



SPN125T06

N-Channel Enhancement Mode MOSFET

DESCRIPTION

The SPN125T06 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 RDS(ON) and fast switching speed.

APPLICATIONS

- AC/DC Synchronous Rectifier
- Load Switch
- UPS
- Motor Control
- Power Tool

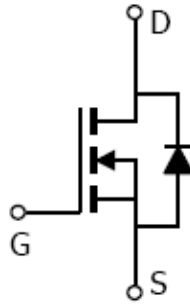
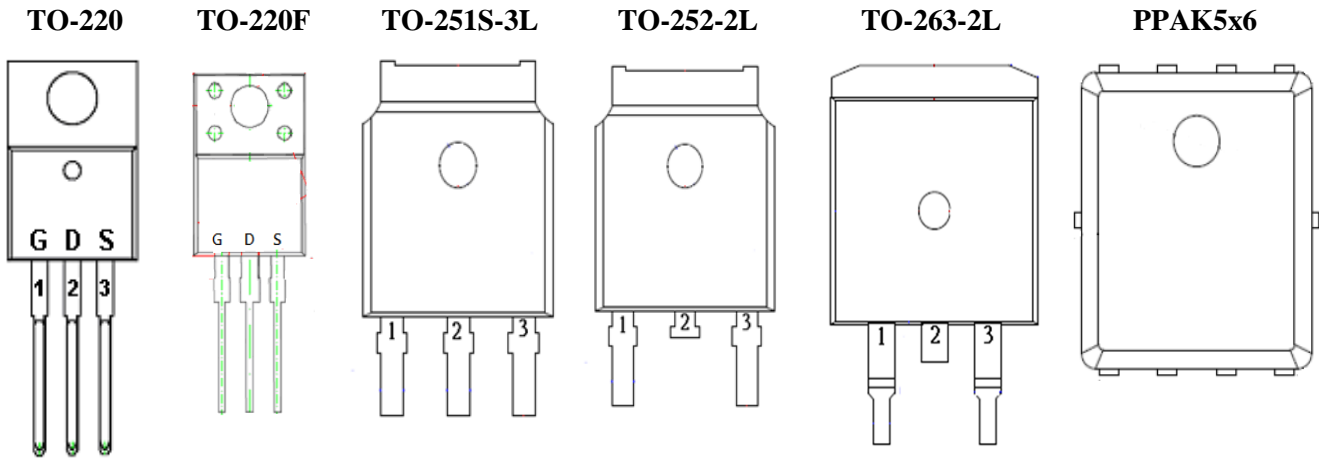
FEATURES

- ◆ 60V/125A , RDS(ON)=4.3mΩ@VGS=10V
60V/125A , RDS(ON)=5.6mΩ@VGS=4.5V
- ◆ Super high density cell design for extremely low RDS (ON)
- ◆ Exceptional on-resistance and maximum DC current capability
- ◆ TO-220-3L/TO-220F-3L/TO-251S-3L/TO-252-2L /PPAK5x6-8L/TO-263-2L package design

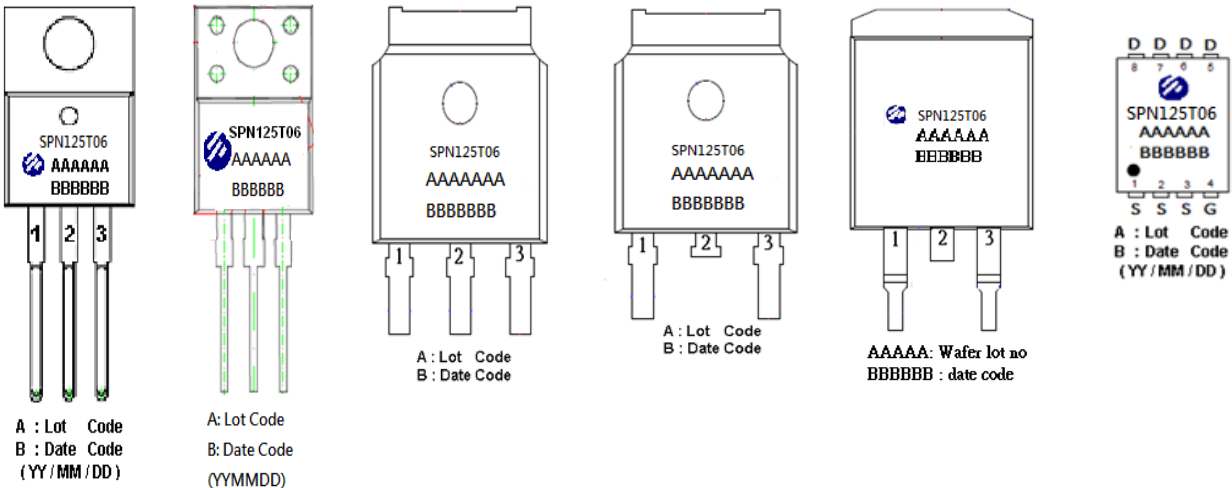


SPN125T06 N-Channel Enhancement Mode MOSFET

PIN CONFIGURATION



PART MARKING





SPN125T06

N-Channel Enhancement Mode MOSFET

TO-220/TO-220F/TO-251/TO-252/TO-263 PIN DESCRIPTION

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

PPAK5x6 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
SPN125T06T220TGB	TO-220-3L	SPN125T06
SPN125T06T220FTGB	TO-220F-3L	SPN125T06
SPN125T06ST251TGB	TO-251S-3L	SPN125T06
SPN125T06T252RGB	TO-252-2L	SPN125T06
SPN125T06T262RGB	TO-263-2L	SPN125T06
SPN125T06DN8RGB	PPAK5x6-8L	SPN125T06

