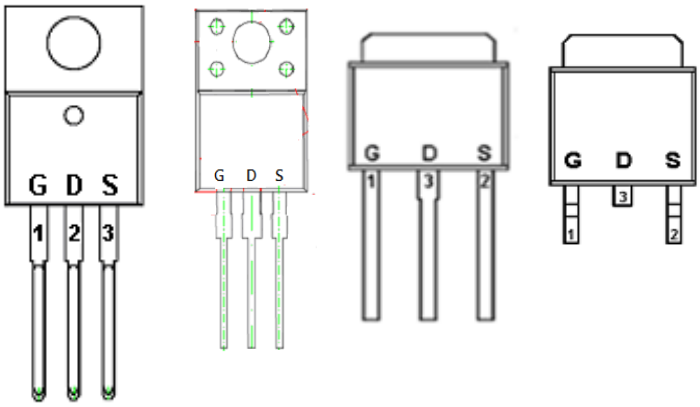
SPN80T10
N-Channel Enhancement Mode MOSFET

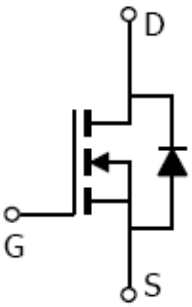
DESCRIPTION
The SPN80T10 is the N-Channel enhancement mode power field effect transistor which is produced using super high cell density DMOS trench technology. The SPN80T10 has been designed specifically to improve the overall efficiency of DC/DC converters using either synchronous or conventional switching PWM controllers. It has been optimized for low gate charge, low $R_{DS(ON)}$ and fast switching speed.

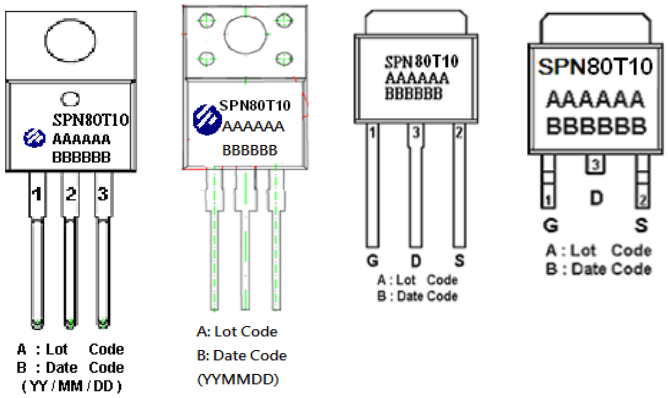
APPLICATIONS
- Powered System
- DC/DC Converter
- Load Switch

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

PIN CONFIGURATION
TO-220 TO-220F TO-251 TO-252





PART MARKING


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N-Channel Enhancement Mode MOSFET

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

ABSOULTE MAXIMUM RATINGS

(T_A=25℃ Unless otherwise noted)

Parameter		Symbol	Typical	Unit
Drain-Source Voltage		V_{DSS}	100	V
Gate –Source Voltage		V_{GSS}	±20	V
Continuous Drain Current (Tj=150℃)	T_A=25℃	I_D	85	A
	T_A=70℃		60	
Pulsed Drain Current		I_{DM}	300	A
Avalanche Energy, Single Pulse, L=0.5mH		E_{AS}	400	mJ
Power Dissipation@ T_A=25℃ (TO-220/TO-220F)		P_D	110	W
Power Dissipation@ T_A=25℃ (TO-251)			83	
Power Dissipation@ T_A=25℃ (TO-252)			72	
Operating Junction Temperature		T_J	-55/150	℃
Storage Temperature Range		T_{STG}	-55/150	℃
Thermal Resistance-Junction to Ambient (TO-220/TO-220F)		$R_{\theta JA}$	62.5	℃/W
Thermal Resistance-Junction to Ambient (TO-251/TO-252)		$R_{\theta JA}$	100	℃/W

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ELECTRICAL CHARACTERISTICS

(T_A=25℃ 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_{GS}=0V T_J=125℃			100	
Drain-Source On-Resistance	$R_{DS(on)}$	V_{GS}= 10V,I_D=20A			8.2	mΩ
Forward Transconductance	gfs	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		

