



SPN9910 N-Channel Enhancement Mode MOSFET

DESCRIPTION

The SPN9910 is the N-Channel logic enhancement mode power field effect transistors are produced using high cell density, DMOS trench technology. This high density process is especially tailored to minimize on-state resistance. These devices are particularly suited for most of synchronous buck converter applications.

FEATURES

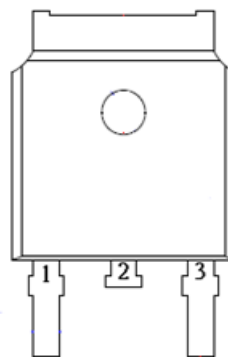
- ◆ 60V/60A, $R_{DS(ON)}=10m\Omega@V_{GS}=10V$
- ◆ 60V/60A, $R_{DS(ON)}=12.0m\Omega@V_{GS}=4.5V$
- ◆ Super high density cell design for extremely low $R_{DS(ON)}$
- ◆ Exceptional on-resistance and maximum DC current capability
- ◆ TO-252-2L/TO-251S-3L package design

APPLICATIONS

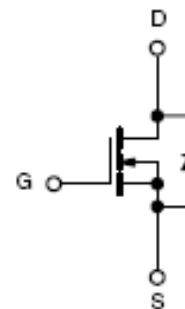
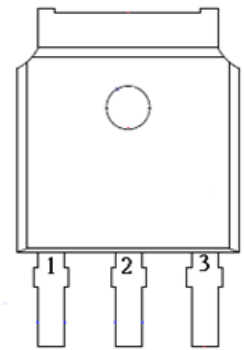
- DC/DC Converter
- Load Switch
- Synchronous Buck Converter

PIN CONFIGURATION

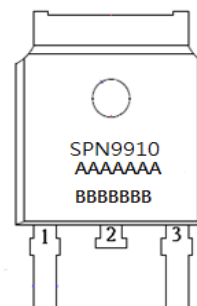
TO-252



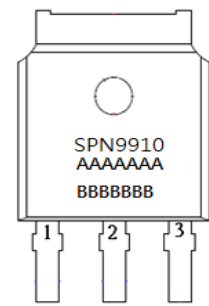
TO-251



PART MARKING



A : Lot Code
B : Date Code



A : Lot Code
B : Date Code



SPN9910

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
SPN9910T252RGB	TO-252-2L	SPN9910
SPN9910ST251TGB	TO-251S-3L	SPN9910

※ SPN9910T252RGB: Tape Reel ; Pb – Free; Halogen – Free

※ SPN9910T251TGB: Tube ; Pb – Free; Halogen – Free

ABSOLUTE MAXIMUM RATINGS

(TA=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(T _J =150°C)	I _D	TA=25°C	60	A
		TA=100°C	47	
Pulsed Drain Current	I _{DM}	120	A	
Avalanche Current	I _{AS}	38	A	
Power Dissipation	P _D	40	W	
Avalanche Energy with Single Pulse (T _J =25°C , L = 0.1mH , I _{AS} = 38A , V _{DD} = 25V.)	E _{AS}	123	mJ	
Operating Junction Temperature	T _J	-55/150	°C	
Storage Temperature Range	T _{STG}	-55/150	°C	
Thermal Resistance-Junction to Ambient	R _{θJA}	62	°C/W	



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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		2.5	
Gate Leakage Current	I_{GSS}	$V_{DS}=0V, V_{GS}=\pm 20V$			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=48V, V_{GS}=0V$			1	uA
		$V_{DS}=48V, V_{GS}=0V$ $T_J = 55^\circ C$			5	
On-State Drain Current	$I_{D(on)}$	$V_{DS} \geq 5V, V_{GS} = 10V$	60			A
Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=15A$		10	12	mΩ
		$V_{GS}=4.5V, I_D=10A$		12	15	
Forward Transconductance	g_{fs}	$V_{DS}=5V, I_D=15A$		47		S
Diode Forward Voltage	V_{SD}	$I_S=60A, V_{GS} = 0V$			1.2	V
Dynamic						
Total Gate Charge	Q_g	$V_{DS}=48V, V_{GS}=4.5V$ $I_D= 12A$		24		nC
Gate-Source Charge	Q_{gs}			6.9		
Gate-Drain Charge	Q_{gd}			10		
Input Capacitance	C_{iss}	$V_{DS}=15V, V_{GS}=0V$ $f=1MHz$		3200		pF
Output Capacitance	C_{oss}			210		
Reverse Transfer Capacitance	C_{rss}			145		
Turn-On Time	$t_{d(on)}$	$V_{DD}=30V, I_D=2A,$ $V_{GEN}=10V, R_G=3.3\Omega$		20		nS
	t_r			4		
Turn-Off Time	$t_{d(off)}$			84.5		
	t_f			6.5		



