



SPN10T10 N-Channel Enhancement Mode MOSFET

DESCRIPTION

The SPN10T10 is the N-Channel logic enhancement mode power field effect transistor which is produced using super high cell density DMOS trench technology. The SPN10T10 has been designed specifically to improve the overall efficiency of DC/DC converters using either synchronous or conventional switching PWM controllers. It has been optimized for low gate charge, low $R_{DS(ON)}$ and fast switching speed.

FEATURES

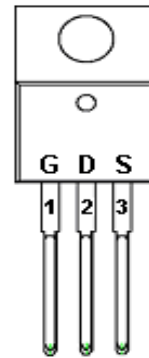
- ◆ 100V/5A, $R_{DS(ON)} = 160m\Omega @ V_{GS} = 10V$
- ◆ High density cell design for extremely low $R_{DS(ON)}$
- ◆ Exceptional on-resistance and maximum DC current capability
- ◆ TO-220, TO-220F package design

APPLICATIONS

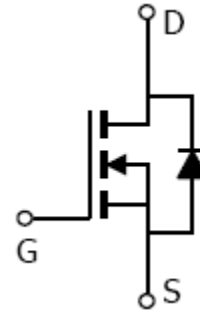
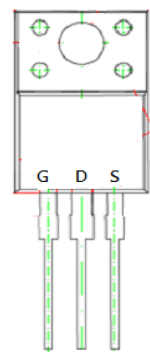
- Powered System
- DC/DC Converter
- Load Switch

PIN CONFIGURATION

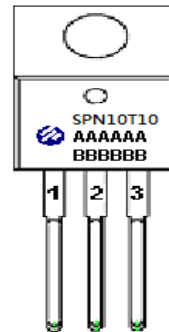
TO-220



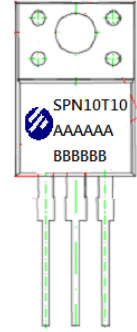
TO-220F



PART MARKING



A : Lot Code
B : Date Code
(YY / MM / DD)



A: Lot Code
B: Date Code
(YYMMDD)



SPN10T10

N-Channel Enhancement Mode MOSFET

PIN DESCRIPTION

Pin	Symbol	Description
1	G	Gate
2	D	Drain
3	S	Source

ORDERING INFORMATION

Part Number	Package	Part Marking
SPN10T10T220TGB	TO-220	SPN10T10
SPN10T10T220FTGB	TO-220F	SPN10T10

※ SPN10T10T220TGB : Tube ; Pb – Free ; Halogen - Free

※ SPN10T10T220FTGB : Tube ; Pb – Free ; Halogen - Free

ABSOLUTE MAXIMUM RATINGS

(TA=25°C Unless otherwise noted)

Parameter	Symbol	Typical	Unit	
Drain-Source Voltage	V _{DSS}	100	V	
Gate –Source Voltage	V _{GSS}	±20	V	
Continuous Drain Current(T _J =150°C)	I _D	T _C =25°C	9	A
		T _C =100°C	5.6	
Pulsed Drain Current	I _{DM}	30	A	
Avalanche Current	I _{AS}	9	A	
Power Dissipation	P _D	T _C = 25°C	28	W
		T _C =100°C	10	
Operating Junction Temperature	T _J	150	°C	
Storage Temperature Range	T _{STG}	-55/150	°C	
Thermal Resistance-Junction to Ambient	R _{θJA}	65	°C/W	



SPN10T10

N-Channel Enhancement Mode MOSFET

ELECTRICAL CHARACTERISTICS

(TA=25°C Unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ	Max.	Unit
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=250\mu A$	100			V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1		3	
Gate Leakage Current	I_{GSS}	$V_{DS}=0V, V_{GS}=\pm 20V$			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=80V, V_{GS}=0V$			25	uA
		$V_{DS}=80V, V_{GS}=0V$ $T_J=125^\circ C$			250	
On-State Drain Current	$I_{D(on)}$	$V_{DS}\geq 5V, V_{GS}=10V$	9			A
Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=5A$		0.110	0.160	Ω
Forward Transconductance	g_{fs}	$V_{DS}=10V, I_D=5A$		5.6		S
Diode Forward Voltage	V_{SD}	$I_S=9A, V_{GS}=0V$			1.3	V
Dynamic						
Total Gate Charge	Q_g	$V_{DS}=80V, V_{GS}=10V$ $I_D=5A$		10	16	nC
Gate-Source Charge	Q_{gs}			2.5		
Gate-Drain Charge	Q_{gd}			4.5		
Input Capacitance	C_{iss}	$V_{DS}=25V, V_{GS}=0V$ $f=1MHz$		430		pF
Output Capacitance	C_{oss}			56		
Reverse Transfer Capacitance	C_{rss}			35		
Turn-On Time	$t_{d(on)}$	$V_{DD}=50V, R_L=10\Omega$ $I_D=5A, V_{GEN}=10V$ $R_G=3.3\Omega$		6.5		nS
	t_r			10		
Turn-Off Time	$t_{d(off)}$			13		
	t_f			3.4		



