



# SPN09T10

## N-Channel Enhancement Mode MOSFET

DESCRIPTION	APPLICATIONS		
<p>The SPN09T10 is the N-Channel logic enhancement mode power field effect transistor which is produced using super high cell density DMOS trench technology. The SPN09T10 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 <math>R_{DS(ON)}</math> and fast switching speed.</p>	<ul style="list-style-type: none"> <li>● Powered System</li> <li>● DC/DC Converter</li> <li>● Load Switch</li> </ul>		
FEATURES	PIN CONFIGURATION		
<ul style="list-style-type: none"> <li>◆ 100V/8A, <math>R_{DS(ON)} = 160m\Omega @ V_{GS} = 10V</math></li> <li>◆ High density cell design for extremely low <math>R_{DS(ON)}</math></li> <li>◆ Exceptional on-resistance and maximum DC current capability</li> <li>◆ TO-252, TO-251, TO-263 package design</li> </ul>	TO-252	TO-251	TO-263
	PART MARKING		



# SPN09T10

## N-Channel Enhancement Mode MOSFET

### PIN DESCRIPTION

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

### ORDERING INFORMATION

Part Number	Package	Part Marking
SPN09T10T252RGB	TO-252	SPN09T10
SPN09T10T251TGB	TO-251	SPN09T10
SPN09T10T263TGB	TO-263	SPN09T10

※ SPN09T10T252RGB : Tape Reel ; Pb – Free ; Halogen - Free

※ SPN09T10T251RGB : Tube ; Pb – Free ; Halogen - Free

※ SPN09T10T263RGB : Tube ; Pb – Free ; Halogen - Free

### ABSOLUTE MAXIMUM RATINGS

( $T_A=25^{\circ}\text{C}$  Unless otherwise noted)

Parameter	Symbol	Typical	Unit
Drain-Source Voltage	$V_{DSS}$	100	V
Gate –Source Voltage	$V_{GSS}$	$\pm 20$	V
Continuous Drain Current( $T_J=150^{\circ}\text{C}$ )	$I_D$	$T_A=25^{\circ}\text{C}$	14
		$T_A=70^{\circ}\text{C}$	9.0
Pulsed Drain Current	$I_{DM}$	45	A
Avalanche Current	$I_{AS}$	14	A
Power Dissipation	$P_D$	$T_A=25^{\circ}\text{C}$ TO-252-2L	40
		TO-251	55
Avalanche Energy with Single Pulse ( $T_J=25^{\circ}\text{C}$ , $L = 0.14\text{mH}$ , $I_{AS} = 20\text{A}$ , $V_{DD} = 20\text{V}$ .)	$E_{AS}$	28	mJ
Operating Junction Temperature	$T_J$	-55/150	$^{\circ}\text{C}$
Storage Temperature Range	$T_{STG}$	-55/150	$^{\circ}\text{C}$
Thermal Resistance-Junction to Ambient	$R_{\theta JA}$	100	$^{\circ}\text{C}/\text{W}$



# SPN09T10

## N-Channel Enhancement Mode MOSFET

### 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	VGS=0V, ID=250uA	100			V
Gate Threshold Voltage	VGS(th)	VDS=VGS, ID=250uA	1		3	
Gate Leakage Current	IGSS	VDS=0V, VGS=±20V			±100	nA
Zero Gate Voltage Drain Current	IDSS	VDS=80V, VGS=0V			25	uA
		VDS=80V, VGS=0V TJ=125°C			250	
On-State Drain Current	ID(on)	VDS≥5V, VGS =10V	9			A
Drain-Source On-Resistance	RDS(on)	VGS= 10V, ID=10A		0.110	0.160	Ω
Forward Transconductance	gfs	VDS=10V, ID=5A		5.6		S
Diode Forward Voltage	VSD	IS=9A, VGS =0V			1.3	V
<b>Dynamic</b>						
Total Gate Charge	Qg	VDS=80V, VGS=10V ID= 5A		10	16	nC
Gate-Source Charge	Qgs			2.5		
Gate-Drain Charge	Qgd			4.5		
Input Capacitance	Ciss	VDS=25, VGS=0V f=1MHz		430		pF
Output Capacitance	Coss			56		
Reverse Transfer Capacitance	Crss			35		
Turn-On Time	td(on)	VDD=50V, RL=10Ω ID=5A, VGEN=10V RG=3.3Ω		6.5		nS
	tr			10		
Turn-Off Time	td(off)			13		
	tf			3.4		