TYPICAL CHARACTERISTICS

Fig 1. Typical Output Characteristics

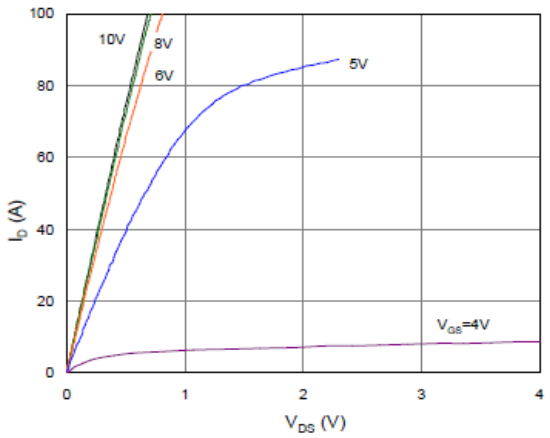


Figure 2. On-Resistance vs. Gate-Source Voltage

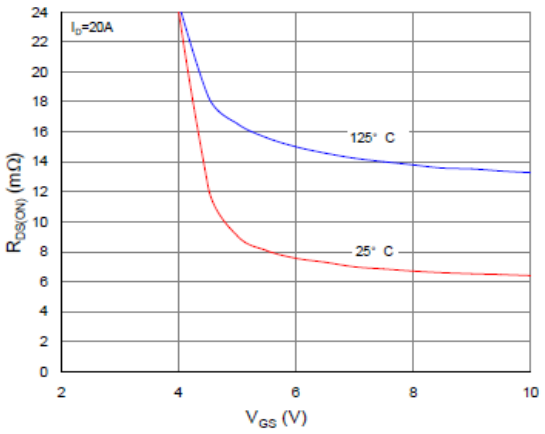


Figure 3. On-Resistance vs. Drain Current and Gate Voltage

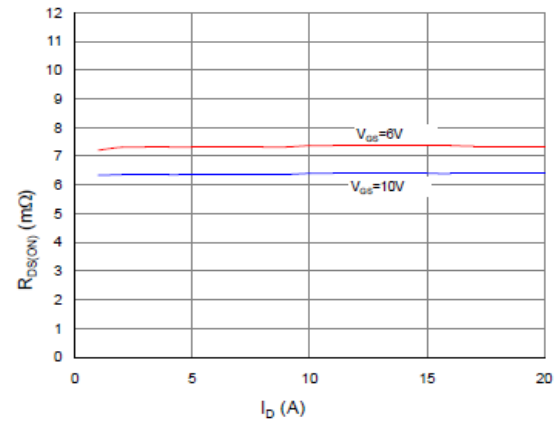


Figure 4. Normalized On-Resistance vs. Junction Temperature

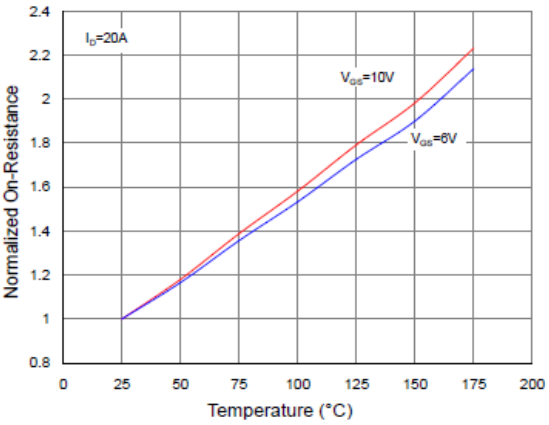


Figure 5. Typical Transfer Characteristics

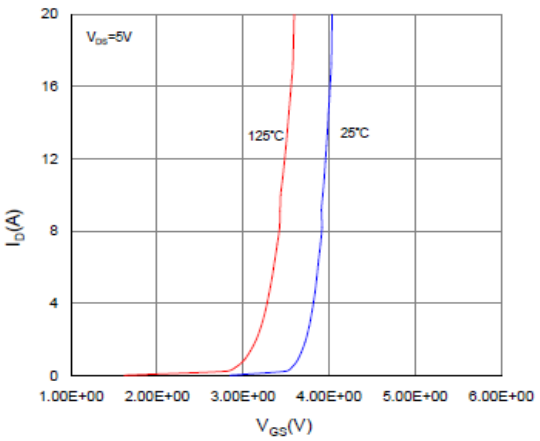
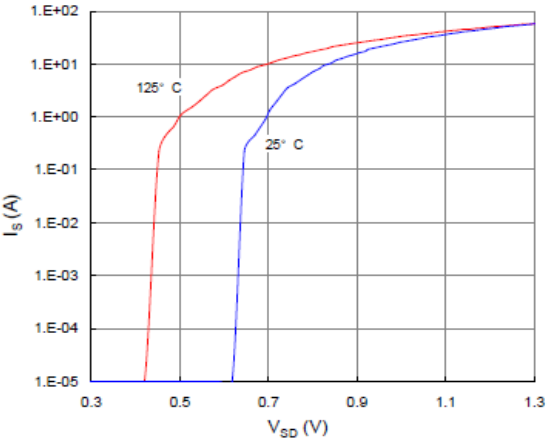


