



SPN9971

N-Channel Enhancement Mode MOSFET

DESCRIPTION

The SPN9971 is the N-Channel logic enhancement mode power field effect transistors are produced using high cell density , DMOS trench technology. The SPN9971 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

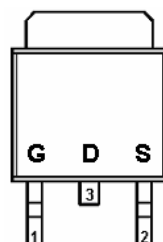
- ◆ 60V/16A, $R_{DS(ON)} = 40m\Omega @ V_{GS} = 10V$
- ◆ 60V/12A, $R_{DS(ON)} = 45m\Omega @ V_{GS} = 4.5V$
- ◆ Super high density cell design for extremely low $R_{DS(ON)}$
- ◆ Exceptional on-resistance and maximum DC current capability
- ◆ TO-252, TO-251 package design

APPLICATIONS

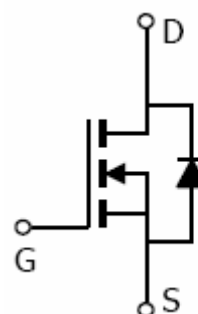
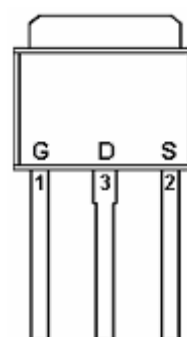
- Power Management in Note book
- Powered System
- DC/DC Converter
- Load Switch

PIN CONFIGURATION

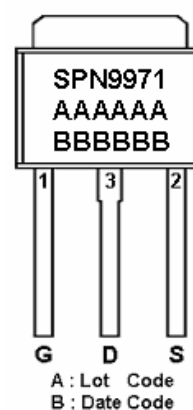
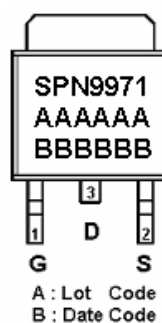
TO-252



TO-251



PART MARKING





SPN9971

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
SPN9971T252RGB	TO-252	SPN9971
SPN9971T251TGB	TO-251	SPN9971

※ SPN9971T252RGB : Tape Reel ; Pb – Free ; Halogen - Free

※ SPN9971T251RGB : 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 _A =25℃		I _D	25	A
	T _A =100℃			16	
Pulsed Drain Current			I _{DM}	80	A
Avalanche Current			I _{AS}	25	A
Power Dissipation	T _A =25℃	TO-252-2L	P _D	40	W
		TO-251		55	
Operating Junction Temperature			T _J	150	℃
Storage Temperature Range			T _{STG}	-55/150	℃
Thermal Resistance-Junction to Ambient			R _{θJA}	100	℃/W



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ELECTRICAL CHARACTERISTICS

(T_A=25°C Unless otherwise noted)

