



# SPN80T06

## N-Channel Enhancement Mode MOSFET

### DESCRIPTION

The SPN80T06 is the N-Channel logic enhancement mode power field effect transistor which is produced using super high cell density DMOS trench technology. This high density process is especially tailored to minimize on-state resistance. These devices are particularly suitable for synchronous rectifier application, Motor control power management and other Power Tool circuits. It has been optimized for low gate charge, low  $R_{DS(ON)}$  and fast switching speed.

### FEATURES

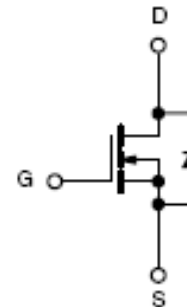
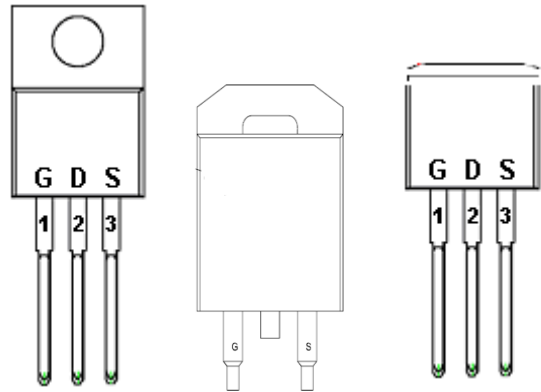
- ◆ 60V/80A,  $R_{DS(ON)} = 8m\Omega @ V_{GS} = 10V$   
 $R_{DS(ON)} = 10m\Omega @ V_{GS} = 5V$
- ◆ Super high density cell design for extremely low  $R_{DS(ON)}$
- ◆ Exceptional on-resistance and maximum DC current capability
- ◆ TO-220-3L/TO-263-2L/TO-262-3L package design

### APPLICATIONS

- DC/DC Converter
- Load Switch
- SMPS Secondary Side Synchronous Rectifier
- Motor Control
- Power Tool

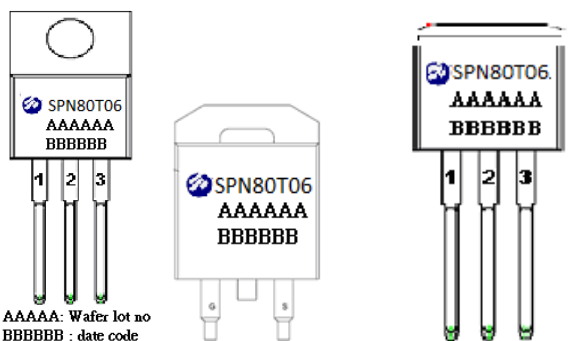
### PIN CONFIGURATION

TO-220-3L      TO-263-2L      TO-262-3L



### PART MARKING

TO-220-3L      TO-263-2L      TO-262-3L



AAAAA: Wafer lot no  
BBBBBB : date code



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### PIN DESCRIPTION

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

### ORDERING INFORMATION

Part Number	Package	Part Marking
SPN80T06T220TGB	TO-220-3L	SPN80T06
SPN80T06T262RGB	TO-263-2L	SPN80T06
SPN80T06K262TGB	TO-262-3L	SPN80T06

- ※ SPN80T06T220TGB : Tube ; Pb – Free ; Halogen - Free
- ※ SPN80T06T262RGB : Tape&Reel ; Pb – Free ; Halogen - Free
- ※ SPN80T06K262TGB : Tube ; Pb – Free ; Halogen - Free

### ABSOLUTE MAXIMUM RATINGS

(TA=25°C Unless otherwise noted)

