are equal and 9V is applied across them the outputs will initially start as +/-4.5V.
There will be a settling time while the divider circuit adjusts to the correct voltages, to calulcate the approixmate value please refer to the following formula.

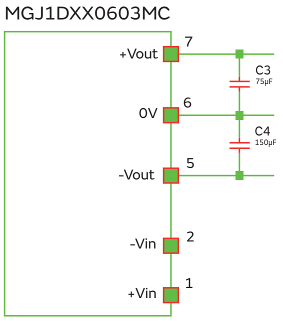
Settling time ≈ 3000 x C (s)

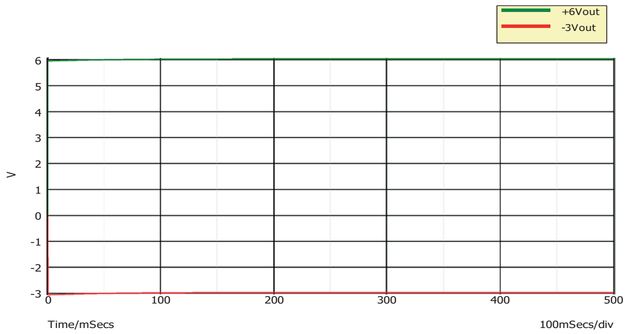
So, for instance if a maximum capacitance of 100uF is applied to each output the settling time will be about 300ms.





To avoid spurious gate pulses it is recommended that the PWM gate signal is not applied until after the settling time has ended.
An alternative method to reduce the settling time is to adjust the values of the additional capacitance so that the CV products are equal. i.e. C3 x 6V = C4 x 3V.
So, for instance if a maximum capacitance of 75uF is applied to the +6V output and 150uF is applied to the -3V output the settling time is greatly reduced.





NB: The total maximum series capacitance across 9V = 50uF.

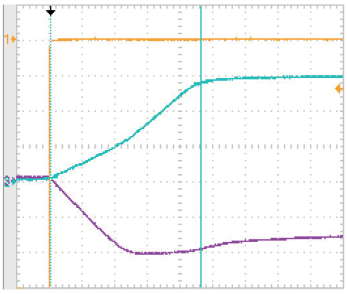
APPLICATION NOTES (Continued)

Capacitive loading and start up

Typical start up times for this series, with a typical input voltage rise time of 2.2μs and output capacitance of 10μF, are shown in the table below. The product series will start into capacitance up to 47μF with increased start times.

	Start-up time ms
MGJ1D052005SC	7
MGJ1D121503SC	4
MGJ1D121505SC	5
MGJ1D121802SC	6
MGJ1D122005SC	7
MGJ1D151509SC	5
MGJ1D152005SC	6
MGJ1D241503SC	2
MGJ1D241505SC	5
MGJ1D241509SC	5
MGJ1D241802SC	5
MGJ1D242005SC	5

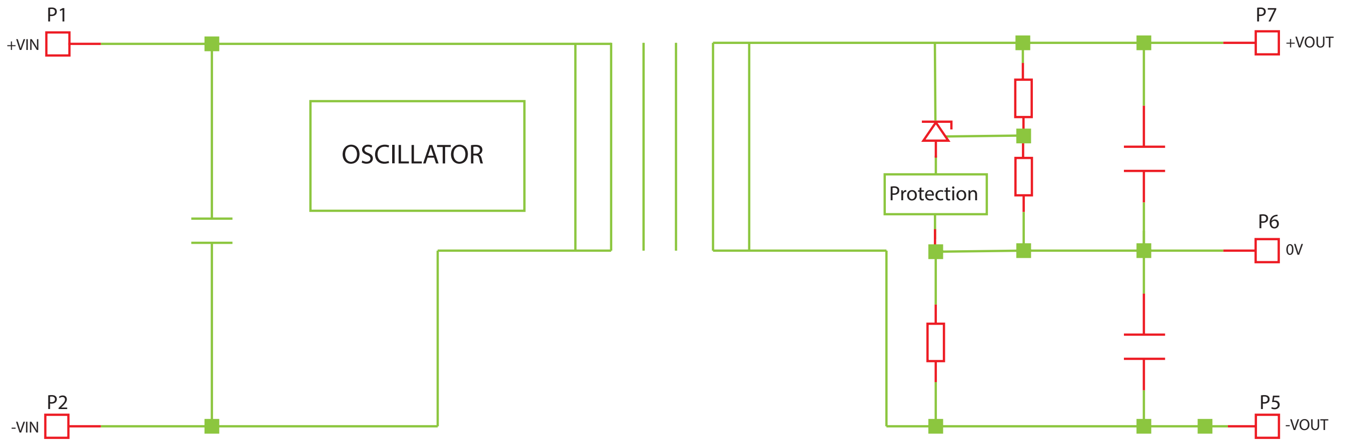
Typical Start-Up Wave Form



APPLICATION NOTES (Continued)

Dual Output Configuration MGJ1D050603SC and MGJ1D120603SC:

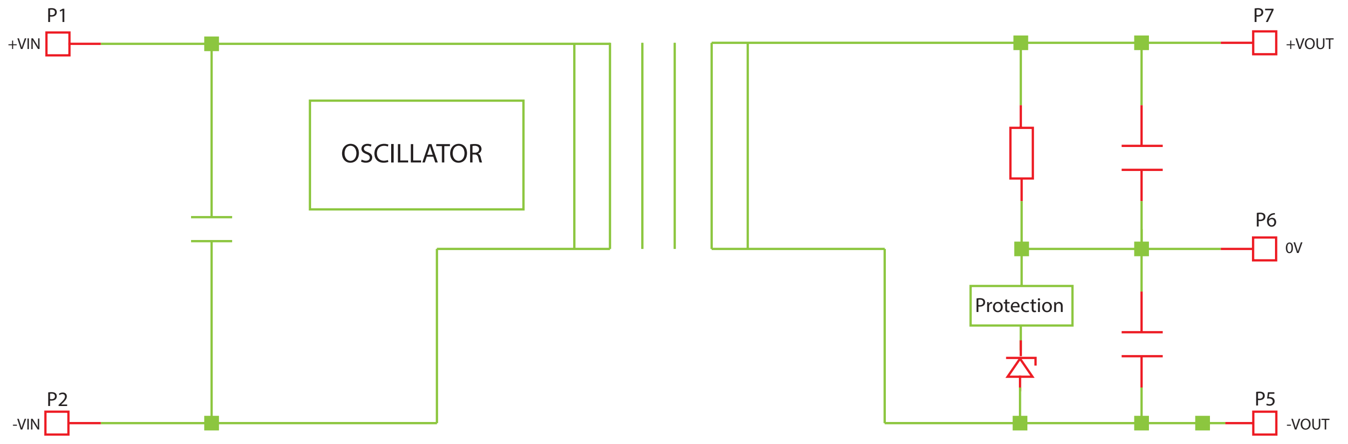
The MGJ1D050603SC and MGJ1D120603SC provide a dual output by using a reference IC and resistor divider network circuit with patented short circuit protection. This is important to maintain an accurate 6V to the gate of the GaN device over the temperature range and operating conditions, something a Zener diode cannot guarantee.



All Other Variants:

The MGJ1 SIP series is a dual output DC-DC specifically designed for gate drive applications and its output configuration is not suitable for application usage as a general dual output DC-DC converter. However the MGJ1 SIP series can be used as a general purpose single output converter, by loading from +Vout to -Vout.