- ※ SPN125T06T220TGB : Tube ; Pb – Free ; Halogen – Free
- ※ SPN125T06T220FTGB : Tube ; Pb – Free ; Halogen – Free
- ※ SPN125T06ST251TGB : Tube ; Pb – Free ; Halogen – Free
- ※ SPN125T06T252RGB : Tape&Reel ; Pb – Free ; Halogen – Free
- ※ SPN125T06T262RGB : Tape&Reel ; Pb – Free ; Halogen – Free
- ※ SPN125T06DN8RGB : Tape&Reel ; Pb – Free ; Halogen - Free



SPN125T06

N-Channel Enhancement Mode MOSFET

ABSOLUTE MAXIMUM RATINGS

(T_A=25°C Unless otherwise noted)

Parameter		Symbol	Typical	Unit
Drain-Source Voltage		V _{DSS}	60	V
Gate –Source Voltage		V _{GSS}	±20	V
Continuous Drain Current(Silicon Limited)	T _c =25°C	I _D	125	A
	T _c =70°C		88	
Pulsed Drain Current		I _{DM}	400	A
Power Dissipation@ T _c =25°C	TO-220/TO-263	P _D	104	W
Power Dissipation@ T _c =25°C	TO-251S/TO-252/TO-220F		93	
Power Dissipation@ T _c =25°C	PPAK5x6		83	
Avalanche Energy with Single Pulse (T _c =25°C , L = 0.1mH.)		EAS	211	mJ
Operating Junction Temperature		T _J	-55/150	°C
Storage Temperature Range		T _{STG}	-55/150	°C
Thermal Resistance-Junction to Case (TO-220/TO-220F/TO-263)		R _{θJC}	1.2	°C/W
Thermal Resistance-Junction to Case (TO-251S/TO-252)		R _{θJC}	1.35	°C/W
Thermal Resistance-Junction to Case (PPAK5x6)		R _{θJC}	1.5	°C/W

Note :

The maximum current rating is package limited at 120A for TO-263-2L and TO-220-3L

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

The maximum current rating is package limited at 70A for TO-251S-3L and TO-252-2L

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



SPN125T06

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	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=250\mu A$	60			V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1.0		2.4	V
Gate Leakage Current	I_{GSS}	$V_{DS}=0V, V_{GS}=\pm 20V$			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=48V, V_{GS}=0V$ $T_J = 25^\circ C$			1	uA
		$V_{DS}=48V, V_{GS}=0V$ $T_J = 100^\circ C$			100	
Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=20A$		3.6	4.3	mΩ
		$V_{GS}=4.5V, I_D=20A$		4.5	5.6	
Forward Transconductance	g_{fs}	$V_{DS}=5V, I_D=20A$		75		S
Gate Resistance	R_G	$V_{GS}=0V, V_{DS}=\text{Open},$ $f=1\text{MHz}$		1.6		Ω
Diode Forward Voltage	V_{SD}	$I_S=20A, V_{GS}=0V$			1.2	V
Dynamic						
Total Gate Charge (10V)	Q_g	$V_{DS}=30V, V_{GS}=10V$ $I_D = 20A$		54		nC
Total Gate Charge (4.5V)	Q_g			27		
Gate-Source Charge	Q_{gs}			14		
Gate-Drain Charge	Q_{gd}			6		
Input Capacitance	C_{iss}	$V_{DS}=30V, V_{GS}=0V$ $f=1\text{MHz}$		3800		pF
Output Capacitance	C_{oss}			520		
Reverse Transfer Capacitance	C_{rss}			50		
Turn-On Time	$t_{d(on)}$	$V_{DD}=30V, I_D=20A$ $V_{GEN}=10V, R_G=10\Omega$		16		nS
	t_r			36		
Turn-Off Time	$t_{d(off)}$			55		
	t_f			35		