Parameter	Symbol	Typical	Unit
Drain-Source Voltage	VDSS	60	V
Gate –Source Voltage	VGSS	±20	V
Continuous Drain Current(Tj=150°C)	ID	TA=25°C	80
		TA=70°C	55
Pulsed Drain Current	IDM	320	A
Power Dissipation	PD	TA=25°C	268
		TA=70°C	134
Avalanche Energy with Single Pulse ( Tj=25°C , L = 1mH , IAS = 22A , VDS =100V. )	EAS	320	mJ
Operating Junction Temperature	TJ	-55/150	°C
Storage Temperature Range	TSTG	-55/150	°C
Thermal Resistance-Junction to Ambient	RθJA	62.5	°C/W



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### ELECTRICAL CHARACTERISTICS

(TA=25°C Unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ	Max.	Unit
<b>Static</b>						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=250\mu A$	60			V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1.0		3.0	
Gate Leakage Current	$I_{GSS}$	$V_{DS}=0V, V_{GS}=\pm 20V$			$\pm 100$	nA
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=60V, V_{GS}=0V$			10	uA
		$V_{DS}=48V, V_{GS}=0V$ $T_J = 150^\circ C$			100	
Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS}= 10V, I_D=30A$		6.5	8	mΩ
		$V_{GS}= 5V, I_D=20A$		8.5	10	
Diode Forward Voltage	$V_{SD}$	$I_S=1A, V_{GS}=0V$			1.0	V
<b>Dynamic</b>						
Total Gate Charge	$Q_g$	$V_{DS}=30V, V_{GS}=10V$ $I_D = 30A$		76		nC
Gate-Source Charge	$Q_{gs}$			17		
Gate-Drain Charge	$Q_{gd}$			19		
Input Capacitance	$C_{iss}$	$V_{DS}=30V, V_{GS}=0V$ $f=1MHz$		3500		pF
Output Capacitance	$C_{oss}$			319		
Reverse Transfer Capacitance	$C_{rss}$			236		
Turn-On Time	$t_{d(on)}$	$V_{DD}=30V, R_L=1\Omega$ $V_{GEN}=10V, R_G=3\Omega$		18		nS
	$t_r$			35		
Turn-Off Time	$t_{d(off)}$			44		
	$t_f$			23		