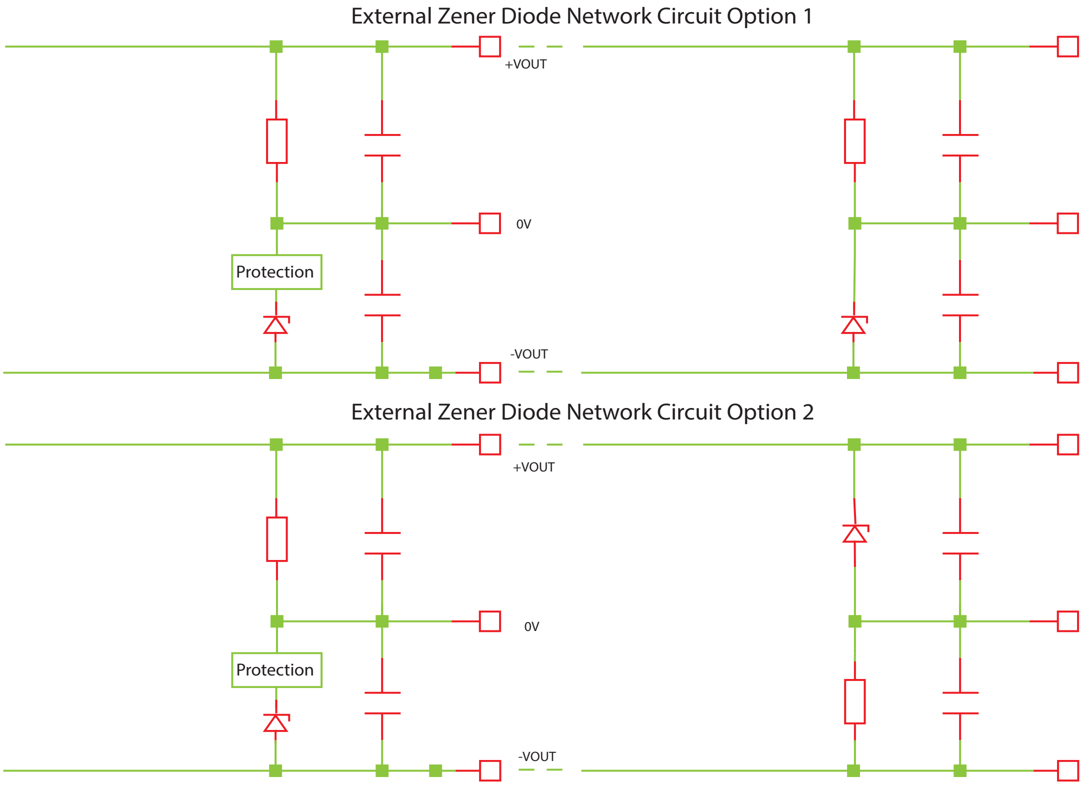
The MGJ1DXX1503SC, MGJ1DXX1505SC, MGJ1DXX1509SC, MGJ1DXX1802SC and MGJ1DXX2005SC provides a dual output by using a zener voltage divider network, the negative output is obtained by using a zener diode as a voltage regulator. If a short circuit occurs, the zener diode is protected. A 2V7 zener diode is used to set the -2.5Vout, a 3V3 zener diode to set the -3Vout, a 5V1 zener diode to set the -5Vout and a 9V3 zener diode is used to set the -9Vout. A tolerance of 2% should be taken into consideration for the zener diodes. All the zener diodes are rated at 400mW.



APPLICATION NOTES (Continued)

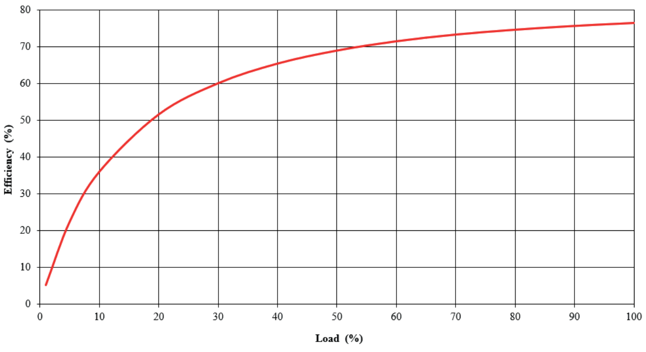
Optional Configuration:

For optional configuration where alternative negative output voltages are required, an external zener diode network can be connected across the main 18V, 20V, 20.5V, 24V or 25V output. However this zener diode will no longer be protected from short circuits as the internal short circuit protection is bypassed.

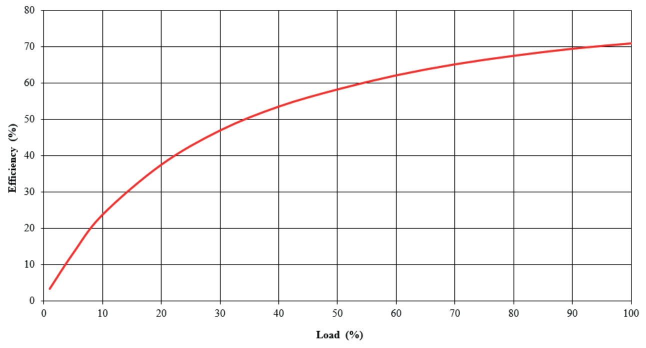


EFFICIENCY VS LOAD

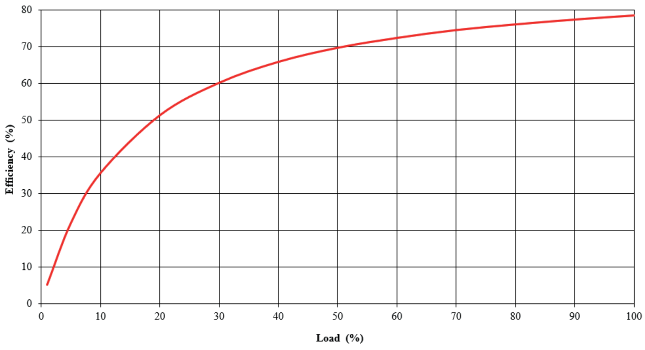
MGJ1D050603SC



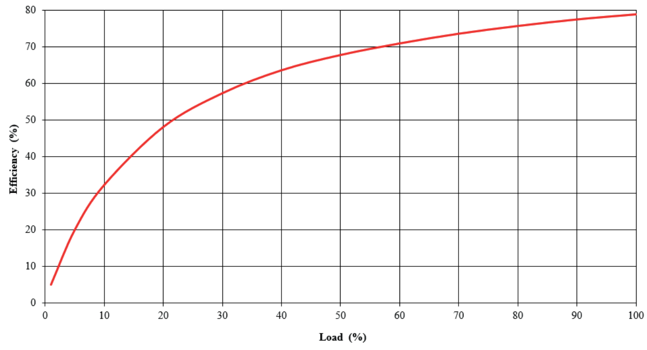
MGJ1D052005SC



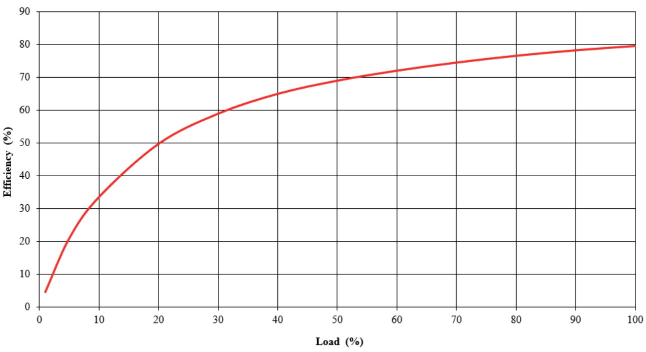
MGJ1D120603SC



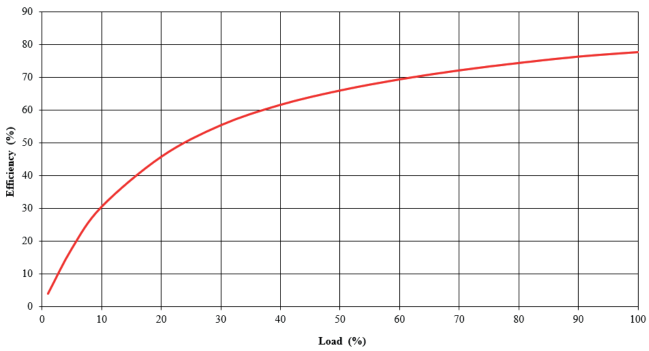
MGJ1D121503SC



MGJ1D121505SC

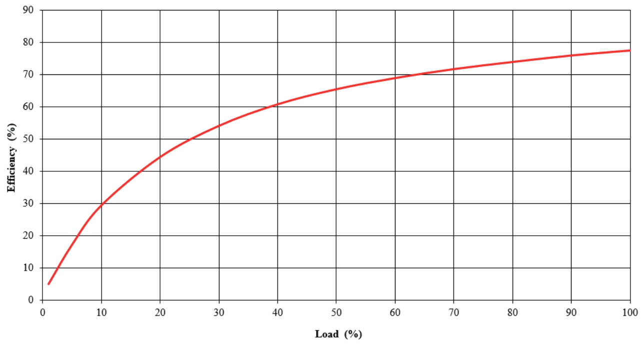


MGJ1D121802SC

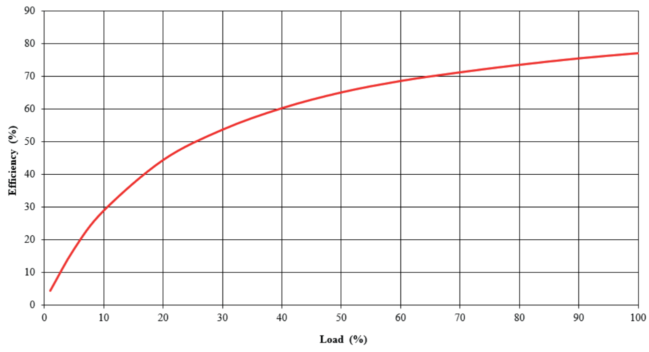


EFFICIENCY VS LOAD (Continued)