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TYPICAL CHARACTERISTICS

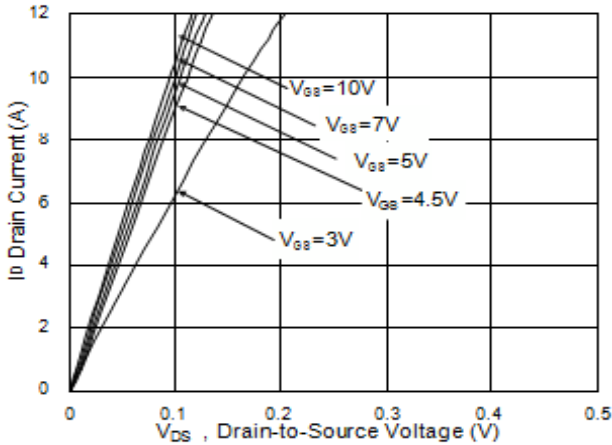


Fig. 1 Typical Output Characteristics

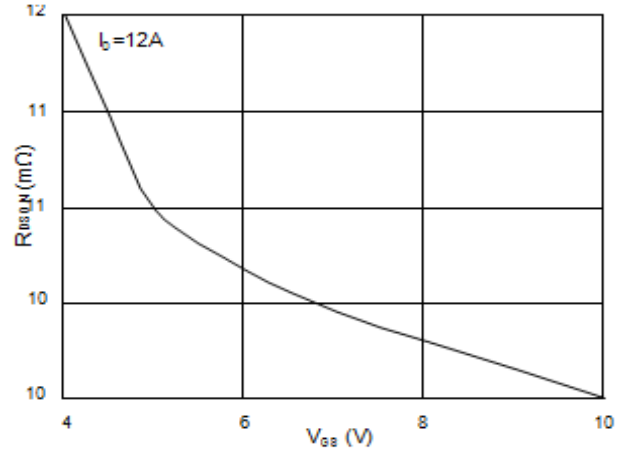


Fig. 2 On-Resistance vs. Gate Voltage

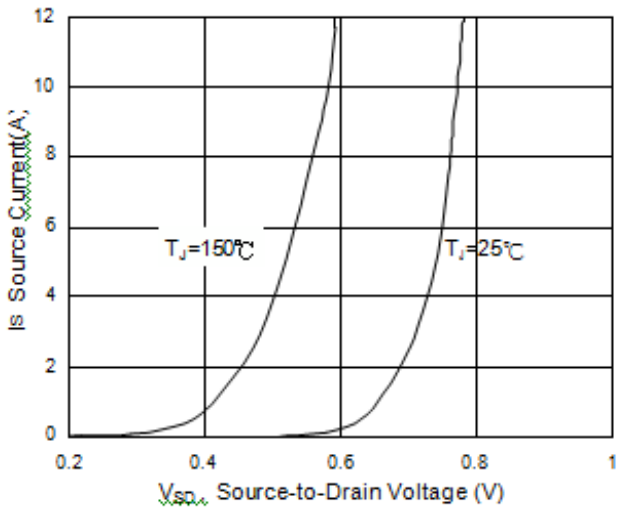


Fig. 3 Forward Characteristics
Reverse Diodes