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## TYPICAL CHARACTERISTICS

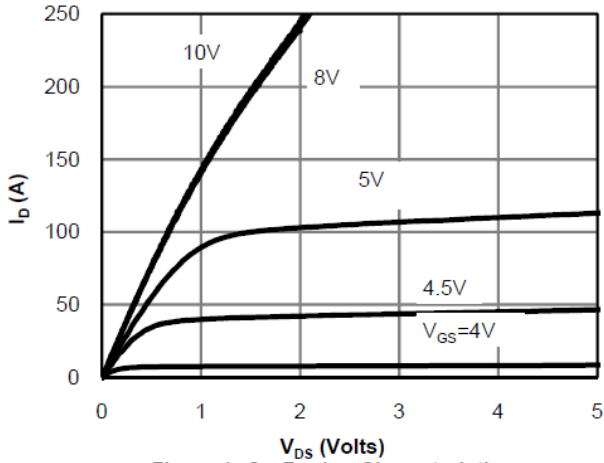


Figure 1: On-Region Characteristics

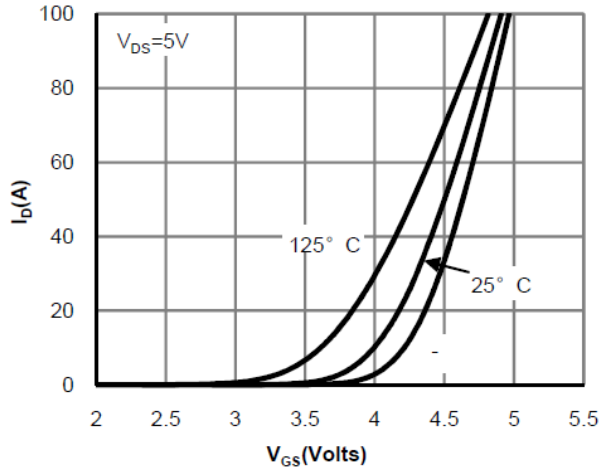


Figure 2: Transfer Characteristics

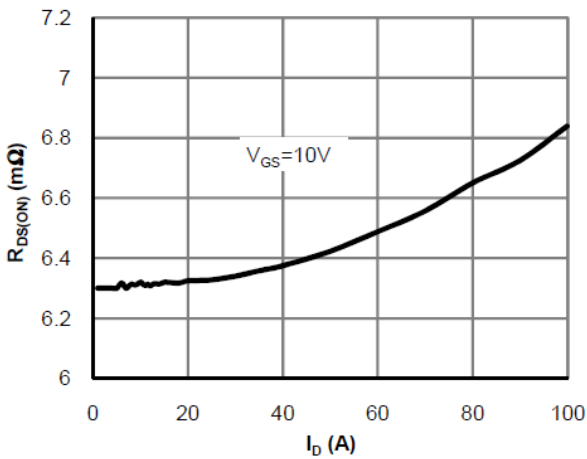


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

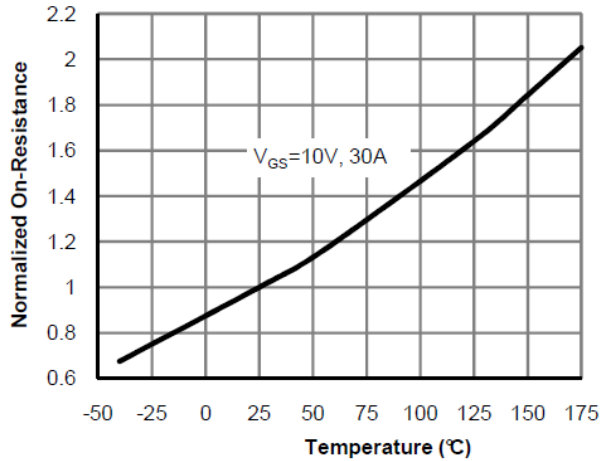


Figure 4: On-Resistance vs. Junction Temperature

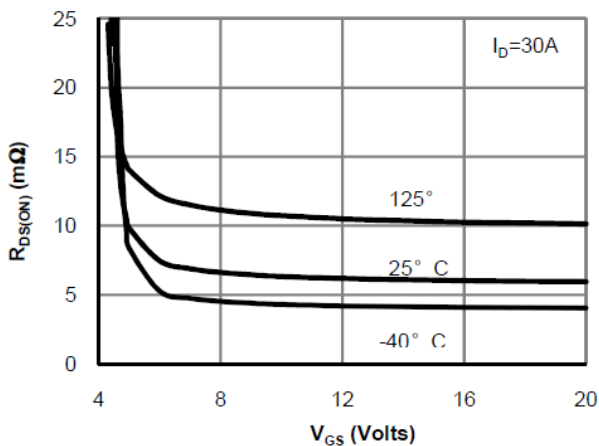


Figure 5: On-Resistance vs. Gate-Source Voltage

