



SPN125T10 N-Channel Enhancement Mode MOSFET

DESCRIPTION

The SPN125T10 is the N-Channel 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

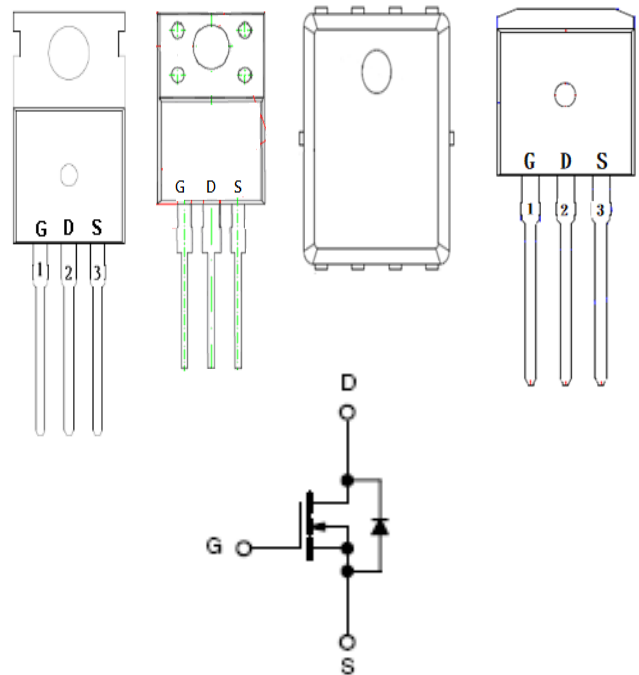
- ◆ 100V/112A, $R_{DS(ON)}=4.2m\Omega@V_{GS}=10V$
- ◆ Super high density cell design for extremely low $R_{DS(ON)}$
- ◆ Exceptional on-resistance and maximum DC current capability
- ◆ TO-220-3L/TO-220F-3L/PPAK5x6-8L/TO-262-3L package design

APPLICATIONS

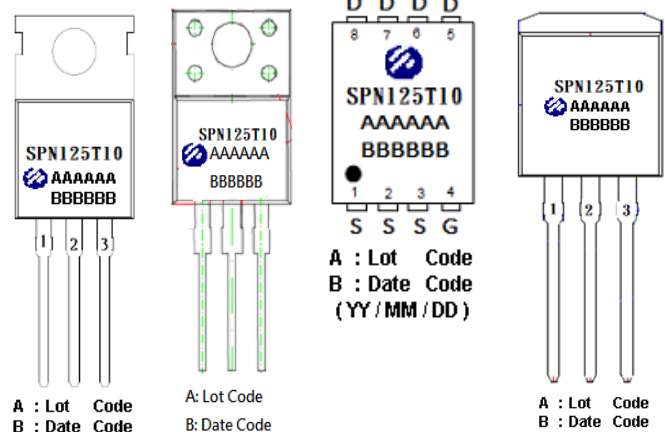
- DC/DC Converter
- Load Switch
- SMPS Secondary Side Synchronous Rectifier
- Motor Control
- Power Tool

PIN CONFIGURATION

TO-220-3L TO-220F-3L PPAK5x6-8L TO-262-3L



PART MARKING





SPN125T10

N-Channel Enhancement Mode MOSFET

TO-220-3L/TO-220F-3L/TO-262-3L PIN DESCRIPTION

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

PPAK5x6-8L PIN DESCRIPTION

Pin	Symbol	Description
1	S	Source
2	S	Source
3	S	Source
4	G	Gate
5	D	Drain
6	D	Drain
7	D	Drain
8	D	Drain

ORDERING INFORMATION

Part Number	Package	Part Marking
SPN125T10T220TGB	TO-220-3L	SPN125T10
SPN125T10T220FTGB	TO-220F-3L	SPN125T10
SPN125T10T263TGB	TO-262-3L	SPN125T10
SPN125T10DN8RGB	PPAK5x6-8L	SPN125T10