SPN10T10 N-Channel Enhancement Mode MOSFET

TYPICAL CHARACTERISTICS

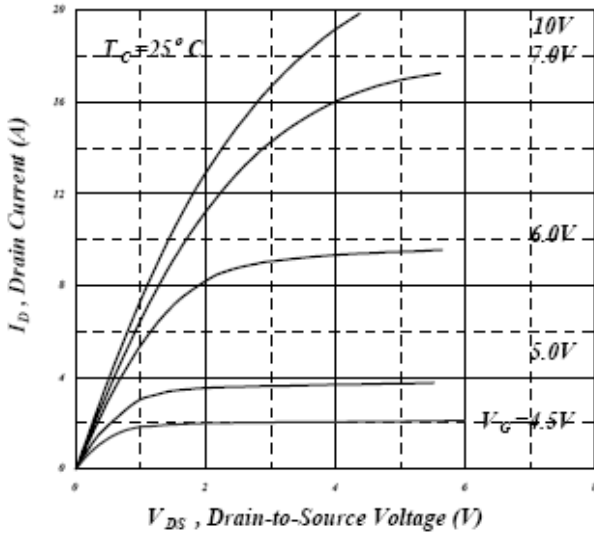


Fig 1. Typical Output Characteristics

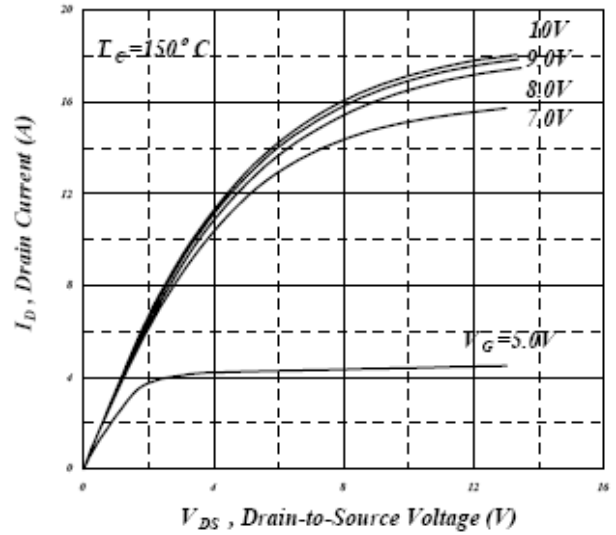


Fig 2. Typical Output Characteristics

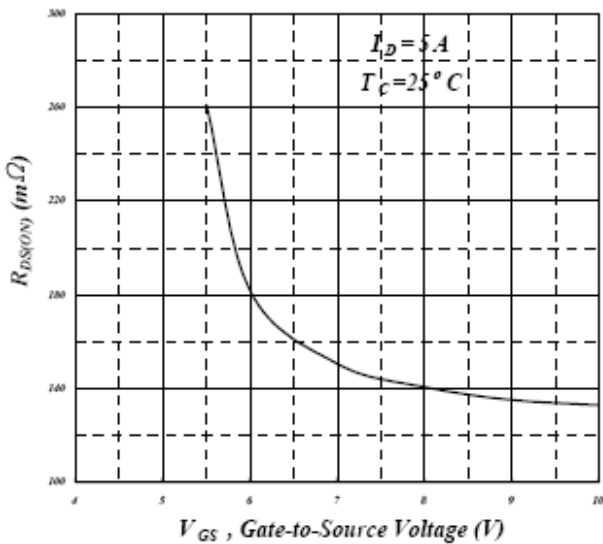


Fig 3. On-Resistance v.s. Gate Voltage