SPN125T06 N-Channel Enhancement Mode MOSFET

TYPICAL CHARACTERISTICS

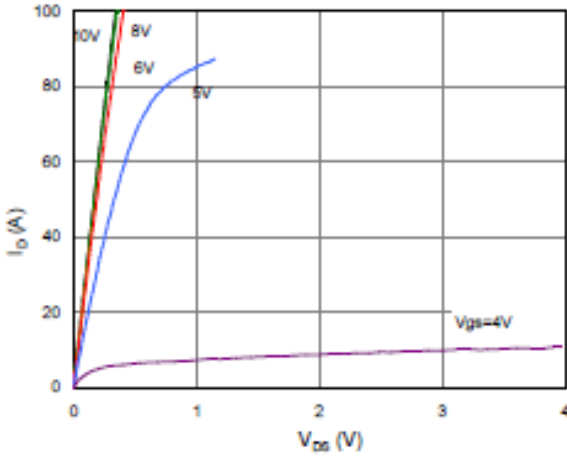


Fig. 1 Output Characteristics

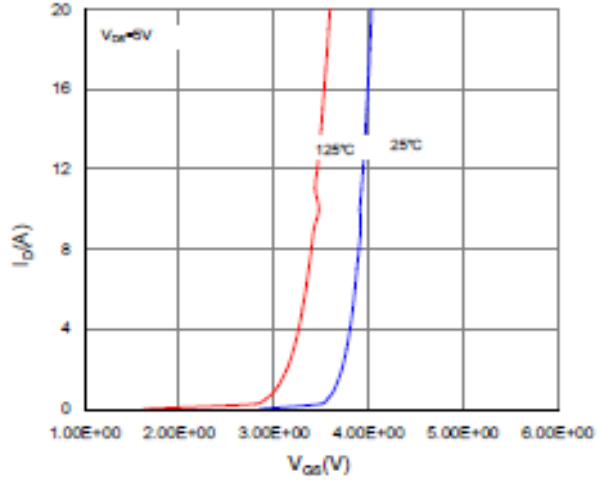


Fig. 2 Transfer Characteristics

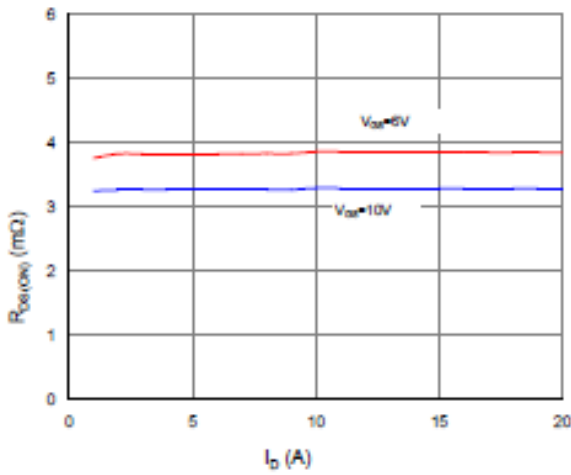


Fig. 3 On Resistances vs Drain Current

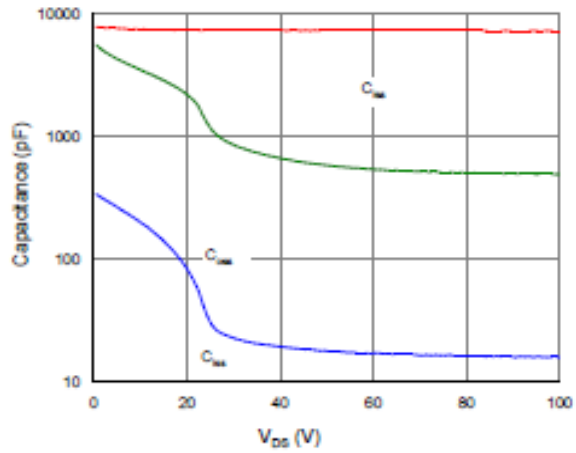


Fig. 4 Capacitance

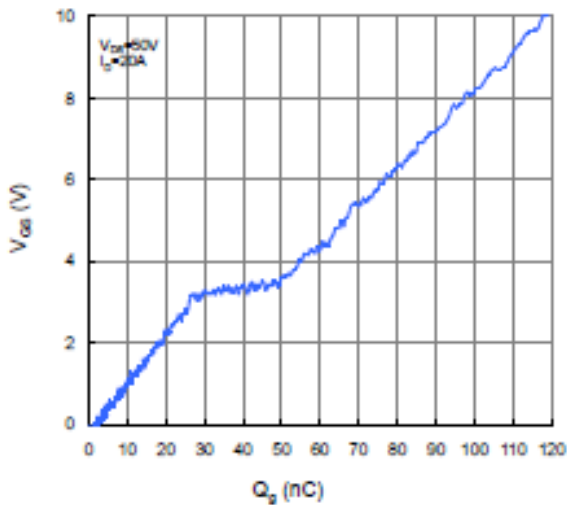


Fig. 5 Gate Charge

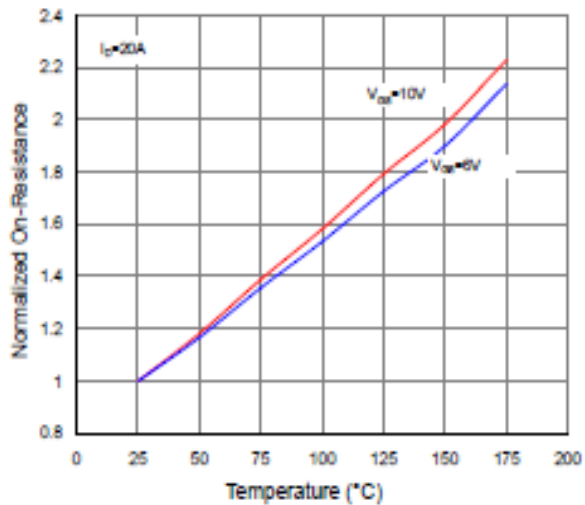


Fig. 6 On-Resistance vs Junction Temperature



