



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.

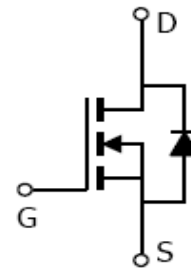
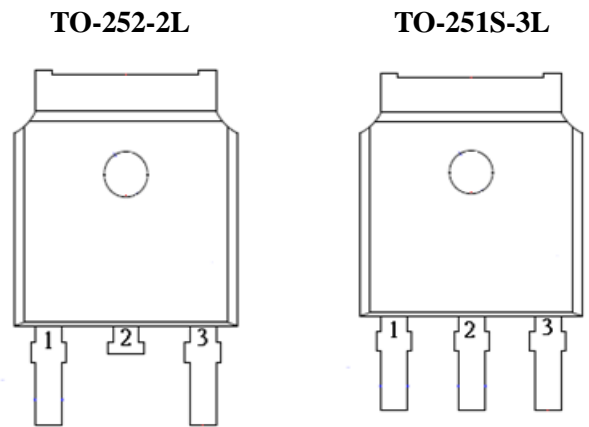
FEATURES

- ◆ 30V/30A, $R_{DS(ON)}=4.7m\Omega@V_{GS}=10V$
- ◆ 30V/15A, $R_{DS(ON)}=7.5m\Omega@V_{GS}=4.5V$
- ◆ 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

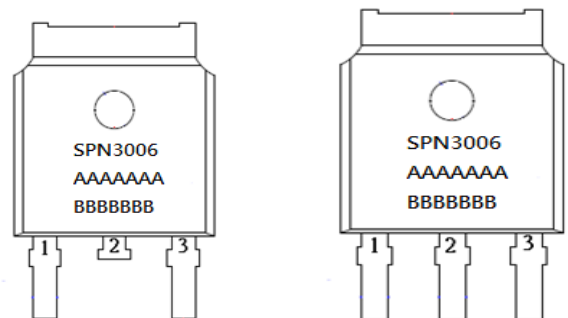
APPLICATIONS

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

PIN CONFIGURATION



PART MARKING



A : Lot Code
B : Date Code

A : Lot Code
B : 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
SPN3006ST251TGB	TO-251S-3L	SPN3006
SPN3006T252RGB	TO-252-2L	SPN3006

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

※ SPN3006ST251TGB: 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}	30	V	
Gate –Source Voltage	V_{GSS}	± 20	V	
Continuous Drain Current	I_D	$T_A=25^{\circ}\text{C}$	80	A
		$T_A=100^{\circ}\text{C}$	57	
Pulsed Drain Current	I_{DM}	160	A	
Avalanche Current	I_{AS}	48	A	
Single Pulse Avalanche Energy	EAS	259	mJ	
Power Dissipation	P_D	2	W	
Operating Junction Temperature	T_J	150	$^{\circ}\text{C}$	
Storage Temperature Range	T_{STG}	-55/150	$^{\circ}\text{C}$	
Thermal Resistance-Junction to Ambient ($t \leq 10\text{s}$)	$R_{\theta JA}$	62	$^{\circ}\text{C}/\text{W}$	



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ELECTRICAL CHARACTERISTICS

(T_A=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 =250μA	30			V
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250μA	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	μA
		V _{DS} =24V, V _{GS} =0V, T _J =55°C			5	
On-State Drain Current	I _{D(on)}	V _{DS} ≥5V, V _{GS} =10V			80	A
Drain-Source On-Resistance	R _{DSON}	V _{GS} =10V, I _D =30A		4.7	5.5	mΩ
		V _{GS} =4.5V, I _D =15A		7.5	9	
Forward Transconductance	g _{fs}	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	E _{AS}	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 =15A		20	18	nC
Gate-Source Charge	Q _{gs}			7.6		
Gate-Drain Charge	Q _{gd}			7.2		
Input Capacitance	C _{iss}	V _{DS} =15V, V _{GS} =0V f=1MHz		2300		pF
Output Capacitance	C _{oss}			265		
Reverse Transfer Capacitance	C _{rss}			210		
Turn-On Time	t _{d(on)}	V _{DD} =15V, I _D =15A, V _{GEN} =10V R _G =3.3Ω		7.8	15	nS
	t _r			15	12	
Turn-Off Time	t _{d(off)}			37	30	
	t _f			10.6	15	



