SPN09T10
N-Channel Enhancement Mode MOSFET

DESCRIPTION

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 $R_{DS(ON)}$ and fast switching speed.

APPLICATIONS

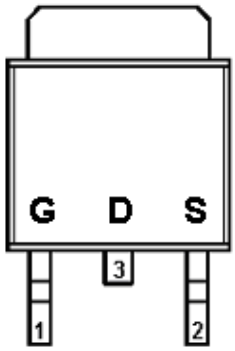
- Powered System
- DC/DC Converter
- Load Switch

FEATURES

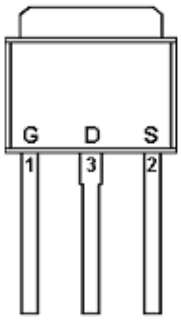
- 100V/8A,$R_{DS(ON)}$= 160mΩ@V_{GS}= 10V
- High density cell design for extremely low RDS (ON)
- Exceptional on-resistance and maximum DC current capability
- TO-252,TO-251,TO-263 package design

PIN CONFIGURATION

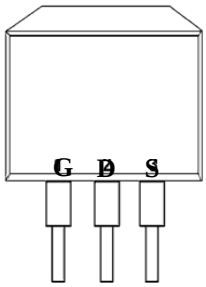
TO-252

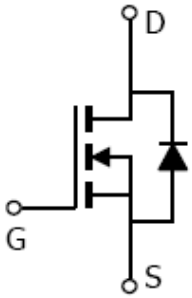


TO-251

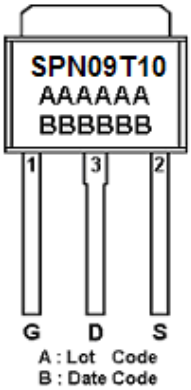


TO-263





PART MARKING



A: Lot Code
B: Date Code

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

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(T_J=150℃)		T_A=25℃	I_D	14	A
		T_A=70℃		9.0	
Pulsed Drain Current			I_{DM}	45	A
Avalanche Current			I_{AS}	14	A
Power Dissipation	T_A=25℃	TO-252-2L	P_D	40	W
		TO-251		55	
Avalanche Energy with Single Pulse (Tj=25℃, L = 0.14mH , I_{AS} = 20A , V_{DD} = 20V.)			EAS	28	mJ
Operating Junction Temperature			T_J	-55/150	℃
Storage Temperature Range			T_{STG}	-55/150	℃
Thermal Resistance-Junction to Ambient			$R_{\theta JA}$	100	℃/W

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	1		3	
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			25	uA
		V_{DS}=80V,V_{GS}=0V T_J=125℃			250	
On-State Drain Current	$I_{D(on)}$	V_{DS}≥5V,V_{GS} =10V	9			A
Drain-Source On-Resistance	$R_{DS(on)}$	V_{GS}= 10V,I_D=10A		0.110	0.160	Ω
Forward Transconductance	gfs	V_{DS}=10V,I_D=5A		5.6		S
Diode Forward Voltage	V_{SD}	I_S=9A,V_{GS} =0V			1.3	V
Dynamic						
Total Gate Charge	Q_g	V_{DS}=80V,V_{GS}=10V I_D= 5A		10	16	nC
Gate-Source Charge	Q_{gs}			2.5		
Gate-Drain Charge	Q_{gd}			4.5		
Input Capacitance	C_{iss}	V_{DS}=25,V_{GS}=0V f=1MHz		430		pF
Output Capacitance	C_{oss}			56		
Reverse Transfer Capacitance	C_{rss}			35		
Turn-On Time	$t_{d(on)}$	V_{DD}=50V,R_L=10Ω I_D≡5A,V_{GEN}=10V R_G=3.3Ω		6.5		nS
	t_r			10		
Turn-Off Time	$t_{d(off)}$			13		
	t_f			3.4		