SPN125T06

N-Channel Enhancement Mode MOSFET

TYPICAL CHARACTERISTICS

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

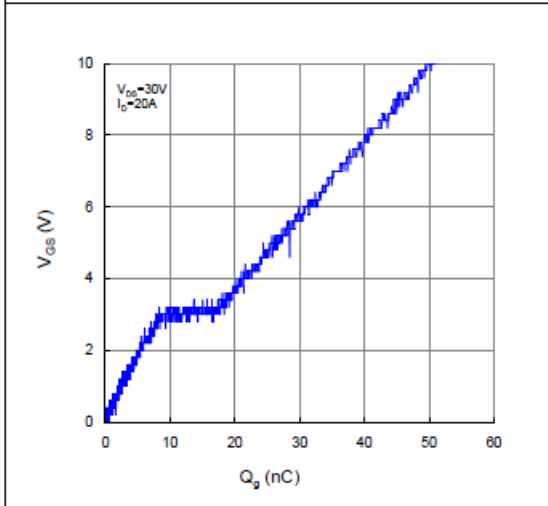


Figure 8. Typical Capacitance vs. Drain-to-Source Voltage

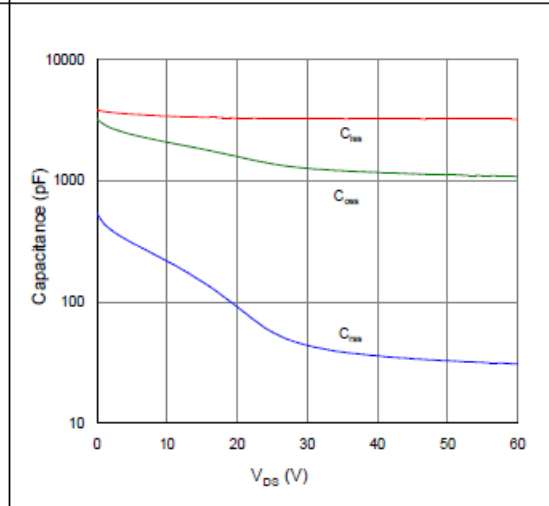


Figure 9. Maximum Safe Operating Area

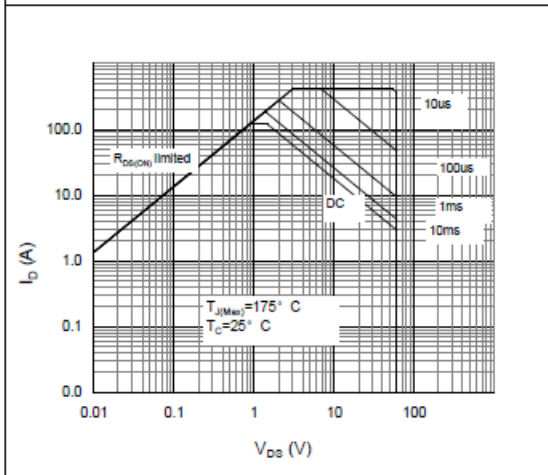


Figure 10. Maximum Drain Current vs. Case Temperature

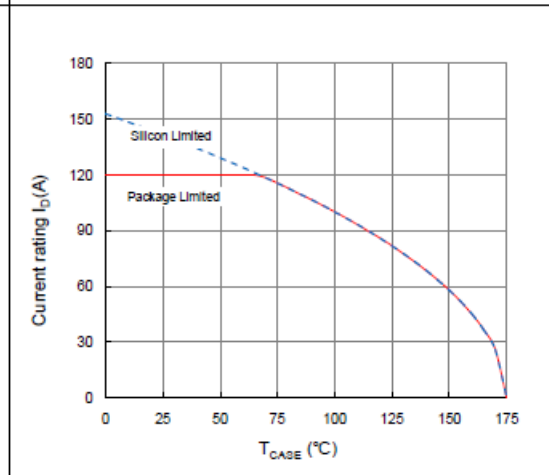
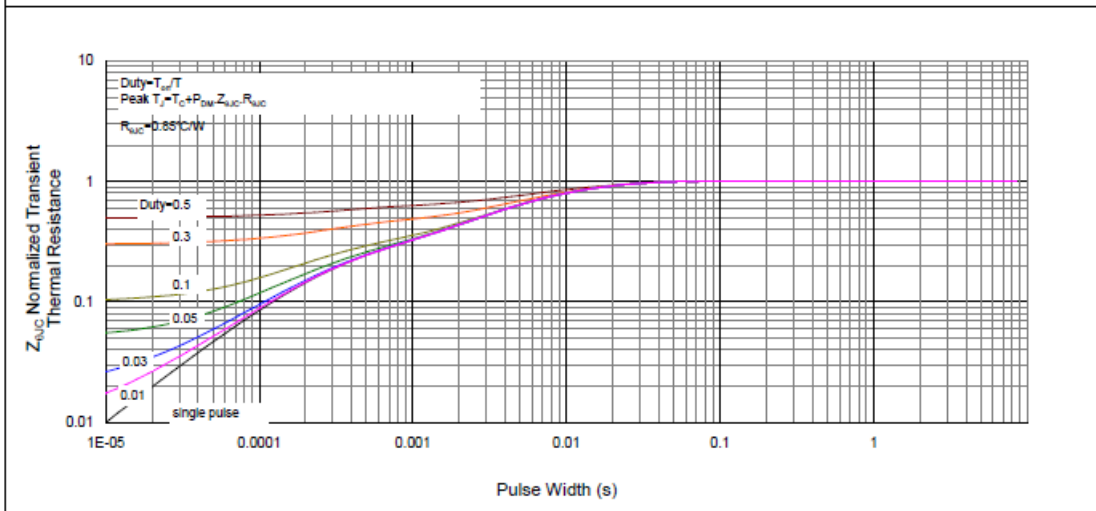