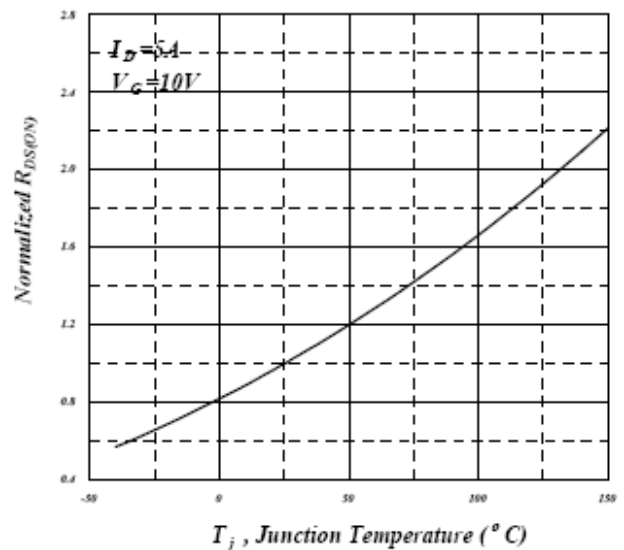


Fig 4. Normalized On-Resistance v.s. Junction Temperature



SPN10T10 N-Channel Enhancement Mode MOSFET

TYPICAL CHARACTERISTICS

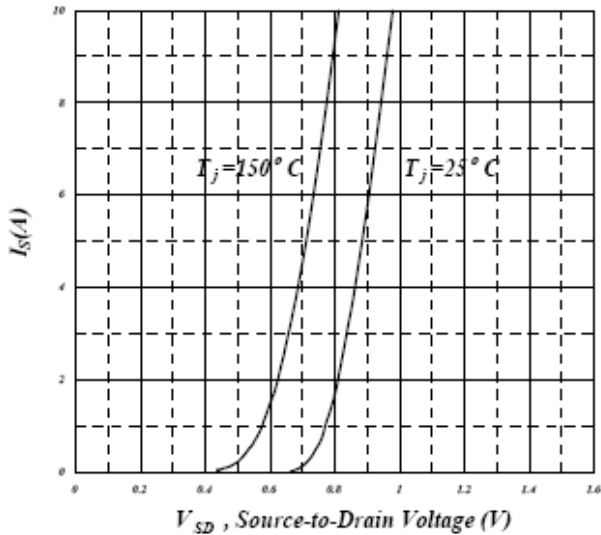


Fig 5. Forward Characteristic of Reverse Diode

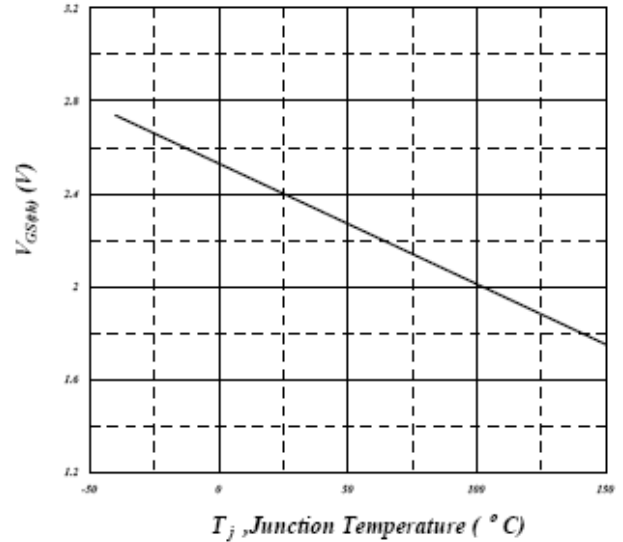