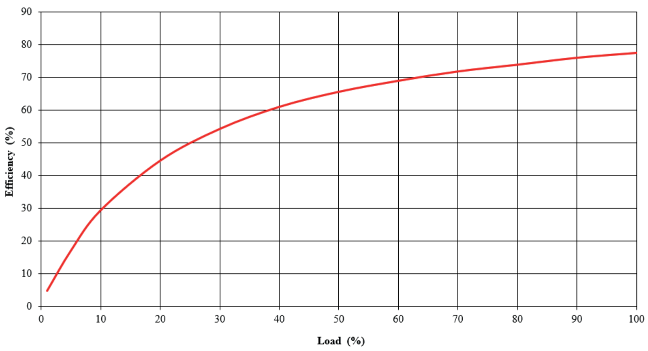
MGJ1D122005SC



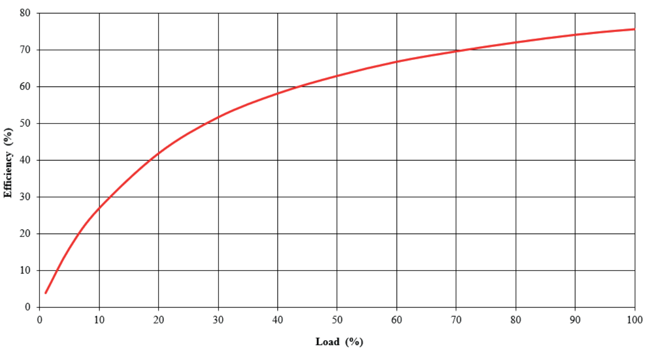
MGJ1D151509SC



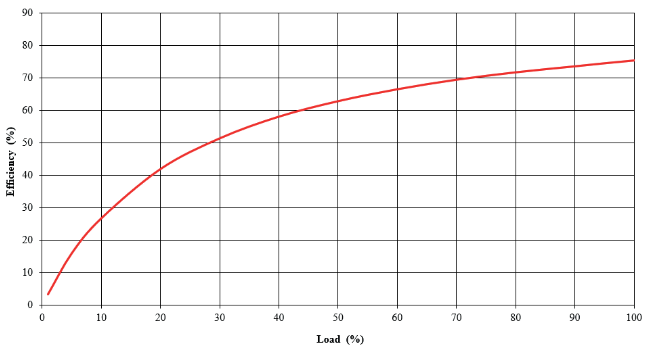
MGJ1D152005SC



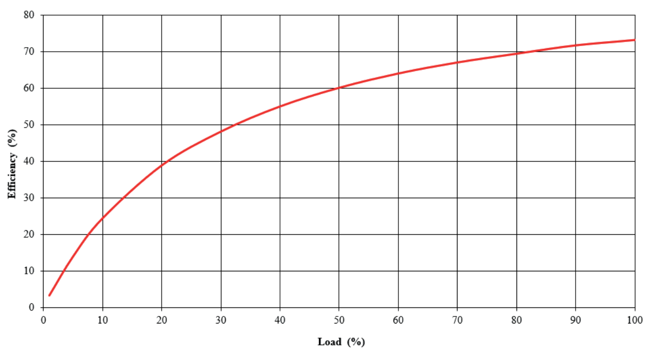
MGJ1D241503SC



MGJ1D241505SC

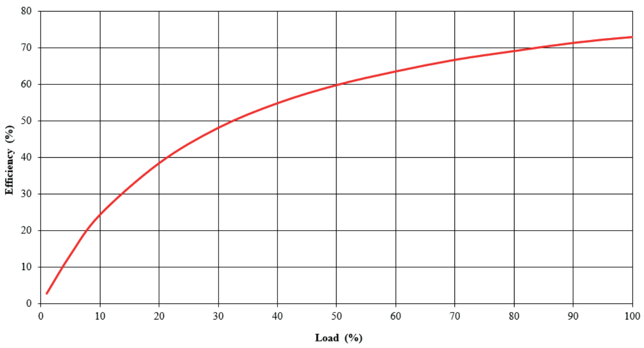


MGJ1D241509SC

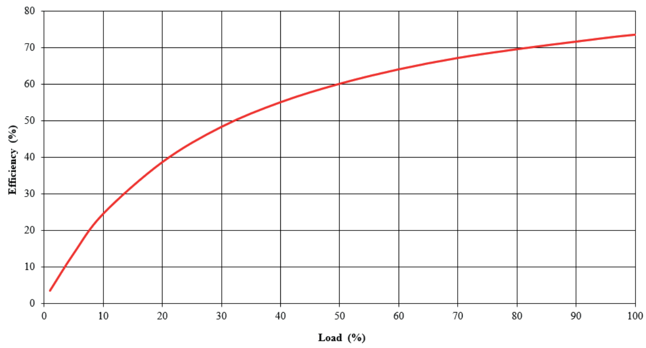


EFFICIENCY VS LOAD (Continued)

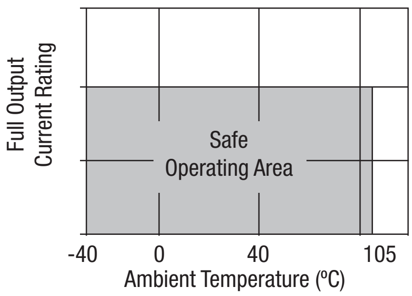
MGJ1D241802SC



MGJ1D242005SC



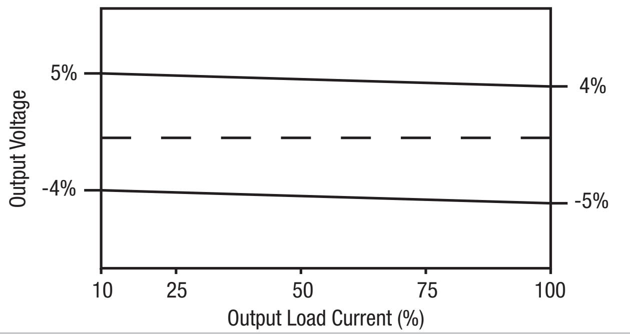
TEMPERATURE DERATING GRAPHS



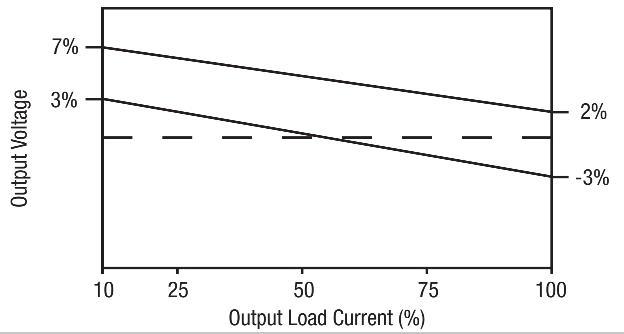
POSITIVE OUTPUT VOLTAGE TOLERANCE ENVELOPES

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.