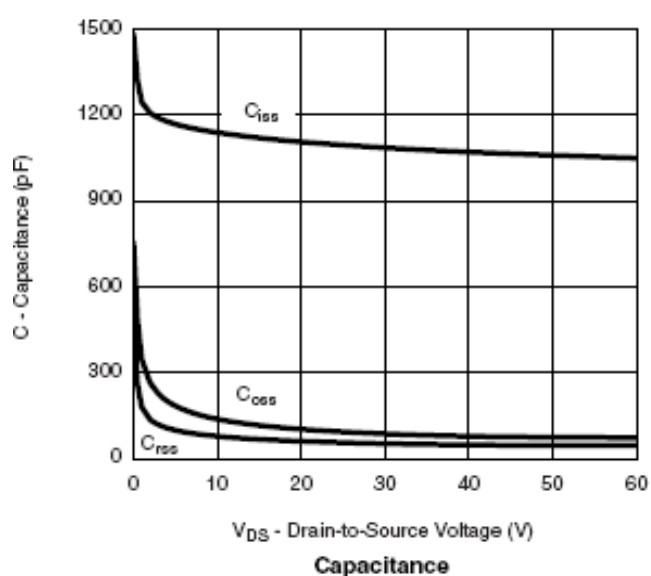
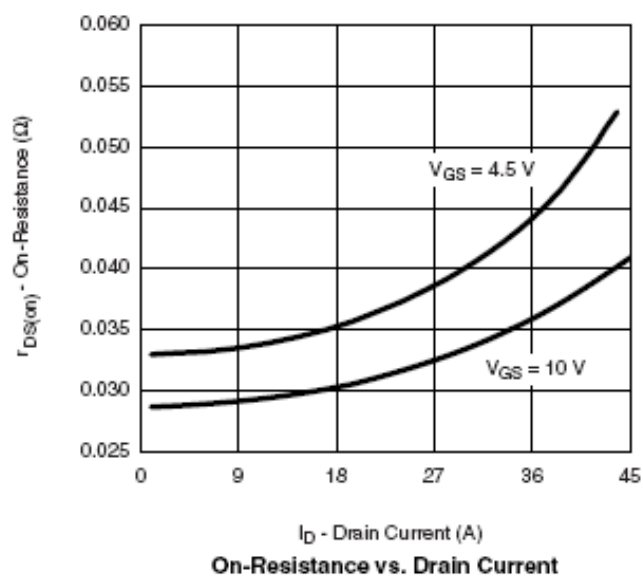
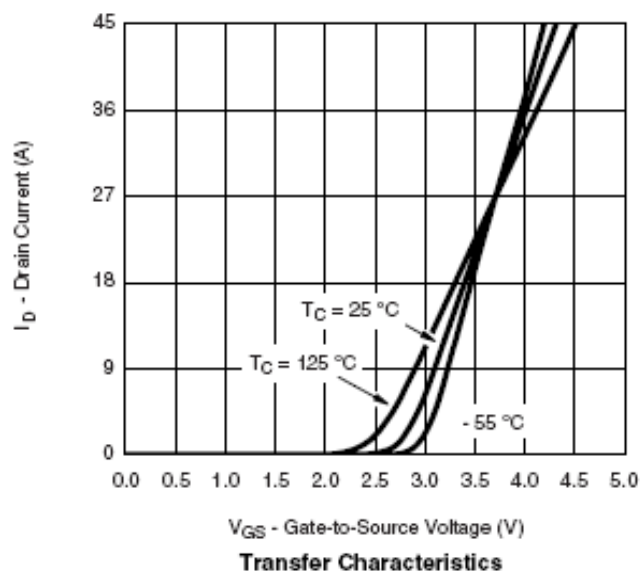
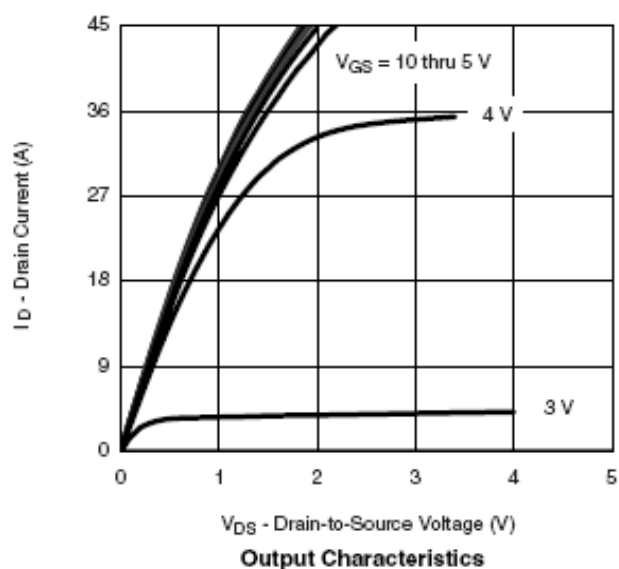
Parameter	Symbol	Conditions	Min.	Typ	Max.	Unit
Static						
Drain-Source Breakdown Voltage	V _{(BR)DSS}	V _{GS} =0V, I _D =250μA	60			V
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250μA	0.8		2.0	
Gate Leakage Current	I _{GSS}	V _{DS} =0V, V _{GS} =±20V			±100	nA
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =60V, V _{GS} =0V			1	μA
		V _{DS} =60V, V _{GS} =0V T _J =85°C			5	
On-State Drain Current	I _{D(on)}	V _{DS} ≥5V, V _{GS} =10V	30			A
Drain-Source On-Resistance	R _{DS(on)}	V _{GS} =10V, I _D =16A		0.038	0.040	Ω
		V _{GS} =4.5V, I _D =12A		0.042	0.045	
Forward Transconductance	g _{fs}	V _{DS} =15V, I _D =5.3A		24		S
Diode Forward Voltage	V _{SD}	I _S =2.0A, V _{GS} =0V		0.8	1.2	V
Dynamic						
Total Gate Charge	Q _g	V _{DS} =30V, V _{GS} =5V I _D =5.3A		10	15	nC
Gate-Source Charge	Q _{gs}			3.5		
Gate-Drain Charge	Q _{gd}			3.6		
Input Capacitance	C _{iss}	V _{DS} =30V, V _{GS} =0V f=1MHz		890		pF
Output Capacitance	C _{oss}			85		
Reverse Transfer Capacitance	C _{rss}			48		
Turn-On Time	t _{d(on)}	V _{DD} =30V, R _L =6.8Ω I _D =4.4A, V _{GEN} =10V R _G =1Ω		10	15	nS
	t _r			12	20	
Turn-Off Time	t _{d(off)}			25	35	
	t _f			10	15	