- ※ SPN125T10T220TGB : Tube ; Pb – Free ; Halogen – Free
- ※ SPN125T10T220FTGB : Tube ; Pb – Free ; Halogen – Free
- ※ SPN125T10T263TGB : Tube ; Pb – Free ; Halogen – Free
- ※ SPN125T10DN8RGB : Tape&Reel ; Pb – Free ; Halogen – Free



SPN125T10

N-Channel Enhancement Mode MOSFET

ABSOLUTE MAXIMUM RATINGS

(TA=25°C Unless otherwise noted)

Parameter		Symbol	Typical	Unit
Drain-Source Voltage		VDSS	100	V
Gate-Source Voltage		VGSS	±20	V
Continuous Drain Current (Silicon Limited) (TO-220/TO-220F/TO-262)	TC=25°C	ID	161	A
	TC=100°C		114	
Continuous Drain Current (Silicon Limited) (PPAK5x6)	TC=25°C	ID	112	A
	TC=100°C		60	
Pulsed Drain Current		IDM	450	A
Power Dissipation (TC=25°C)	TO-220/TO-262	PD	104	W
Power Dissipation (TC=25°C)	TO-220F	PD	93	W
Power Dissipation (TC=25°C)	PPAK5x6	PD	83	W
Avalanche Energy with Single Pulse (Tj=25°C , L=0.1mH)		EAS	180	mJ
Operating Junction Temperature		TJ	-55/150	°C
Storage Temperature Range		TSTG	-55/150	°C
Thermal Resistance-Junction to Case (TO-220/TO-220F/TO-262)		RθJC	1.2	°C/W
Thermal Resistance-Junction to Case (PPAK5x6)		RθJC	1.5	°C/W

Note :

The maximum current rating is package limited at 130A for TO-262-3L

The maximum current rating is package limited at 120A for TO-220-3L

The maximum current rating is package limited at 78A for TO-220F-3L

The maximum current rating is package limited at 80A for PPAK5x6-8L



SPN125T10

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	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	2	3	4	
Gate Leakage Current	I_{GSS}	$V_{DS}=0V, V_{GS}=\pm 20V$			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=80V, V_{GS}=0V$ $T_J=25^\circ C$			1	uA
		$V_{DS}=80V, V_{GS}=0V$ $T_J=100^\circ C$			100	
Drain-Source On-Resistance (TO-220, TO-262, PPAK5x6)	$R_{DS(on)}$	$V_{GS}=10V, I_D=20A$			4.2	mΩ
Drain-Source On-Resistance (TO-220F)	$R_{DS(on)}$	$V_{GS}=10V, I_D=20A$			4.8	mΩ
Forward Transconductance	g_{fs}	$V_{DS}=5V, I_D=20A$		70		S
Gate Resistance	R_G	$V_{GS}=0V, V_{DS}$ open, $f=1MHz$		2.1		Ω
Diode Forward Voltage	V_{SD}	$I_S=20A, V_{GS}=0V$		0.9	1.2	V
Dynamic						
Total Gate Charge (10V)	Q_g	$V_{DS}=50V, V_{GS}=10V$ $I_D=20A$		52		nC
Gate-Source Charge	Q_{gs}			16		
Gate-Drain Charge	Q_{gd}			11		
Input Capacitance	C_{iss}	$V_{DS}=50V, V_{GS}=0V$ $f=1MHz$		4110		pF
Output Capacitance	C_{oss}			1066		
Reverse Transfer Capacitance	C_{rss}			13		
Turn-On Time	$t_{d(on)}$	$V_{DD}=50V, I_D=20A$ $V_{GS}=10V, R_G=10\Omega$		14		nS
	t_r			10		
Turn-Off Time	$t_{d(off)}$			50		
	t_f			15		