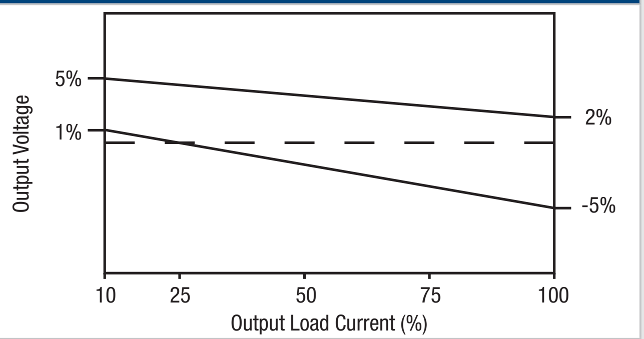
XX0603



052005



121503



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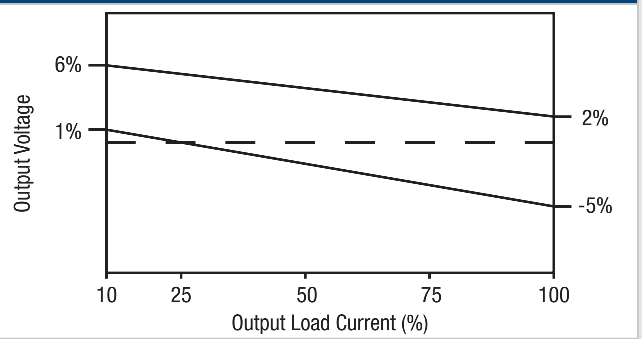
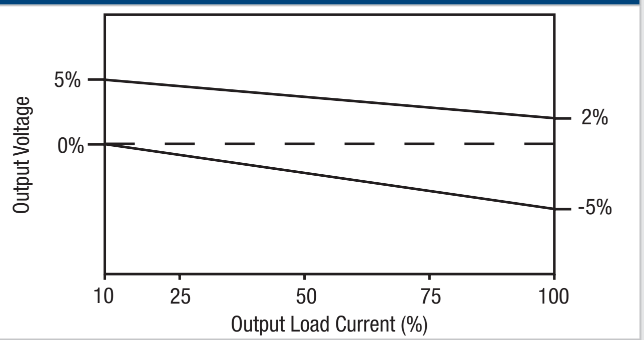
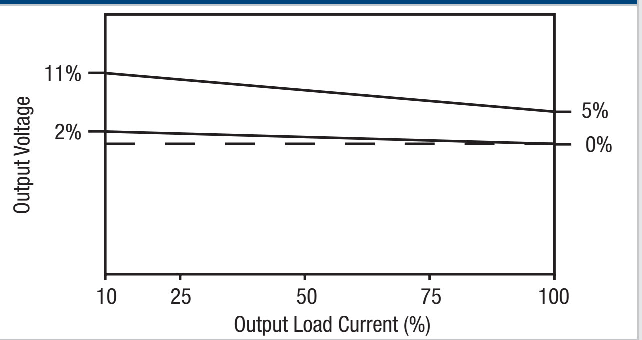


121802

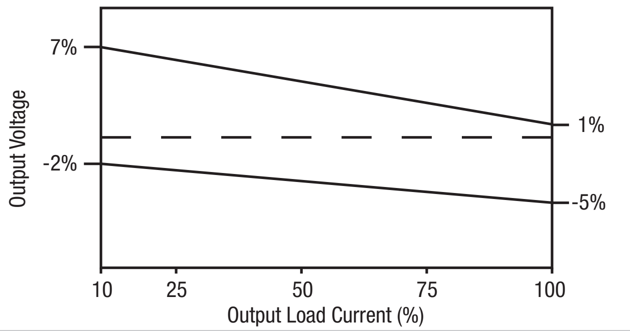


122005

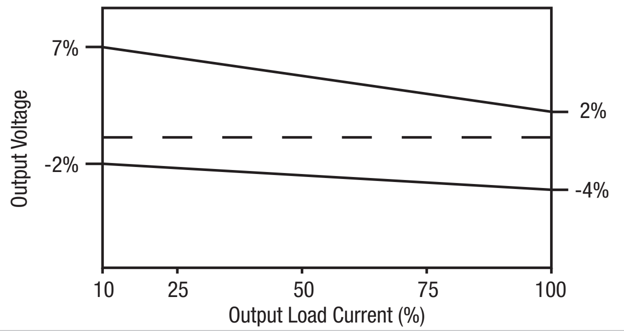


POSITIVE OUTPUT VOLTAGE TOLERANCE ENVELOPES (Continued)

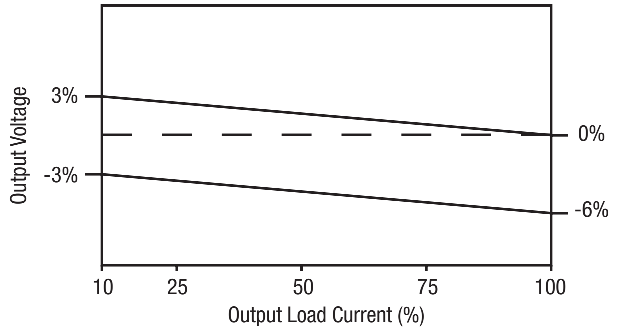
151509



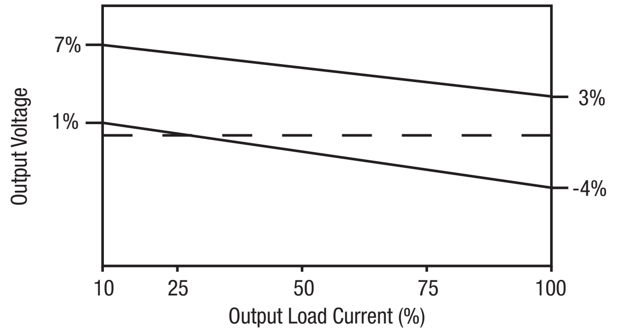
152005



241503



241505



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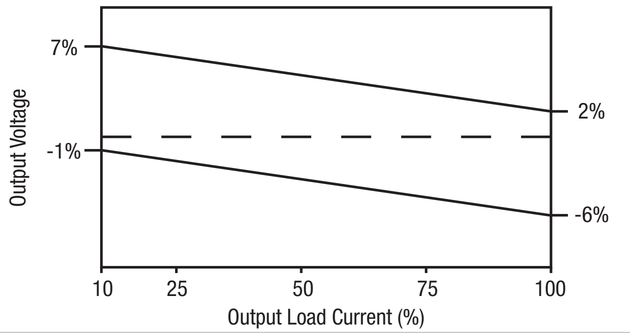

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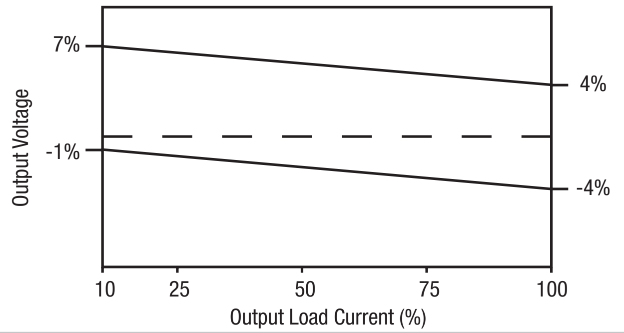
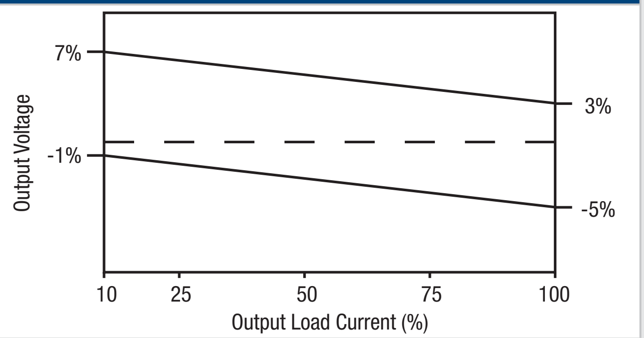
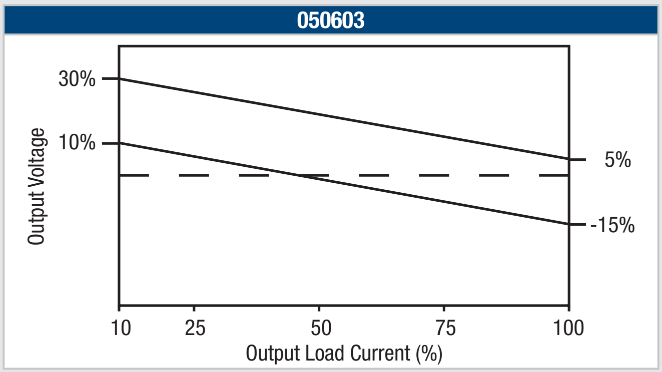
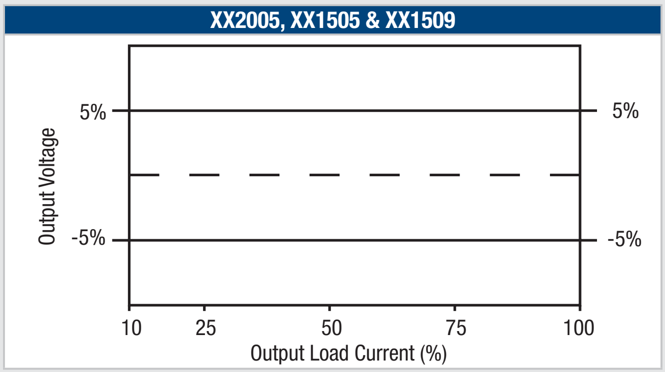