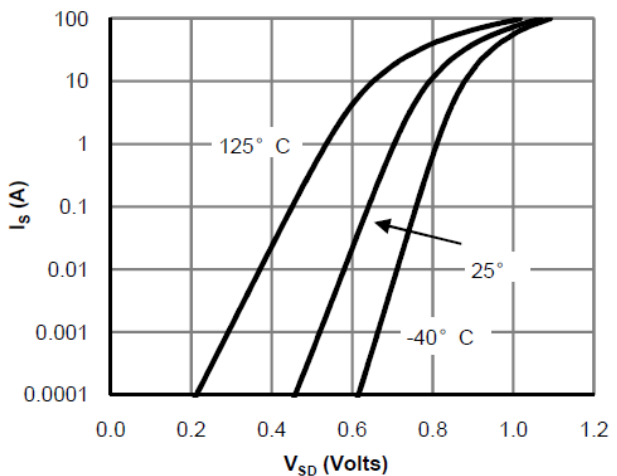


Figure 6: Body-Diode Characteristics



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### TYPICAL CHARACTERISTICS

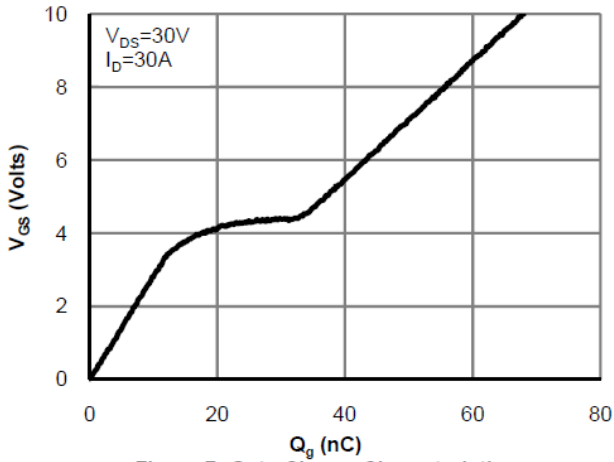


Figure 7: Gate-Charge Characteristics

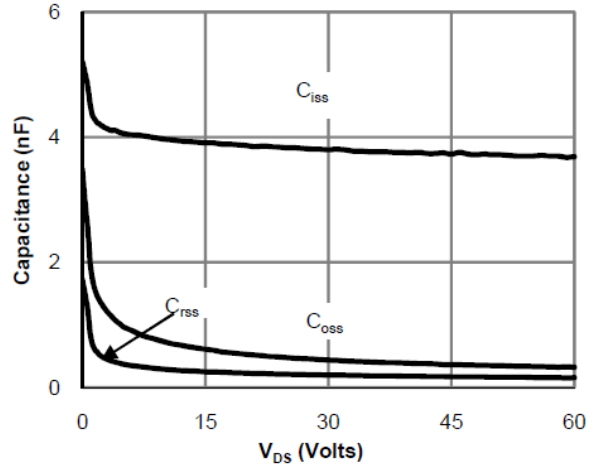


Figure 8: Capacitance Characteristics

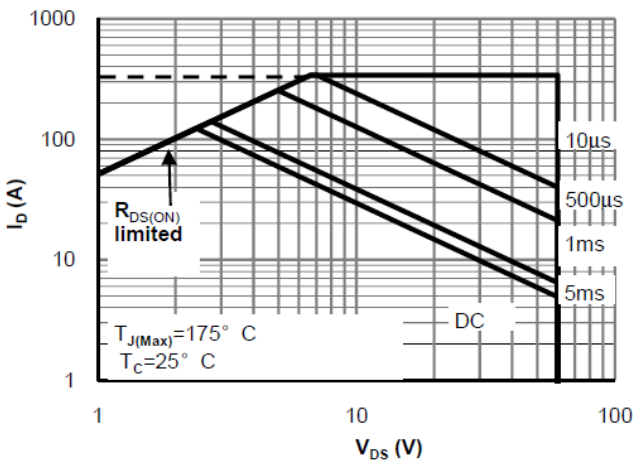


Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

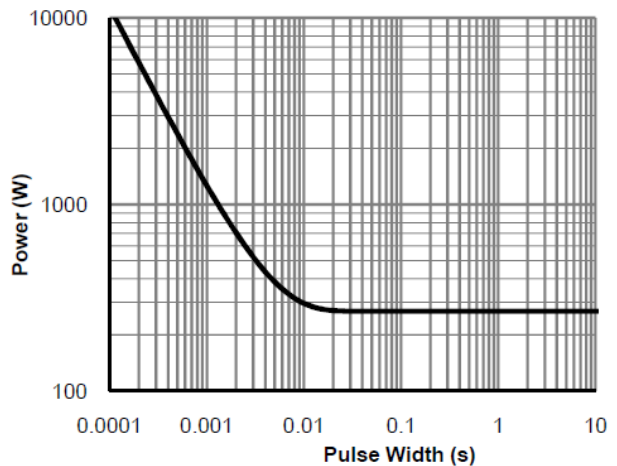


Figure 10: Single Pulse Power Rating Junction-to-Case (Note F)

