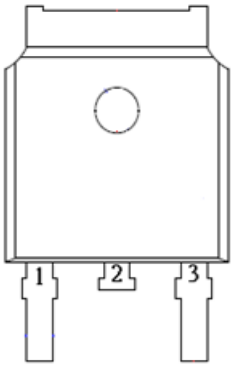
SPN3006
N-Channel Enhancement Mode MOSFET

DESCRIPTION
The SPN3006 is the N-Channel logic enhancement mode power field effect transistors are produced using high cell density, DMOS trench technology. The SPN3006 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.

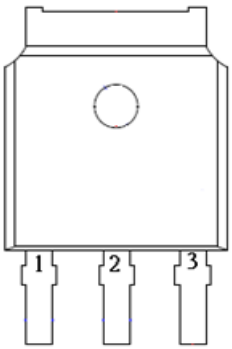
APPLICATIONS
- High Frequency Synchronous Buck Converter
- DC/DC Power System
- Load Switch

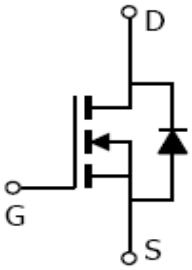
FEATURES
- 30V/80A,$R_{DS(ON)}$=4.7mΩ@V_{GS}=10V
- 30V/80A,$R_{DS(ON)}$=7.5mΩ@V_{GS}=4.5V
- Super high density cell design for extremely low R_{DS} (ON)
- Exceptional on-resistance and maximum DC current capability
- TO-252/TO-251 package design

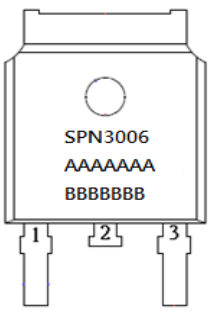
PIN CONFIGURATION
TO-252-2L



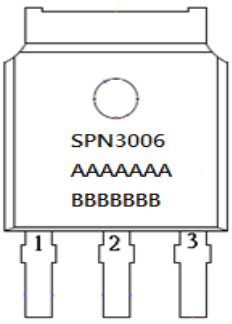
TO-251S-3L





PART MARKING


A : Lot Code
B : Date Code



A : Lot Code
B : Date Code

SPN3006
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
SPN3006ST251TGB	TO-251S-3L	SPN3006
SPN3006T252RGB	TO-252-2L	SPN3006

※ SPN3006T252RGB : Tape Reel ; Pb – Free ; Halogen - Free
※ SPN3006ST251TGB: Tube ; Pb – Free; Halogen – Free

ABSOULTE MAXIMUM RATINGS

(T_A=25℃ Unless otherwise noted)

Parameter		Symbol	Typical	Unit
Drain-Source Voltage		V_{DSS}	30	V
Gate –Source Voltage		V_{GSS}	±20	V
Continuous Drain Current	T_A=25℃	I_D	80	A
	T_A=100℃		57	
Pulsed Drain Current		I_{DM}	160	A
Avalanche Current		I_{AS}	48	A
Single Pulse Avalanche Energy		EAS	259	mJ
Power Dissipation	T_A=25℃	P_D	2	W
Operating Junction Temperature		T_J	150	℃
Storage Temperature Range		T_{STG}	-55/150	℃
Thermal Resistance-Junction to Ambient (t≦10s)		$R_{\theta JA}$	62	℃/W

SPN3006
N-Channel Enhancement Mode MOSFET

ELECTRICAL CHARACTERISTICS

(T_A=25℃ Unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ	Max.	Unit
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS}=0V,I_D=250uA	30			V
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS},I_D=250uA	1.0		2.5	
Gate Leakage Current	I_{GSS}	V_{DS}=0V,V_{GS}=±20V			±100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=24V,V_{GS}=0V			1	uA
		V_{DS}=24V,V_{GS}=0V, T_J=55℃			5	
On-State Drain Current	$I_{D(on)}$	V_{DS}≥5V,V_{GS} =10V			80	A
Drain-Source On-Resistance	$R_{DS(on)}$	V_{GS}= 10V,I_D=30A		4.7	5.5	mΩ
		V_{GS}=4.5V,I_D=15A		7.5	9	
Forward Transconductance	gfs	V_{DS}=5V,I_D=30A		22		S
Diode Forward Voltage	V_{SD}	I_S=1A,V_{GS} =0V			1	V
Single Pulse Avalanche Energy	EAS	V_{DD}=25V, L=0.1mH, I_{AS}=24A	60			mJ
Dynamic						
Total Gate Charge	Q_g	V_{DS}=15V,V_{GS}=4.5V I_D=20A		11.1	18	nC
Gate-Source Charge	Q_{gs}			1.85	3.8	
Gate-Drain Charge	Q_{gd}			6.8	12	
Input Capacitance	C_{iss}	V_{DS}=24V,V_{GS}=0V f=1MHz		1210	1800	pF
Output Capacitance	C_{oss}			190	280	
Reverse Transfer Capacitance	C_{rss}			100	150	
Turn-On Time	$t_{d(on)}$	V_{DD}=15V, I_D=15A,V_{GEN}=10V R_G=3.3Ω		7.5	14	nS
	t_r			14.5	28	
Turn-Off Time	$t_{d(off)}$			35.2	67	
	t_f			9.6	18	

