



SPN80T10

N-Channel Enhancement Mode MOSFET

DESCRIPTION

The SPN80T10 is the N-Channel enhancement mode power field effect transistor which is produced using super high cell density DMOS trench technology. The SPN80T10 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.

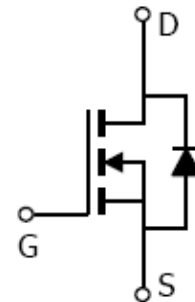
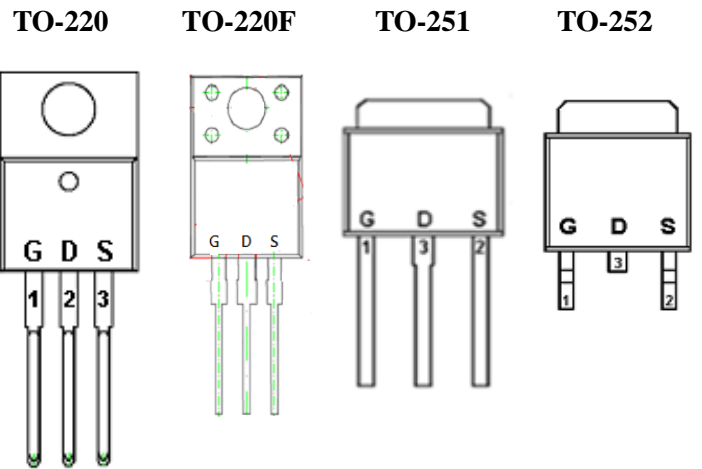
FEATURES

- ◆ 100V/85A, $R_{DS(ON)}=8.2m\Omega@V_{GS}=10V$
- ◆ High density cell design for extremely low $R_{DS(ON)}$
- ◆ Exceptional on-resistance and maximum DC current capability
- ◆ TO-220-3L/TO-220F-3L/TO-251/TO-252 package design

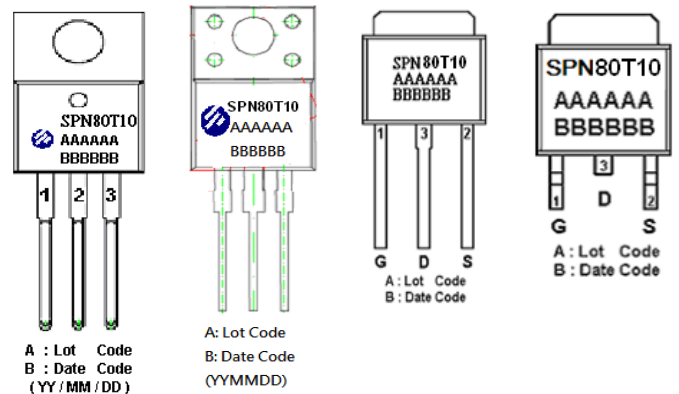
APPLICATIONS

- Powered System
- DC/DC Converter
- Load Switch

PIN CONFIGURATION



PART MARKING





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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
SPN80T10T220TGB	TO-220-3L	SPN80T10
SPN80T10T220FTGB	TO-220F-3L	SPN80T10
SPN80T10ST251TGB	TO-251	SPN80T10
SPN80T10T252RGB	TO-252	SPN80T10

- ※ SPN80T10T220TGB : Tube ; Pb – Free ; Halogen – Free
- ※ SPN80T10T220FTGB : Tube ; Pb – Free ; Halogen – Free
- ※ SPN80T10ST251TGB : Tube ; Pb – Free ; Halogen - Free
- ※ SPN80T10T252RGB : Tape Reel ; Pb – Free ; Halogen - Free

ABSOLUTE MAXIMUM RATINGS

(TA=25°C Unless otherwise noted)