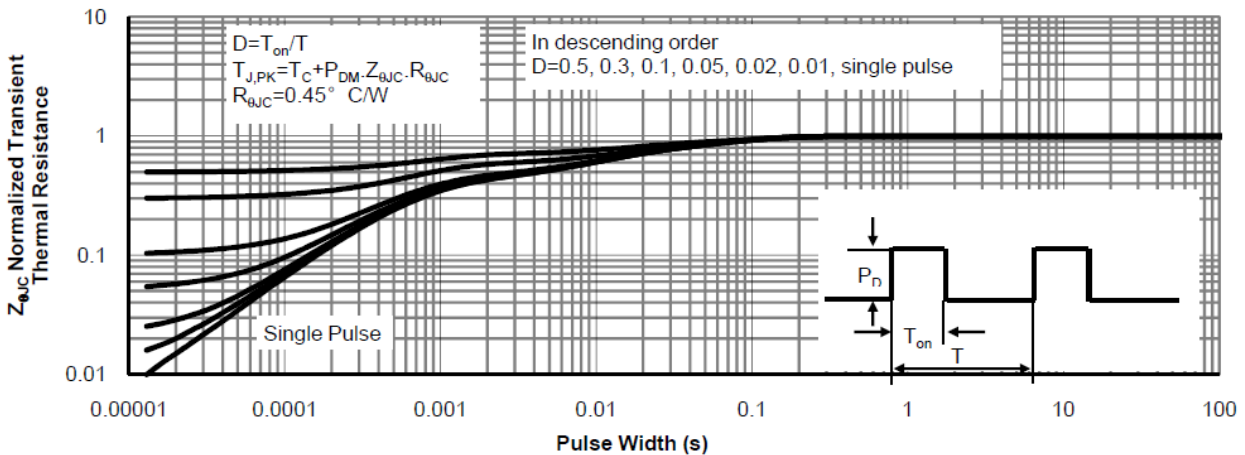


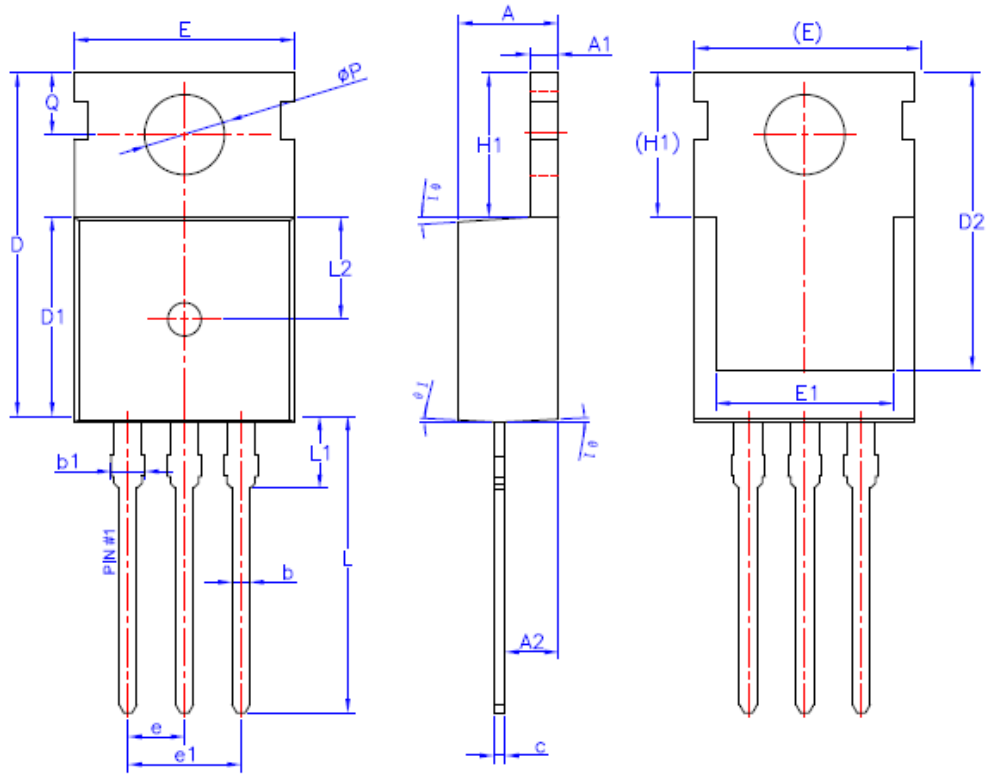
Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)