# SPN09T10 N-Channel Enhancement Mode MOSFET

## TYPICAL CHARACTERISTICS

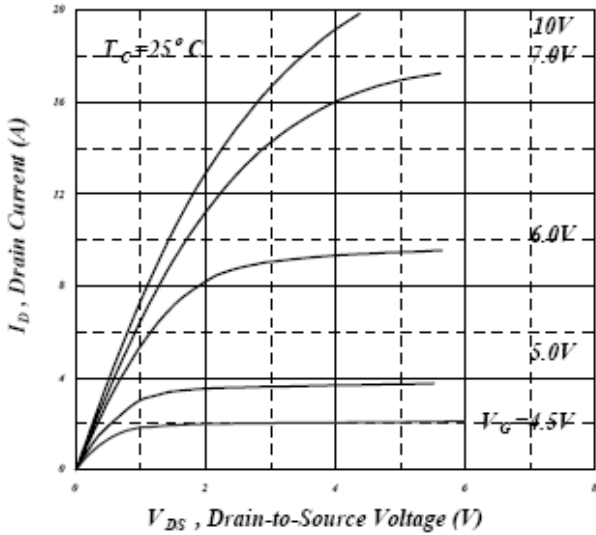


Fig 1. Typical Output Characteristics

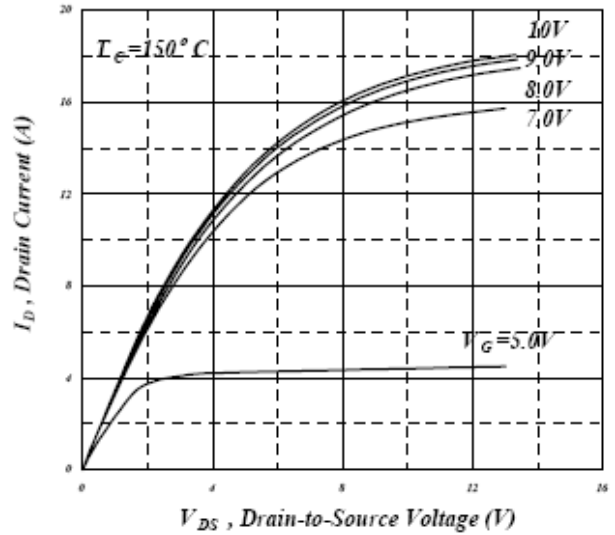


Fig 2. Typical Output Characteristics

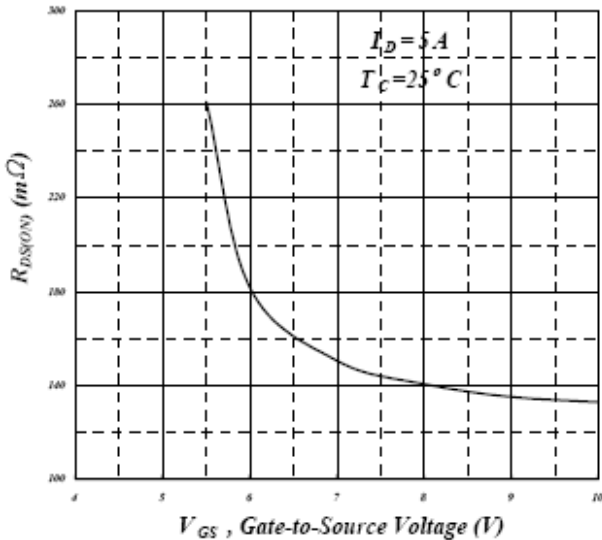


Fig 3. On-Resistance v.s. Gate Voltage

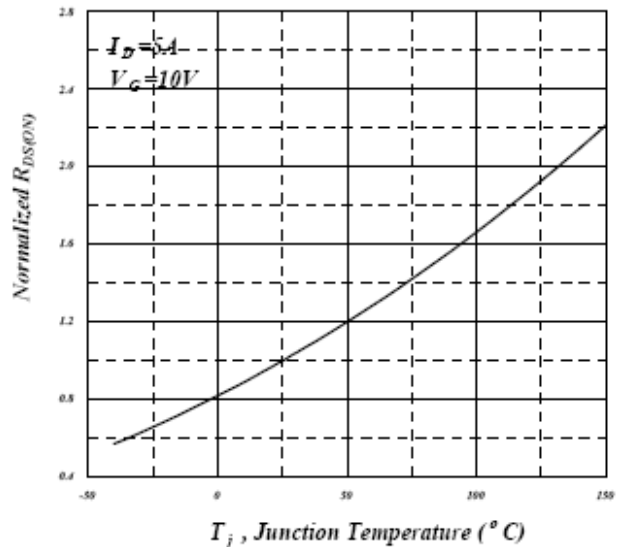