Parameter	Symbol	Typical	Unit
Drain-Source Voltage	V _{DSS}	100	V
Gate –Source Voltage	V _{GSS}	±20	V
Continuous Drain Current (T _j =150°C)	I _D	TA=25°C	85
		TA=70°C	60
Pulsed Drain Current	I _{DM}	300	A
Avalanche Energy, Single Pulse, L=0.5mH	E _{AS}	400	mJ
Power Dissipation@ TA=25°C (TO-220/TO-220F)	P _D	110	W
Power Dissipation@ TA=25°C (TO-251)		83	
Power Dissipation@ TA=25°C (TO-252)		72	
Operating Junction Temperature	T _J	-55/150	°C
Storage Temperature Range	T _{STG}	-55/150	°C
Thermal Resistance-Junction to Ambient (TO-220/TO-220F)	R _{θJA}	62.5	°C/W
Thermal Resistance-Junction to Ambient (TO-251/TO-252)	R _{θJA}	100	°C/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 =250uA	100			V
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250uA	2.0		4.0	
Gate Leakage Current	I _{GSS}	V _{DS} =0V, V _{GS} =±20V			±100	nA
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =80V, V _{GS} =0V			1	uA
		V _{DS} =100V, V _{GS} =0V T _J =125°C			100	
Drain-Source On-Resistance	R _{DS(on)}	V _{GS} = 10V, I _D =20A			8.2	mΩ
Forward Transconductance	g _{fs}	V _{DS} =10V, I _D =40A		75		S
Gate Resistance	R _G	V _{DS} = 5V, I _D = 20A				
Diode Forward Voltage	V _{SD}	I _S =20A, V _{GS} =0V			1.2	V
Dynamic						
Total Gate Charge	Q _g	V _{DS} =50V, V _{GS} =10V I _D = 20A		56		nC
Gate-Source Charge	Q _{gs}			14		
Gate-Drain Charge	Q _{gd}			18		
Input Capacitance	C _{iss}	V _{DS} =50V, V _{GS} =0V f=1MHz		3600		pF
Output Capacitance	C _{oss}			290		
Reverse Transfer Capacitance	C _{rss}			88		
Turn-On Time	t _{d(on)}	V _{DD} =50V, R _L =1Ω I _D =20A, V _{GS} =10V R _G =10Ω		17		nS
	t _r			40		
Turn-Off Time	t _{d(off)}			57		
	t _f			37		



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N-Channel Enhancement Mode MOSFET