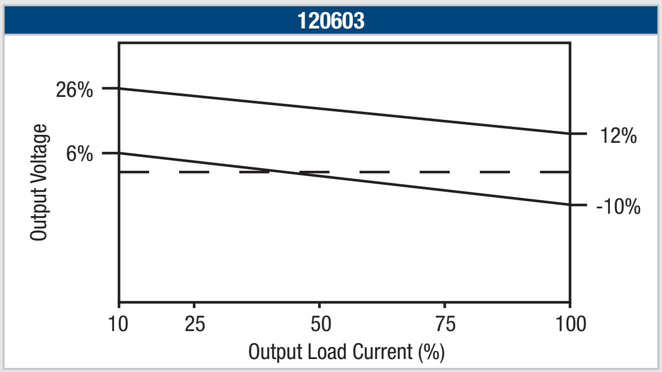
242005

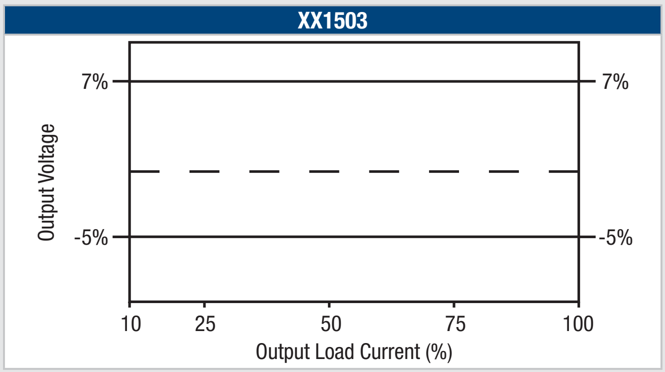


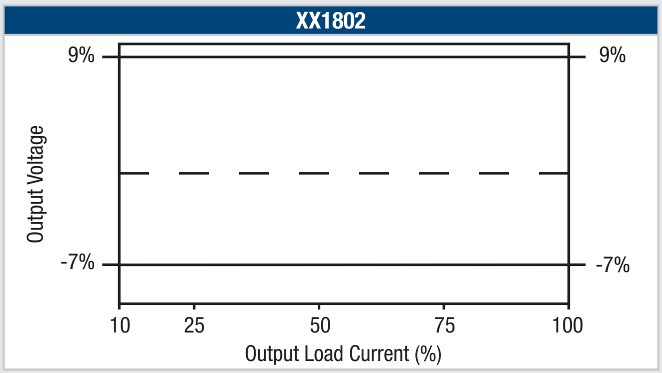
NEGATIVE OUTPUT VOLTAGE TOLERANCE ENVELOPES







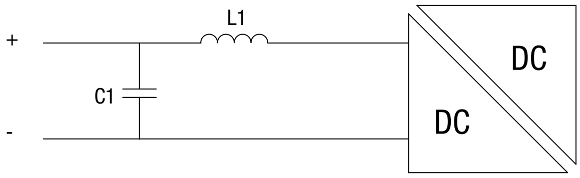




EMC FILTERING AND SPECTRA

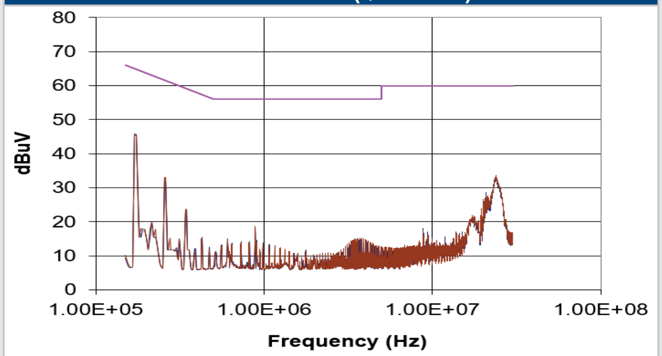
FILTERING

The following filter circuit and filter table shows the input filters typically required to meet EN55022 Quasi-PeakCurve A or B.

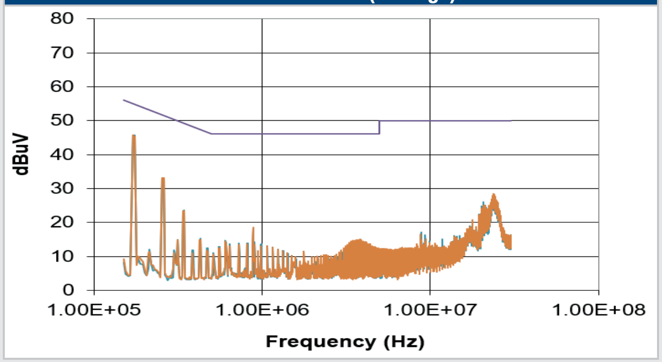


	Inductor			Capacitor		
	L, µH	SMD	Through Hole	C, µF	SMD	Through Hole
MGJ1D050603SC	10	84103C	13R103C	4.7	GRM21BC71E475KE11L	RCER71H475K3K1H03B
MGJ1D052005SC	10	84103C	13R103C	4.7	GRM21BC71E475KE11L	RCER71H475K3K1H03B
MGJ1D120603SC	10	84103C	13R103C	4.7	GRM21BC71E475KE11L	RCER71H475K3K1H03B
MGJ1D121503SC	10	84103C	13R103C	4.7	GRM21BC71E475KE11L	RCER71H475K3K1H03B
MGJ1D121505SC	10	84103C	13R103C	4.7	GRM21BC71E475KE11L	RCER71H475K3K1H03B
MGJ1D121802SC	10	84103C	13R103C	4.7	GRM21BC71E475KE11L	RCER71H475K3K1H03B
MGJ1D122005SC	10	84103C	13R103C	4.7	GRM21BC71E475KE11L	RCER71H475K3K1H03B
MGJ1D151509SC	10	84103C	13R103C	4.7	GRM21BC71E475KE11L	RCER71H475K3K1H03B
MGJ1D152005SC	10	84103C	13R103C	4.7	GRM21BC71E475KE11L	RCER71H475K3K1H03B
MGJ1D241503SC	10	84103C	13R103C	4.7	GRM21BC71H475KE11L	RCER71H475K3K1H03B
MGJ1D241505SC	10	84103C	13R103C	4.7	GRM21BC71H475KE11L	RCER71H475K3K1H03B
MGJ1D241509SC	10	84103C	13R103C	4.7	GRM21BC71H475KE11L	RCER71H475K3K1H03B
MGJ1D241802SC	10	84103C	13R103C	4.7	GRM21BC71H475KE11L	RCER71H475K3K1H03B
MGJ1D242005SC	10	84103C	13R103C	4.7	GRM21BC71H475KE11L	RCER71H475K3K1H03B