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TYPICAL CHARACTERISTICS

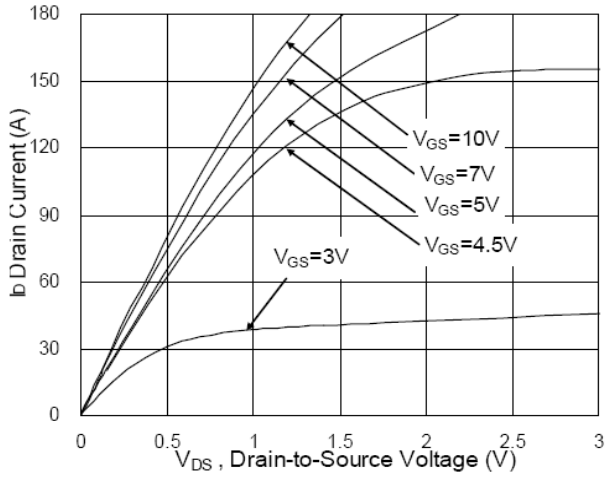


Fig. 1 Typical Output Characteristics

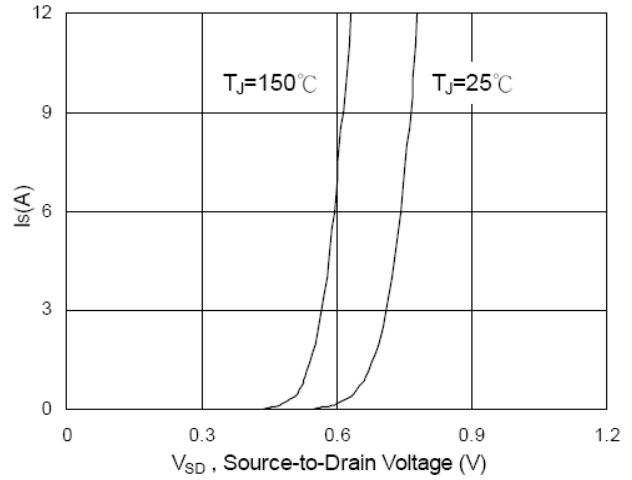


Fig. 2 Transfer Characteristics

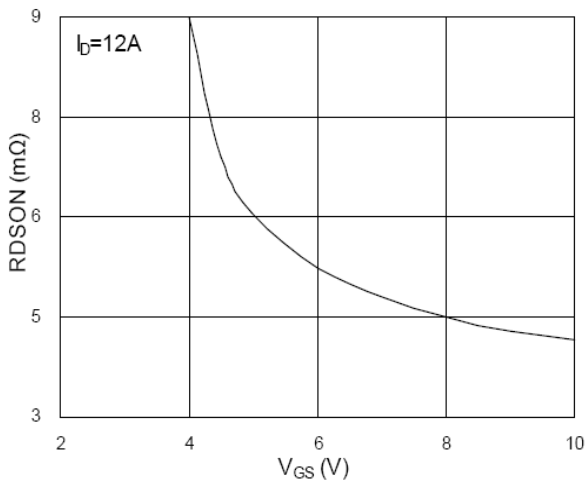


Fig. 3 On-Resistance vs Gate voltage

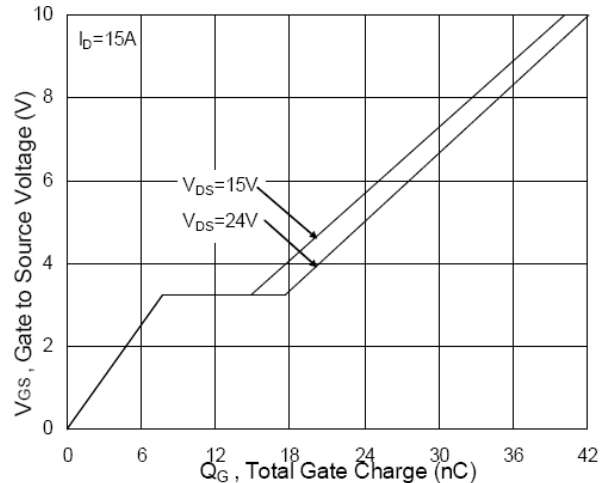