TYPICAL CHARACTERISTICS

Fig 1. Typical Output Characteristics

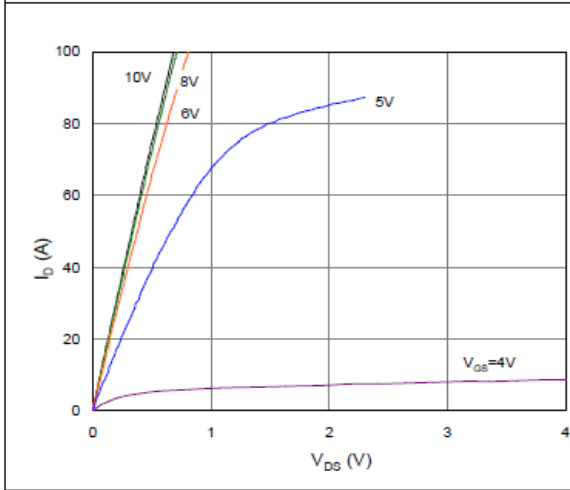


Figure 2. On-Resistance vs. Gate-Source Voltage

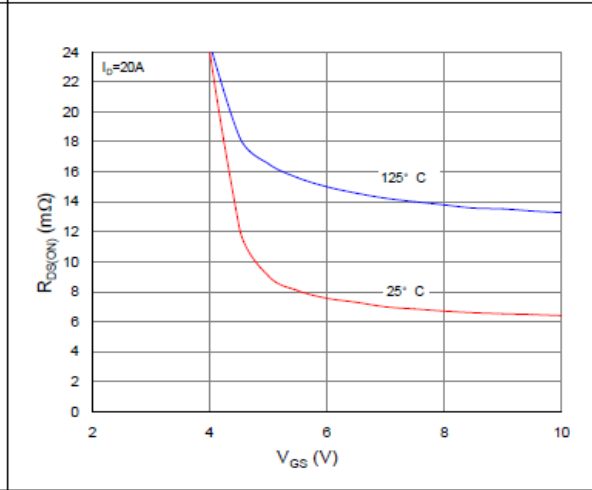


Figure 3. On-Resistance vs. Drain Current and Gate Voltage

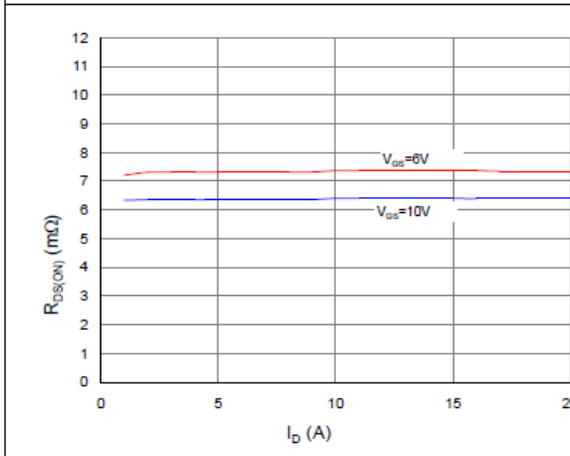


Figure 4. Normalized On-Resistance vs. Junction Temperature

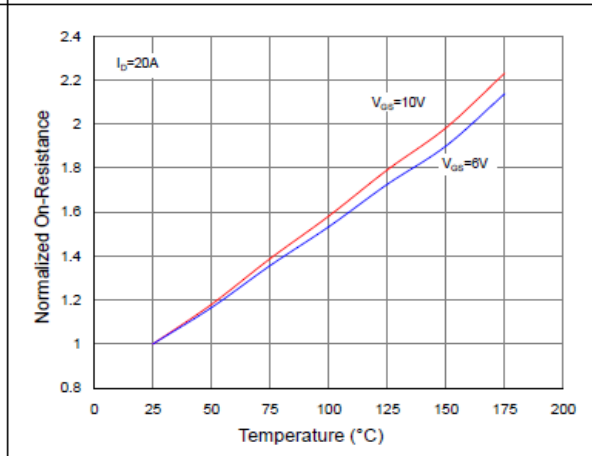


Figure 5. Typical Transfer Characteristics

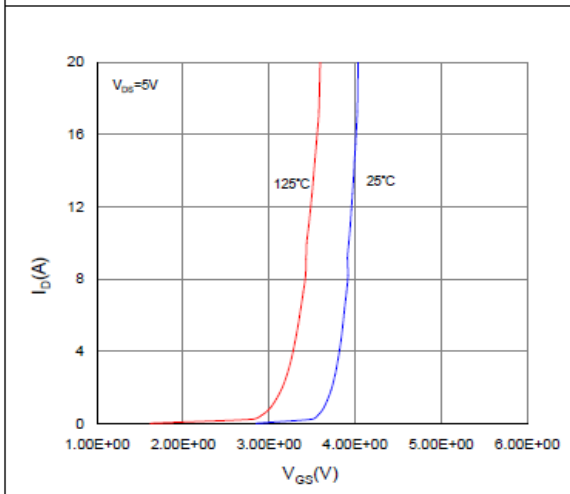
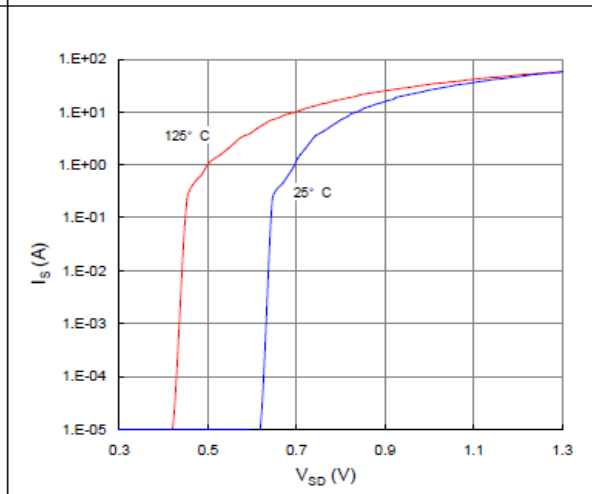


