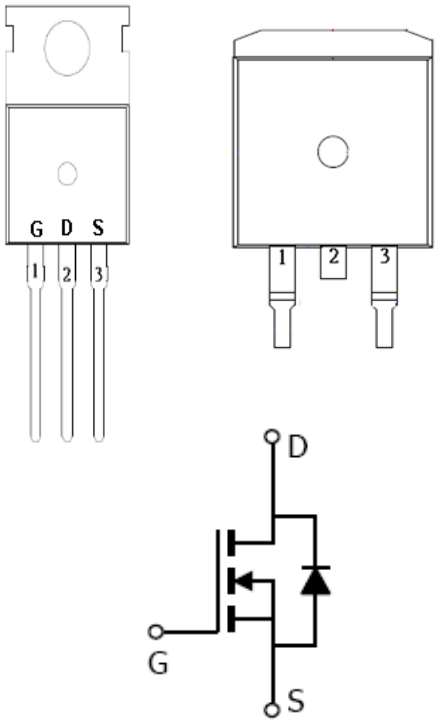
SPN180T10
N-Channel Enhancement Mode MOSFET

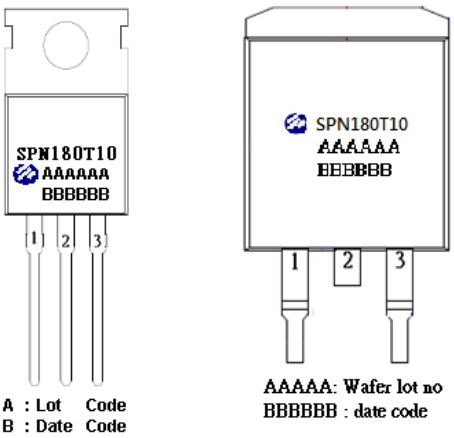
DESCRIPTION
The SPN180T10 is the N-Channel enhancement mode power field effect transistor which is produced using super high cell density DMOS trench technology. This high density process is especially tailored to minimize on-state resistance. These devices are particularly suitable for synchronous rectifier application, Motor control power management and other Power Tool circuits. It has been optimized for low gate charge, low $R_{DS(ON)}$ and fast switching speed.

FEATURES
- 100V/180A, $R_{DS(ON)}$=3.7mΩ@V_{GS}=10V
- High density cell design for extremely low $R_{DS(ON)}$
- Exceptional on-resistance and maximum DC current capability
- TO-220-3L and TO-263-2L package design

APPLICATIONS
- AC/DC Synchronous Rectifier
- Load Switch
- UPS
- Power Tool
- Motor Control

PIN CONFIGURATION
TO-220-3L **TO-263-2L**



PART MARKING


A : Lot Code
B : Date Code

AAAAA: Wafer lot no
BBBBBB : 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
SPN180T10T220TGB	TO-220-3L	SPN180T10
SPN180T10T262RGB	TO-263-2L	SPN180T10

※ SPN180T10T220TGB : Tube ; Pb – Free ; Halogen - Free

※ SPN180T10T262RGB : 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(T_J=150℃)	T_C=25℃	I_D	180	A
	T_C=70℃		135	
Pulsed Drain Current		I_{DM}	400	A
Avalanche Energy, Single Pulse @ L=0.1mH, T_A=25℃		E_{AS}	980	mJ
Power Dissipation @ T_C=25℃		P_D	330	W
Operating Junction Temperature		T_J	-55/150	℃
Storage Temperature Range		T_{STG}	-55/150	℃
Thermal Resistance-Junction to Ambient		$R_{\theta JA}$	62	℃/W
Thermal Resistance-Junction to Case		$R_{\theta JC}$	0.5	℃/W

Note :

The maximum current rating is package limited at 120A for TO-263-2L and TO-220-3L

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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}=100V,V_{GS}=0V			1	uA
		V_{DS}=100V,V_{GS}=0V T_J=100℃			100	
Drain-Source On-Resistance	$R_{DS(on)}$	V_{GS}=10V,I_D=20A		3.4	3.7	mΩ
Forward Transconductance	gfs	V_{DS}=5V,I_D=20A		90		S
Gate Resistance	R_G	V_{GS}=0V,V_{DS}=Open, f=1MHz		0.7		Ω
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		118		nC
Gate-Source Charge	Q_{gs}			27		
Gate-Drain Charge	Q_{gd}			21		
Input Capacitance	C_{iss}	V_{DS}=50V,V_{GS}=0V f=1MHz		7300		pF
Output Capacitance	C_{oss}			580		
Reverse Transfer Capacitance	C_{rss}			18		
Turn-On Time	$t_{d(on)}$	V_{DD}=50V, V_{GS}=10V I_D=20A, R_G=10Ω		35		nS
	t_r			56		
Turn-Off Time	$t_{d(off)}$			92		
	t_f			26		