Fig 4. Normalized On-Resistance v.s. Junction Temperature



# SPN09T10

## N-Channel Enhancement Mode MOSFET

### TYPICAL CHARACTERISTICS

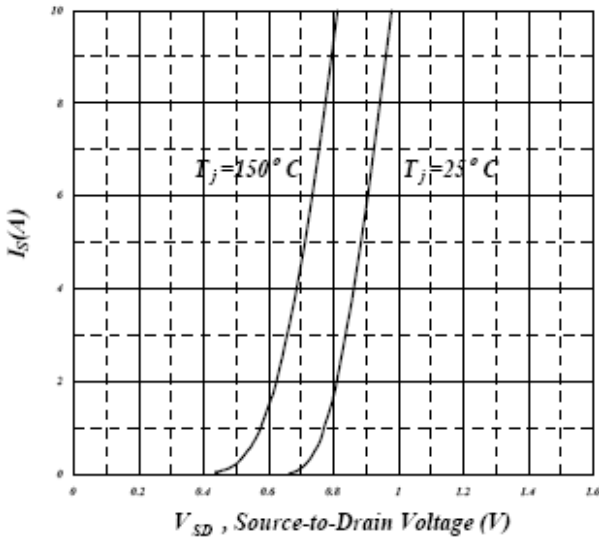


Fig 5. Forward Characteristic of Reverse Diode

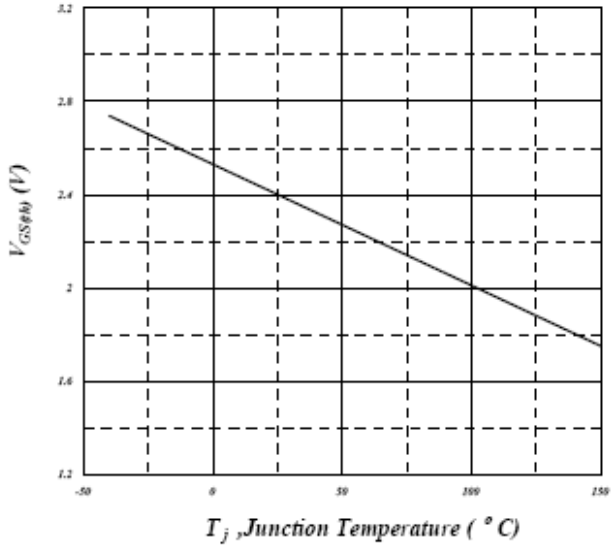


Fig 6. Gate Threshold Voltage v.s. Junction Temperature

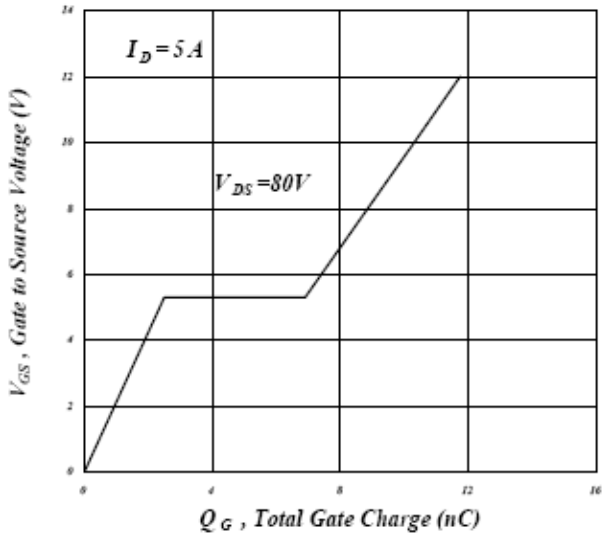


Fig 7. Gate Charge Characteristics