Figure 6. Typical Source-Drain Diode Forward Voltage





SPN80T10

N-Channel Enhancement Mode MOSFET

TYPICAL CHARACTERISTICS

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

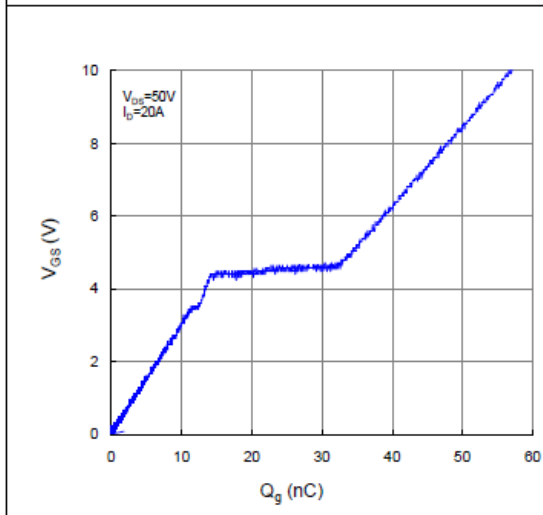


Figure 8. Typical Capacitance vs. Drain-to-Source Voltage

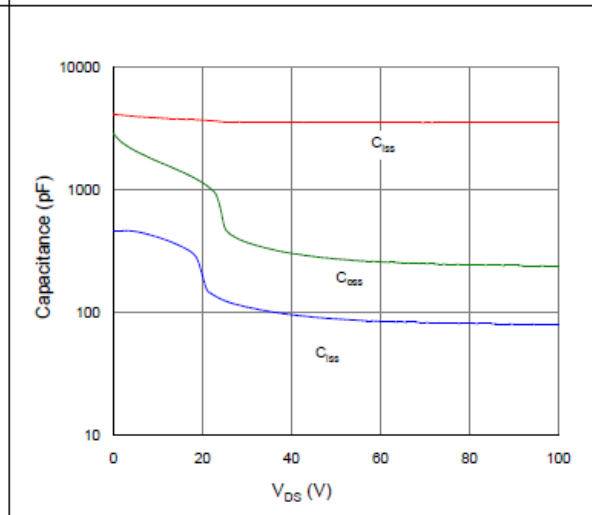


Figure 9. Maximum Safe Operating Area

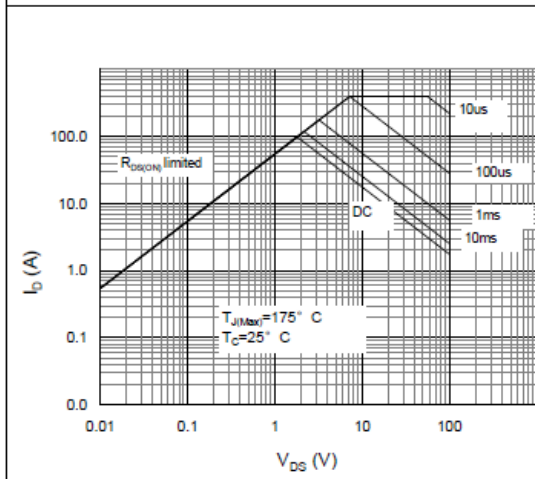


Figure 10. Maximum Drain Current vs. Case Temperature

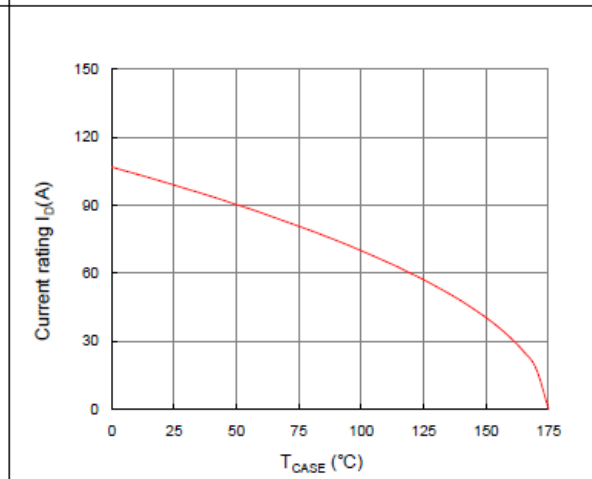
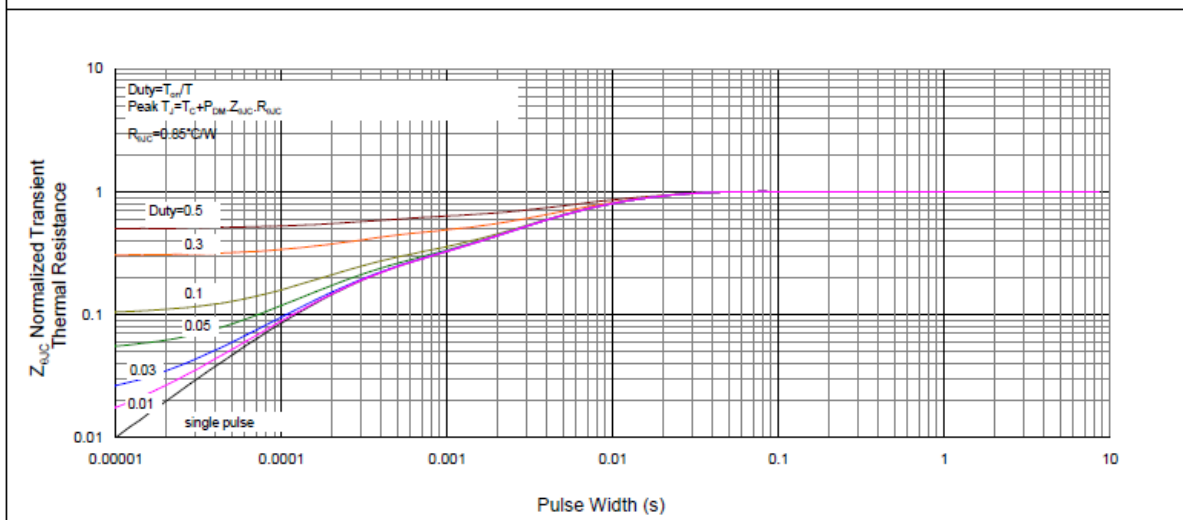