TYPICAL CHARACTERISTICS

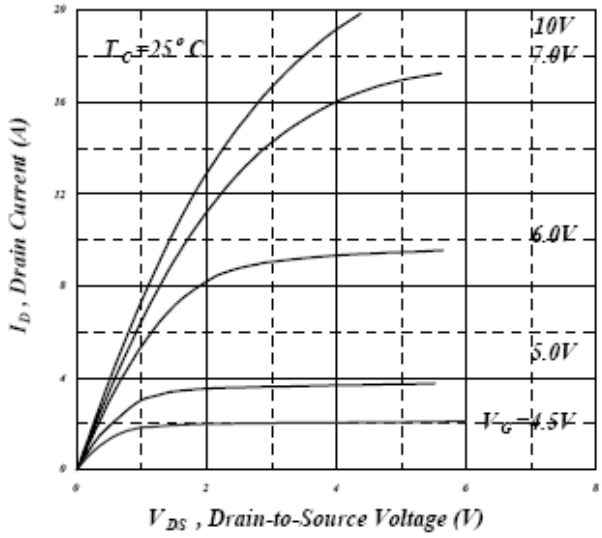


Fig 1. Typical Output Characteristics

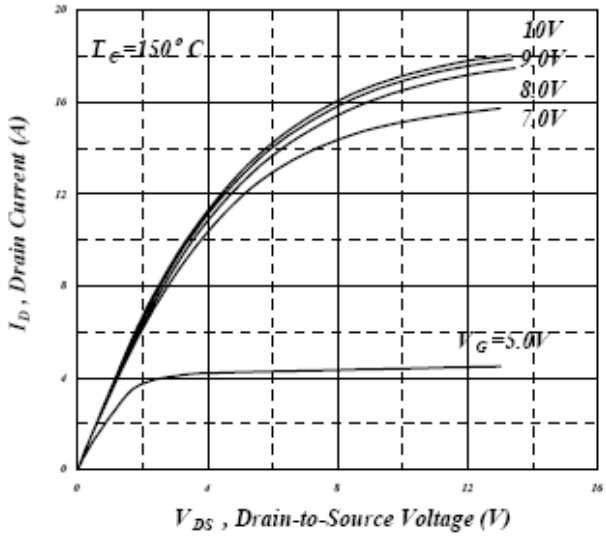


Fig 2. Typical Output Characteristics

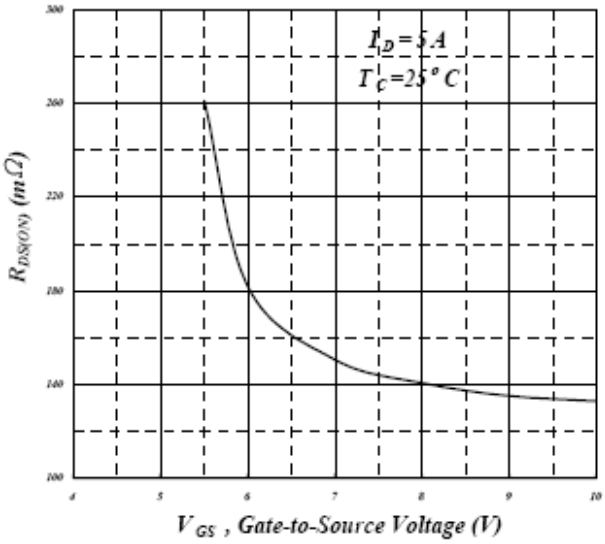


Fig 3. On-Resistance v.s. Gate Voltage