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TYPICAL CHARACTERISTICS

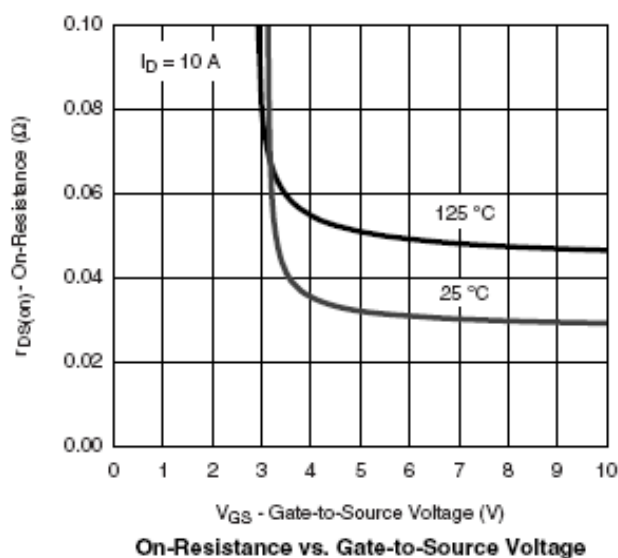
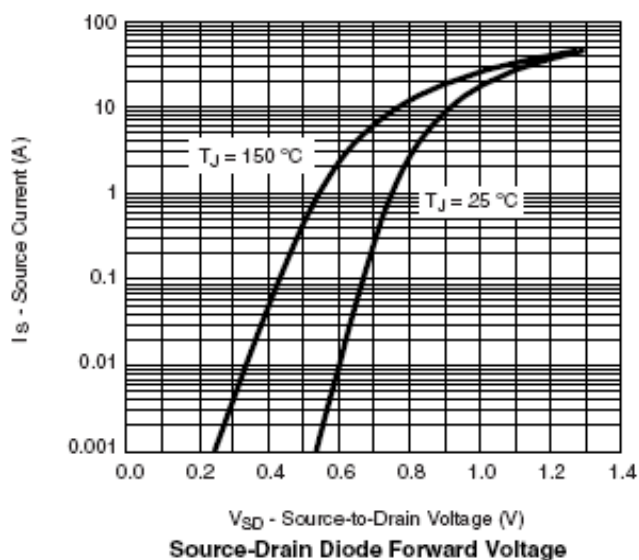
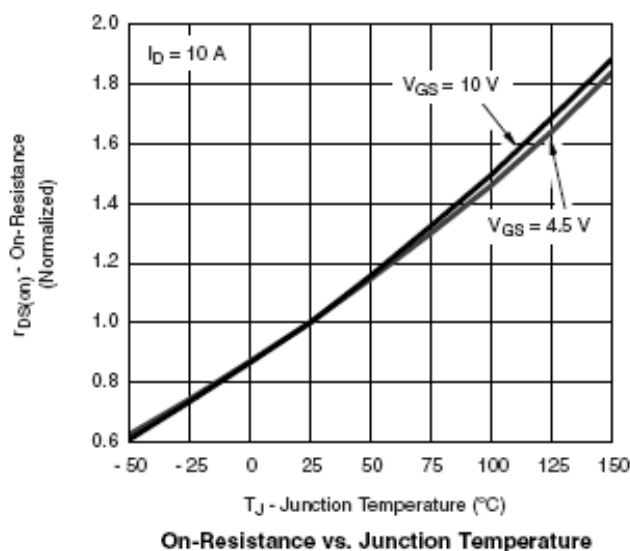
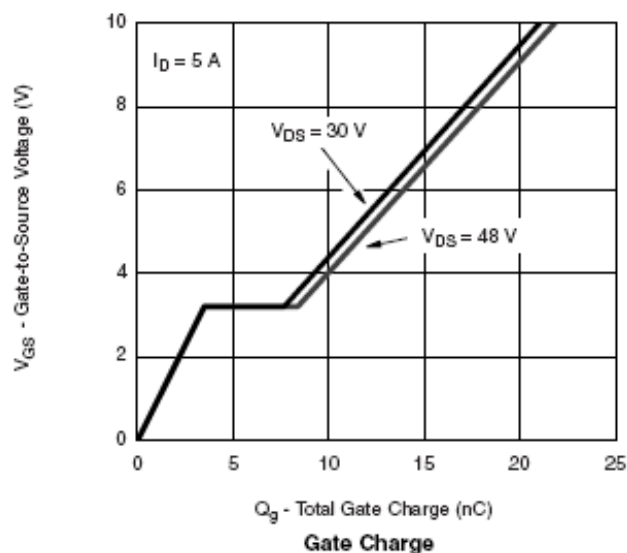