Figure 11. Normalized Maximum Transient Thermal Impedance, Junction-to-Case

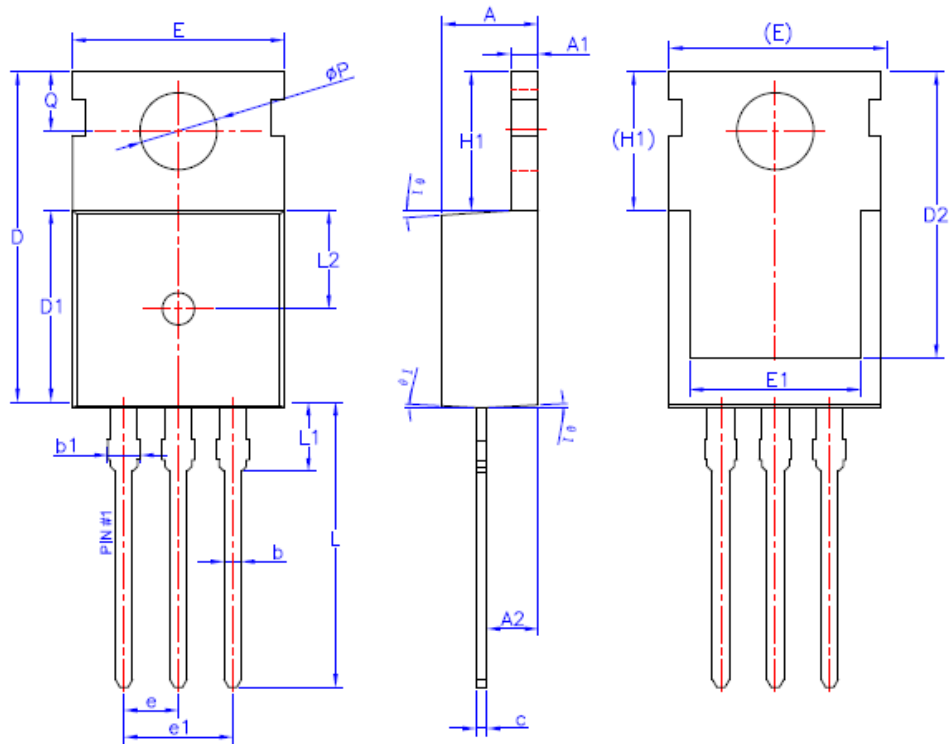




SPN80T10

N-Channel Enhancement Mode MOSFET

TO-220-3L PACKAGE OUTLINE



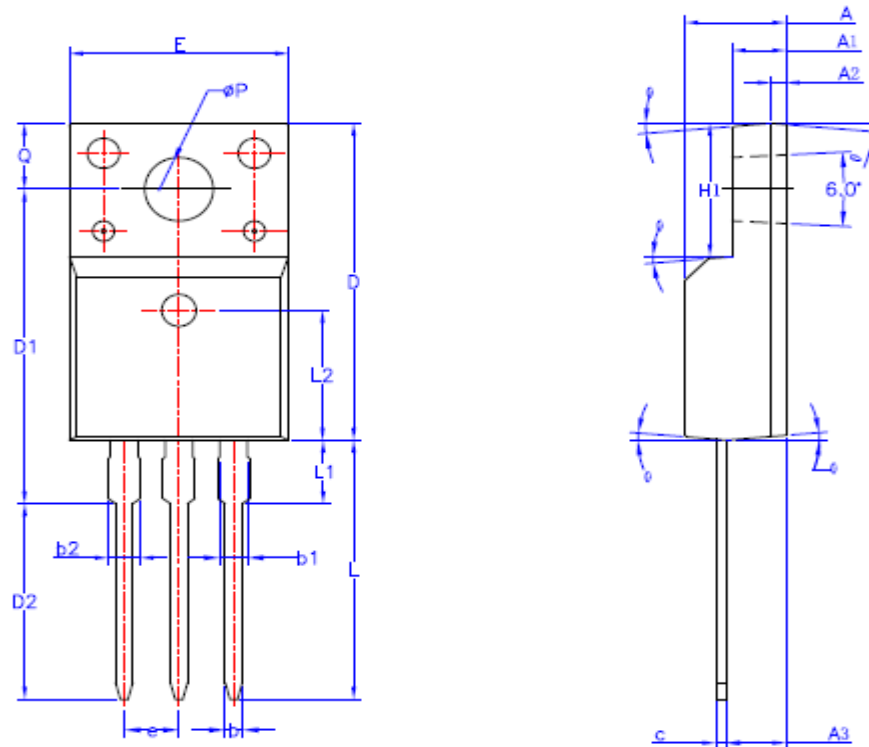
SYMBOL	MIN	NOM	MAX
A	4.40	4.50	4.60
A1	1.27	1.30	1.33
A2	2.30	2.40	2.50
b	0.70	—	0.90
b1	1.42	—	1.57
c	0.45	0.50	0.60
D	15.30	15.70	16.10
D1	9.10	9.20	9.30
D2	13.10	—	13.70
E	9.70	9.90	10.20
E1	7.80	8.00	8.20
e	2.54BSC		
e1	5.08BSC		
H1	6.30	6.50	6.70
L	12.78	13.08	13.38
L1	—	—	3.50
L2	4.60REF		
øP	3.55	3.60	3.65
Q	2.73	—	2.87
θ ₁	1°	3°	5°