TYPICAL CHARACTERISTICS

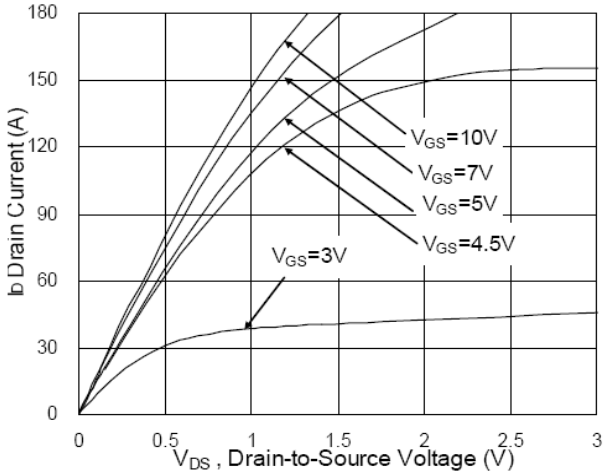


Fig. 1 Typical Output Characteristics

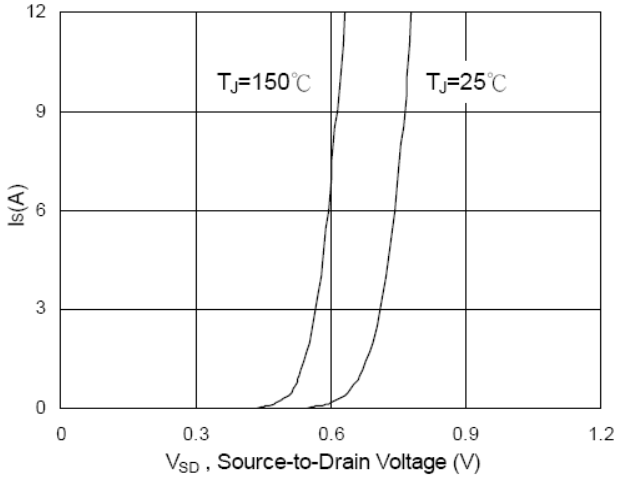


Fig. 2 Transfer Characteristics

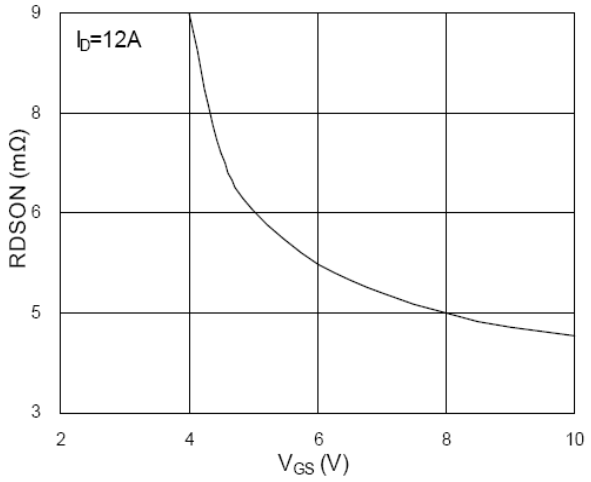