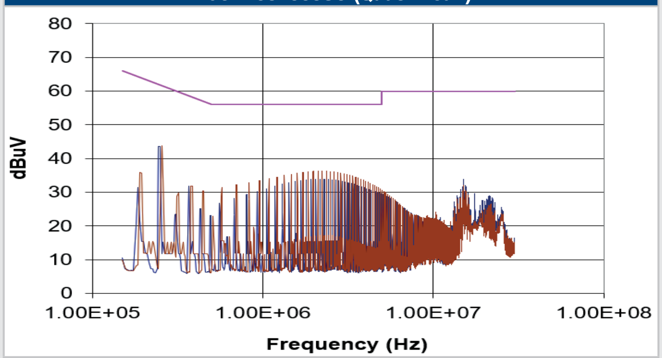
MGJ1D050603SC (Quasi-Peak)



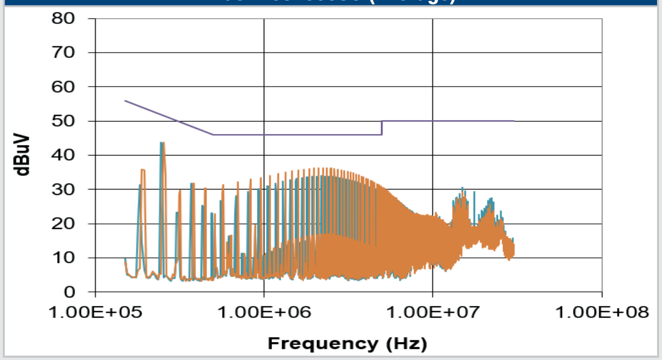
MGJ1D050603SC (Average)



MGJ1D052005SC (Quasi-Peak)

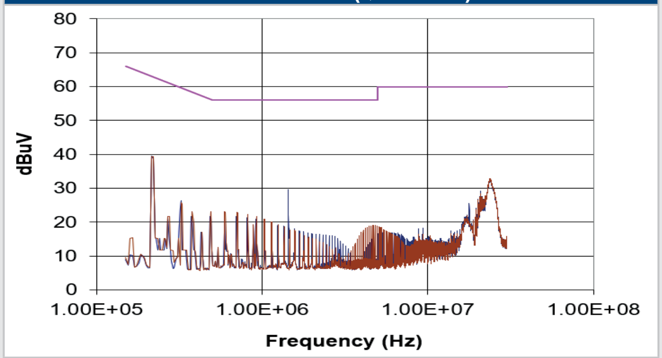


MGJ1D052005SC (Average)

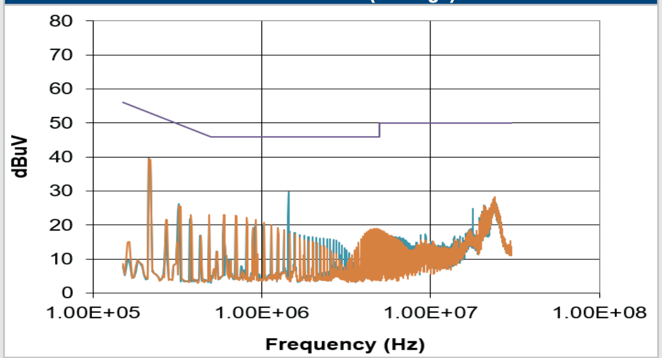


EMC FILTERING AND SPECTRA (Continued)

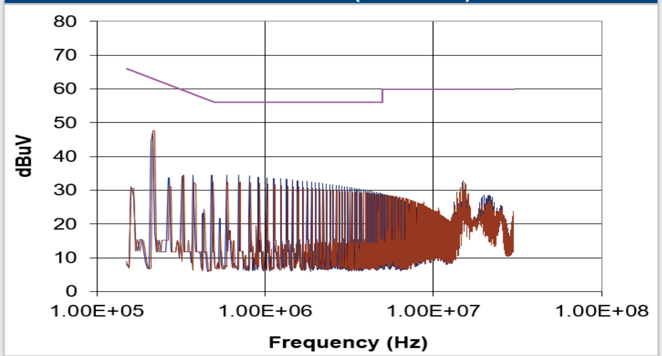
MGJ1D120603SC (Quasi-Peak)



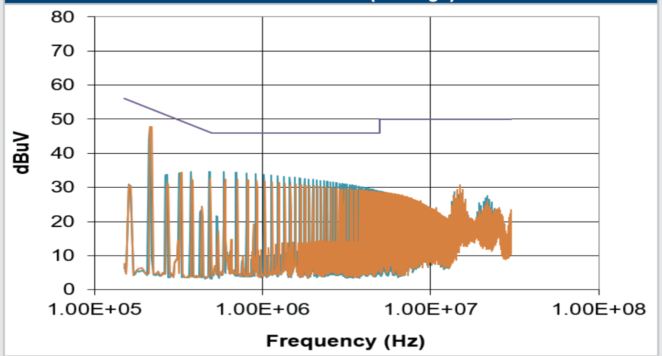
MGJ1D120603SC (Average)



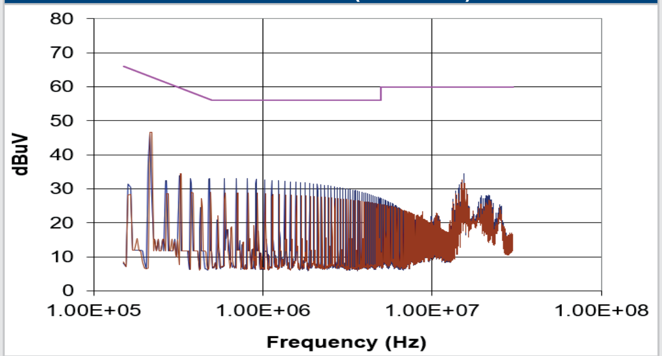
MGJ1D121503SC (Quasi-Peak)



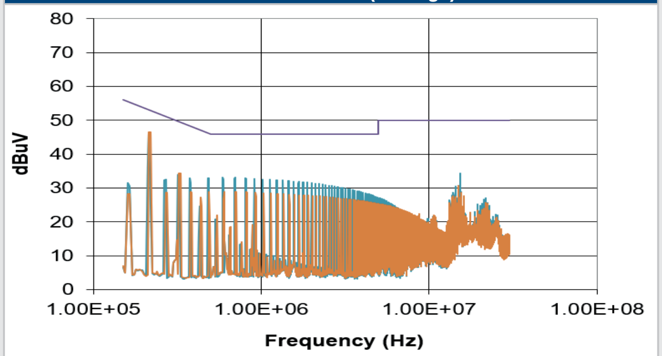
MGJ1D121503SC (Average)



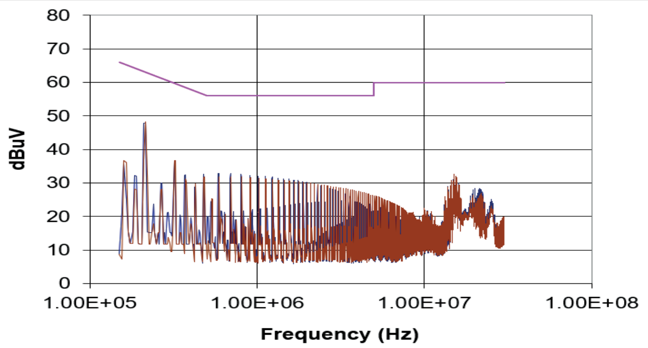
MGJ1D121505SC (Quasi-Peak)



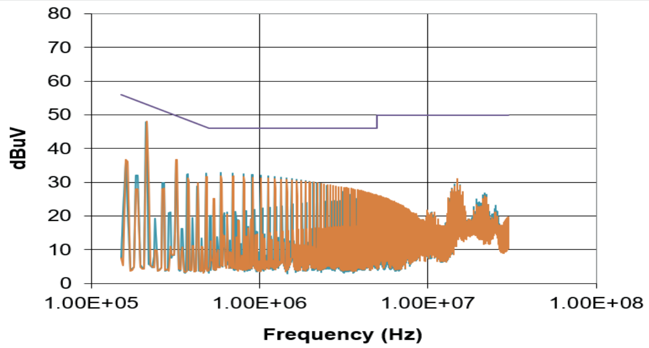
MGJ1D121505SC (Average)



MGJ1D121802SC (Quasi-Peak)