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TYPICAL CHARACTERISTICS

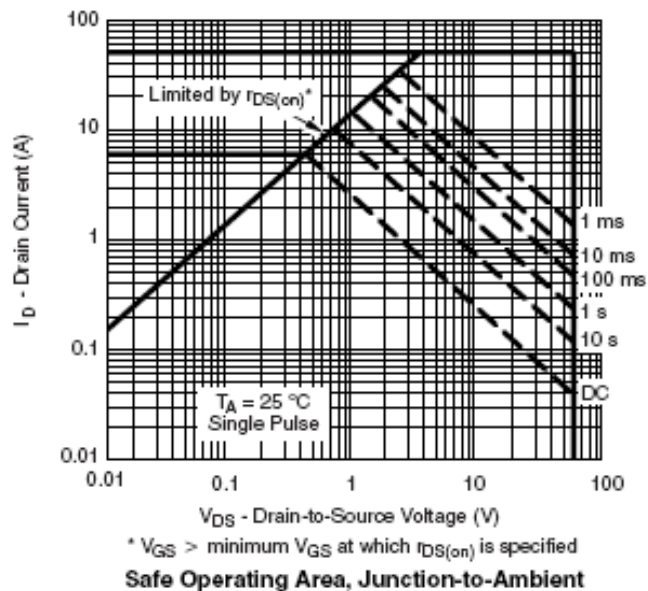
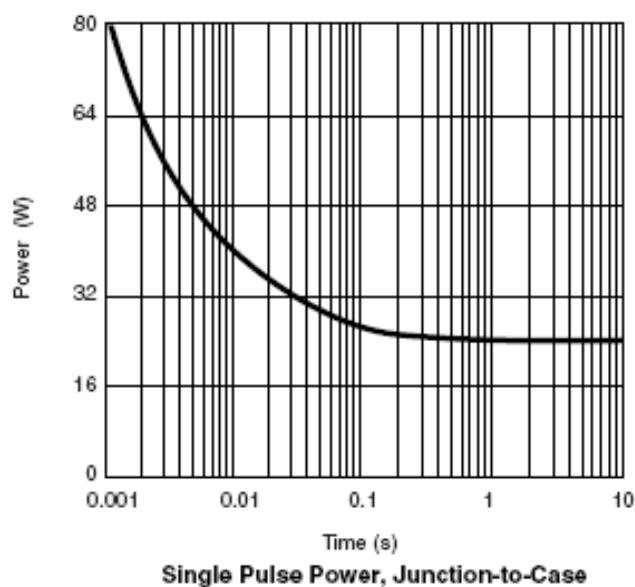
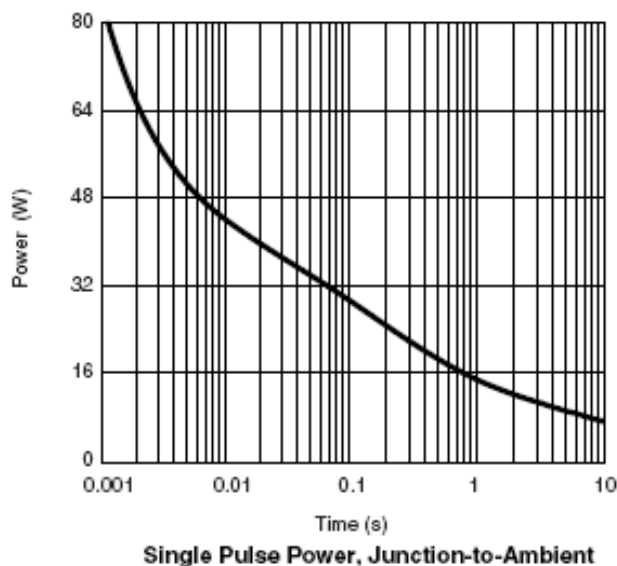
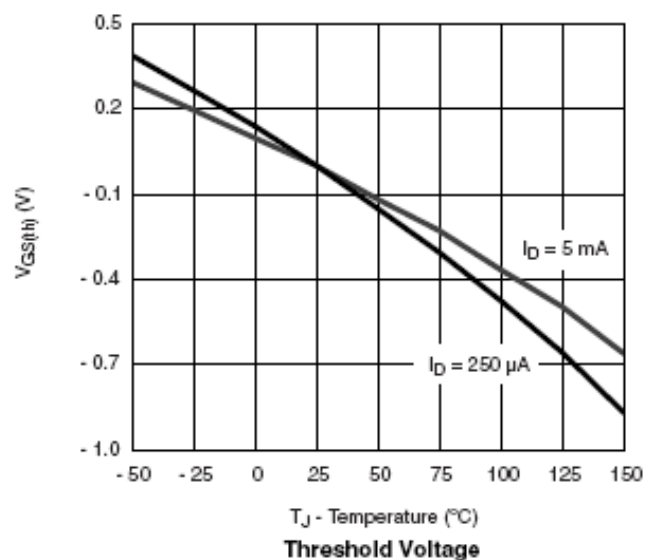