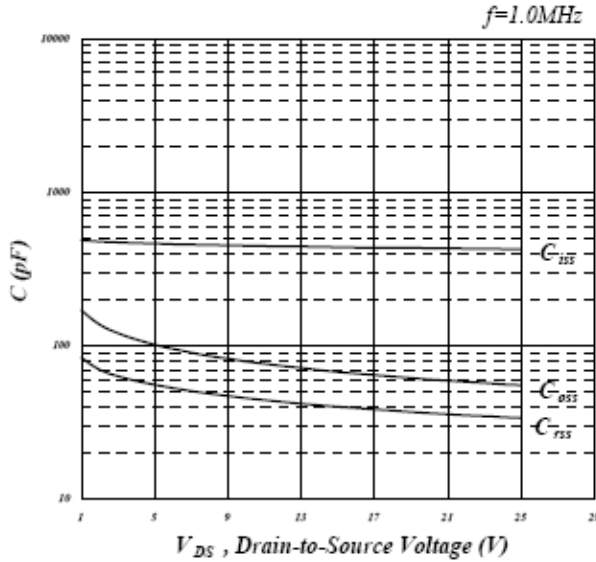


Fig 8. Typical Capacitance Characteristics



# SPN09T10 N-Channel Enhancement Mode MOSFET

## TYPICAL CHARACTERISTICS

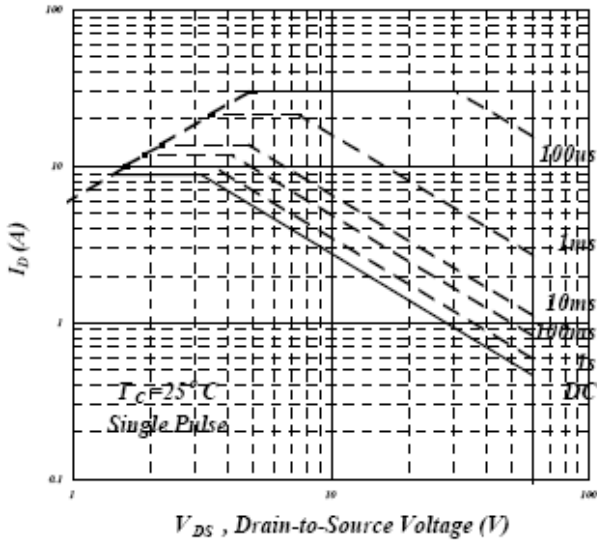


Fig 9. Maximum Safe Operating Area

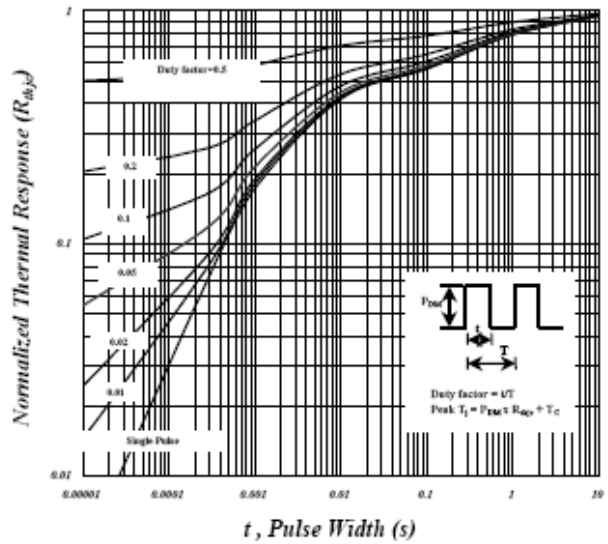


Fig 10. Effective Transient Thermal Impedance

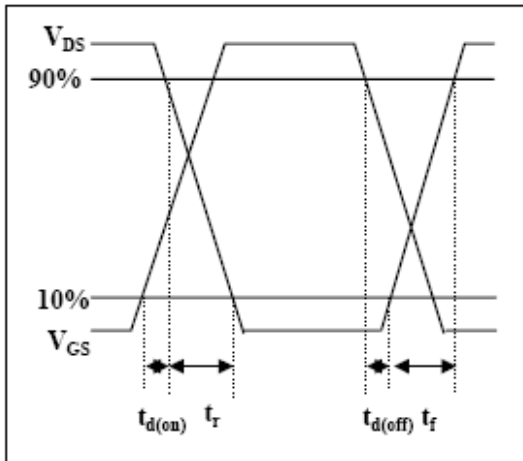