Figure 6. Typical Source-Drain Diode Forward Voltage



TYPICAL CHARACTERISTICS

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

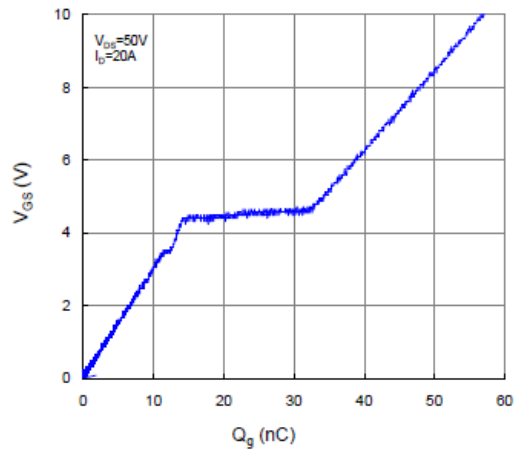


Figure 8. Typical Capacitance vs. Drain-to-Source Voltage

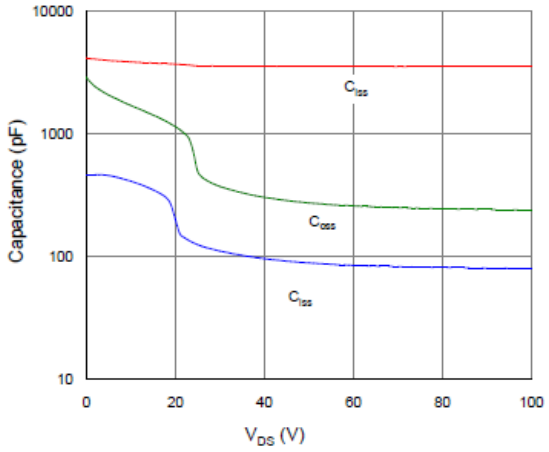


Figure 9. Maximum Safe Operating Area

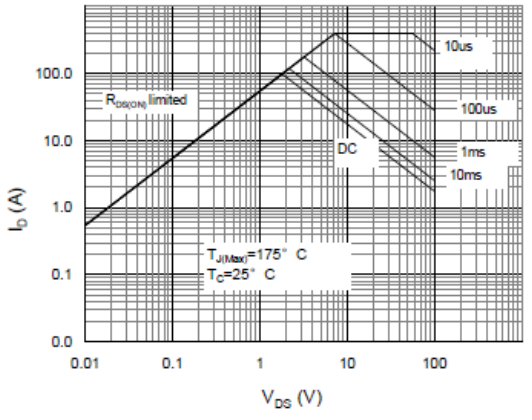


Figure 10. Maximun Drain Current vs. Case Temperature

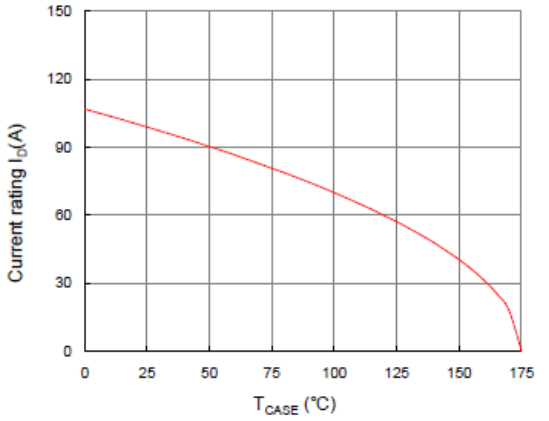
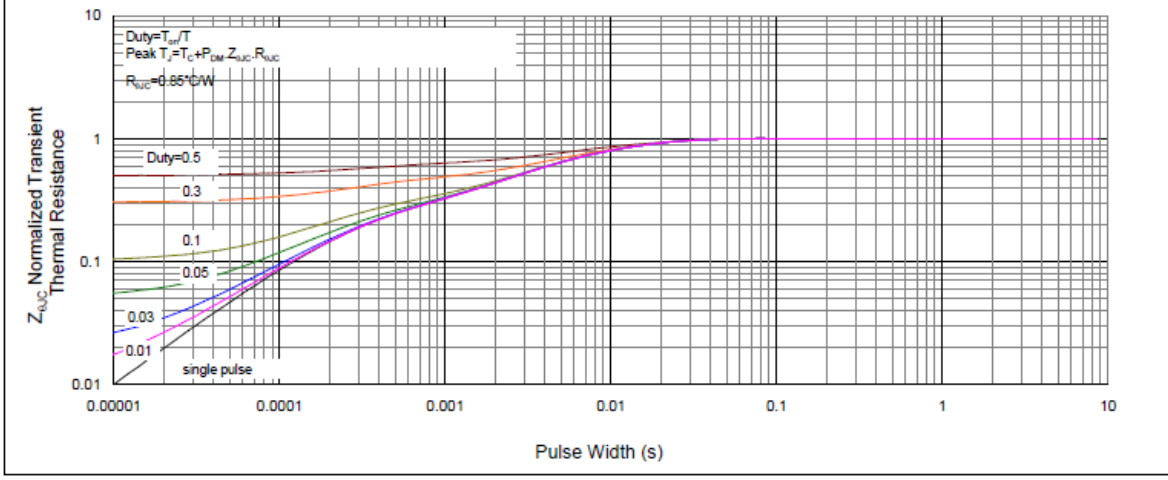