Fig. 3 On-Resistance vs Gate voltage

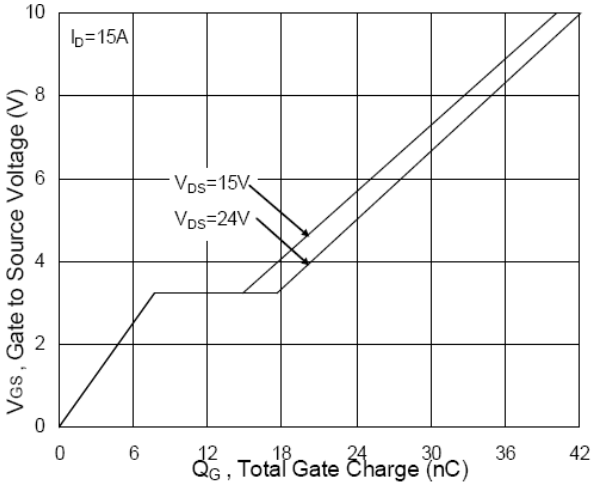


Fig. 4 Gate Charge Characteristics

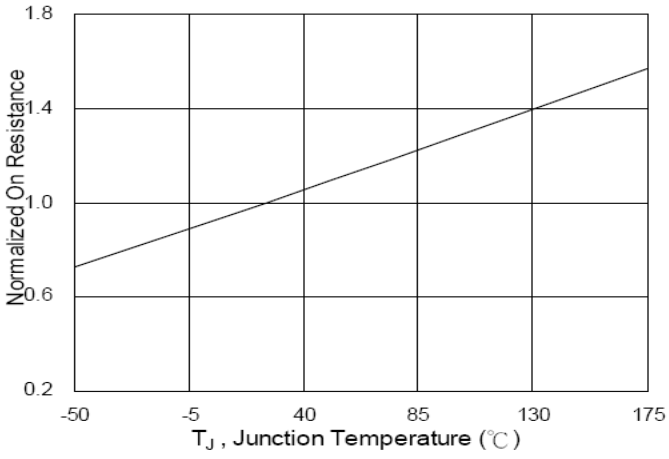


Fig. 5 On-Resistance vs Junction Temp

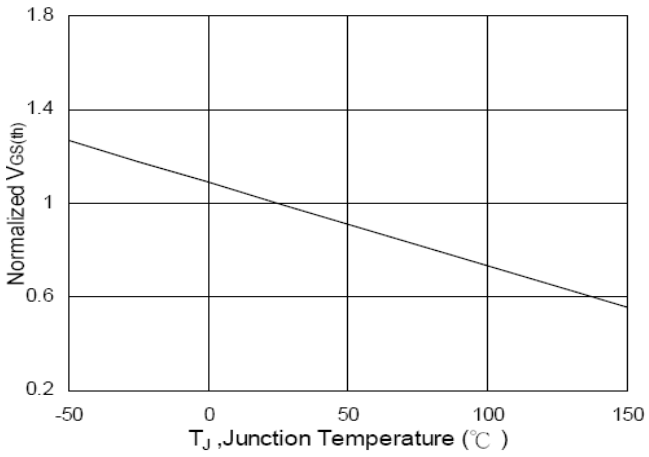