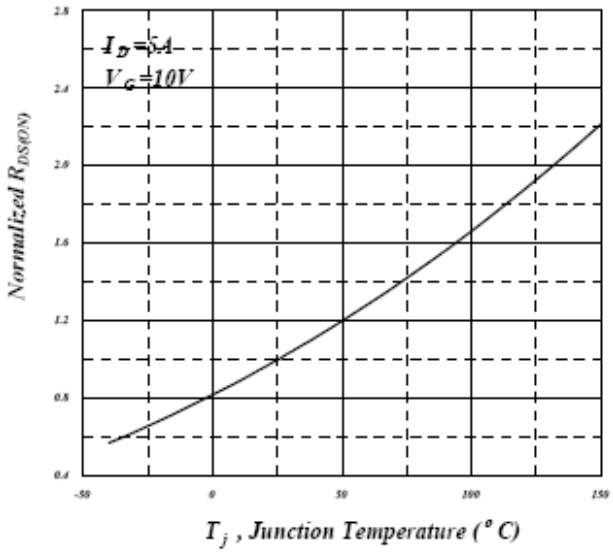


Fig 4. Normalized On-Resistance v.s. Junction Temperature

TYPICAL CHARACTERISTICS

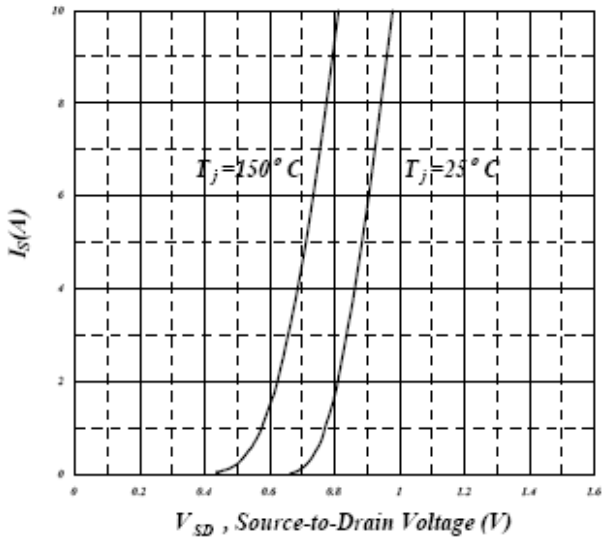


Fig 5. Forward Characteristic of Reverse Diode

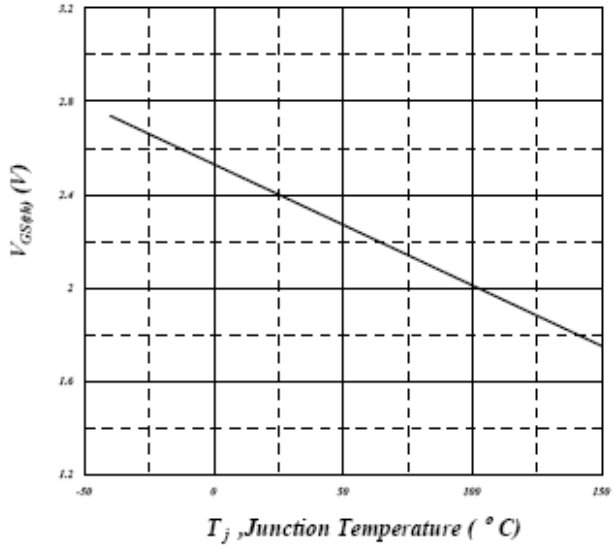