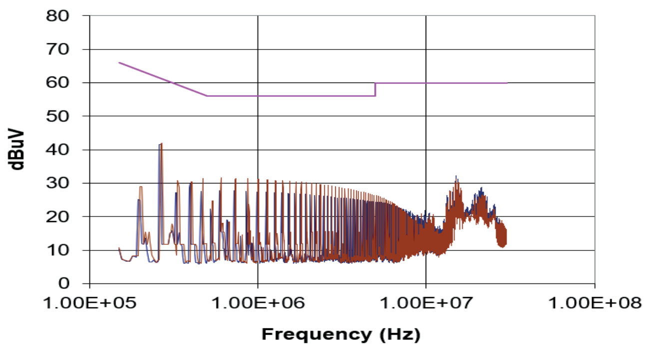


MGJ1D121802SC (Average)

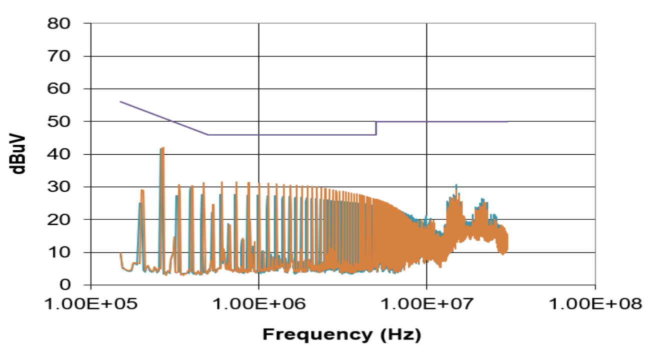


EMC FILTERING AND SPECTRA (Continued)

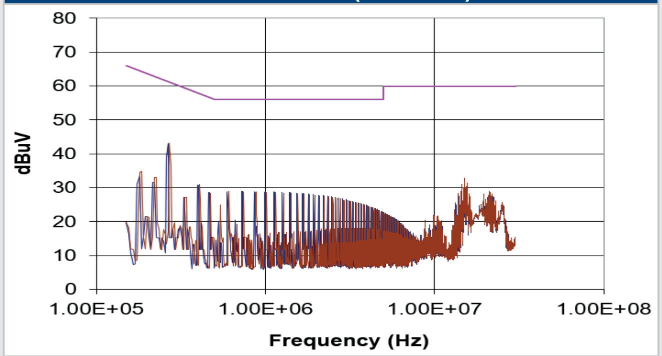
MGJ1D122005SC (Quasi-Peak)



MGJ1D122005SC (Average)



MGJ1D151509SC (Quasi-Peak)



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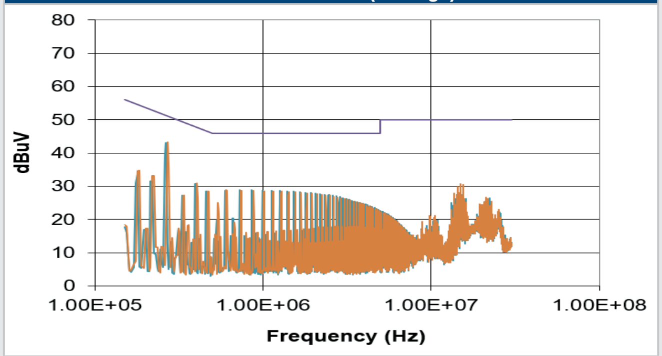

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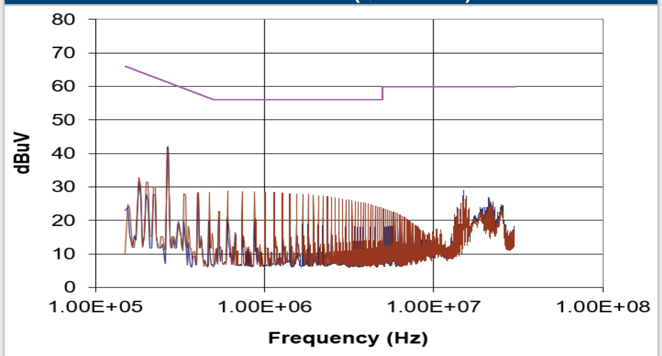

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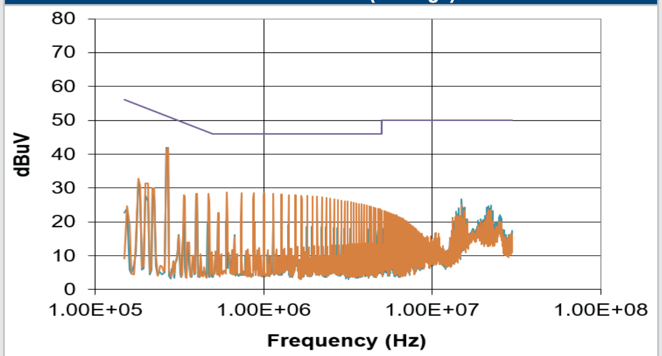
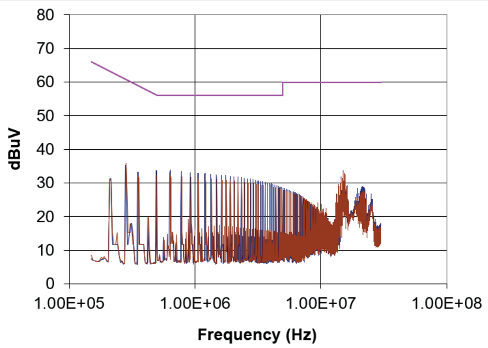


MGJ1D241503SC (Quasi-Peak)



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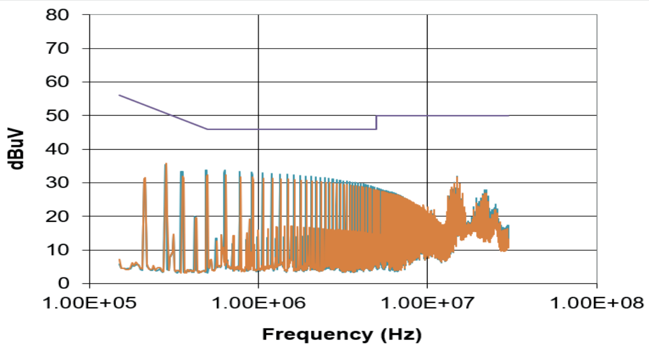
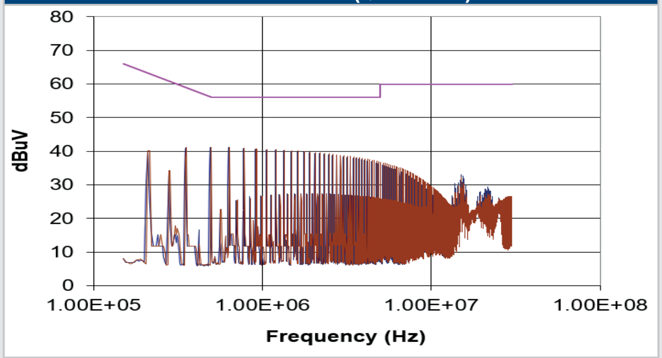


EMC FILTERING AND SPECTRA (Continued)

MGJ1D241505SC (Quasi-Peak)



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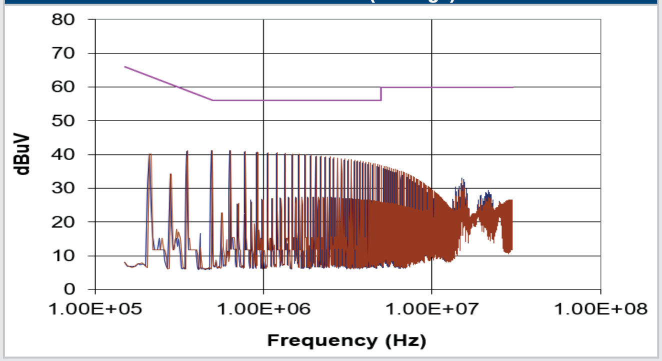
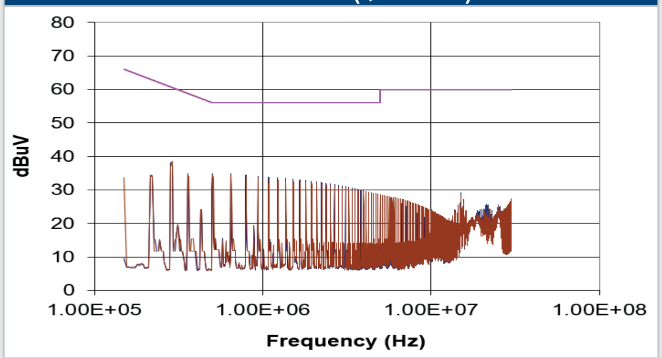