Fig. 4 Gate Charge Characteristics

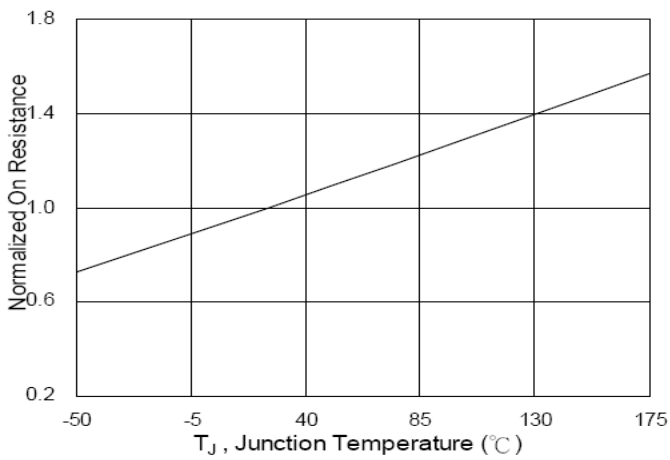


Fig. 5 On-Resistance vs Junction Temp

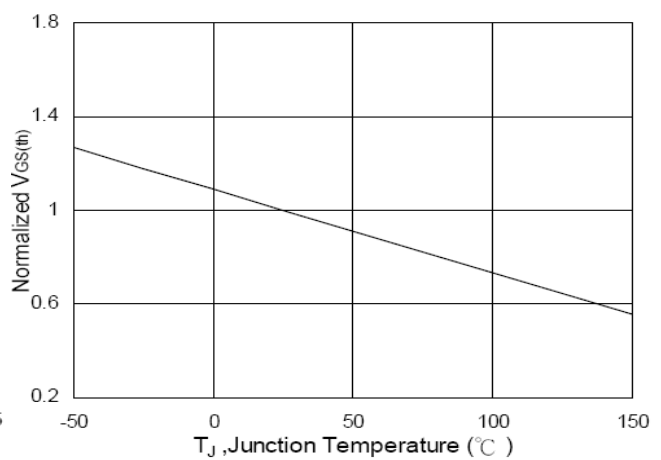


Fig. 6 Vgs vs Junction Temperature



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TYPICAL CHARACTERISTICS

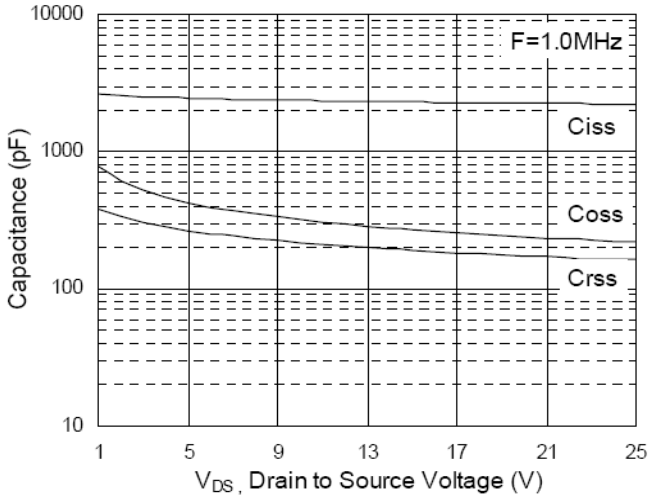