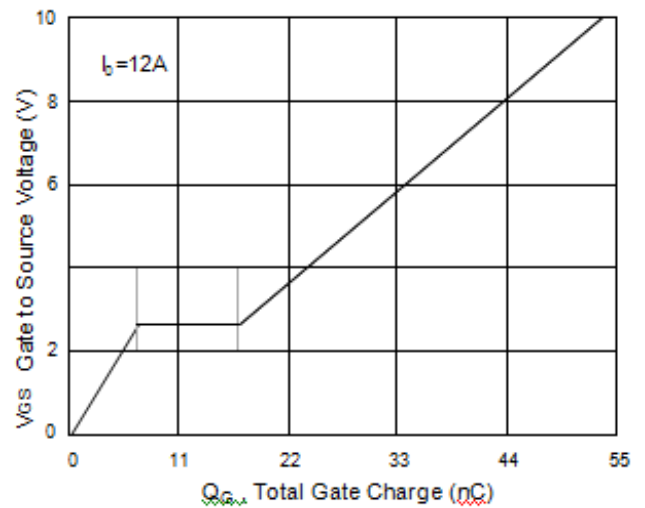


Fig. 4 Gate Charge Characteristics

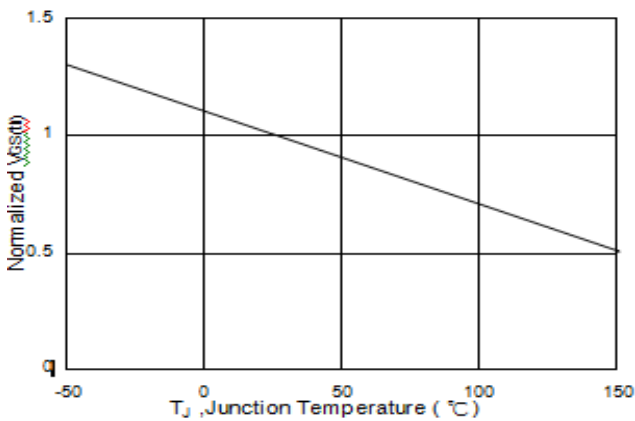


Fig. 5 Vgs vs. Junction Temperature

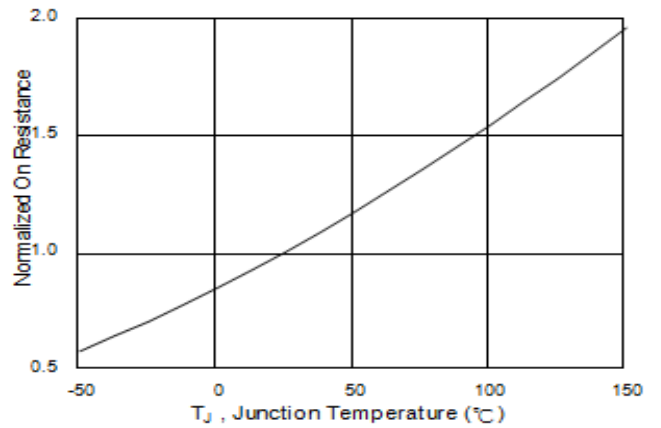


Fig. 6 On-Resistance vs. Temperature



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TYPICAL CHARACTERISTICS

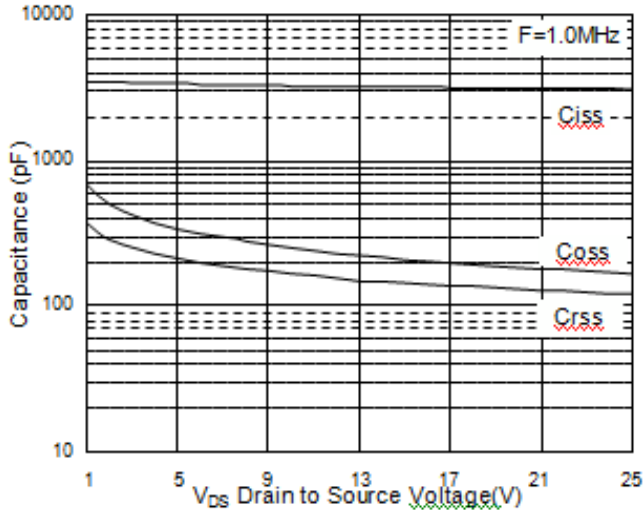