Fig 6. Gate Threshold Voltage v.s. Junction Temperature

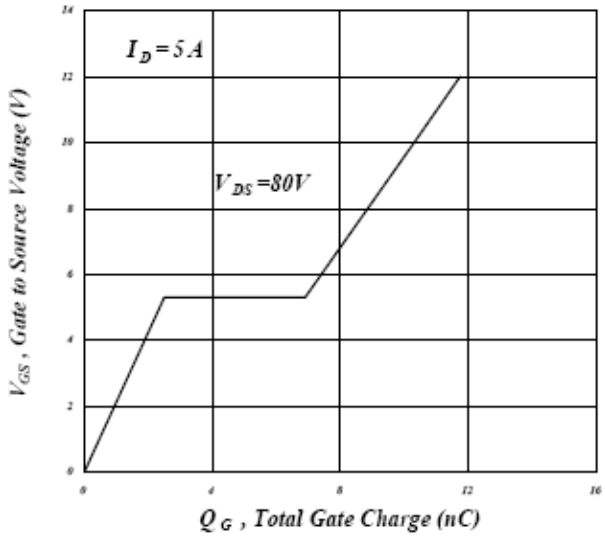


Fig 7. Gate Charge Characteristics

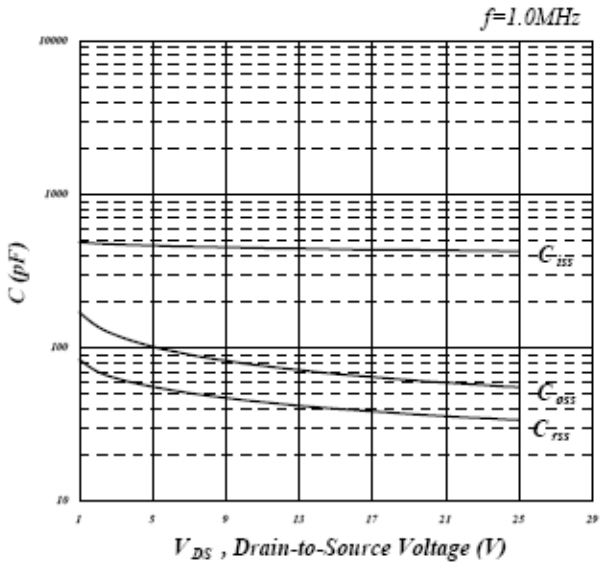


Fig 8. Typical Capacitance Characteristics

TYPICAL CHARACTERISTICS

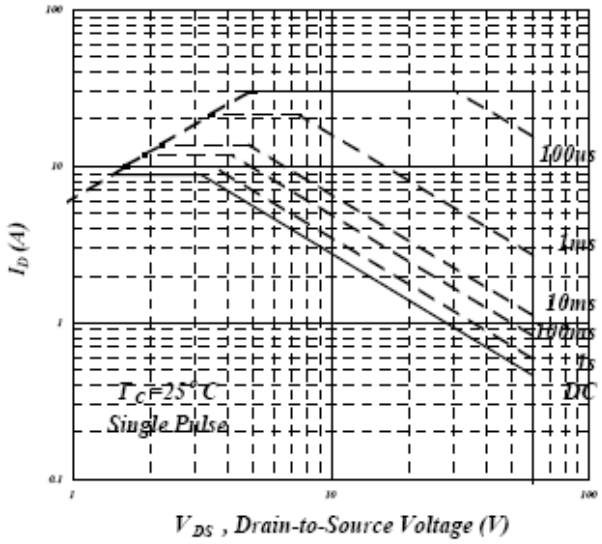