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TYPICAL CHARACTERISTICS

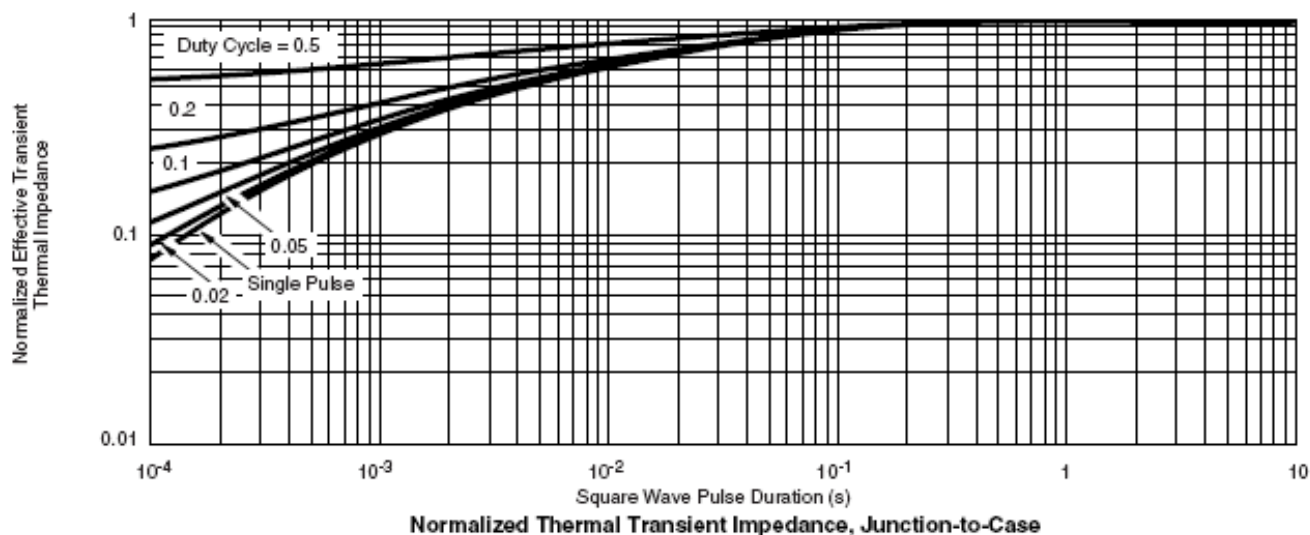
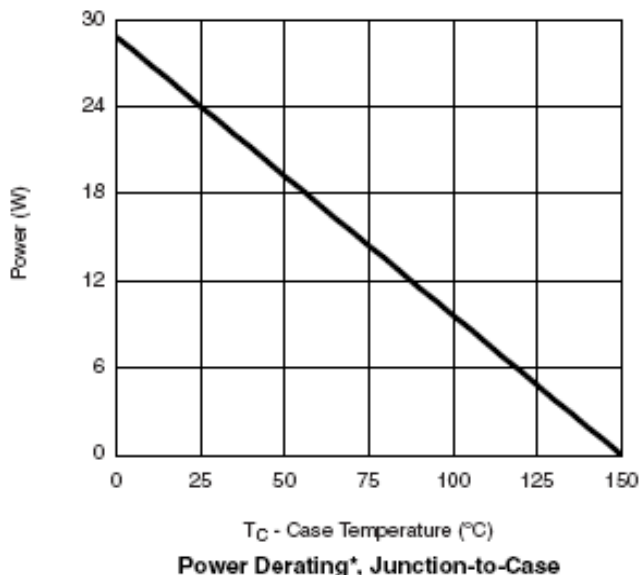
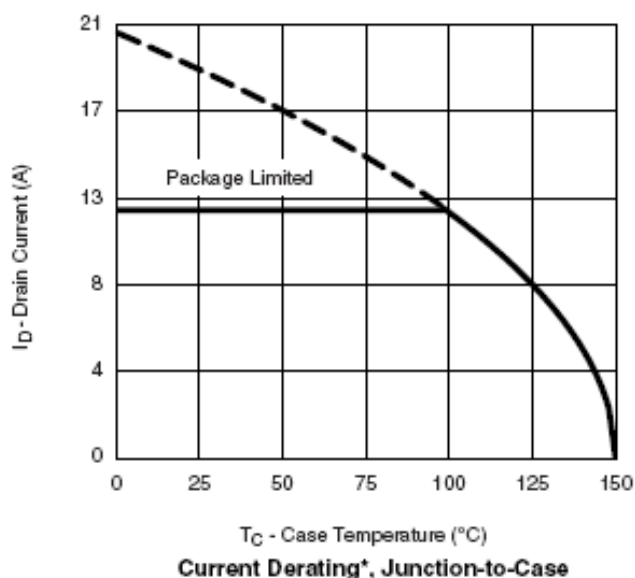