Fig 6. Gate Threshold Voltage v.s. Junction Temperature

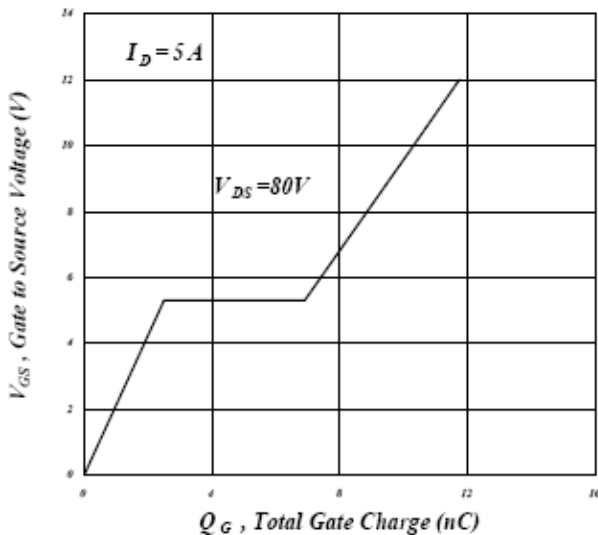


Fig 7. Gate Charge Characteristics

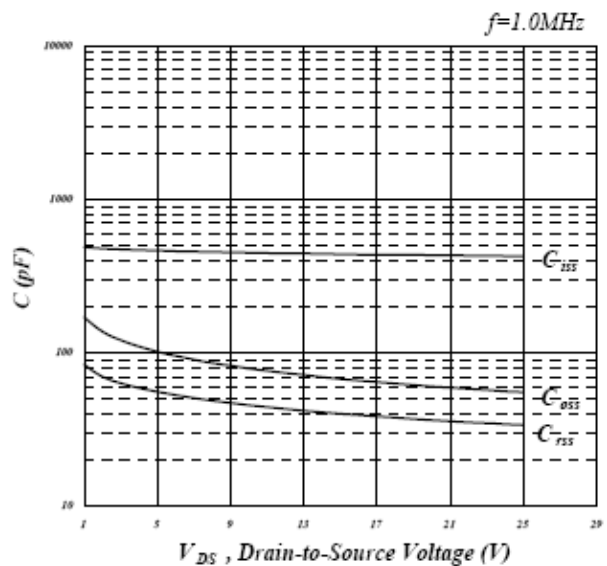


Fig 8. Typical Capacitance Characteristics



SPN10T10 N-Channel Enhancement Mode MOSFET

TYPICAL CHARACTERISTICS