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### TO-220-3L PACKAGE OUTLINE



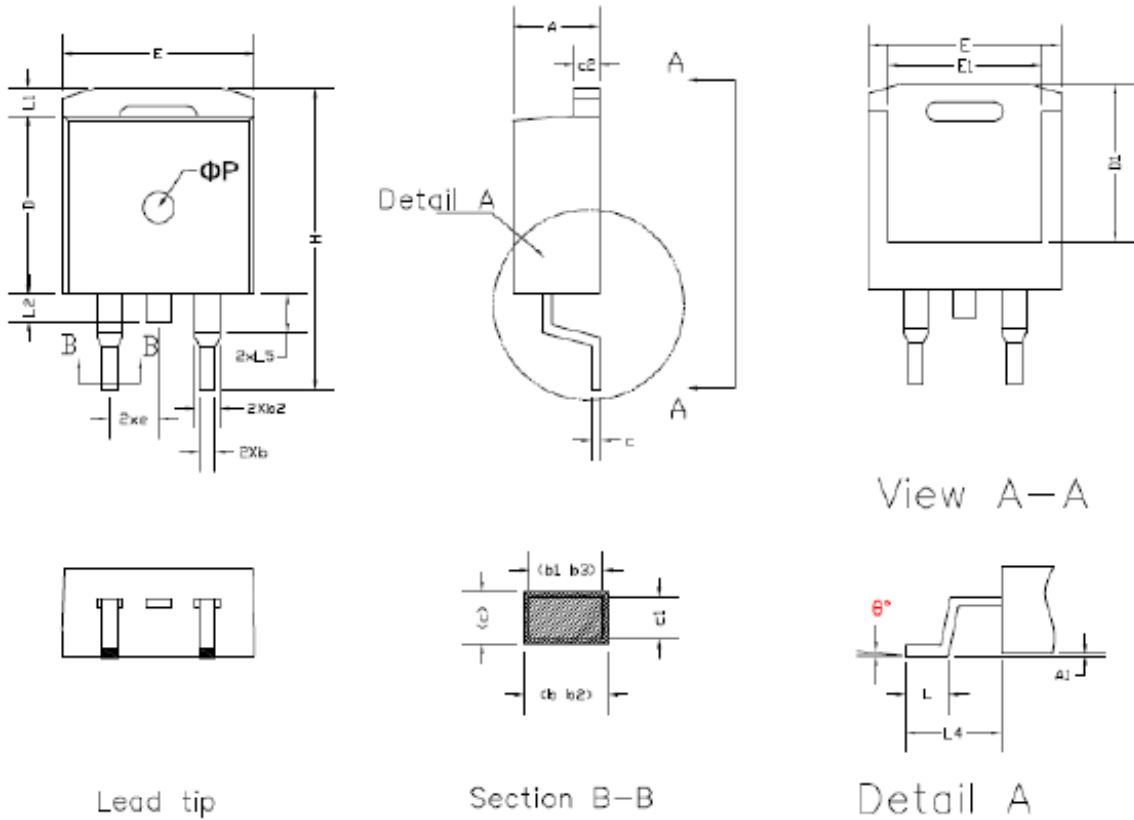
SYMBOL	MIN	NOM	MAX
A	4.40	4.50	4.60
A1	1.27	1.30	1.33
A2	2.30	2.40	2.50
b	0.70	—	0.90
b1	1.42	—	1.57
c	0.45	0.50	0.60
D	15.30	15.70	16.10
D1	9.10	9.20	9.30
D2	13.10	—	13.70
E	9.70	9.90	10.20
E1	7.80	8.00	8.20
e	2.54BSC		
e1	5.08BSC		
H1	6.30	6.50	6.70
L	12.78	13.08	13.38
L1	—	—	3.50
L2	4.60REF		
øP	3.55	3.60	3.65
Q	2.73	—	2.87
ø1	1°	3°	5°