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TYPICAL CHARACTERISTICS

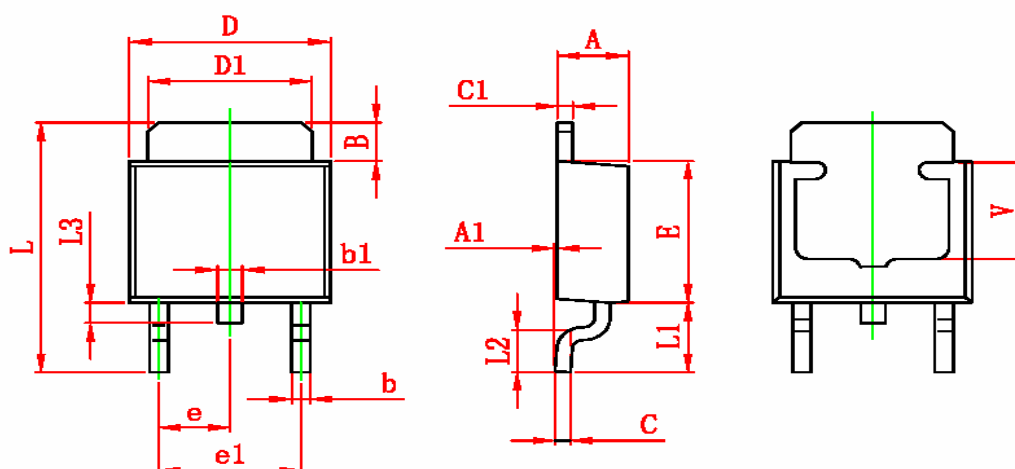




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TO-252 PACKAGE OUTLINE



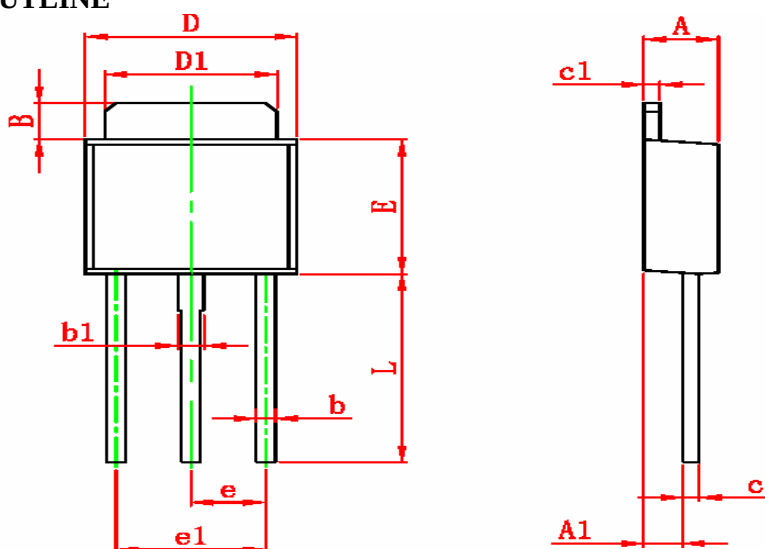
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	2.200	2.400	0.087	0.094
A1	0.000	0.127	0.000	0.005
B	1.350	1.650	0.053	0.065
b	0.500	0.700	0.020	0.028
b1	0.700	0.900	0.028	0.035
c	0.430	0.580	0.017	0.023
c1	0.430	0.580	0.017	0.023
D	6.350	6.650	0.250	0.262
D1	5.200	5.400	0.205	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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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



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