Figure 11. Normalized Maximum Transient Thermal Impedance, Junction-to-Case

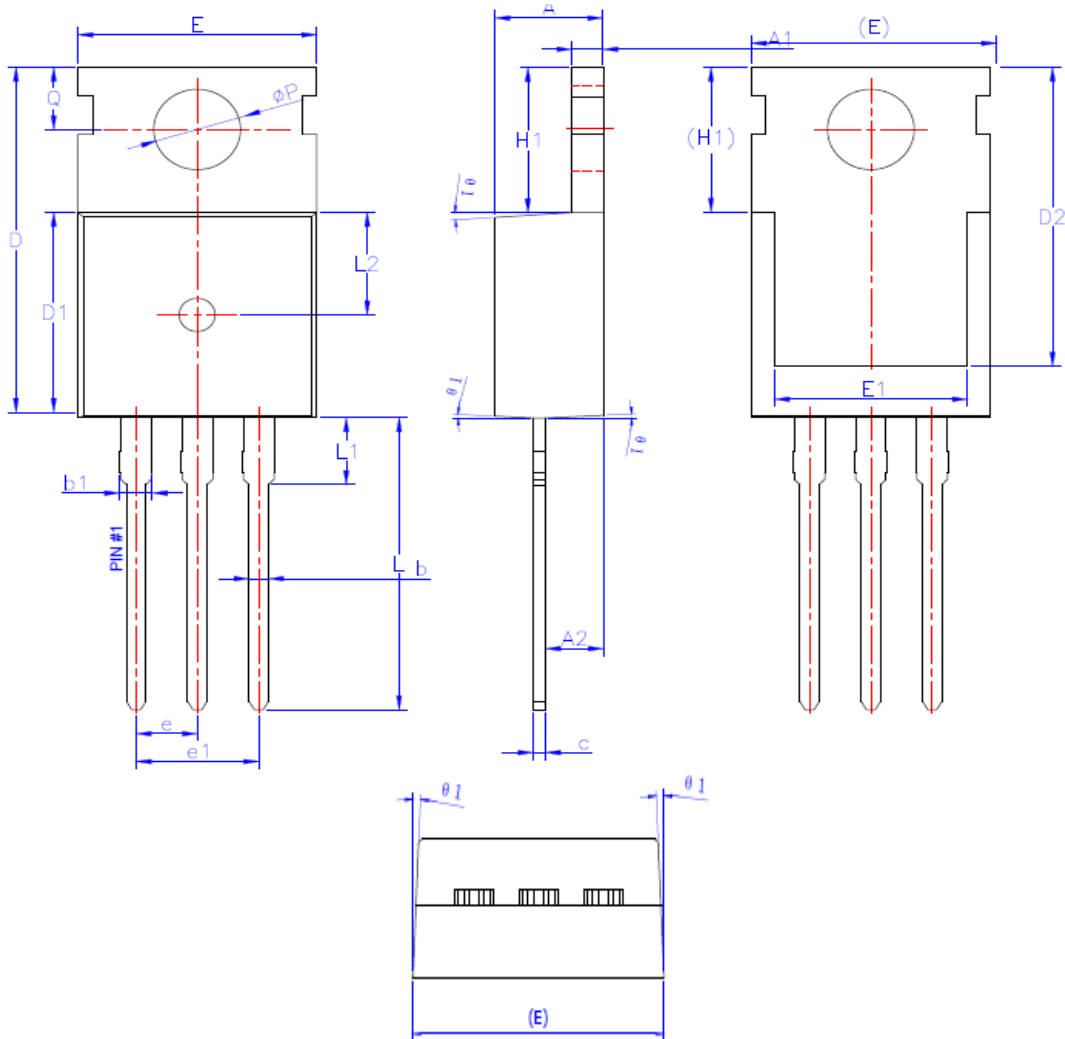




SPN125T06

N-Channel Enhancement Mode MOSFET

TO-220-3L PACKAGE OUTLINE



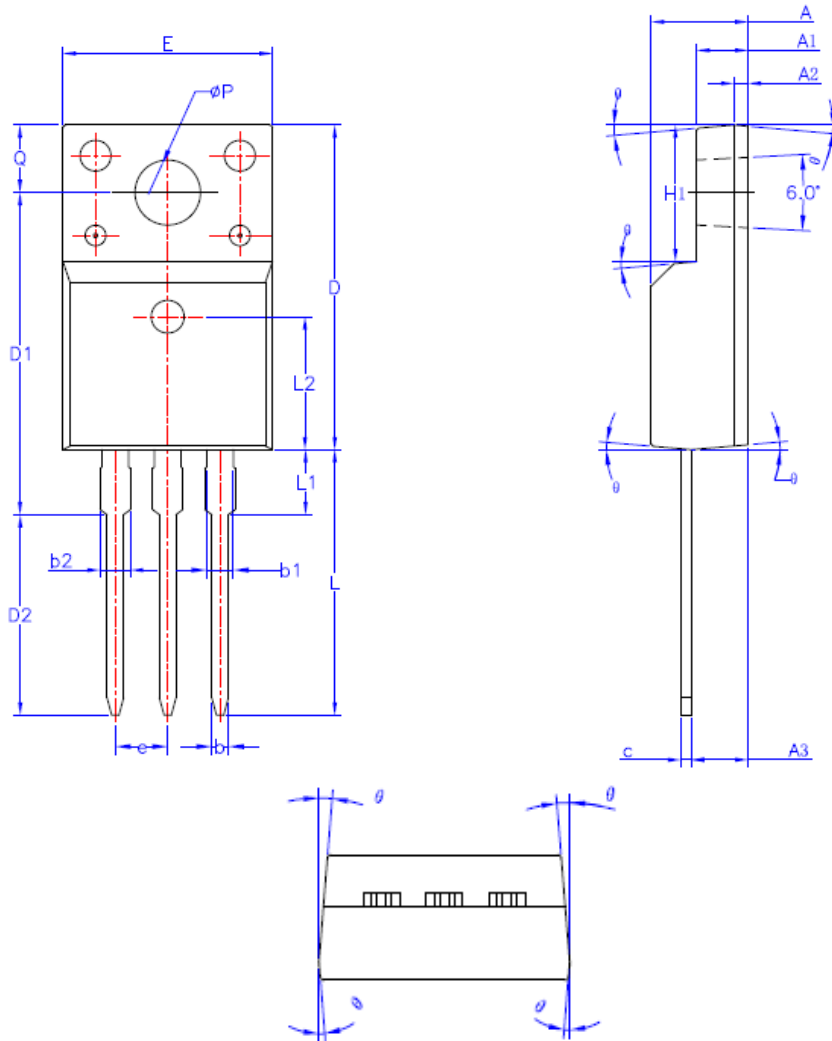
SYMBOL	MIN	NOM	MAX
A	4.40	4.50	4.60
A1	1.27	1.30	1.33
A2	2.30	2.40	2.50
b	0.70	-	0.90
b1	-	-	1.40
c	0.45	0.50	0.50
D	15.30	15.70	16.10
D1	9.10	9.20	9.30
D2	13.10	-	13.70
E	9.70	9.90	10.20
E1	7.80	8.00	8.20
e	2.54BSC		
e1	5.08BSC		
H1	6.30	6.50	6.70
L	12.78	13.08	13.38
L1	-	-	3.50
L2	4.6REF		
ϕP	3.55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