SPN80T10

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TO-220F-3L PACKAGE OUTLINE



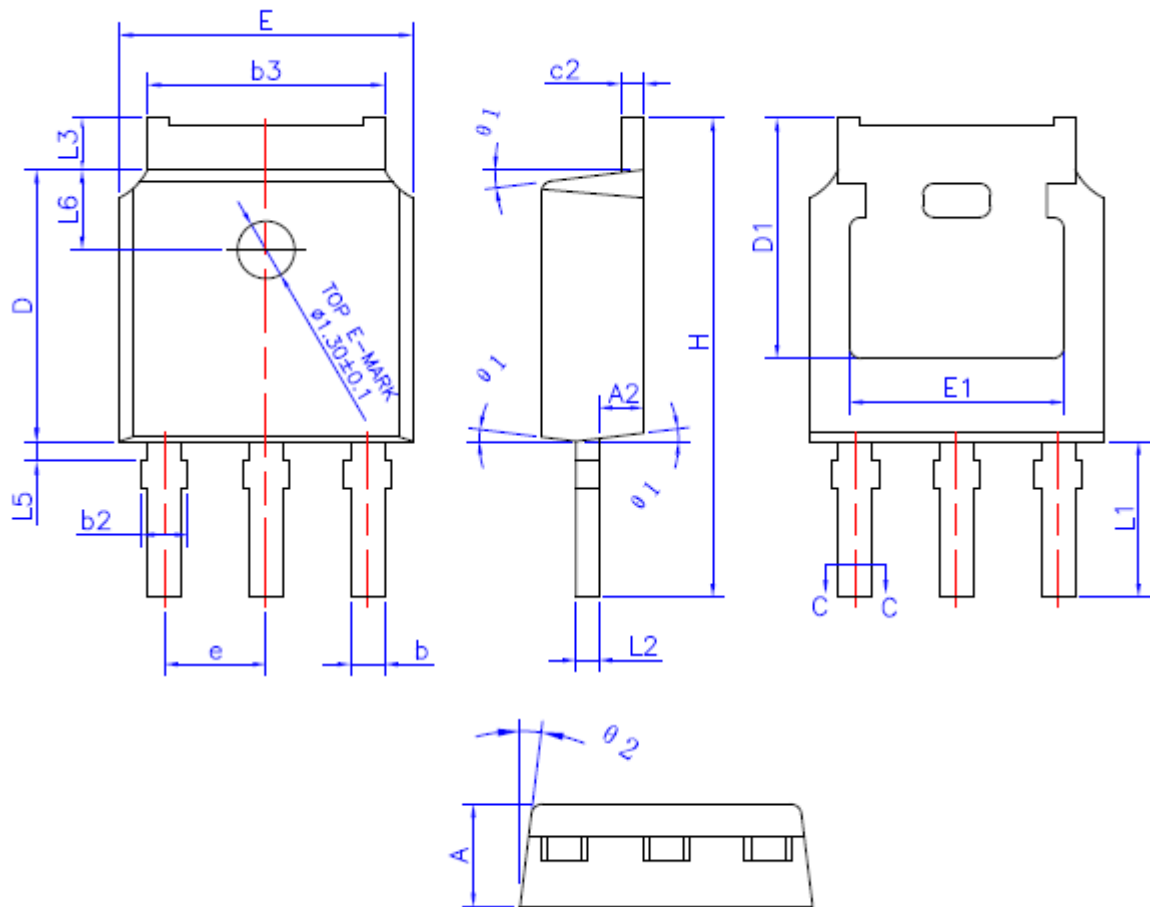
SYMBOL	MIN	NOM	MAX
A	4.50	4.70	4.83
A1	2.34	2.54	2.74
A2	0.70 REF		
A3	2.56	2.76	2.93
b	0.70	—	0.90
b1	1.18	—	1.38
b2	—	—	1.47
c	0.45	0.50	0.60
D	15.67	15.87	16.07
D1	15.55	15.75	15.95
D2	9.60	9.80	10.0
E	9.96	10.16	10.36
e	2.54BSC		
H1	6.48	6.68	6.88
L	12.68	12.98	13.28
L1	—	—	3.50
L2	6.50REF		
ϕP	3.08	3.18	3.28
Q	3.20	—	3.40
θ	1°	3°	5°



