



SPN03T20

N-Channel Enhancement Mode MOSFET

DESCRIPTION

The SPN03T20 is the N-Channel logic enhancement mode power field effect transistor which is produced using super high cell density DMOS trench technology. The SPN03T20 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

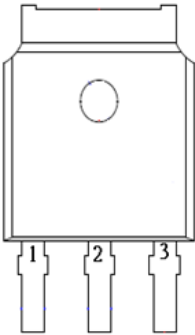
- ◆ 200V/3A, $R_{DS(ON)}=850m\Omega@V_{GS}=10V$
- ◆ High density cell design for extremely low $R_{DS(ON)}$
- ◆ Exceptional on-resistance and maximum DC current capability
- ◆ TO-251S-3L ,TO-252-2L package design

APPLICATIONS

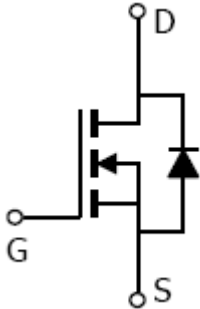
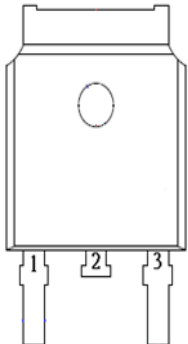
- High Frequency Small Power Switching for MB/NB/VGA
- Network DC/DC Power System
- Load Switch
- TV Power

PIN CONFIGURATION

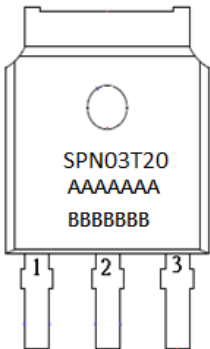
TO-251S-3L



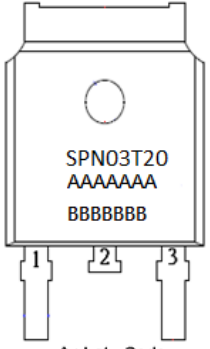
TO-252-2L



PART MARKING



A : Lot Code
B : Date Code



A : Lot Code
B : Date Code



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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
SPN03T20ST251TGB	TO-251S-3L	SPN03T20
SPN03T20T252RGB	TO-252-2L	SPN03T20

※ SPN03T20ST251TGB : Tube ; Pb – Free ; Halogen - Free

※ SPN03T20T252RGB : Tape Reel ; Pb – Free ; Halogen – Free

ABSOLUTE MAXIMUM RATINGS

(TA=25°C Unless otherwise noted)

Parameter	Symbol	Typical	Unit	
Drain-Source Voltage	V _{DSS}	200	V	
Gate –Source Voltage	V _{GSS}	±30	V	
Continuous Drain Current(T _J =150°C)	I _D	T _A =25°C	3	A
		T _A =70°C	2	
Pulsed Drain Current	I _{DM}	12	A	
Avalanche Energy, Single Pulse @ L=0.1mH, T _A =25°C	E _{AS}	21	mJ	
Power Dissipation	P _D	40	W	
Operating Junction Temperature	T _J	-55/150	°C	
Storage Temperature Range	T _{STG}	-55/150	°C	
Thermal Resistance-Junction to Ambient	R _{θJA}	3.1	°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	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=250\mu A$	200			V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	3.0	4.0	5.0	V
Gate Leakage Current	I_{GSS}	$V_{DS}=0V, V_{GS}=\pm 30V$			± 100	nA
Drain-Source Leakage Current	I_{DSS}	$V_{DS}=200V, V_{GS}=0V$			1	μA
On-State Drain Current	$I_{D(on)}$	$V_{DS}\geq 5V, V_{GS}=10V$			3	A
Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=2A$		0.7	0.85	Ω
Forward Transconductance	g_{fs}	$V_{DS}=10V, I_D=2A$		3.6		S
Diode Forward Voltage	V_{SD}	$I_S=1A, V_{GS}=0V$			1	V
Dynamic						
Total Gate Charge	Q_g	$V_{DS}=160V, V_{GS}=10V$ $I_D=1A$		4.8	9	nC
Gate-Source Charge	Q_{gs}			2	4	
Gate-Drain Charge	Q_{gd}			0.8	2	
Input Capacitance	C_{iss}	$V_{DS}=25V, V_{GS}=0V$ $f=1MHz$		266	510	pF
Output Capacitance	C_{oss}			160	300	
Reverse Transfer Capacitance	C_{rss}			55	110	
Turn-On Time	$t_{d(on)}$	$V_{DD}=100V, I_D=1A,$ $V_{GEN}=10V, R_G=25\Omega$		10	20	nS
	t_r			35	70	
Turn-Off Time	$t_{d(off)}$			10	20	
	t_f			28	56	