Fig 11. Switching Time Waveform

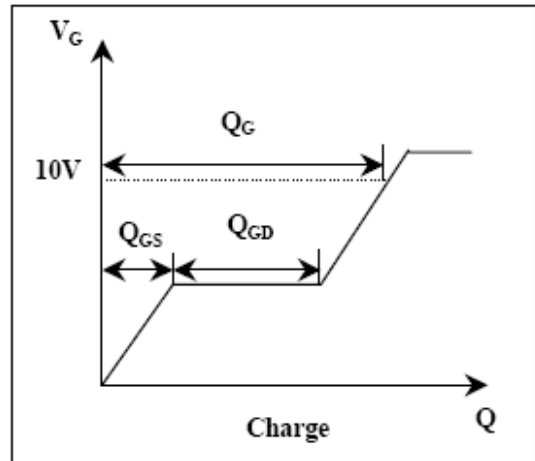


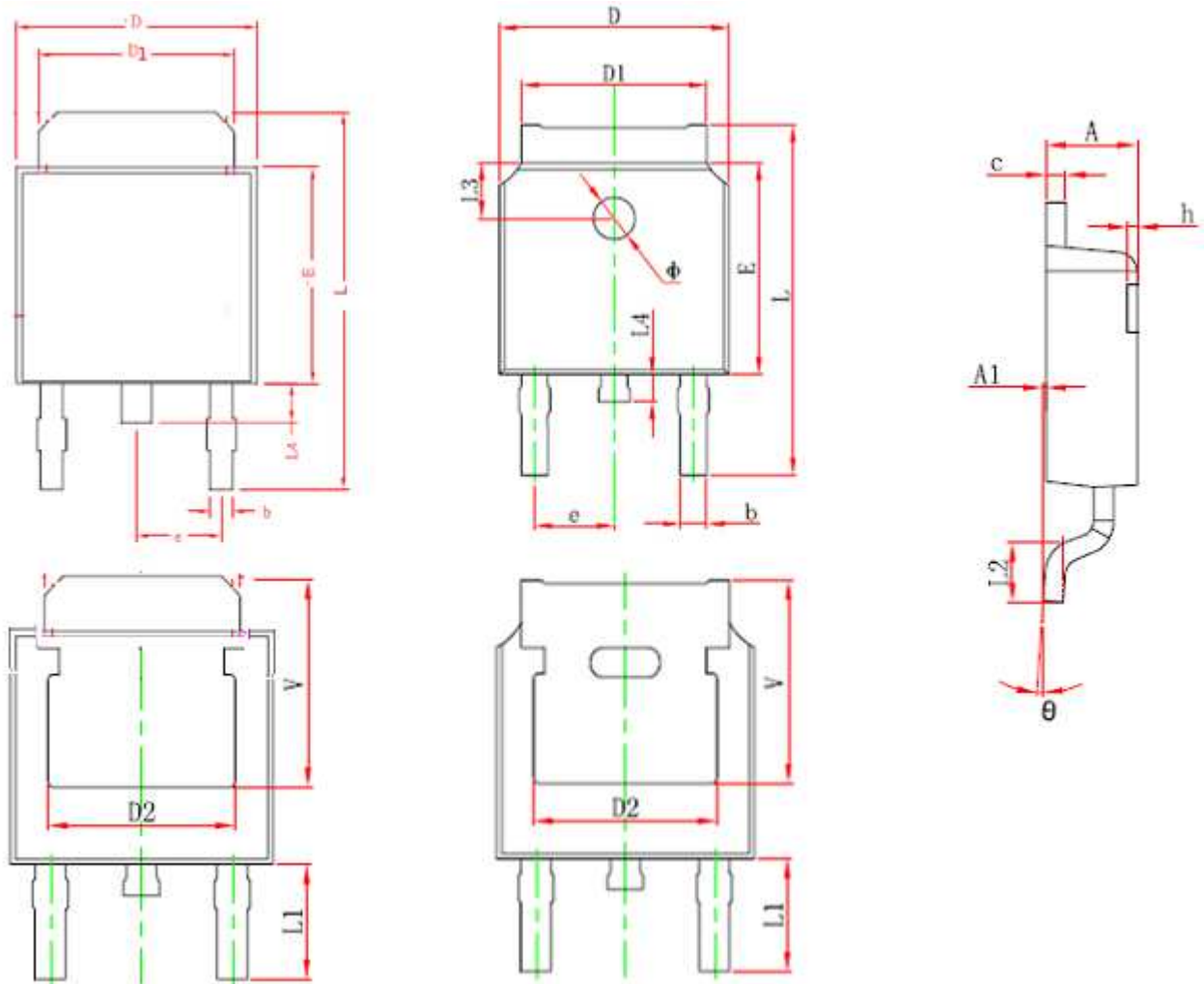
Fig 12. Gate Charge Waveform



# SPN09T10

## N-Channel Enhancement Mode MOSFET

### TO-252 PACKAGE OUTLINE



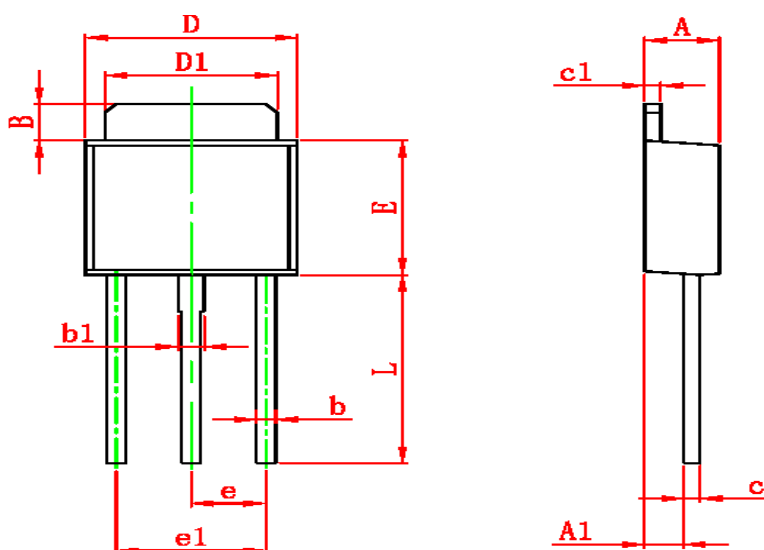
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.400	0.087	0.094
A1	0.000	0.127	0.000	0.005
b	0.660	0.860	0.026	0.034
c	0.460	0.580	0.018	0.023
D	6.500	6.700	0.256	0.264
D1	5.100	5.460	0.201	0.215
D2	4.830 REF.		0.190 REF.	
E	6.000	6.200	0.236	0.244
e	2.186	2.386	0.086	0.094
L	9.800	10.400	0.386	0.409
L1	2.900 REF.		0.114 REF.	
L2	1.400	1.700	0.055	0.067
L3	1.600 REF.		0.063 REF.	
L4	0.600	1.000	0.024	0.039
Φ	1.100	1.300	0.043	0.051
θ	0°	8°	0°	8°
h	0.000	0.300	0.000	0.012
V	5.350 REF.		0.211 REF.	