SPN125T10

N-Channel Enhancement Mode MOSFET

TYPICAL CHARACTERISTICS

Fig 1. Typical Output Characteristics

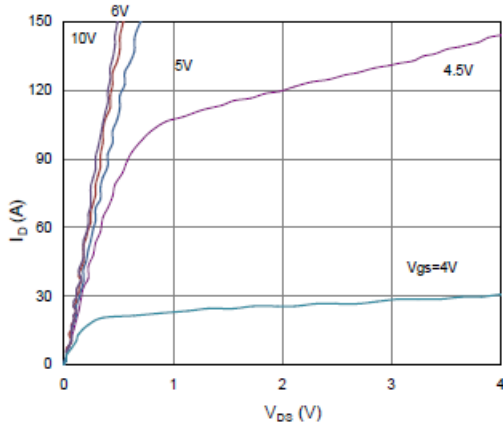


Figure 2. On-Resistance vs. Gate-Source Voltage

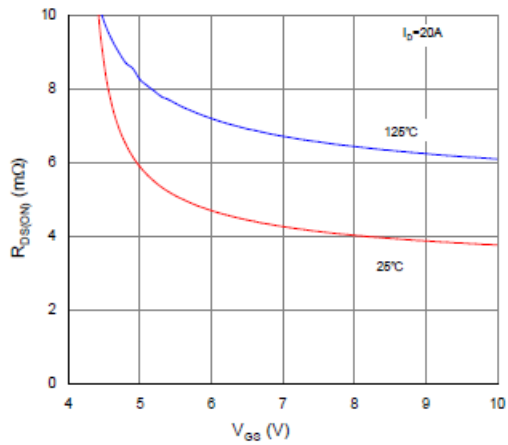


Figure 3. On-Resistance vs. Drain Current and Gate Voltage

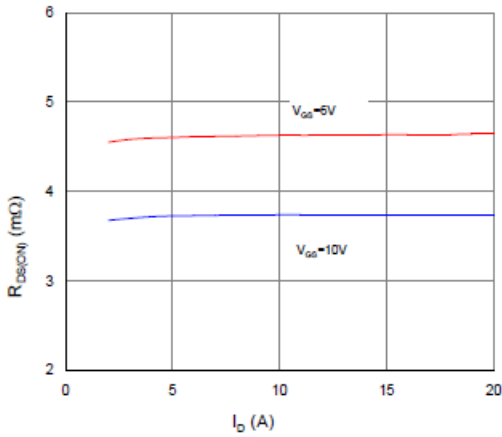


Figure 4. Normalized On-Resistance vs. Junction Temperature

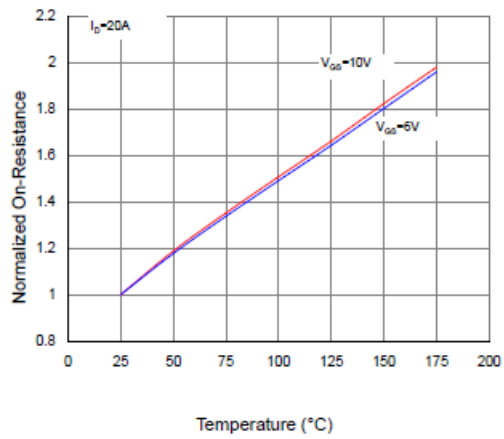


Figure 5. Typical Transfer Characteristics

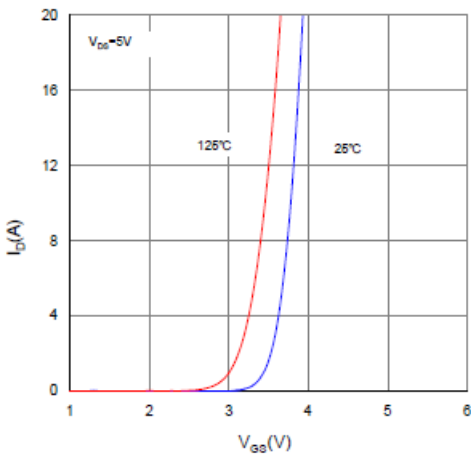
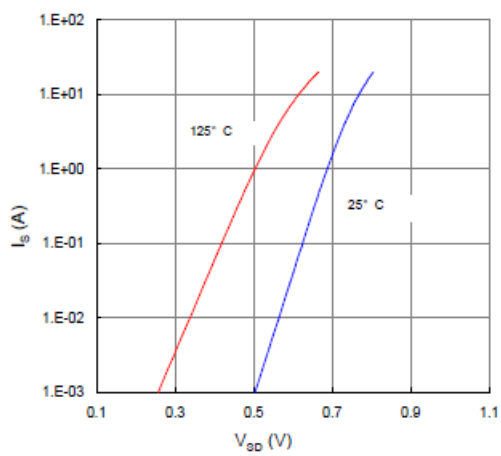


