



# Test Report : RQB60W12-110S48

---

60W Quarter Brick 14~160Vdc Ultra-wide Input Railway DC-DC Converter

## ■ DESIGN VERIFY TEST

Output Function Test  
Input Function Test  
Protection Function Test  
Control Function Test

## ■ SAFETY TEST

Safety Test

## ■ RELIABILITY TEST

Environment Test

## DESIGN VERIFY TEST

### OUTPUT FUNCTION TEST

NO	TEST ITEM	SPECICATION	TEST CONDITION	RESULT	VERDITC
1	VOLTAGE ACCURACY	-1.0% ~ +1.0 %	I/P:110VDC O/P:FULL LOAD Ta:25°C	-0.05%	P
2	RIPPLE & NOISE	150 mVp-p	I/P:110VDC O/P:FULL LOAD Ta:25°C	56mV	P
3	LINE REGULATION	-0.2% ~ +0.2%	I/P:14VDC~160VDC O/P:FULL LOAD Ta:25°C	+0.00% ~ -0.06%	P
4	LOAD REGULATION	-0.2% ~ +0.2%	I/P:110VDC O/P:0% LOAD~FULL LOAD Ta:25°C	+0.00% ~ +0.01%	P

### INPUT FUNCTION TEST

NO	TEST ITEM	SPECICATION	TEST CONDITION	RESULT	VERDITC
1	INPUT VOLTAGE RANGE	14 VDC ~160 VDC	I/P:TESTING O/P:FULL LOAD Ta:25°C	12.89VDC ~160 VDC	P
2	EFFICIENCY	89%	I/P:110VDC O/P:FULL LOAD Ta:25°C	89.37%	P
3	DC CURRENT	610 mA / FULL LOAD 15 mA / NO LOAD	I/P:110VDC O/P:NO / FULL LOAD Ta:25°C	596mA / FULL LOAD 9.0 mA / NO LOAD	P

### PROTECTION FUNCTION TEST

NO	TEST ITEM	SPECICATION	TEST CONDITION	RESULT	VERDITC
1	SHORT PROTECTION	CONTINUOUS	I/P:160VDC O/P:FULL LOAD Ta:25°C	HICCUP MODE AUTO-RECOVER	P
2	OVER LOAD PROTECTION	110% ~ 180%	I/P:110VDC O/P:TESTING Ta:25°C	162.8% HICCUP MODE AUTO-RECOVER	P
3	OVER VOLTAGE PROTECTION	YES	I/P:110VDC O/P:TESTING Ta:25°C	CLAMP BY ZENER DIODE	P
4	OVER TEMPERATURE PROTECTION	+115°C THERMAL SHUTDOWN	I/P:110VDC O/P:TESTING Ta: TESTING	OK AUTOMATIC RECOVERY	P
5	UNDER VOLTAGE LOCKOUT	START-UP 13.6V SHUTDOWN VOLTAGE 12.7V	I/P:TESTING O/P:FULL LOAD Ta:25°C	13.51 VDC 12.89 VDC	P

## CONTROL FUNCTION TEST

NO	TEST ITEM	SPECICATION	TEST CONDITION	RESULT	VERDITC
1	REMOTE CONTROL	Power on : R.C. ~ - Vin>3.0~12Vdc or open circuit Power off : R.C. ~ - Vin <1.2Vdc or short	I/P:110VDC O/P:FULL LOAD Ta:25°C	Power on : R.C>3.0Vdc or Open Power off : R.C<1.2Vdc or short	P
2	TRIM CONTROL	+10%~-10% (Typ) Trim ~ +Vout Trim DOWN Trim ~ -Vout Trim UP Using 500K ohm VR	I/P:110VDC O/P:FULL LOAD Ta:25°C	Trim DOWN -9.89% Trim UP +9.71%	P

## SAFETY TEST

### SAFETY TEST

NO	TEST ITEM	SPECICATION	TEST CONDITION	RESULT	VERDITC
1	WITHSTAND VOLTAGE	I/P-O/P:3.0K VDC/min	I/P-O/P:3.0K VDC/min Ta:25°C	I/P-O/P: 0.002mA NO DAMAGE	P
2	ISOLATION RESISTANCE	I/P-O/P:500VDC>1000MΩ	I/P-O/P:500 VDC Ta:25°C	I/P-O/P>1000MΩ NO DAMAGE	P

## RELIABILITY TEST

### ENVIRONMENT TEST

NO	TEST ITEM	SPECICATION	TEST CONDITION	RESULT	VERDITC															
1	TEMPERATURE RISE TEST	1. ROOM AMBIENT BURN-IN : 4HRS I/P:110VDC O/P:FULL LOAD Ta=25°C 2. HIGH AMBIENT BURN-IN : 4HRS I/P:110VDC O/P:FULL LOAD Ta=50°C 3. HIGH AMBIENT BURN-IN : 4HRS I/P:110VDC O/P:50% LOAD Ta=70°C 4. HIGH AMBIENT ADD BASEPLATE BURN-IN : 4HRS I/P:110VDC O/P:100% LOAD Ta=70°C 5. HIGH AMBIENT ADD BASEPLATE BURN-IN : 4HRS I/P:110VDC O/P:50% LOAD Ta=85°C			P															
		<table border="1"> <thead> <tr> <th>NO</th> <th>Position</th> <th>1</th> <th>2</th> <th>3</th> <th>4</th> <th>5</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>CASE</td> <td>81°C</td> <td>100.6°C</td> <td>100.4°C</td> <td>107.3°C</td> <td>105.1°C</td> </tr> </tbody> </table>					NO	Position	1	2	3	4	5	1	CASE	81°C	100.6°C	100.4°C	107.3°C	105.1°C
NO	Position	1	2	3	4	5														
1	CASE	81°C	100.6°C	100.4°C	107.3°C	105.1°C														
2	LOW TEMPERATURE TURN ON TEST	TURN ON AFTER 4 HOURS	I/P:110VDC O/P: FULL LOAD Ta= -40°C	TEST : OK	P															

## OTHER

NO	TEST ITEM	SPECICATION	TEST CONDITION	RESULT	VERDITC
1	MTBF	MIL-HDBK-217F,GB,25°C TOTAL FAILURE RATE : 4.878048 M.T.B.F : 205KHRS			P

TEST RESULT	TESTER	APPROVAL
PASS	ARCHEN HSIAO	PETER CHENG