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## N-Channel Enhancement Mode MOSFET

### TO-263-2L PACKAGE OUTLINE



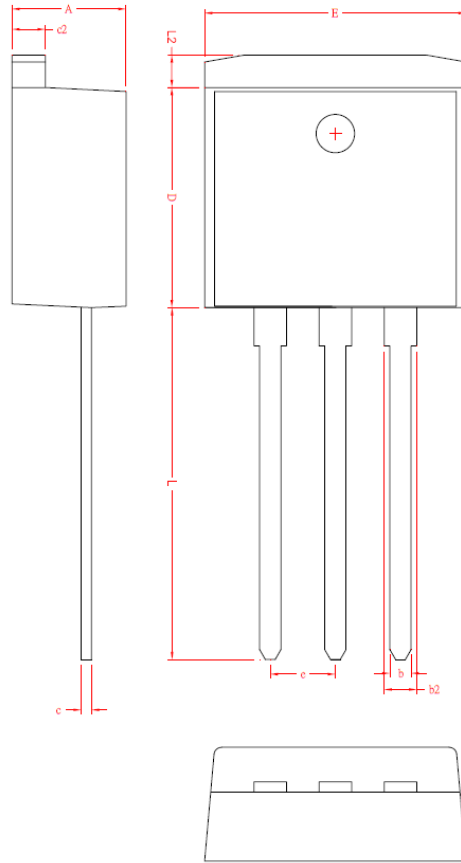
TO-263 Dimension									
Symbol	Millimeters		Inches		Symbol	Millimeters		Inches	
	Min	Max	Min	Max		Min	Max	Min	Max
A	4.400	4.600	0.173	0.181	E1	7.850	8.150	0.309	0.321
A1	0.010	0.200	0.000	0.008	e	2.540REF		0.100REF	
b	0.750	0.850	0.030	0.033	L	2.350	2.750	0.092	0.108
b2	1.170	1.450	0.046	0.057	L1	4.850	5.150	0.187	0.203
c	0.400	0.600	0.016	0.024	L3	1.200	1.600	0.047	0.062
c2	1.200	1.400	0.047	0.055	L4	0.700	1.400	0.051	0.058
D	8.950	9.450	0.352	0.372	L5	0.000	3.200	0.000	0.126
D1	8.000	8.400	0.315	0.331	H	15.450	15.850	0.000	0.126
E	9.850	10.150	0.388	0.400	ΦP	1.000	2.500	0.039	0.098
θ°	0	8	--	--	--	--	--	--	--



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### TO-262-3L PACKAGE OUTLINE



Symbol	Millimeter		Inch	
	Min	Max	Min	Max
A	4.4	4.8	0.173	0.189
b	0.76	1	0.030	0.039
D	8.6	9	0.339	0.354
c	0.36	0.5	0.014	0.020
E	9.8	10.4	0.386	0.409
c2	1.25	1.45	0.049	0.057
b2	1.17	1.47	0.046	0.058
L	13.25	14.25	0.522	0.561
e	2.54REF		0.1REF	
L2	1.27REF		0.05REF	





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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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