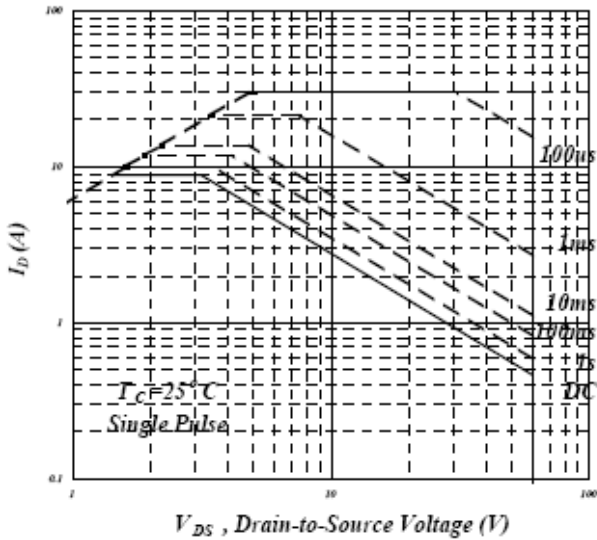


Fig 9. Maximum Safe Operating Area

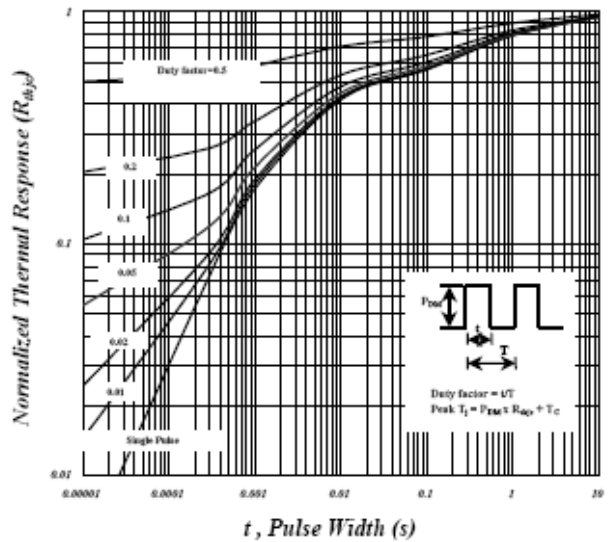


Fig 10. Effective Transient Thermal Impedance

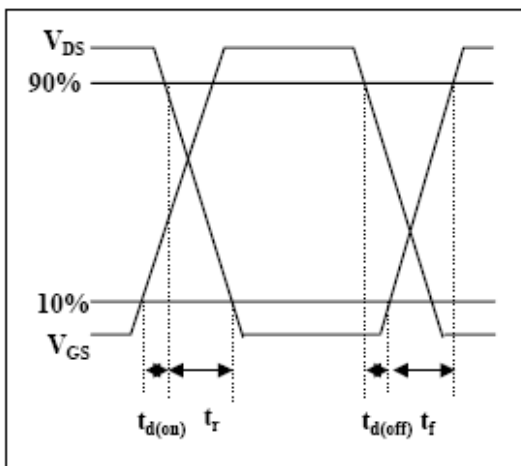


Fig 11. Switching Time Waveform

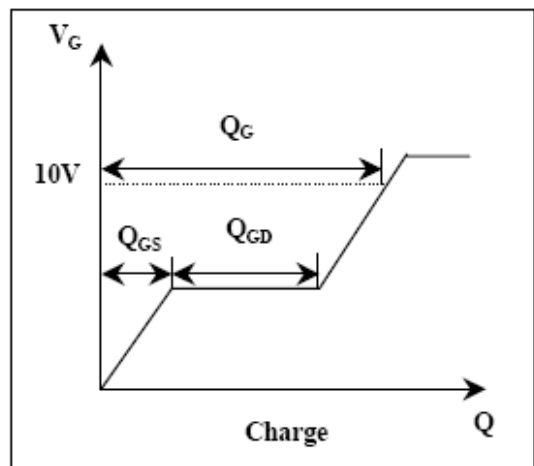
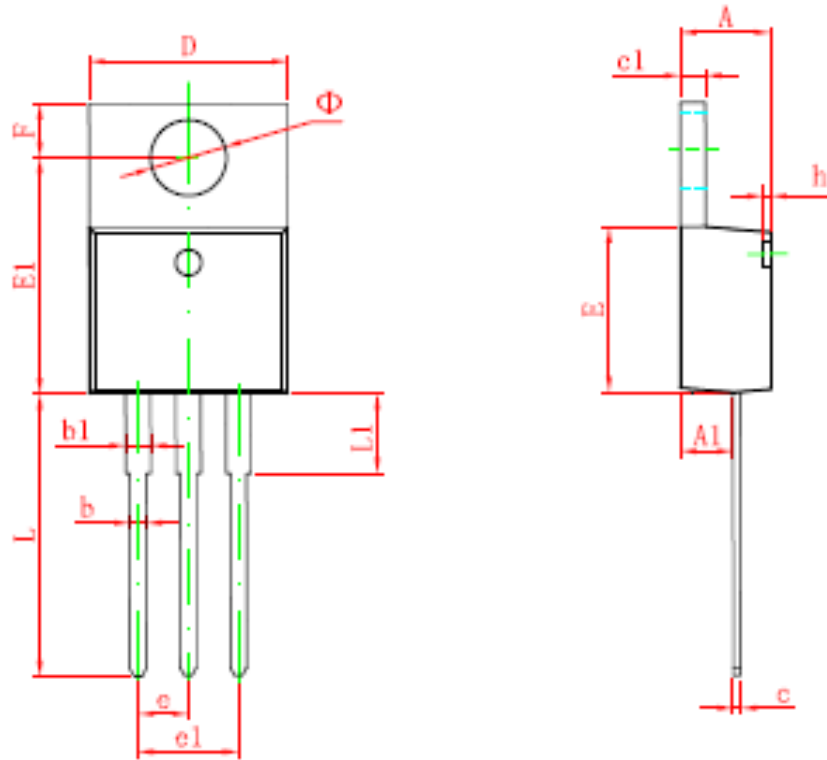