Fig. 7 Typical Capacitance Characteristics

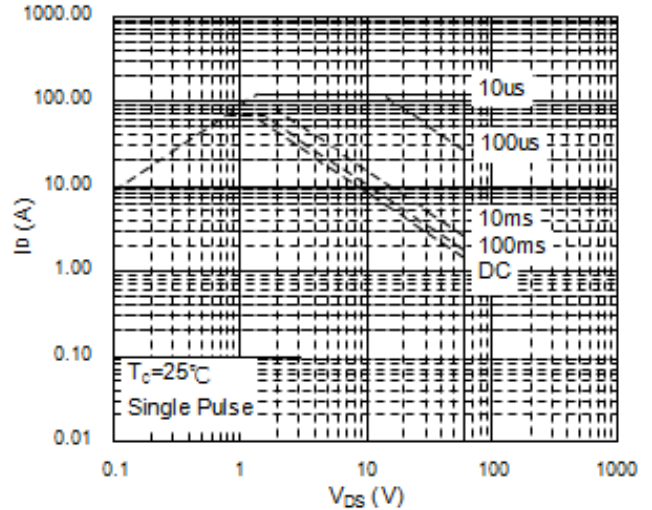


Fig. 8 Maximum Safe Operation Area

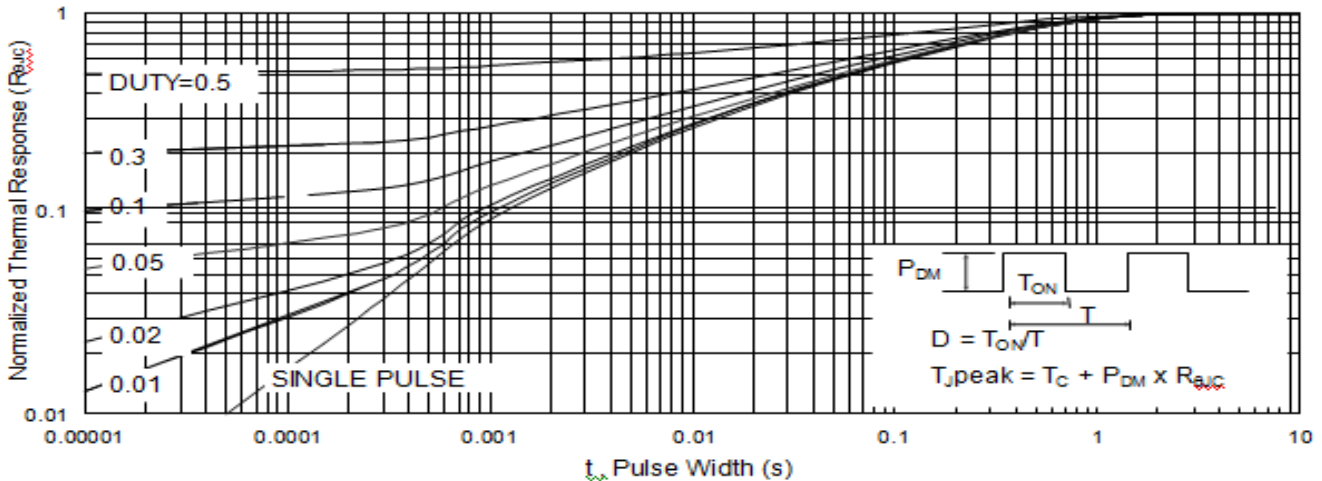


Fig. 9 Effective Transient Thermal Impedance

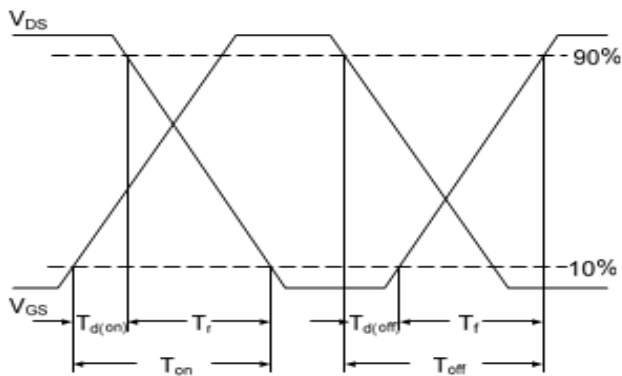


Fig. 10 Switching Time Waveform

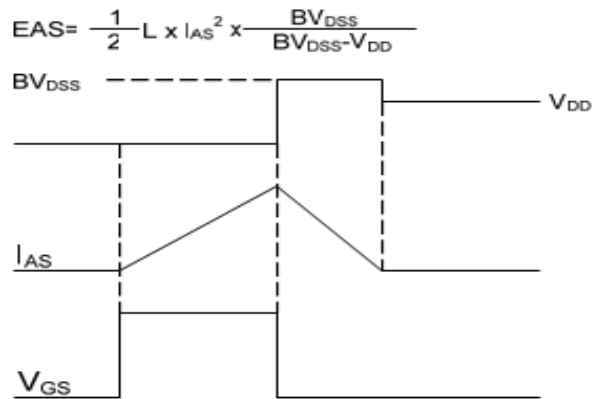


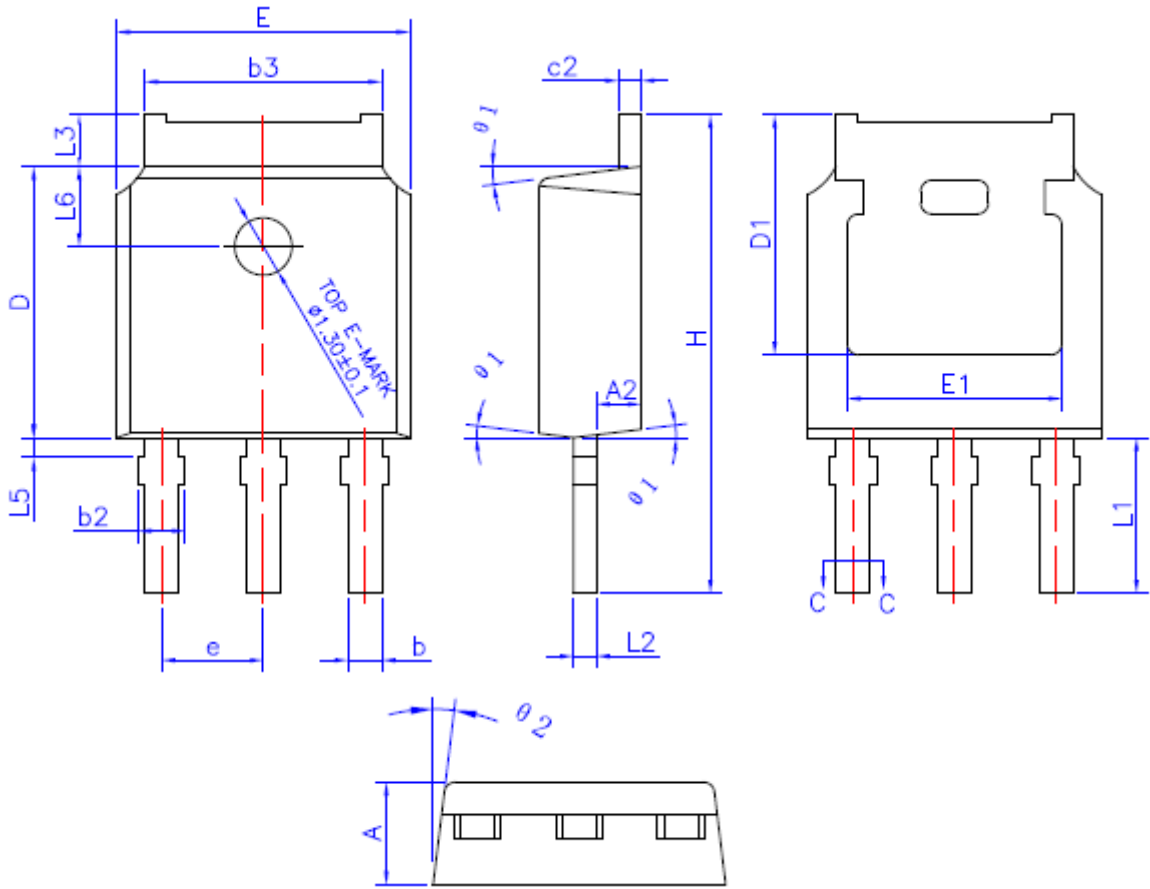