Fig 9. Maximum Safe Operating Area

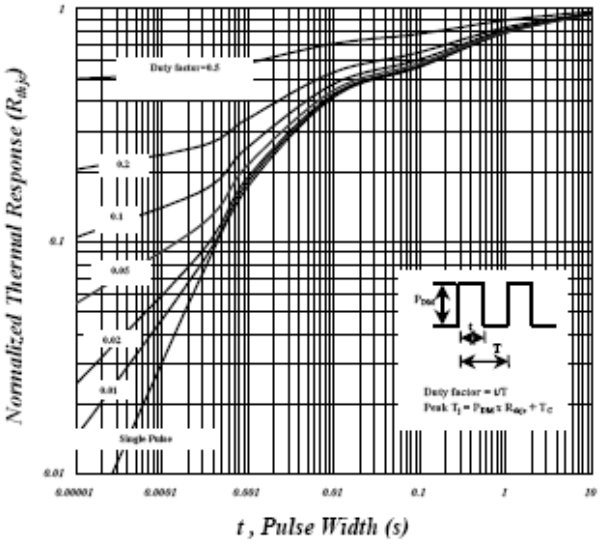


Fig 10. Effective Transient Thermal Impedance

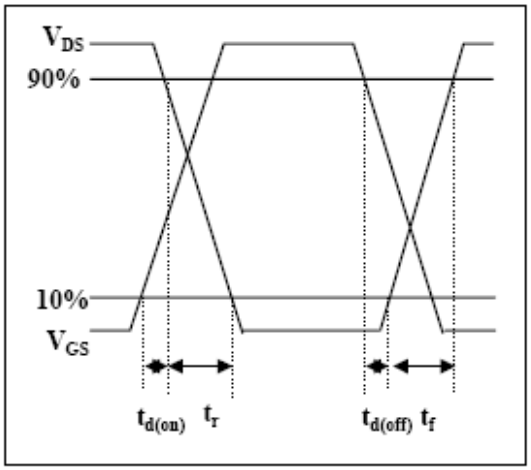


Fig 11. Switching Time Waveform

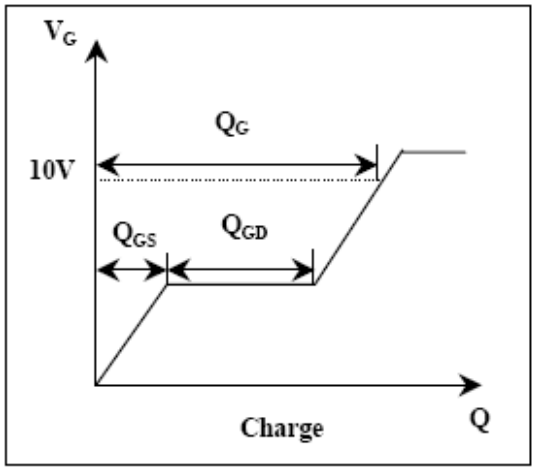
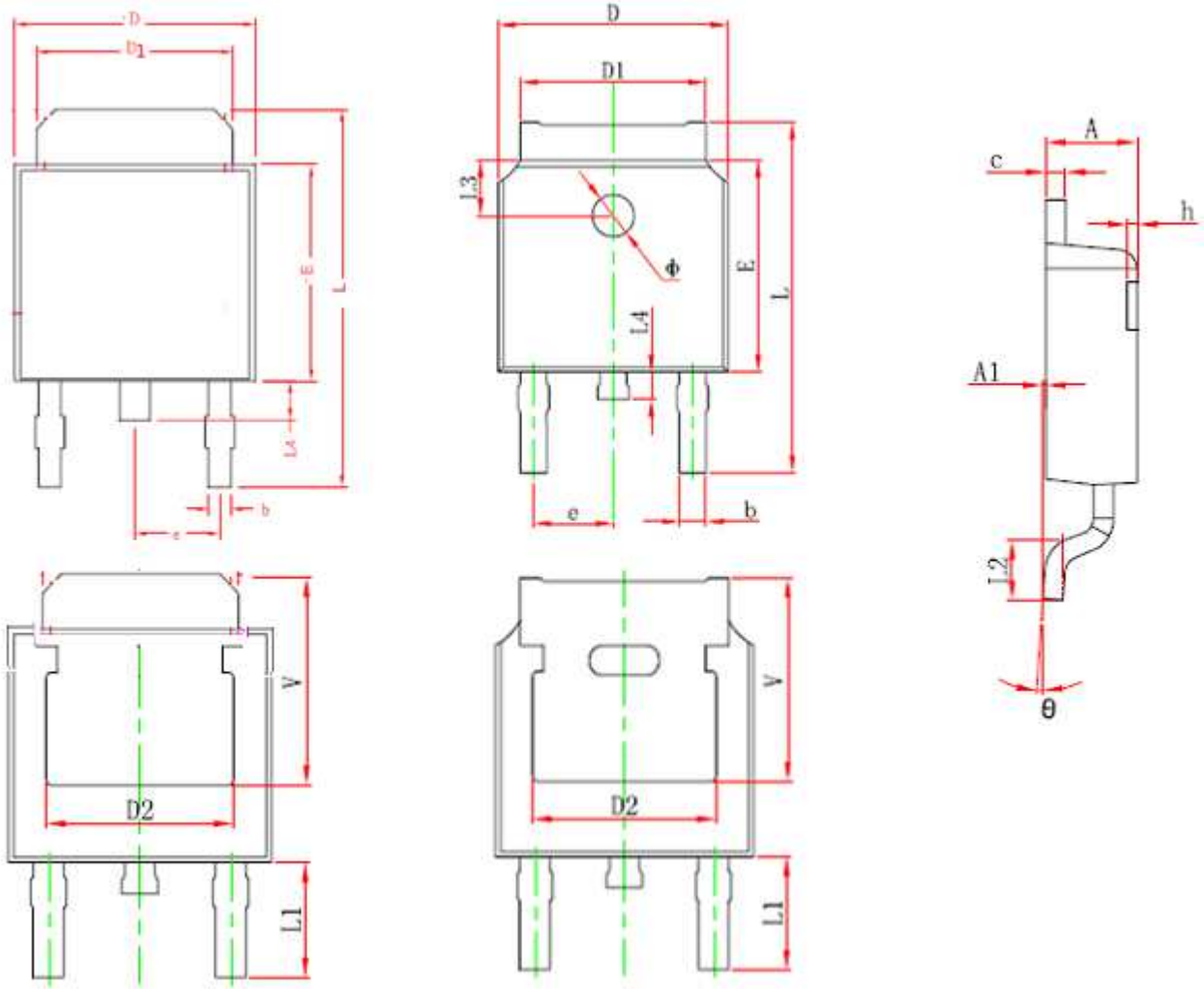