Fig. 7 Typical Capacitance Characteristics

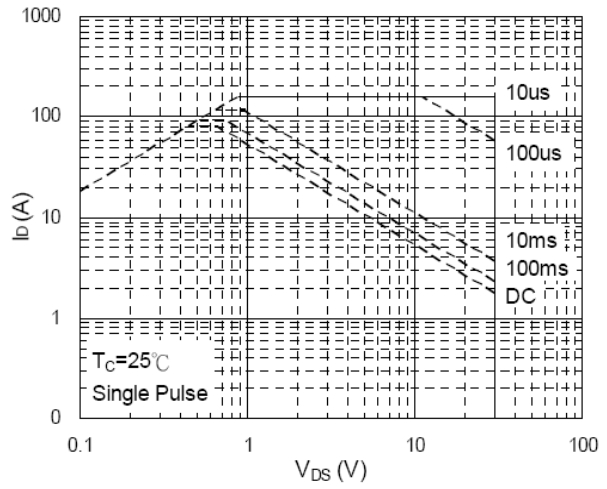


Fig. 8 Maximum Safe Operation Area

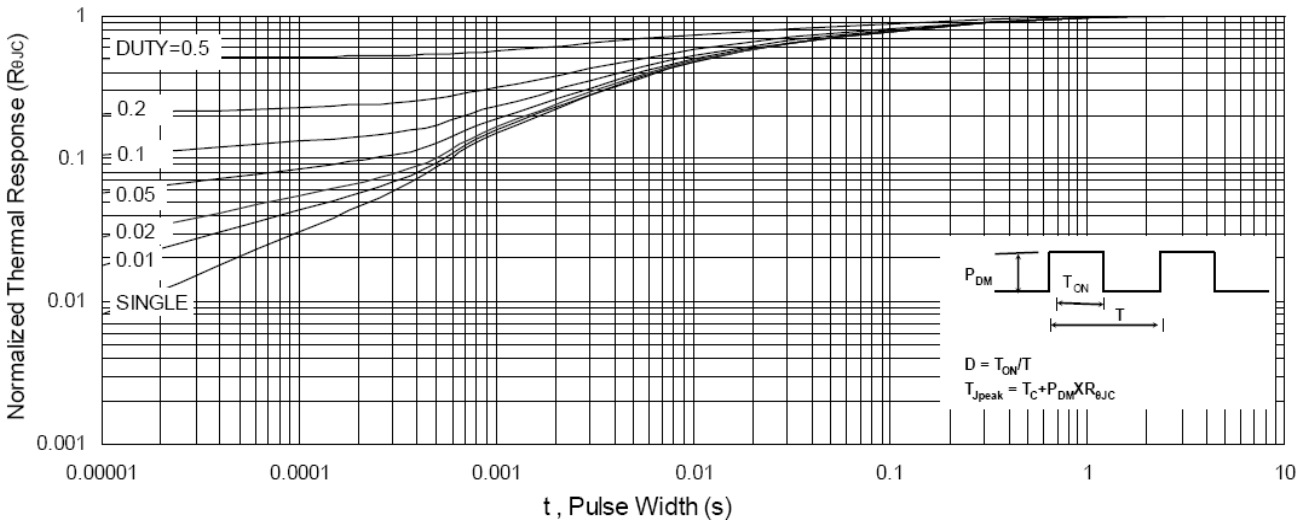


Fig. 9 Effective Transient Thermal Impedance

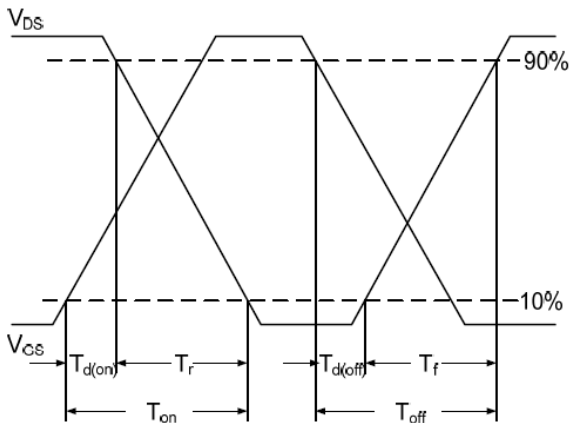


Fig. 10 Switching Time Waveform

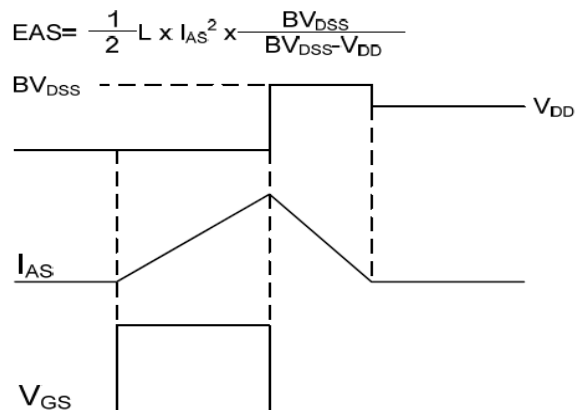


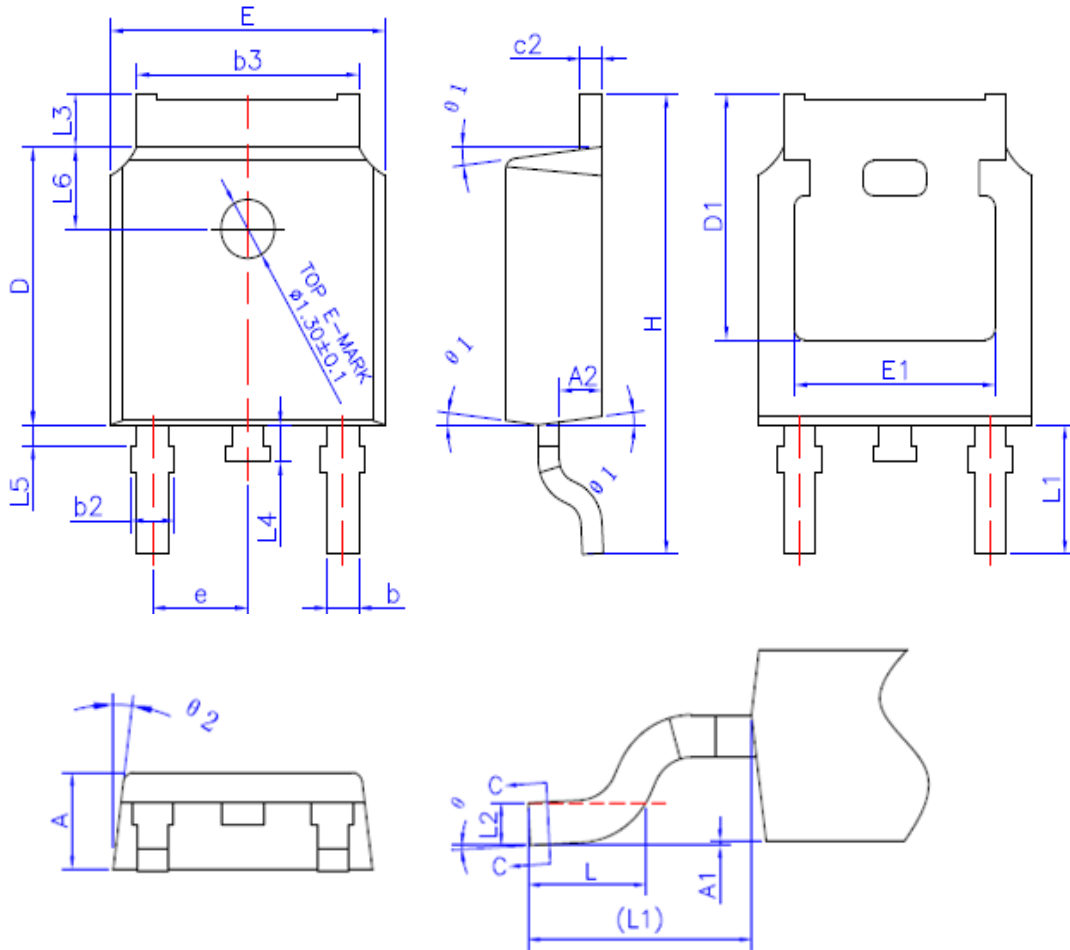