TYPICAL CHARACTERISTICS

Fig 1. Typical Output Characteristics

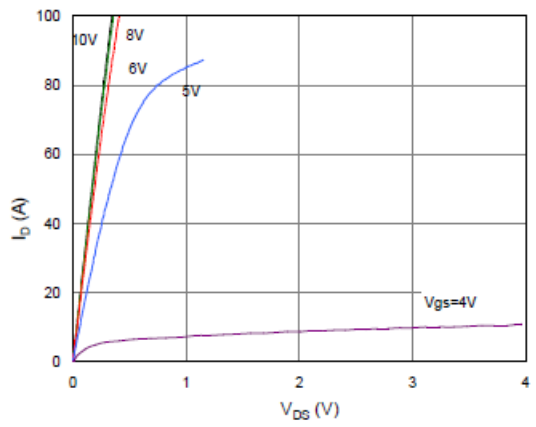


Figure 2. On-Resistance vs. Gate-Source Voltage

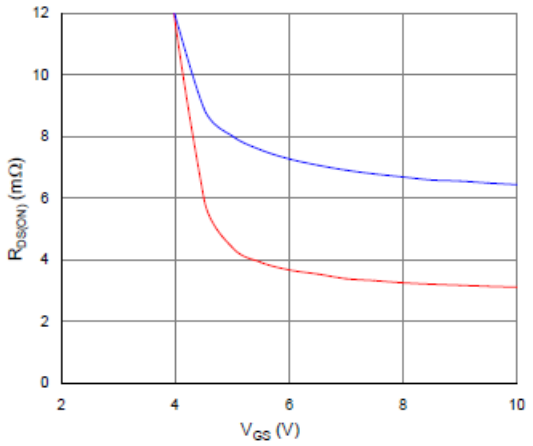


Figure 3. On-Resistance vs. Drain Current and Gate Voltage

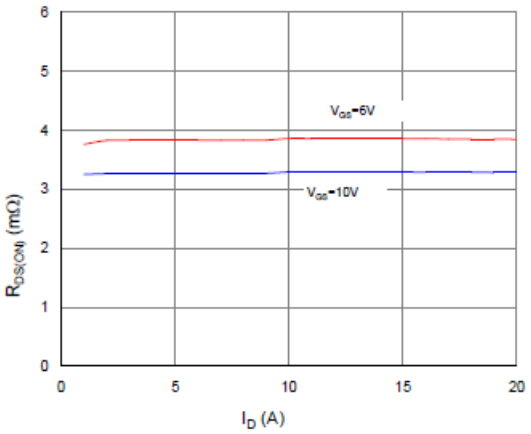


Figure 4. Normalized On-Resistance vs. Junction Temperature

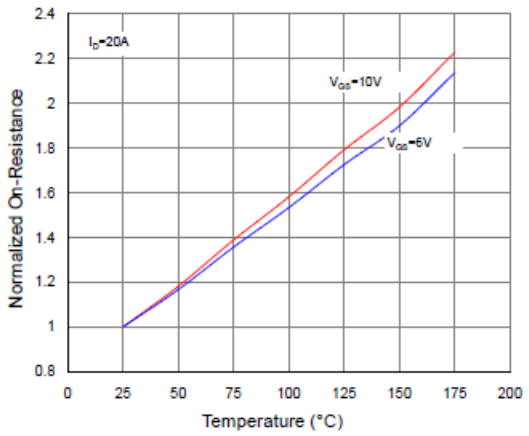


Figure 5. Typical Transfer Characteristics

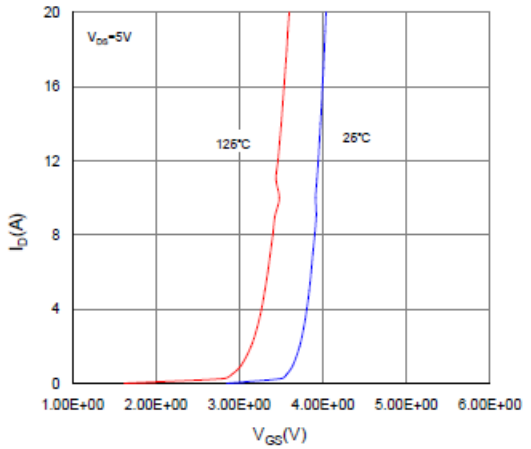
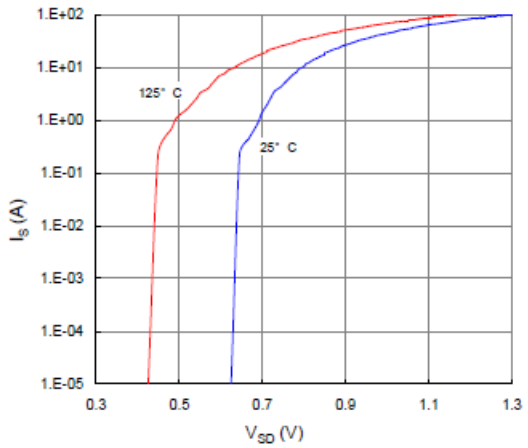