Figure 6. Typical Source-Drain Diode Forward Voltage





SPN125T10

N-Channel Enhancement Mode MOSFET

TYPICAL CHARACTERISTICS

Figure 7. Typical Gate-Charge vs. Gate-to-Source Voltage

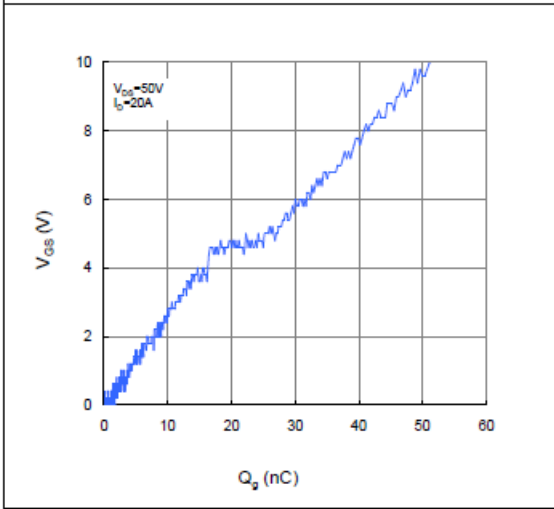


Figure 8. Typical Capacitance vs. Drain-to-Source Voltage