Fig. 11 Unclamped Inductive Waveform



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TO-252-2L PACKAGE OUTLINE



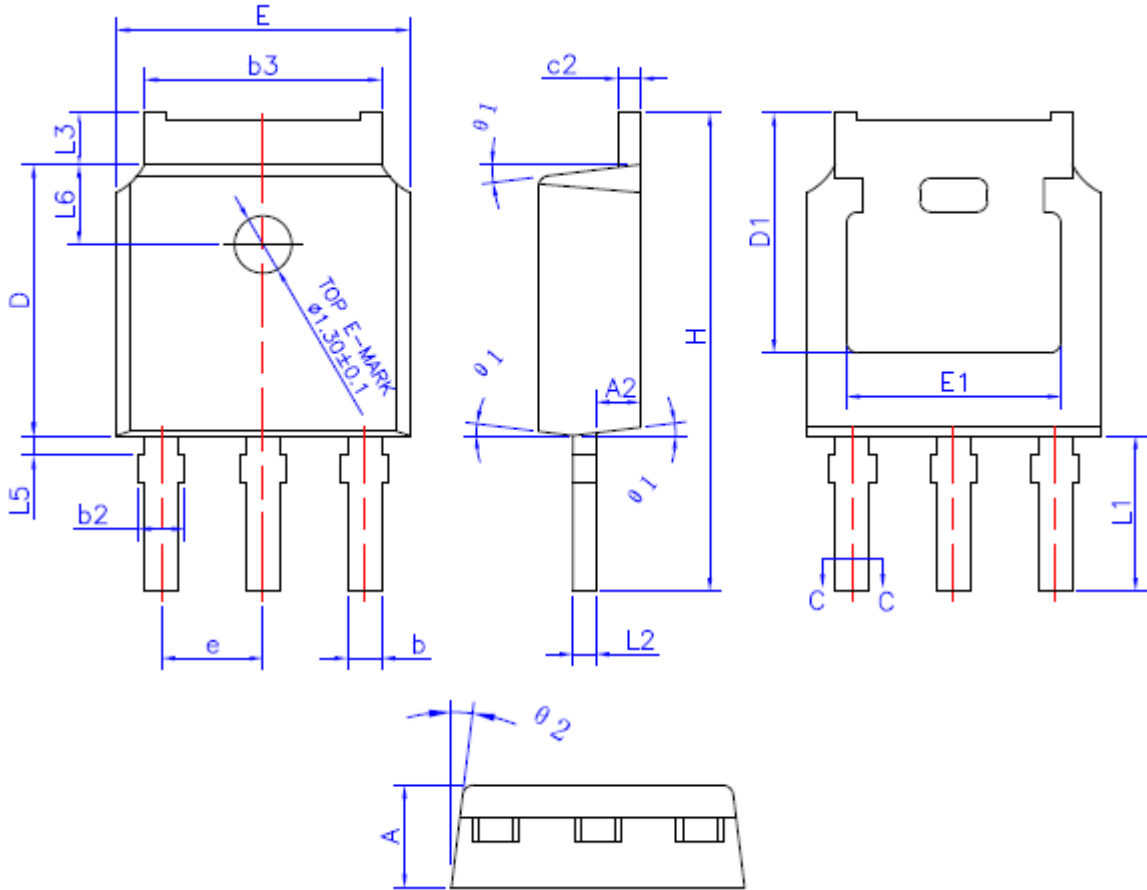
SYMBOL	MIN	NOM	MAX
A	2.20	2.30	2.40
A1	0.00	--	0.15
A2	0.90	1.01	1.10
b	0.72	-	0.85
b2	0.72	--	0.90
b3	5.13	5.33	5.46
c	0.47	--	0.60
c2	0.47	--	0.60
D	6.00	6.10	6.20
D1	5.25	--	--
E	6.40	6.60	6.80
E1	4.70	--	--
e	2.3REF		
H	9.80	10.10	10.40
L	1.40	1.60	1.80
L1	2.90REF		
L2	0.508BSC		
L3	0.90	--	1.25
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°



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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°



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