Fig. 6 Vgs vs Junction Temperature

TYPICAL CHARACTERISTICS

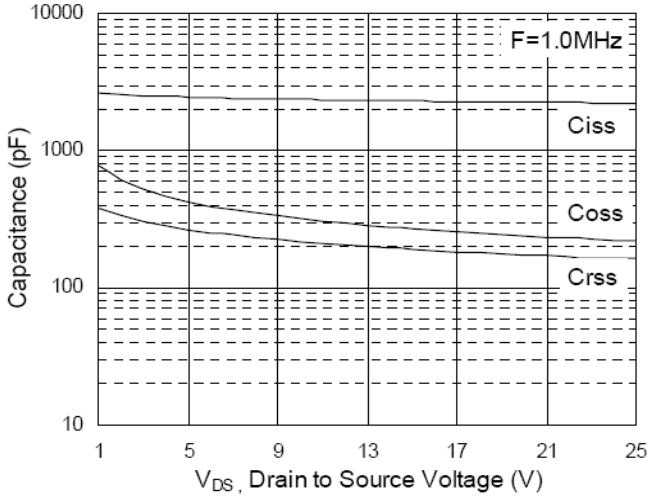


Fig. 7 Typical Capacitance Characteristics

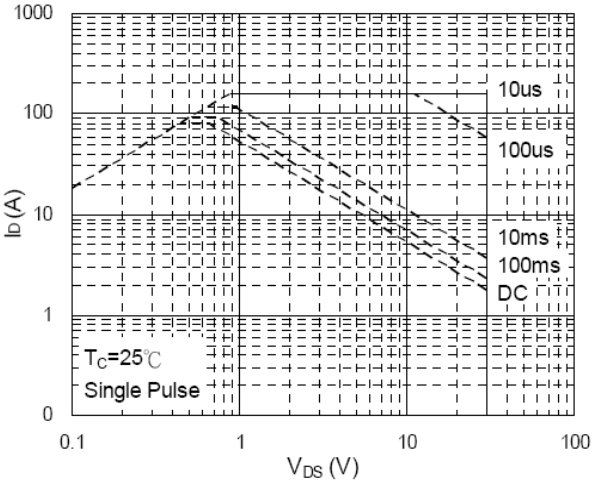


Fig. 8 Maximum Safe Operation Area