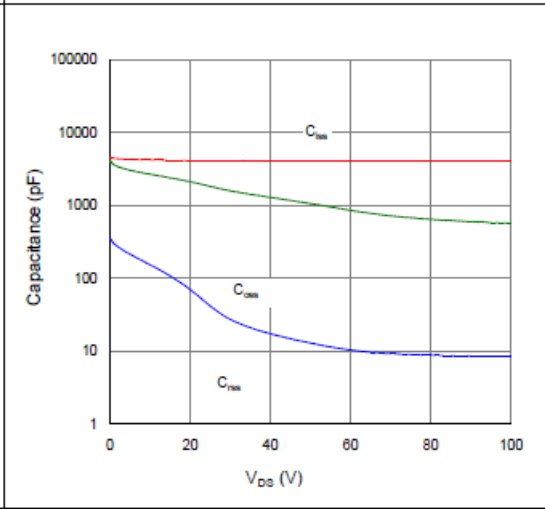


Figure 9. Maximum Safe Operating Area

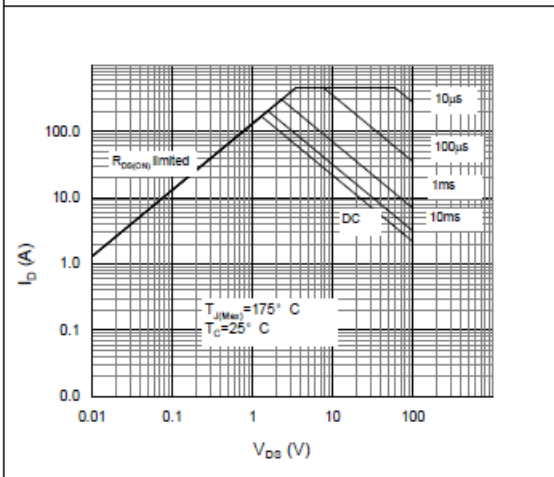


Figure 10. Maximum Drain Current vs. Case Temperature

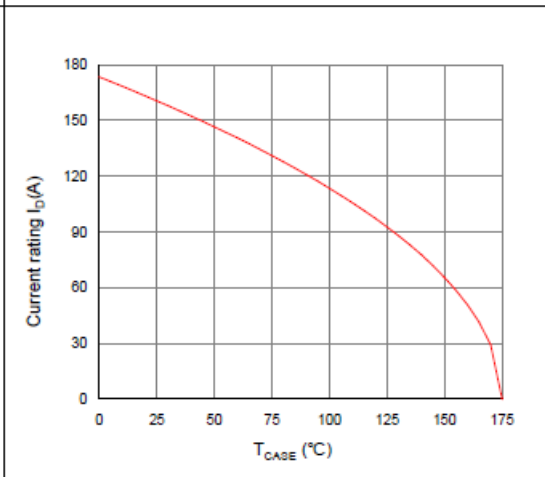
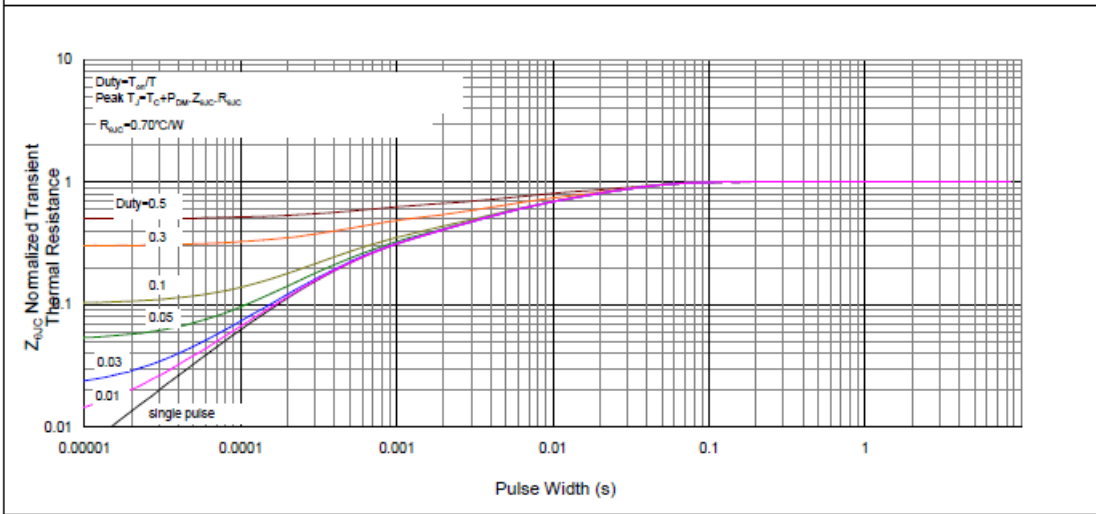