Fig 12. Gate Charge Waveform



SPN10T10 N-Channel Enhancement Mode MOSFET

TO-220 PACKAGE OUTLINE



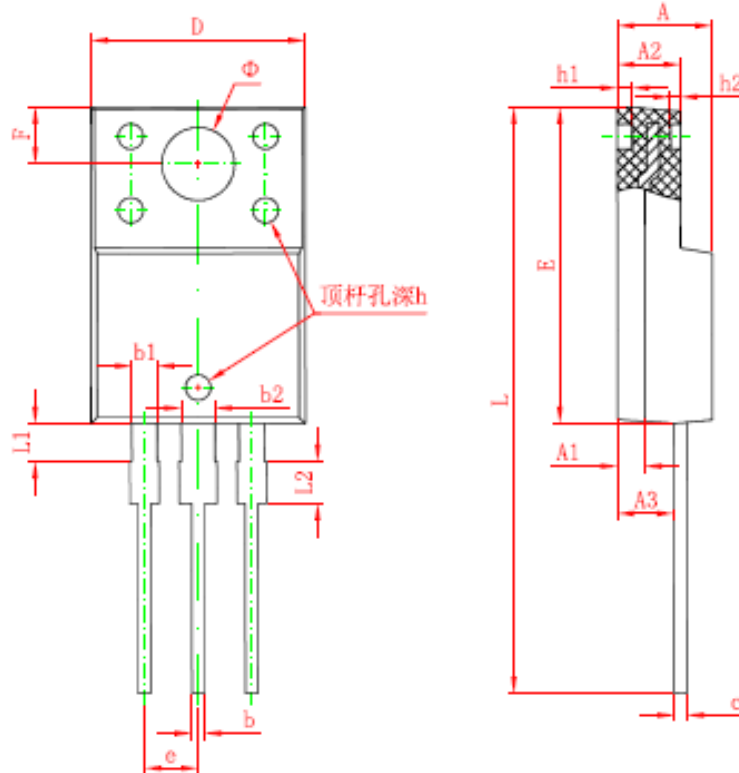
Symbol	Dimensions in Millimeters		Dimensions in Inches	
	Min.	Max.	Min.	Max.
A	4.470	4.670	0.176	0.184
A1	2.520	2.820	0.099	0.111
b	0.710	0.910	0.028	0.036
b1	1.170	1.370	0.046	0.054
c	0.310	0.530	0.012	0.021
c1	1.170	1.370	0.046	0.054
D	10.010	10.310	0.394	0.406
E	8.500	8.900	0.335	0.350
E1	12.060	12.460	0.475	0.491
e	2.540 TYP.		0.100 TYP.	
e1	4.980	5.180	0.196	0.204
F	2.590	2.890	0.102	0.114
h	0.000	0.300	0.000	0.012
L	13.400	13.800	0.528	0.543
L1	3.560	3.960	0.140	0.156
Φ	3.735	3.935	0.147	0.155



SPN10T10

N-Channel Enhancement Mode MOSFET

TO-220F PACKAGE OUTLINE



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.300	4.700	0.169	0.185
A1	1.300 REF.		0.051 REF.	
A2	2.800	3.200	0.110	0.126
A3	2.500	2.900	0.098	0.114
b	0.500	0.750	0.020	0.030
b1	1.100	1.350	0.043	0.053
b2	1.500	1.750	0.059	0.069
c	0.500	0.750	0.020	0.030
D	9.960	10.360	0.392	0.408
E	14.800	15.200	0.583	0.598
e	2.540 TYP.		0.100 TYP.	
F	2.700 REF.		0.106 REF.	
Φ	3.500 REF.		0.138 REF.	
h	0.000	0.300	0.000	0.012
h1	0.800 REF.		0.031 REF.	
h2	0.500 REF.		0.020 REF.	
L	28.000	28.400	1.102	1.118
L1	1.700	1.900	0.067	0.075
L2	1.900	2.100	0.075	0.083



SPN10T10

N-Channel Enhancement Mode MOSFET

Information provided is alleged to be exact and consistent. SYNC Power Corporation presumes no responsibility for the penalties of use of such information or for any violation of patents or other rights of third parties which may result from its use. No license is granted by allegation or otherwise under any patent or patent rights of SYNC Power Corporation. Conditions mentioned in this publication are subject to change without notice. This publication surpasses and replaces all information previously supplied. SYNC Power Corporation products are not authorized for use as critical components in life support devices or systems without express written approval of SYNC Power Corporation.

©The SYNC Power logo is a registered trademark of SYNC Power Corporation

©2012 SYNC Power Corporation – Printed in Taiwan – All Rights Reserved

SYNC Power Corporation

7F-2, No.3-1, Park Street

NanKang District (NKSP), Taipei, Taiwan 115

Phone: 886-2-2655-8178

Fax: 886-2-2655-8468

©<http://www.syncpower.com>