SPN80T10

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TO-251 PACKAGE OUTLINE



COMMON DIMENSIONS
(UNITS OF MEASURE =MILLIMETER)

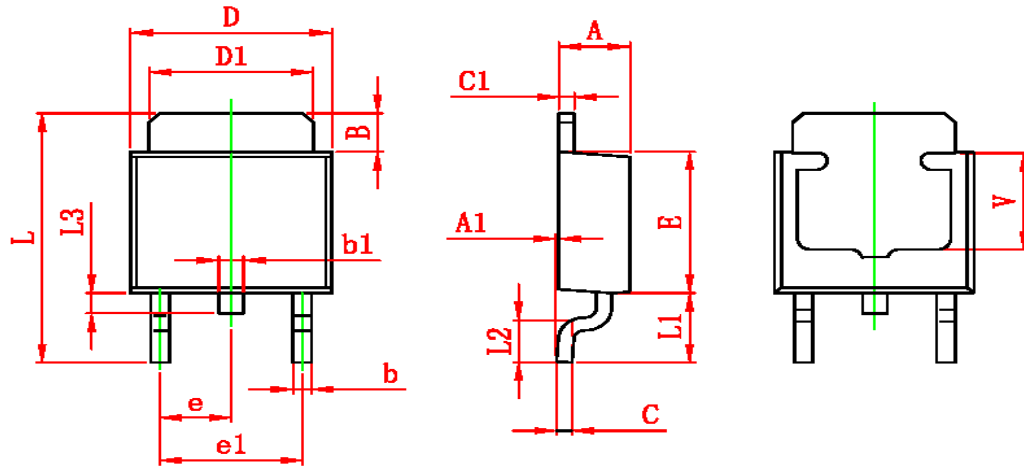
SYMBOL	MIN	NOM	MAX
A	2.20	2.30	2.38
A2	0.90	1.01	1.10
b	0.72	—	0.85
b1	0.71	0.76	0.81
b2	0.72	—	0.90
b3	5.13	5.33	5.46
c	0.47	—	0.60
c1	0.46	0.51	0.56
c2	0.47	—	0.60
D	6.00	6.10	6.20
D1	5.25	—	—
E	6.50	6.60	6.70
E1	4.70	—	—
e	2.186	2.286	2.386
H	10.40	10.70	11.00
L1	3.50 REF		
L2	0.508 BSC		
L3	0.90	—	1.25
L5	0.15	—	0.75
L6	1.80 REF		
θ_1	5°	7°	9°
θ_2	5°	7°	9°



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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	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	9.500	9.900	0.374	0.390
L1	2.550	2.900	0.100	0.114
L2	1.400	1.780	0.055	0.070
L3	0.350	0.650	0.014	0.026
V	3.80 REF		0.150 REF	



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