# SPN09T10

## N-Channel Enhancement Mode MOSFET

### TO-251 PACKAGE OUTLINE



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	2.200	2.400	0.087	0.094
A1	1.020	1.270	0.040	0.050
B	1.350	1.650	0.053	0.065
b	0.500	0.700	0.020	0.028
b1	0.700	0.900	0.028	0.035
c	0.430	0.580	0.017	0.023
c1	0.430	0.580	0.017	0.023
D	6.350	6.650	0.250	0.262
D1	5.200	5.400	0.205	0.213
E	5.400	5.700	0.213	0.224
e	2.300 TYP		0.091 TYP	
e1	4.500	4.700	0.177	0.185
L	7.500	7.900	0.295	0.311

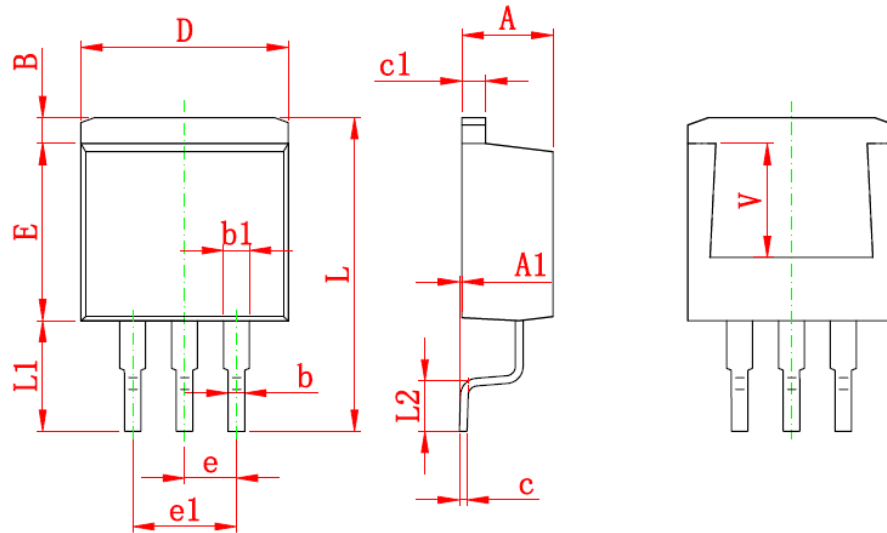




# SPN09T10

## N-Channel Enhancement Mode MOSFET

### TO-263 PACKAGE OUTLINE



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	4.470	4.670	0.176	0.184
A1	0.000	0.150	0.000	0.006
B	1.170	1.370	0.046	0.054
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
e	2.540 TYP		0.100 TYP	
e1	4.980	5.180	0.196	0.204
L	15.050	15.450	0.593	0.608
L1	5.080	5.480	0.200	0.216
L2	2.340	2.740	0.092	0.108
V	5.600 REF		0.220 REF	



# SPN09T10

## 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

©2004 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>

---