Figure 11. Normalized Maximum Transient Thermal Impedance, Junction-to-Case

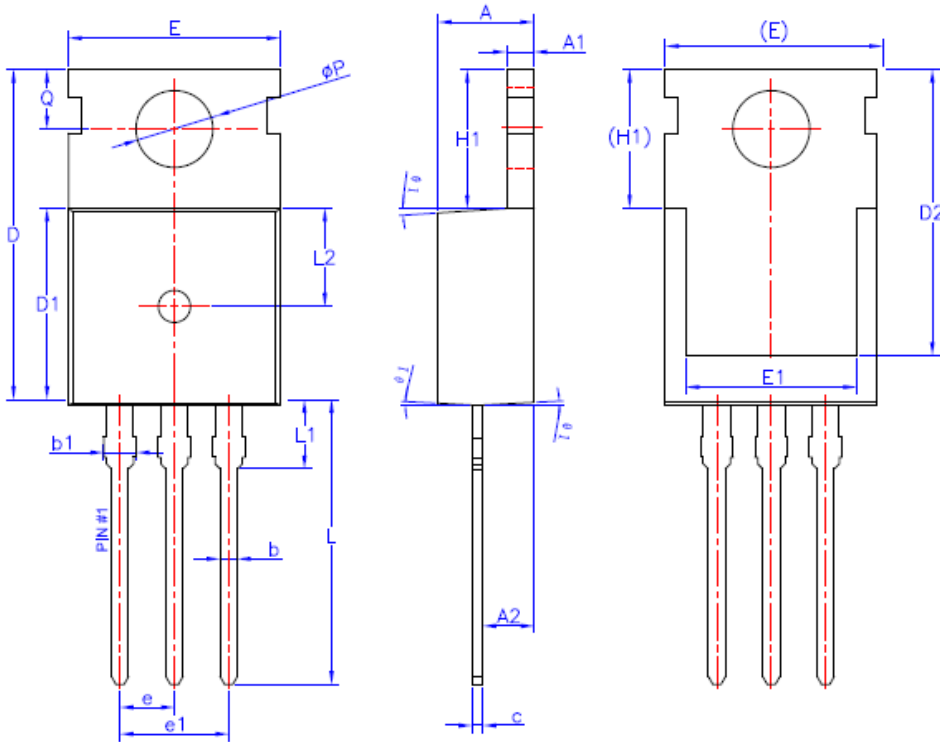




SPN125T10

N-Channel Enhancement Mode MOSFET

TO-220-3L PACKAGE OUTLINE



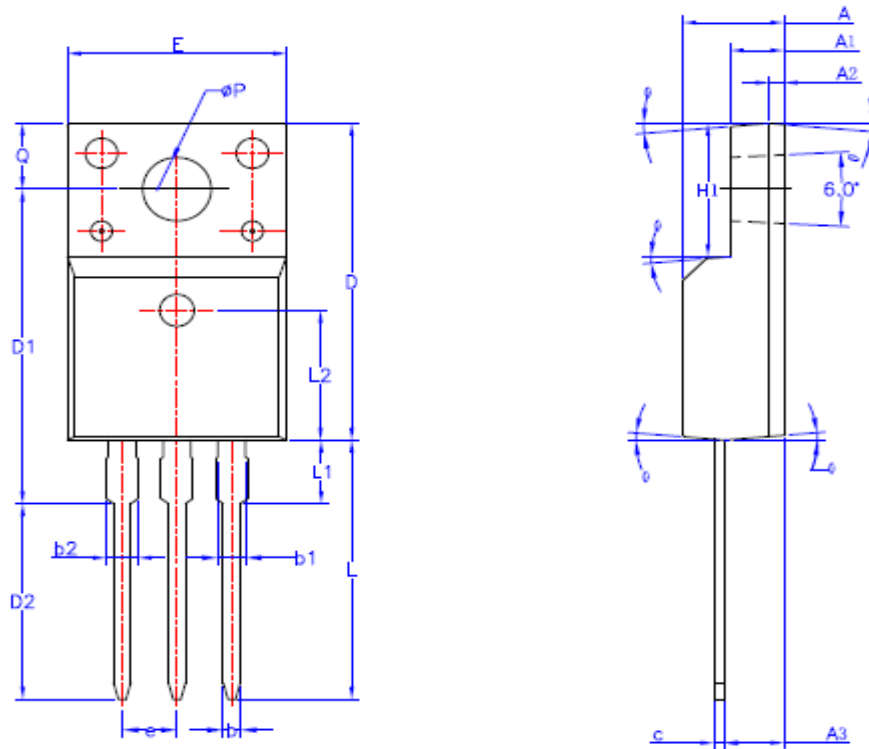
SYMBOL	MIN	NOM	MAX
A	4.40	4.50	4.60
A1	1.27	1.30	1.33
A2	2.30	2.40	2.50
b	0.70	0.60	0.90
b1	-	-	1.40
c	0.45	0.50	0.60
D	15.30	15.70	16.10
D1	9.10	9.20	9.30
D2	13.10	-	13.70
E	9.70	9.90	10.20
E1	7.80	8.00	8.20
e	2.54BSC		
e1	5.08BSC		
H1	6.30	6.50	6.70
L	12.78	13.08	13.38
L1	-	-	3.50
L2	4.6REF		
ϕP	3.55	3.60	3.65
Q	2.73	-	2.87
$\theta 1$	1°	3°	5°