Figure 11. Normalized Maximum Transient Thermal Impedance, Junction-to-Case



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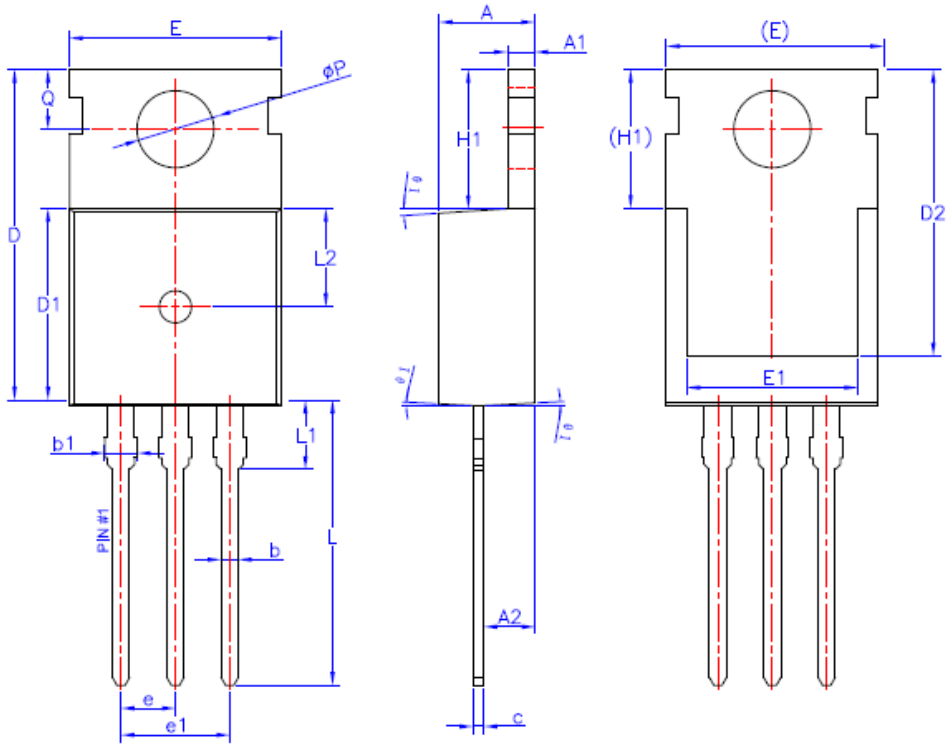
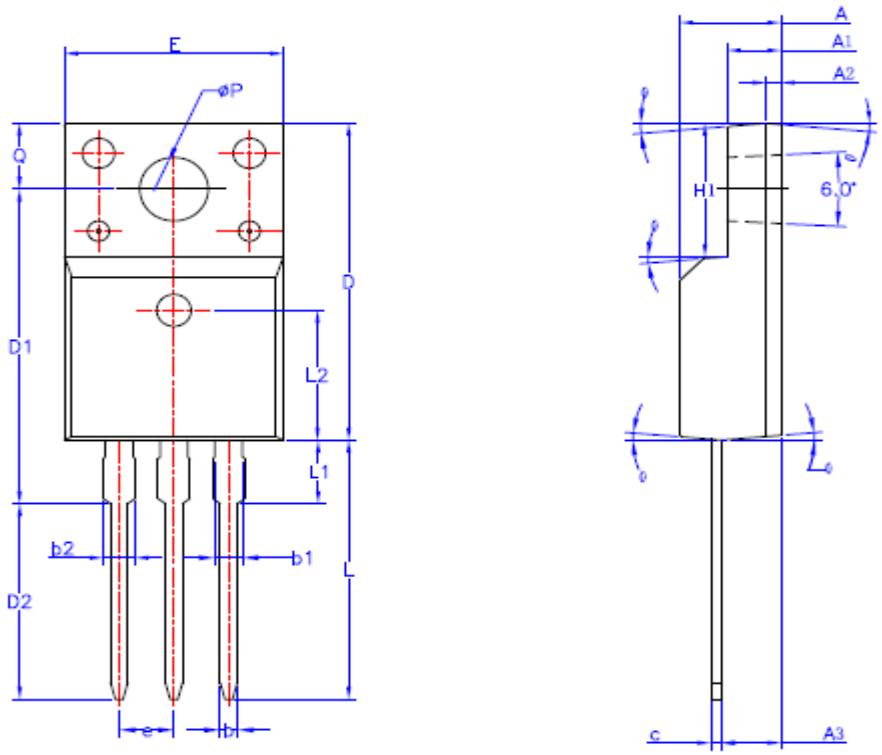
TO-220-3L PACKAGE OUTLINE