SPN125T06

N-Channel Enhancement Mode MOSFET

TO-220F-3L PACKAGE OUTLINE



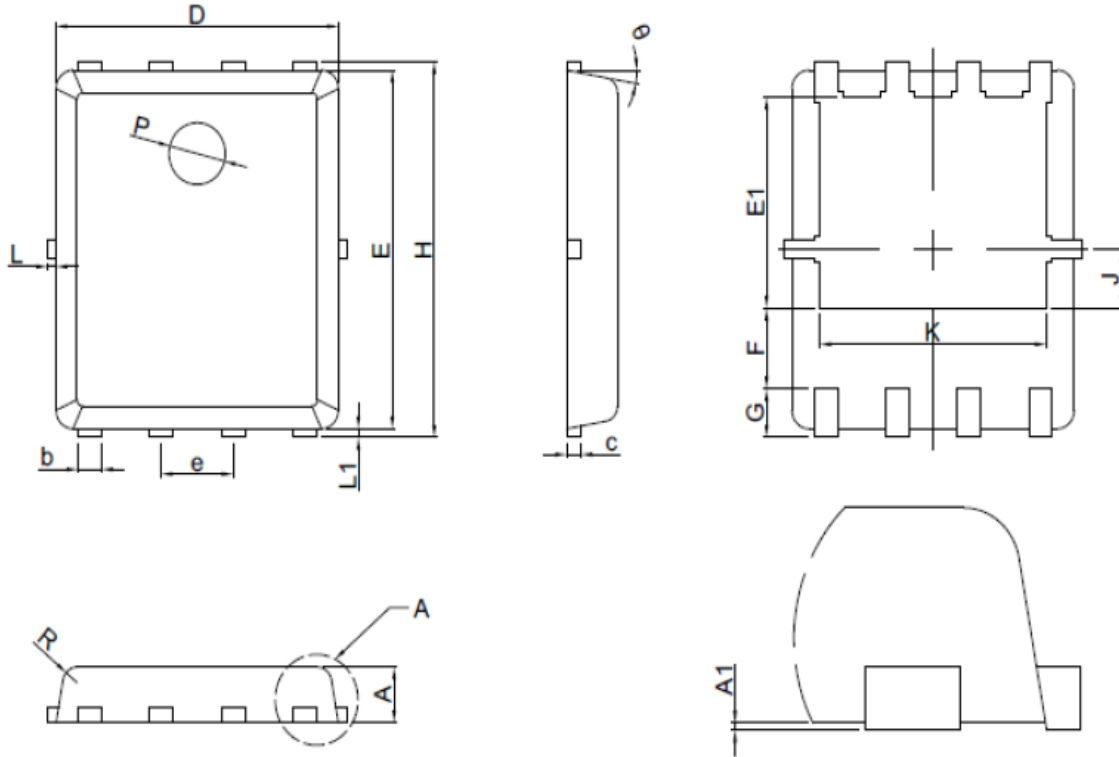
SYMBOL	MIN	NOM	MAX
A	4.50	4.70	4.83
A1	2.34	2.54	2.74
A2	0.7REF		
A3	2.56	2.76	2.93
b	0.70	--	0.90
b1	1.18	--	1.40
b2	--	--	1.47
c	0.45	0.50	0.60
D	15.67	15.87	16.07
D1	15.55	15.75	15.95
D2	9.60	9.80	10.00
E	9.96	10.16	10.36
e	2.54BSC		
H1	6.48	6.68	6.88
L	12.68	12.98	13.28
L1	-	-	3.50
L2	6.50REF		
φ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