SPN125T10

N-Channel Enhancement Mode MOSFET

TO-220F-3L PACKAGE OUTLINE



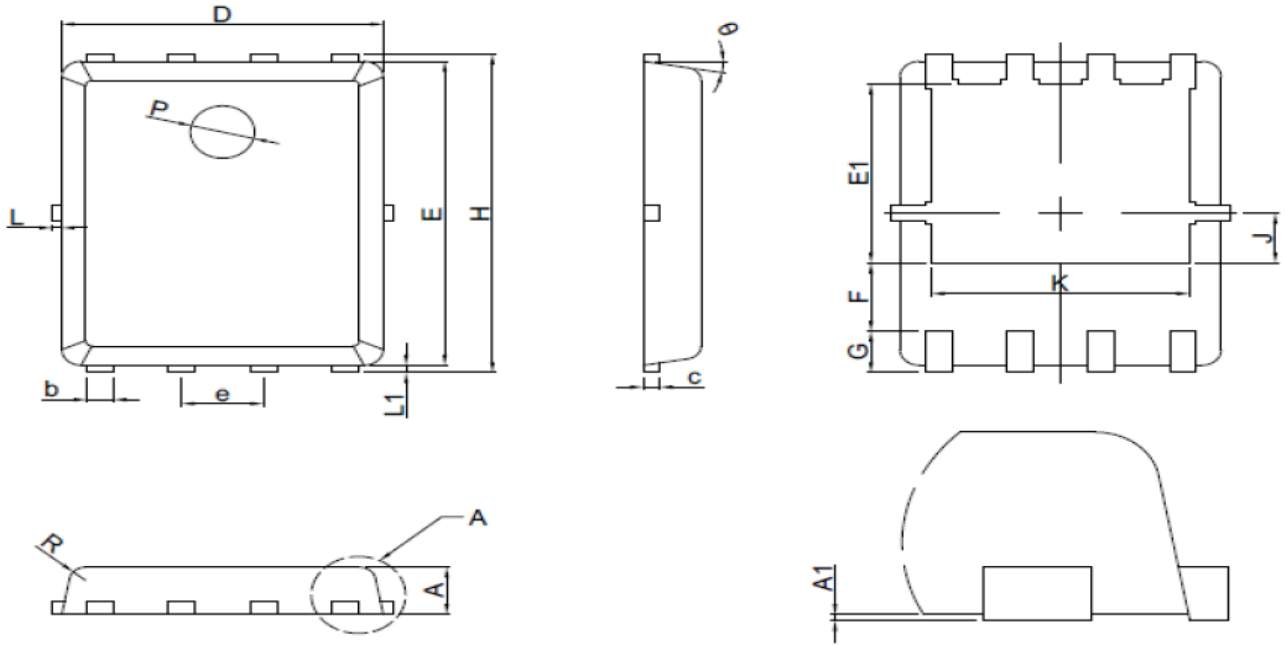
SYMBOL	MIN	NOM	MAX
A	4.50	4.70	4.83
A1	2.34	2.54	2.74
A2	0.7REF		
A3	2.56	2.76	2.93
b	0.70	--	0.90
b1	1.18	--	1.40
b2	--	--	1.47
c	0.45	0.50	0.60
D	15.67	15.87	16.07
D1	15.55	15.75	15.95
D2	9.60	9.80	10.00
E	9.96	10.16	10.36
e	2.54BSC		
H1	6.48	6.68	6.88
L	12.68	12.98	13.28
L1	-	-	3.50
L2	6.50REF		
ϕP	3.08	3.18	3.28
Q	3.20	-	3.40
$\theta 1$	1°	3°	5°