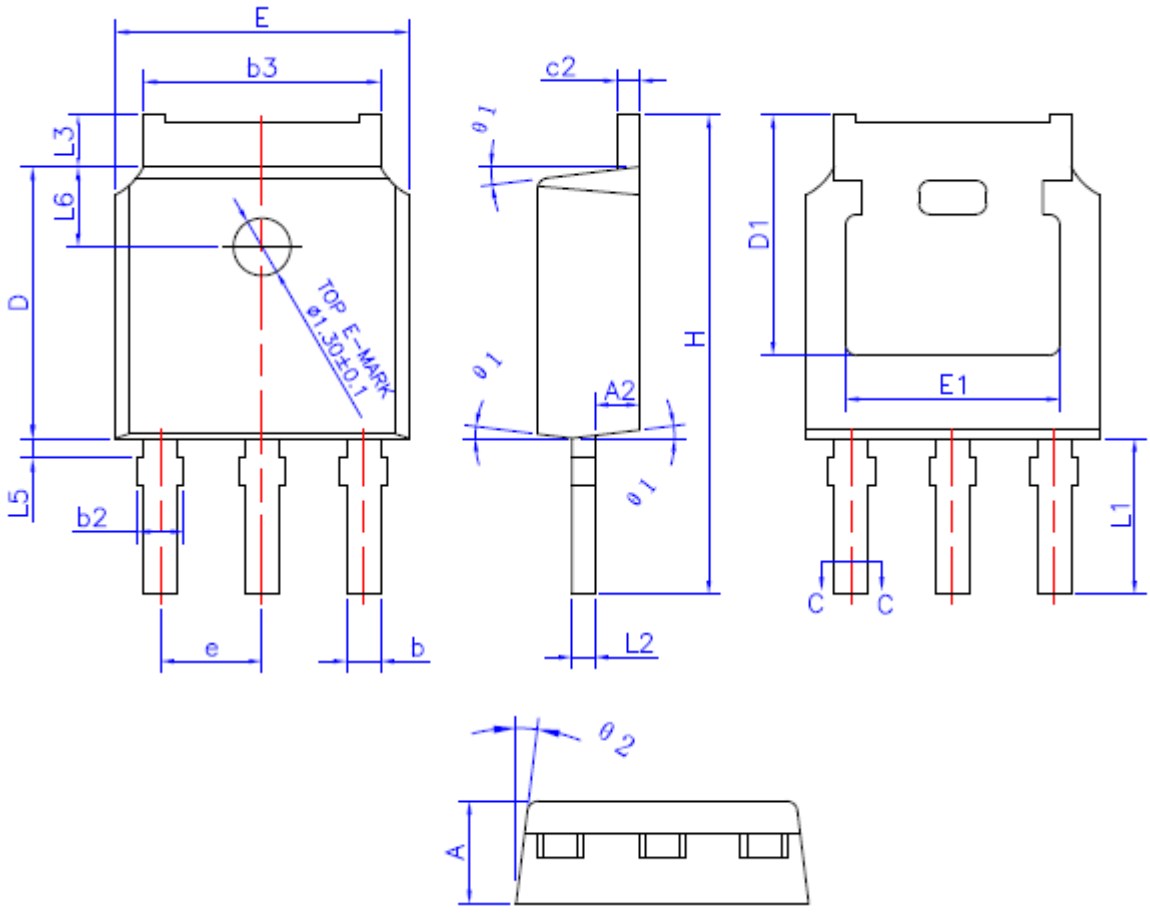
SYMBOL	MIN	NOM	MAX
A	4.40	4.50	4.60
A1	1.27	1.30	1.33
A2	2.30	2.40	2.50
b	0.70	–	0.90
b1	1.42	–	1.57
c	0.45	0.50	0.60
D	15.30	15.70	16.10
D1	9.10	9.20	9.30
D2	13.10	–	13.70
E	9.70	9.90	10.20
E1	7.80	8.00	8.20
e	2.54BSC		
e1	5.08BSC		
H1	6.30	6.50	6.70
L	12.78	13.08	13.38
L1	–	–	3.50
L2	4.60REF		
øP	3.55	3.60	3.65
Q	2.73	–	2.87