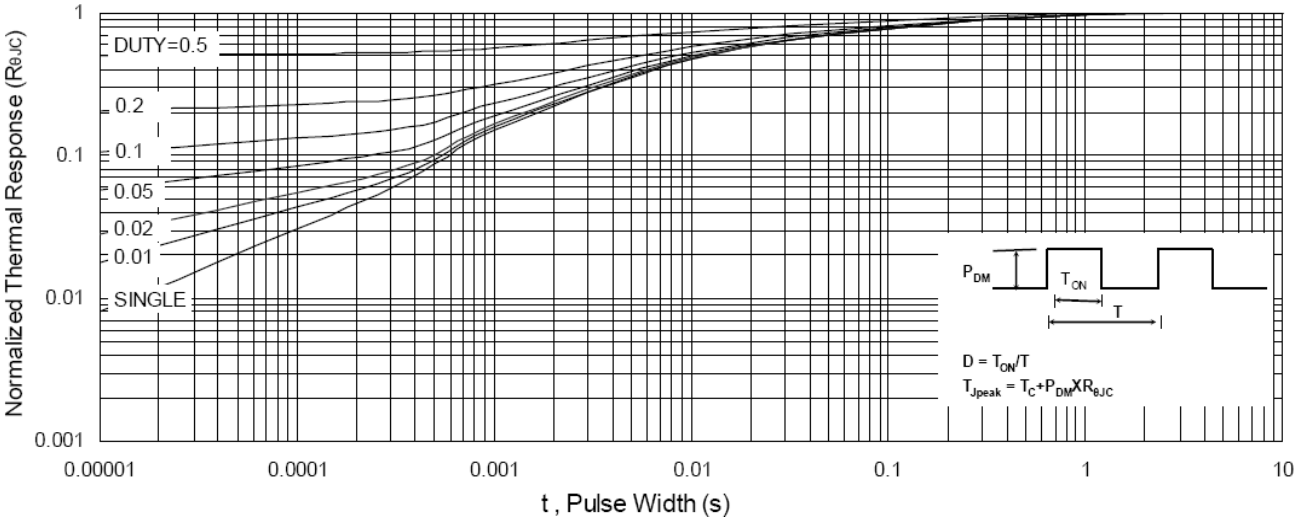


Fig. 9 Effective Transient Thermal Impedance

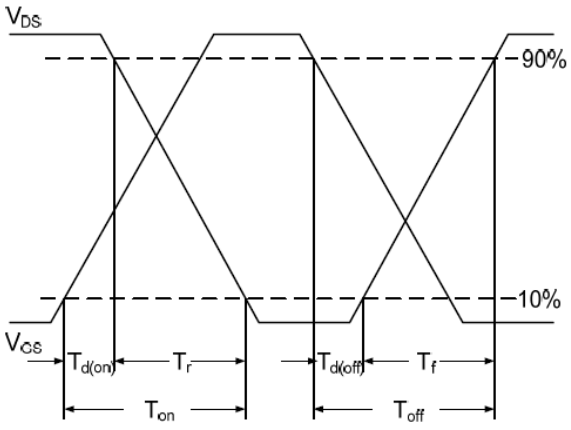


Fig. 10 Switching Time Waveform

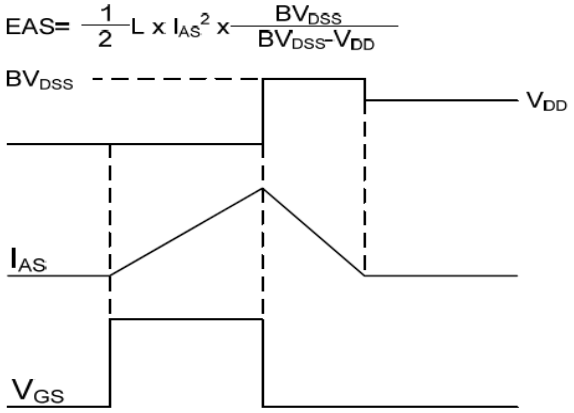
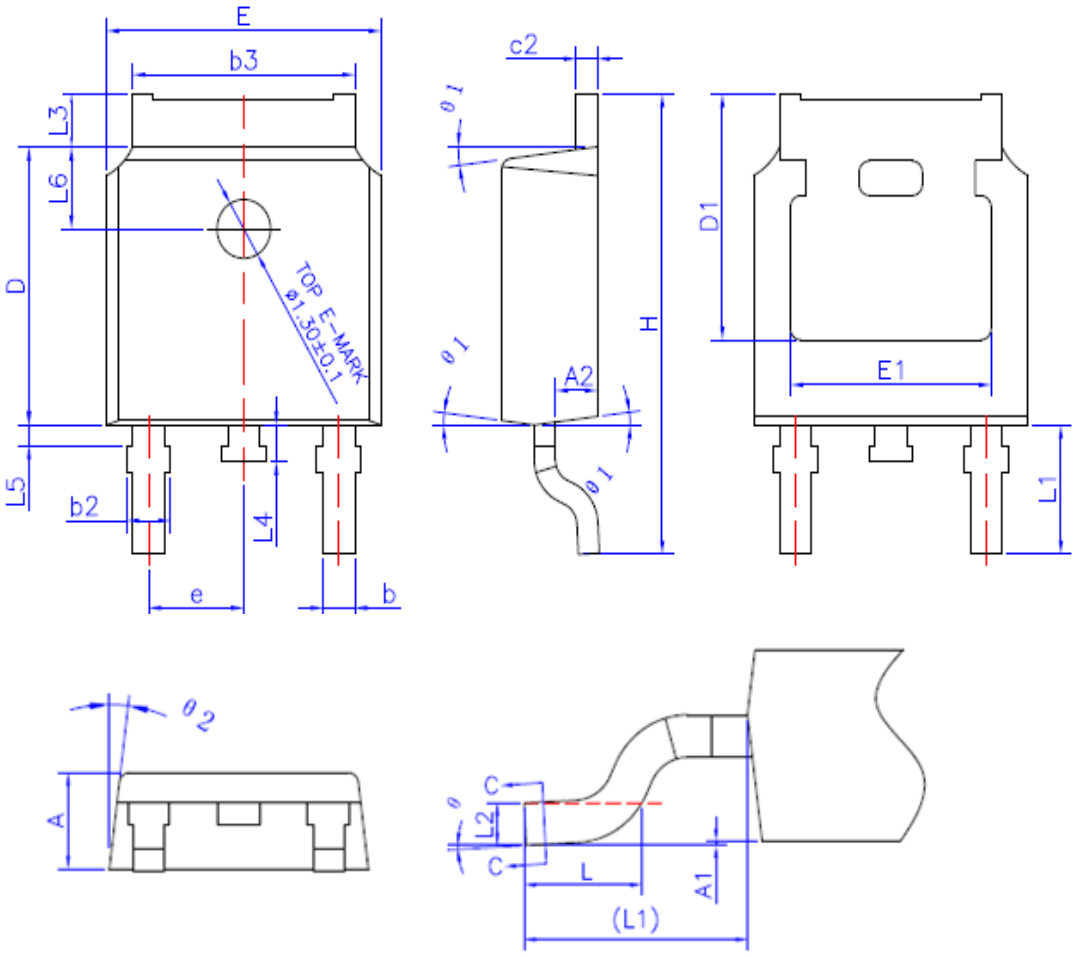