Fig. 11 Unclamped Inductive Waveform



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TO-251S-3L PACKAGE OUTLINE

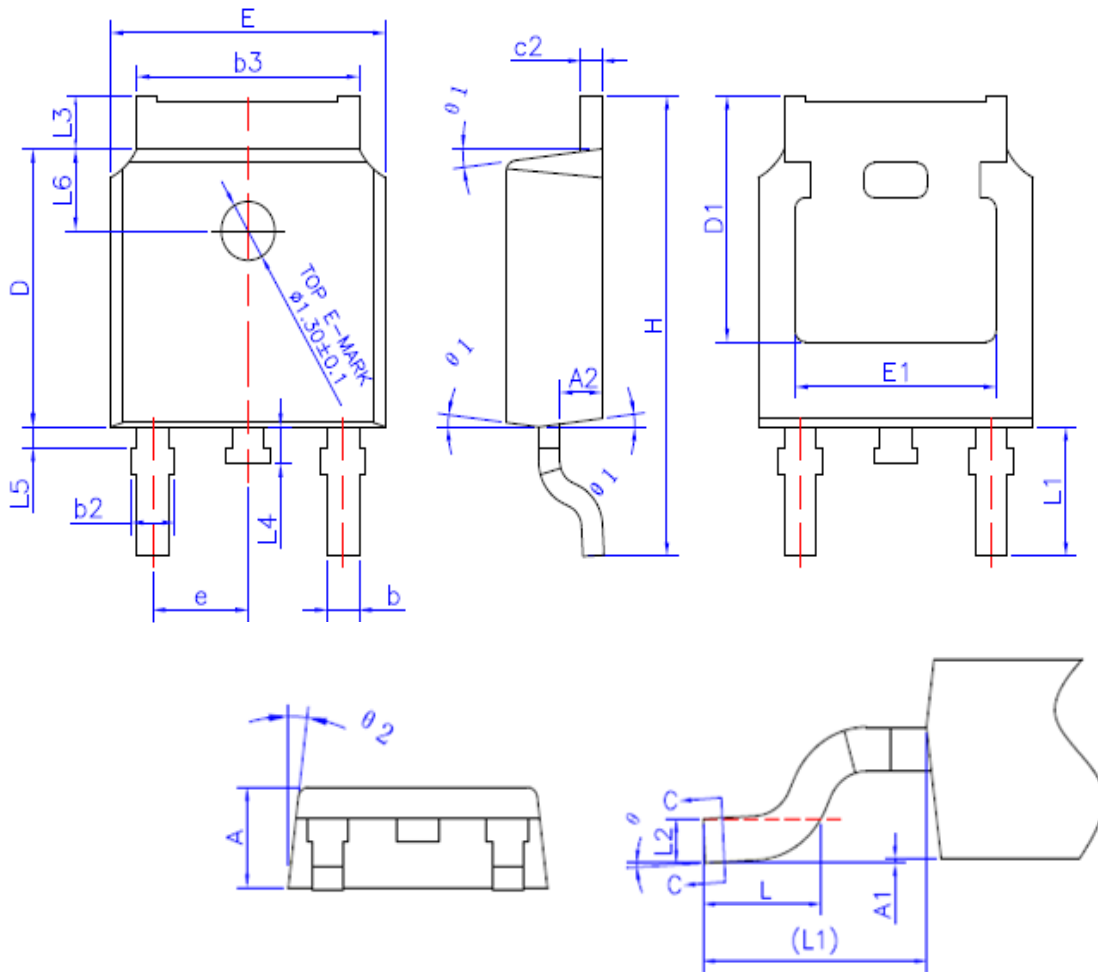


SYMBOL	MIN	NOM	MAX
A	2.20	2.30	2.40
A2	0.86	1.01	1.16
b	0.66	-	0.86
b2	0.66	--	0.96
b3	5.10	5.28	5.46
c	0.46	--	0.60
c2	0.47	--	0.60
D	6.00	6.10	6.20
D1	5.35REF		
E	6.40	6.60	6.80
E1	4.83REF		
e	2.3REF		
H	9.80	10.40	11.00
L1	3.50REF		
L2	0.508BSC		
L3	0.90	--	1.25
L5	0.15	--	0.75
L6	1.80REF		
$\theta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



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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°



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