MGJ1D241509SC (Quasi-Peak)



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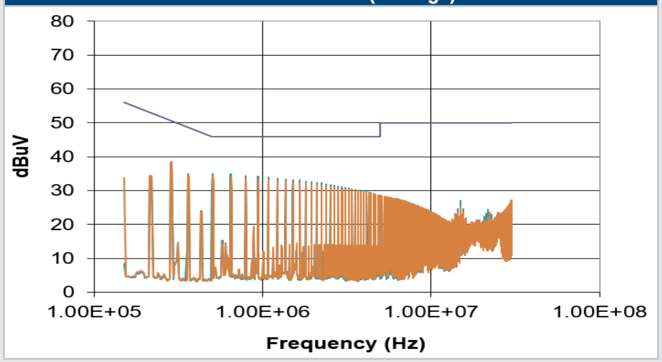
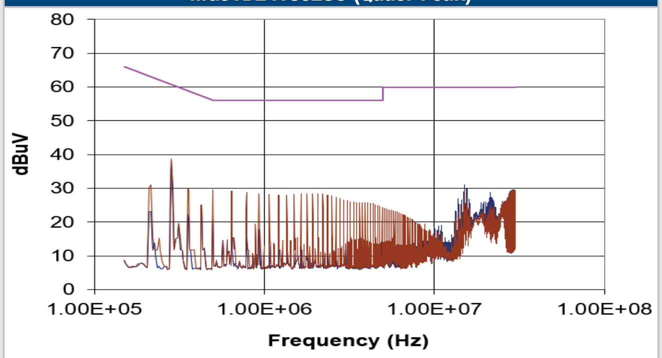


MGJ1D241802SC (Quasi-Peak)



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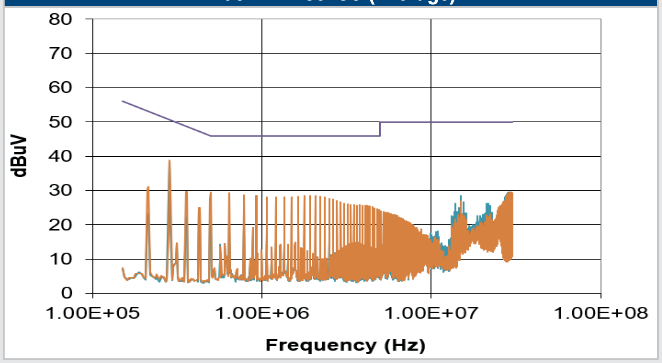

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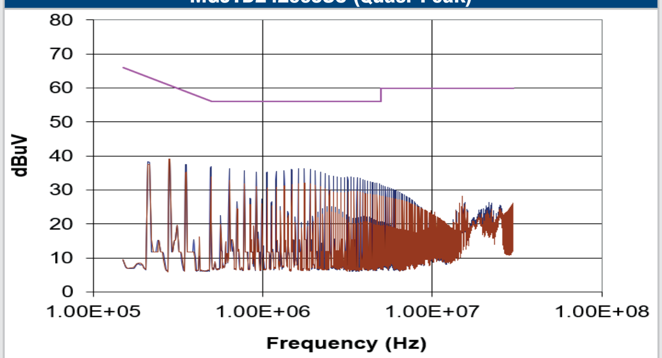

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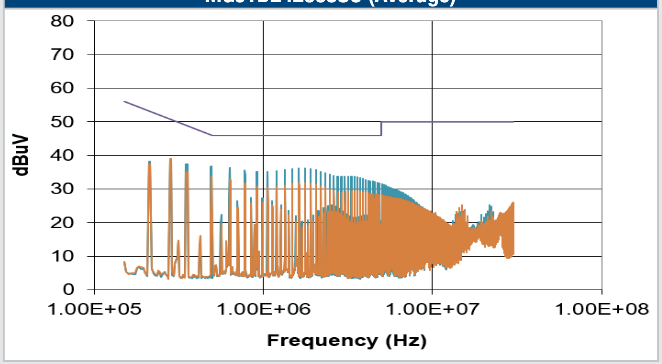
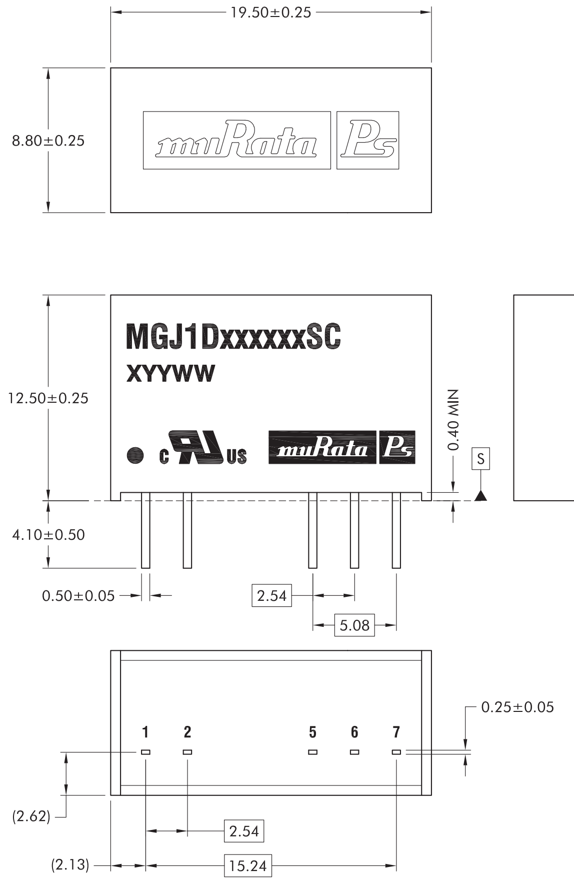


PACKAGE SPECIFICATIONS

MECHANICAL DIMENSIONS



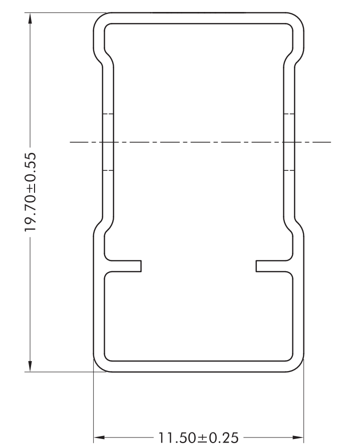
All dimensions in mm. All pins on a 2.54 pitch and within ±0.1 of true position from pin 1 at seating plane 'S'.

Weight: 3.8g

PIN CONNECTIONS

Pin	Function
1	$+V_{IN}$
2	$-V_{IN}$
5	$-V_{OUT}$
6	0V
7	$+V_{OUT}$

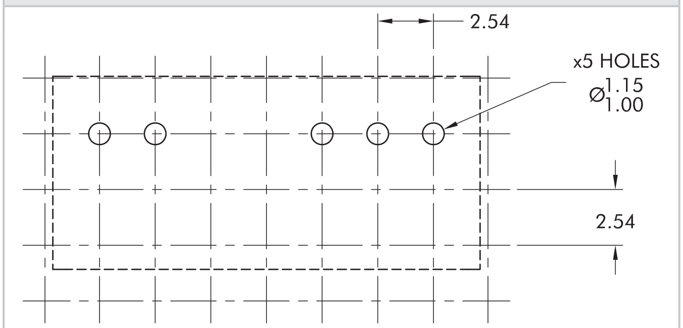
Tube outline dimensions



Unless otherwise stated all dimensions in mm.
Tube length : 525mm ±2.0.

Tube Quantity : 25

RECOMMENDED FOOTPRINT DETAILS



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- Aerospace equipment
- Undersea equipment
- Power plant control equipment
- Medical equipment
- Transportation equipment (automobiles, trains, ships, etc.)
- Traffic signal equipment
- Disaster prevention / crime prevention equipment
- Data Processing equipment

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