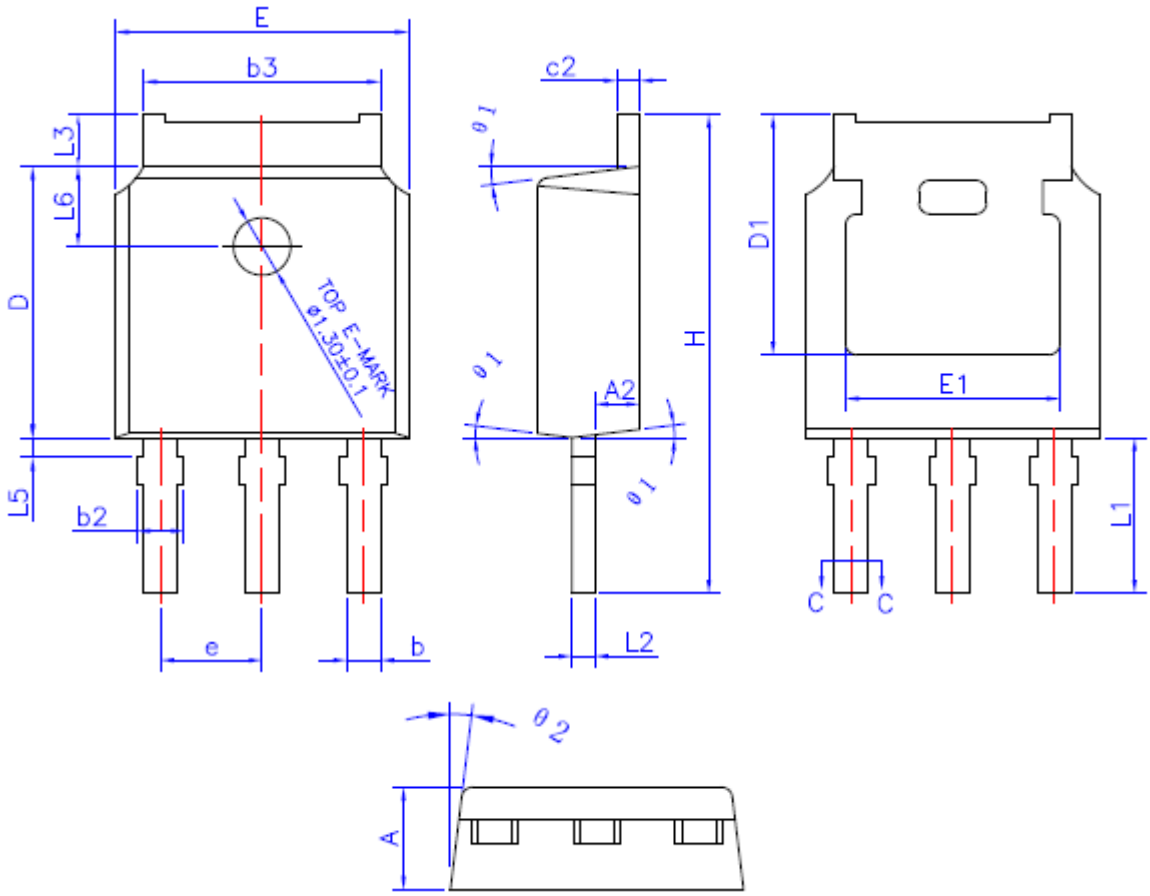
Fig. 11 Unclamped Inductive Waveform

TO-252-2L PACKAGE OUTLINE



SYMBOL	MIN	NOM	MAX
A	2.20	2.30	2.40
A1	0.00	--	0.15
A2	0.90	1.01	1.10
b	0.72	-	0.85
b2	0.72	--	0.90
b3	5.13	5.33	5.46
c	0.47	--	0.60
c2	0.47	--	0.60
D	6.00	6.10	6.20
D1	5.25	--	--
E	6.40	6.60	6.80
E1	4.70	--	--
e	2.3REF		
H	9.80	10.10	10.40
L	1.40	1.60	1.80
L1	2.90REF		
L2	0.508BSC		
L3	0.90	--	1.25
L4	0.60	0.80	1.00
L5	0.15	--	0.75
L6	1.80REF		
θ	0°	3°	8°
θ 1	5°	7°	9°
θ 2	5°	7°	9°

TO-251S-3L PACKAGE OUTLINE



SYMBOL	MIN	NOM	MAX
A	2.20	2.30	2.40
A2	0.86	1.01	1.16
b	0.66	-	0.86
b2	0.66	--	0.96
b3	5.10	5.28	5.46
c	0.46	--	0.60
c2	0.47	--	0.60
D	6.00	6.10	6.20
D1		5.35REF	
E	6.40	6.60	6.80
E1		4.83REF	
e		2.3REF	
H	9.80	10.40	11.00
L1		3.50REF	
L2		0.508BSC	
L3	0.90	--	1.25
L5	0.15	--	0.75
L6		1.80REF	
θ 1	5°	7°	9°
θ 2	5°	7°	9°

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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
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