SPN125T06

N-Channel Enhancement Mode MOSFET

PPAK5x6-8L PACKAGE OUTLINE



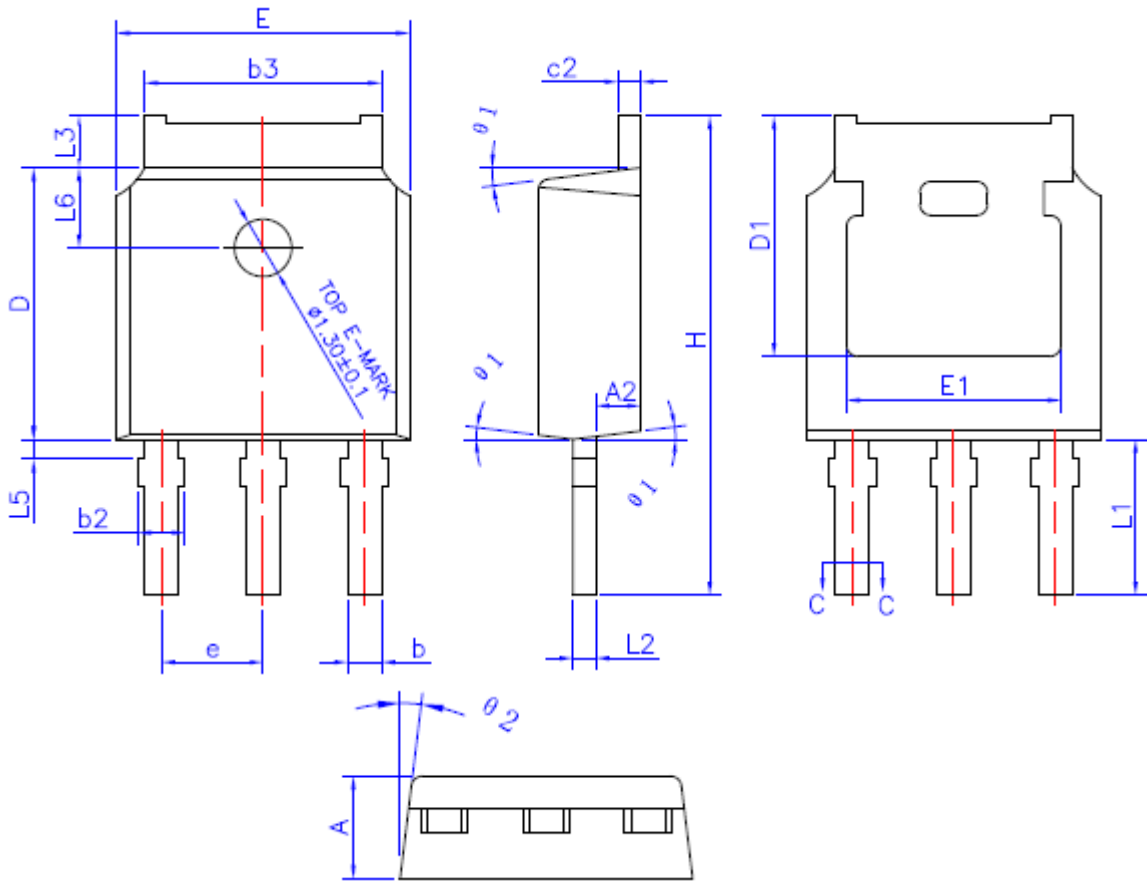
SYMBOL	MILLIMETERS		
	MIN	NOM	MAX
A	0.8	0.95	1.1
A1	0	0.03	0.05
b	0.33	0.41	0.51
c	0.254 REF		
D	4.80	4.95	5.10
F	1.40 REF		
E	5.70	5.80	5.90
e	1.27 BSC		
H	5.90	6.05	6.20
L1	0.06	0.13	0.20
G	0.60 REF		
J	0.95 BSC		
K	4.00 REF		
L	---	----	0.20
P	1.00 REF		
E1	3.40REF		
E2	0.95 REF		
θ	6°	10°	14°
R	0.25REF		



SPN125T06

N-Channel Enhancement Mode MOSFET

TO-251S-3L PACKAGE OUTLINE



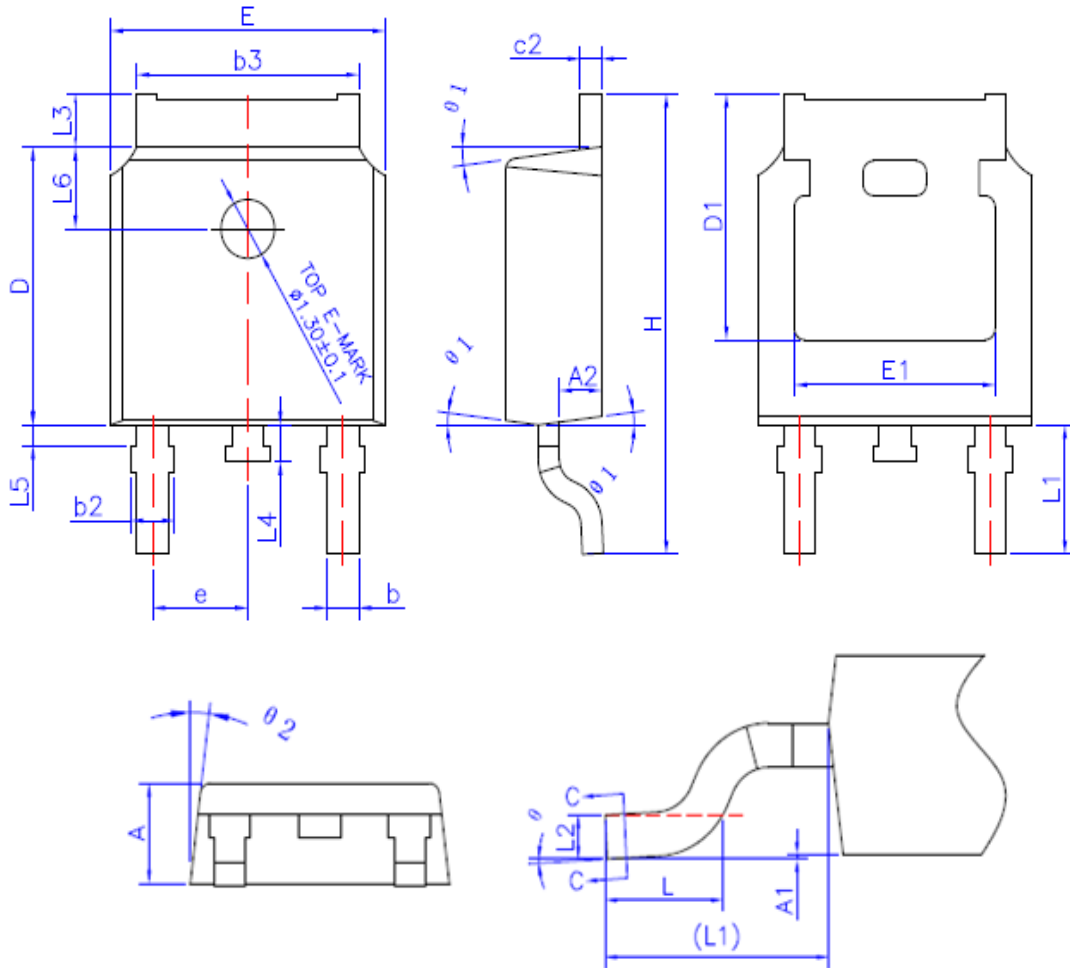
SYMBOL	MIN	NOM	MAX
A	2.20	2.30	2.40
A2	0.86	1.01	1.16
b	0.66	-	0.86
b2	0.66	--	0.96
b3	5.10	5.28	5.46
c	0.46	--	0.60
c2	0.47	--	0.60
D	6.00	6.10	6.20
D1	5.35REF		
E	6.40	6.60	6.80
E1	4.83REF		
e	2.3REF		
H	9.80	10.40	11.00
L1	3.50REF		
L2	0.508BSC		
L3	0.90	--	1.25
L5	0.15	--	0.75
L6	1.80REF		
$\theta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