SPN125T10

N-Channel Enhancement Mode MOSFET

PPAK5x6-8L PACKAGE OUTLINE



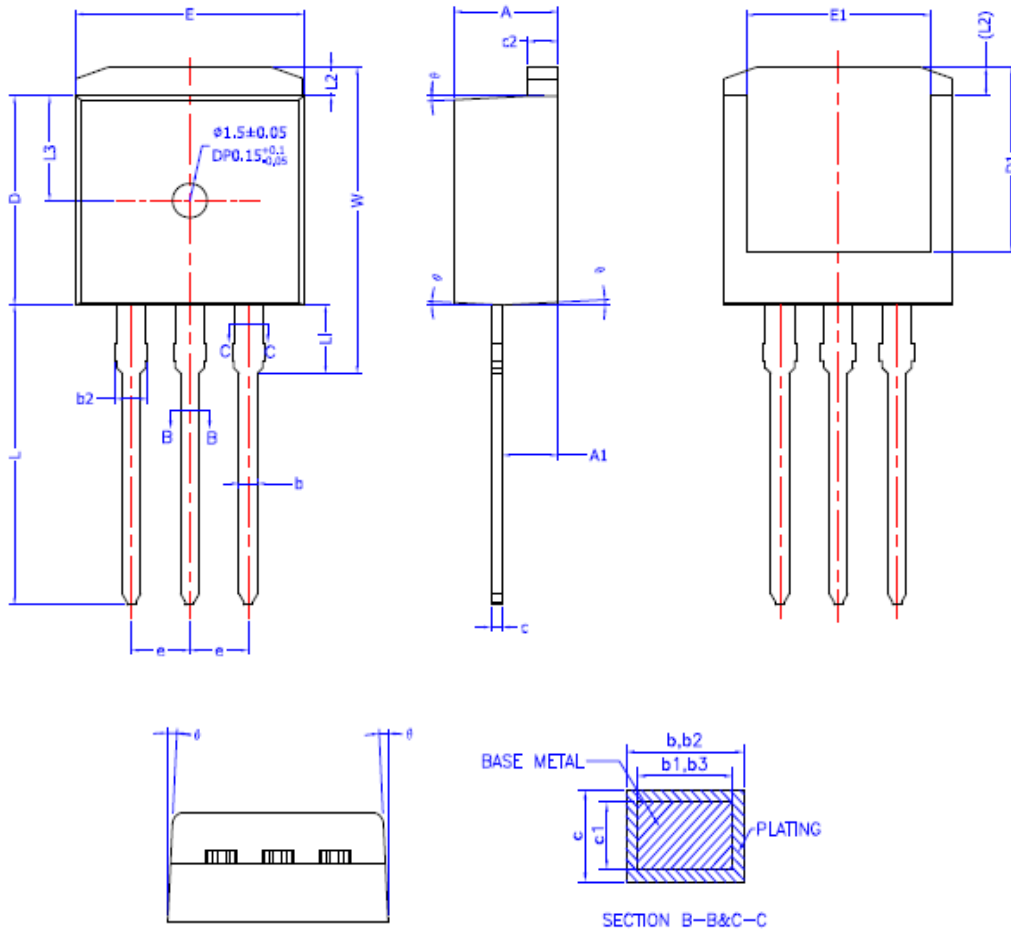
SYMBOL	MILLIMETERS		
	MIN	NOM	MAX
A	0.8	0.95	1.1
A1	0.00	0.03	0.05
b	0.33	0.41	0.51
c	0.254 REF		
D	4.80	4.95	5.10
F	1.40 REF		
E	5.70	5.80	5.90
e	1.27 BSC		
H	5.90	6.05	6.20
L1	0.06	0.13	0.20
G	0.60 REF		
J	0.95 BSC		
K	4.00 REF		
L	---	----	0.20
P	1.00 REF		
E1	3.40REF		
E2	0.95 REF		
θ	6°	10°	14°
R	0.25REF		



SPN125T10

N-Channel Enhancement Mode MOSFET

TO-262-3L PACKAGE OUTLINE



COMMON DIMENSIONS
(UNITS OF MEASURE =MILLIMETER)

SYMBOL	MIN	NOM	MAX
A	4.40	4.50	4.60
A1	2.20	2.40	2.60
b	0.76	—	0.89
b1	0.75	0.80	0.85
b2	1.23	—	1.37
b3	1.22	1.27	1.32
c	0.47	—	0.60
c1	0.46	0.51	0.56
c2	1.25	1.30	1.35
D	9.10	9.20	9.30
D1	8.00	—	—
E	9.80	9.90	10.00
E1	7.80	—	—
e	2.54 BSC		
L	12.90	13.20	13.50
L1	2.80	3.00	3.20
L2	1.17	1.27	1.40
L3	4.60 REF		
W	13.25	—	14.00
θ	1°	3°	5°



SPN125T10

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

© 2019 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>