Fig 12. Gate Charge Waveform

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.	

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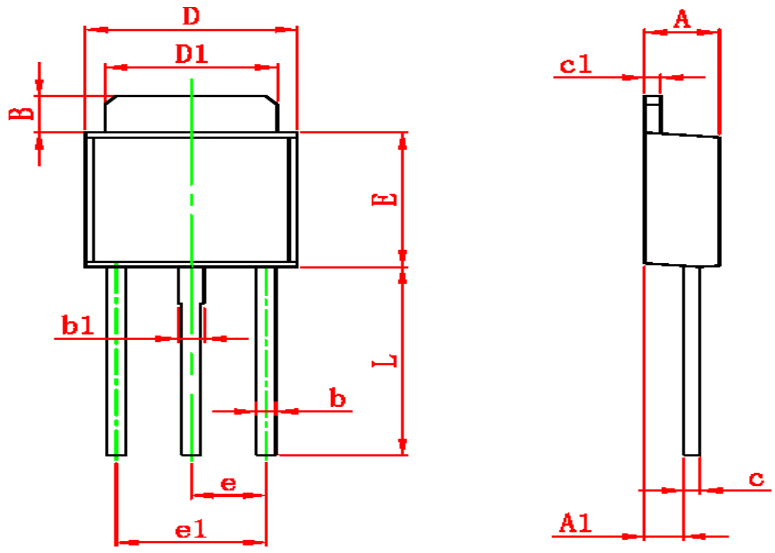
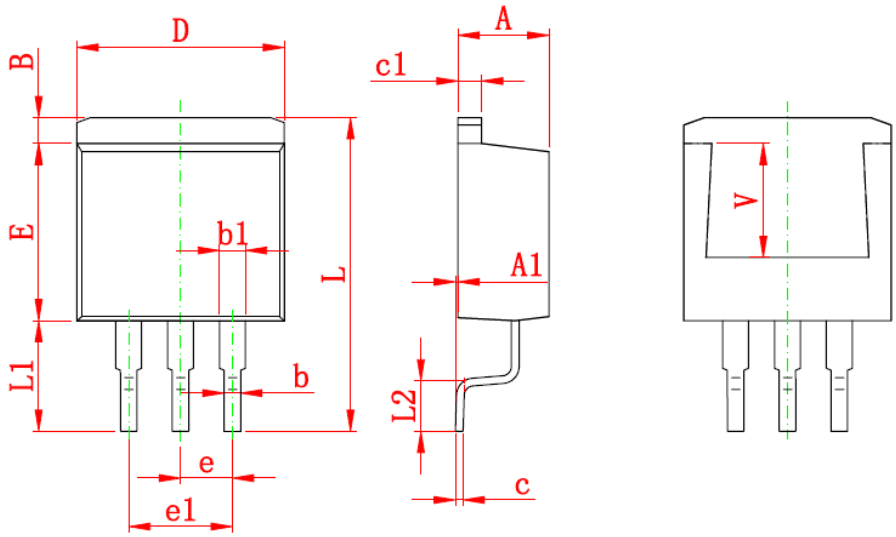
TO-251 PACKAGE OUTLINE



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

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	

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