θ1	1°	3°	5°

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	
øP	3.08	3.18	3.28
Q	3.20	—	3.40
θ 1	1°	3°	5°

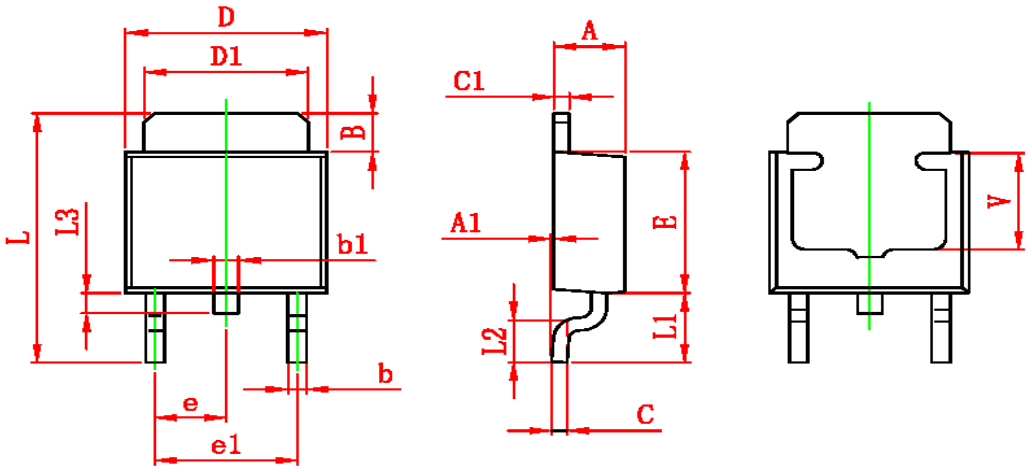
TO-251 PACKAGE OUTLINE



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		
θ1	5°	7°	9°
θ2	5°	7°	9°

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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