SPN125T06

N-Channel Enhancement Mode MOSFET

TO-252-2L PACKAGE OUTLINE



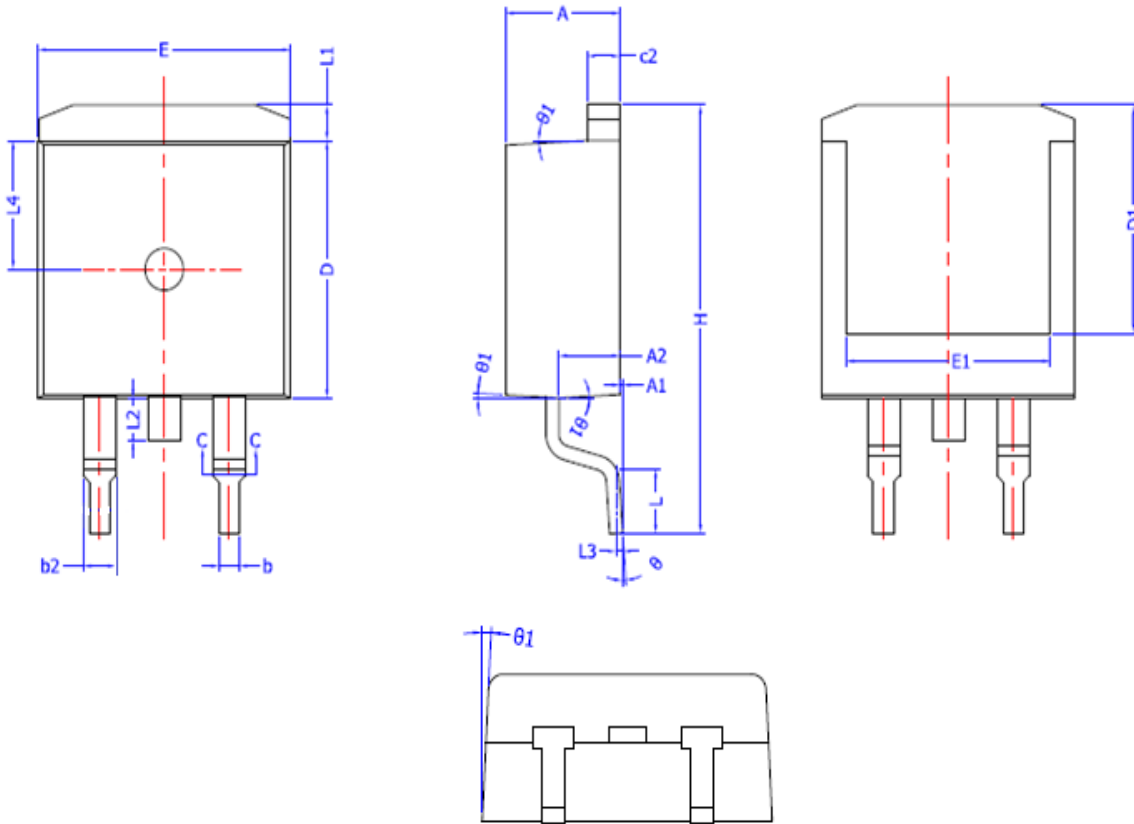
SYMBOL	MIN	NOM	MAX
A	2.20	2.30	2.40
A1	0.00	--	0.15
A2	0.90	1.01	1.10
b	0.72	-	0.85
b2	0.72	--	0.90
b3	5.13	5.33	5.46
c	0.47	--	0.60
c2	0.47	--	0.60
D	6.00	6.10	6.20
D1	5.25	--	--
E	6.40	6.60	6.80
E1	4.70	--	--
e	2.3REF		
H	9.80	10.10	10.40
L	1.40	1.60	1.80
L1	2.90REF		
L2	0.508BSC		
L3	0.90	--	1.25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



SPN125T06

N-Channel Enhancement Mode MOSFET

TO-263-2L PACKAGE OUTLINE



SYMBOL	MIN	NOM	MAX
A	4.40	4.50	4.60
A1	0.00	0.10	0.25
A2	2.20	2.40	2.60
b	0.71	-	0.91
b2	1.17	--	1.37
c	0.47	--	0.60
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	2.54BSC		
H	14.90	15.30	15.70
L	2.00	2.30	2.60
L1	1.12	1.27	1.42
L2	--	--	1.75
L3	0.25BSC		
L4	4.60 REF		
θ	0°	--	8°
$\theta 1$	1°	3°	5°



SPN125T06

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

© 2017 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>