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TYPICAL CHARACTERISTICS

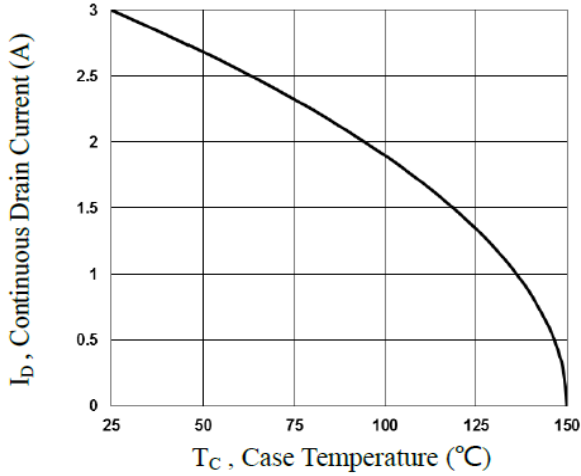


Fig.1 Continuous Drain Current vs. T_C

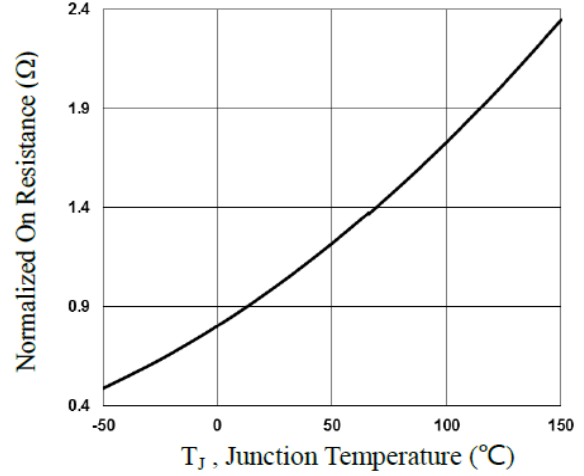


Fig.2 Normalized $R_{DS(on)}$ vs. T_J

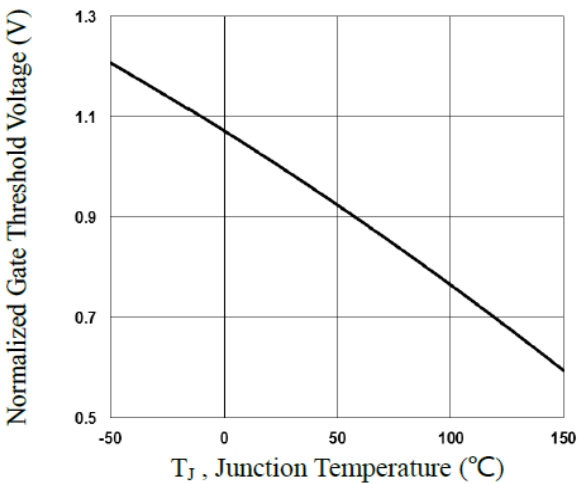


Fig.3 Normalized V_{th} vs. T_J

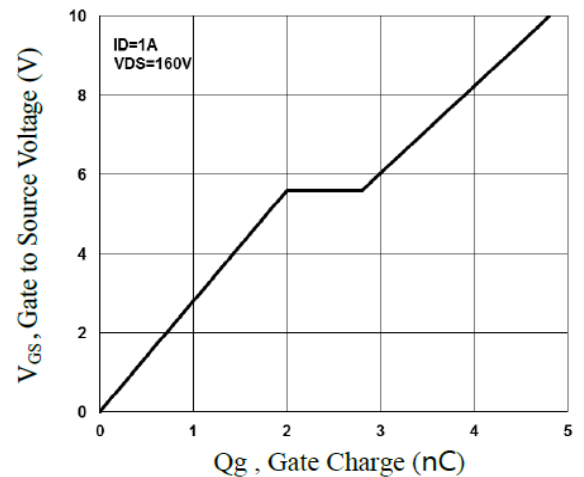


Fig.4 Gate Charge Waveform

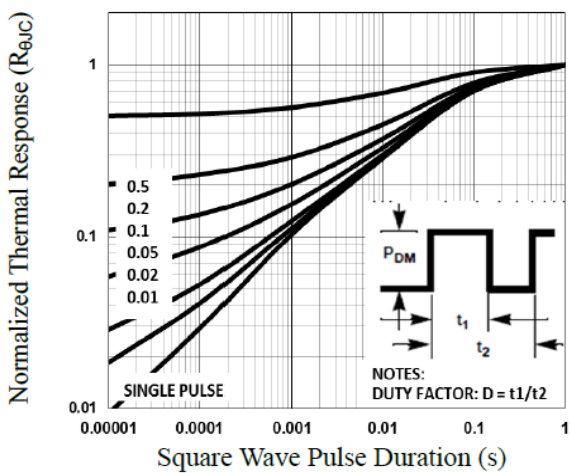


Fig.5 Normalized Transient Impedance

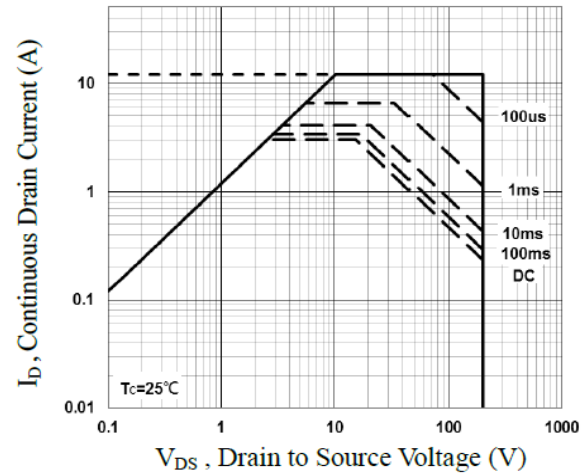


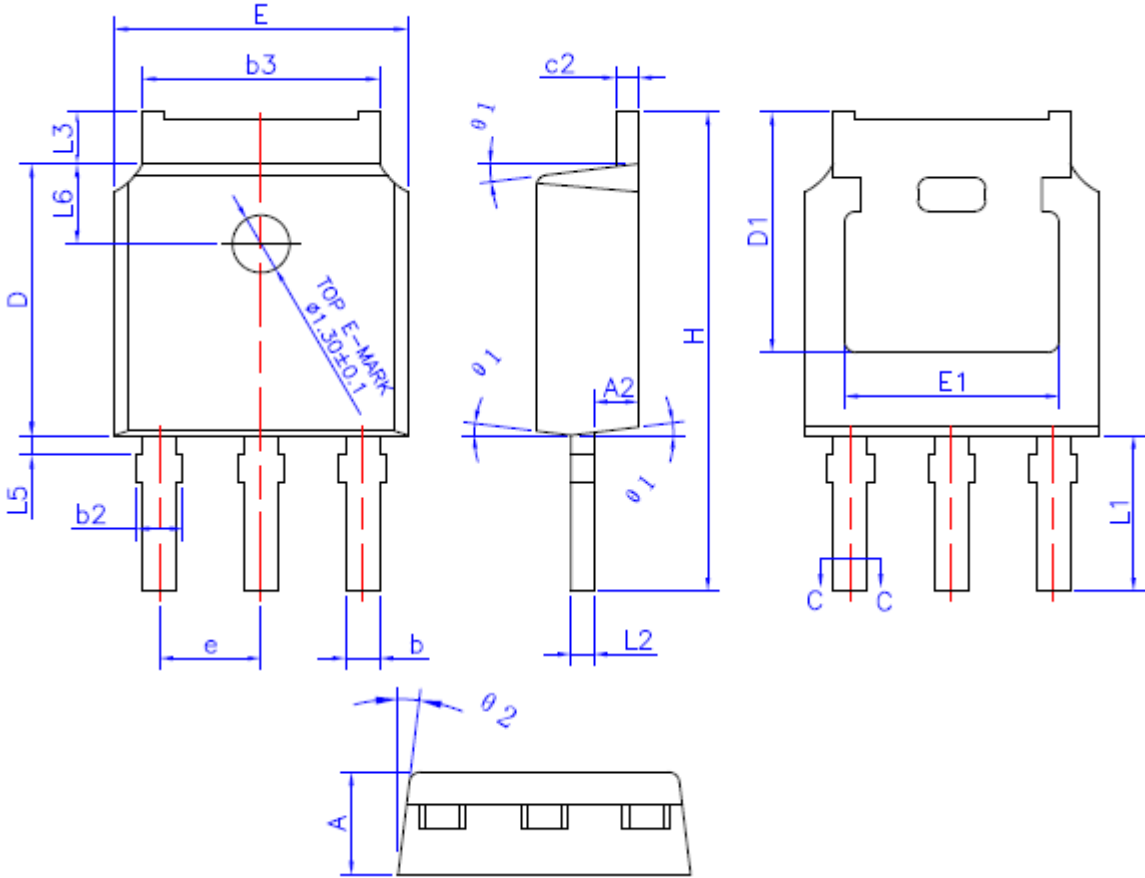
Fig.6 Maximum Safe Operation Area



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TO-251S-3L PACKAGE OUTLINE



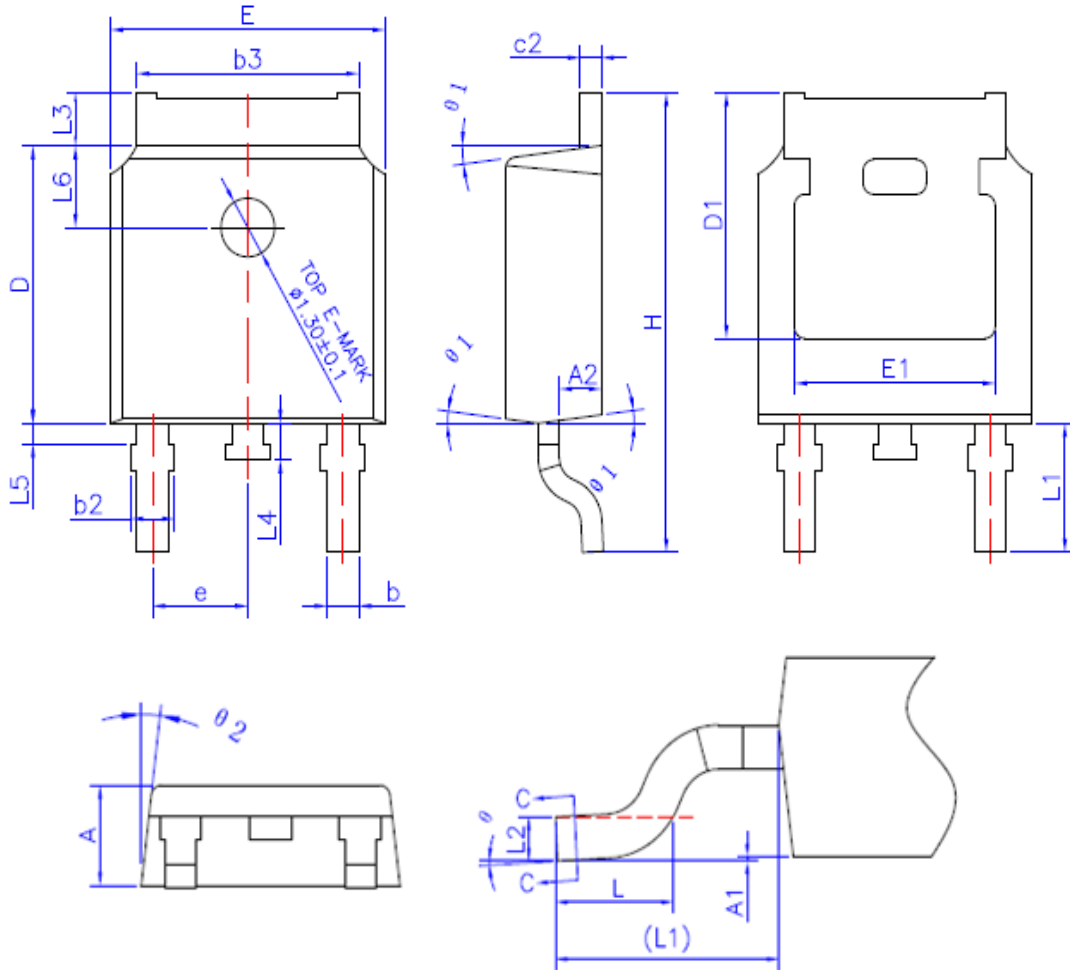
SYMBOL	MIN	NOM	MAX
A	2.20	2.30	2.40
A2	0.86	1.01	1.16
b	0.66	-	0.86
b2	0.66	--	0.96
b3	5.10	5.28	5.46
c	0.46	--	0.60
c2	0.47	--	0.60
D	6.00	6.10	6.20
D1	5.35REF		
E	6.40	6.60	6.80
E1	4.83REF		
e	2.3REF		
H	9.80	10.40	11.00
L1	3.50REF		
L2	0.508BSC		
L3	0.90	--	1.25
L5	0.15	--	0.75
L6	1.80REF		
$\theta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



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