Figure 6. Typical Source-Drain Diode Forward Voltage



TYPICAL CHARACTERISTICS

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

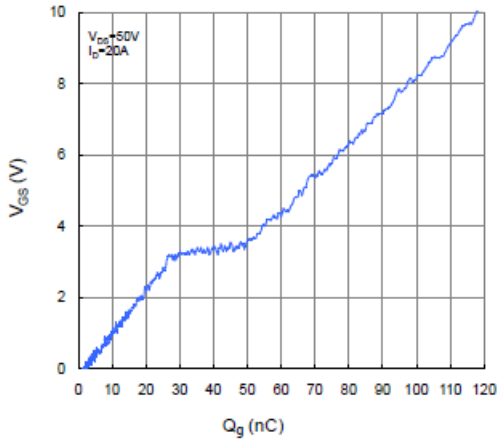


Figure 8. Typical Capacitance vs. Drain-to-Source Voltage

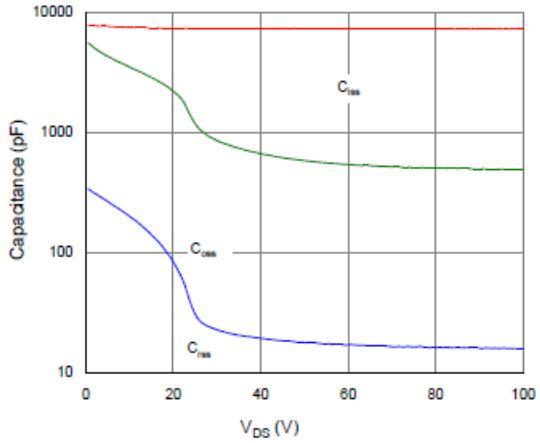


Figure 9. Maximum Safe Operating Area

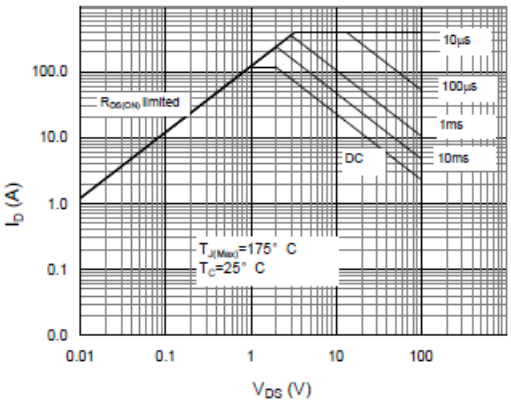


Figure 10. Maximun Drain Current vs. Case Temperature

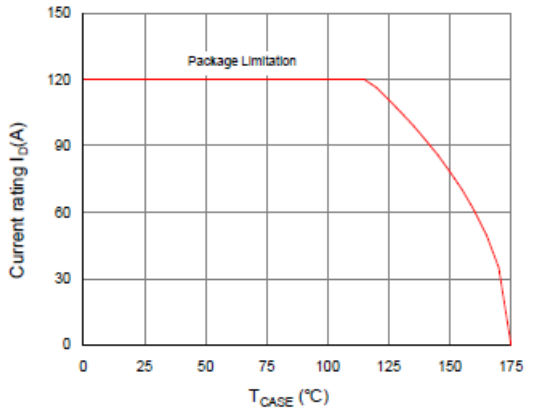
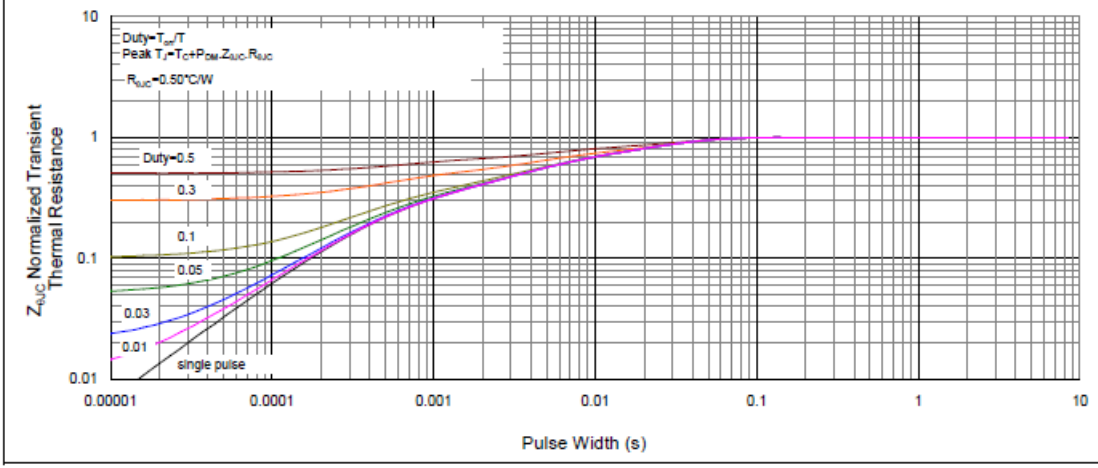
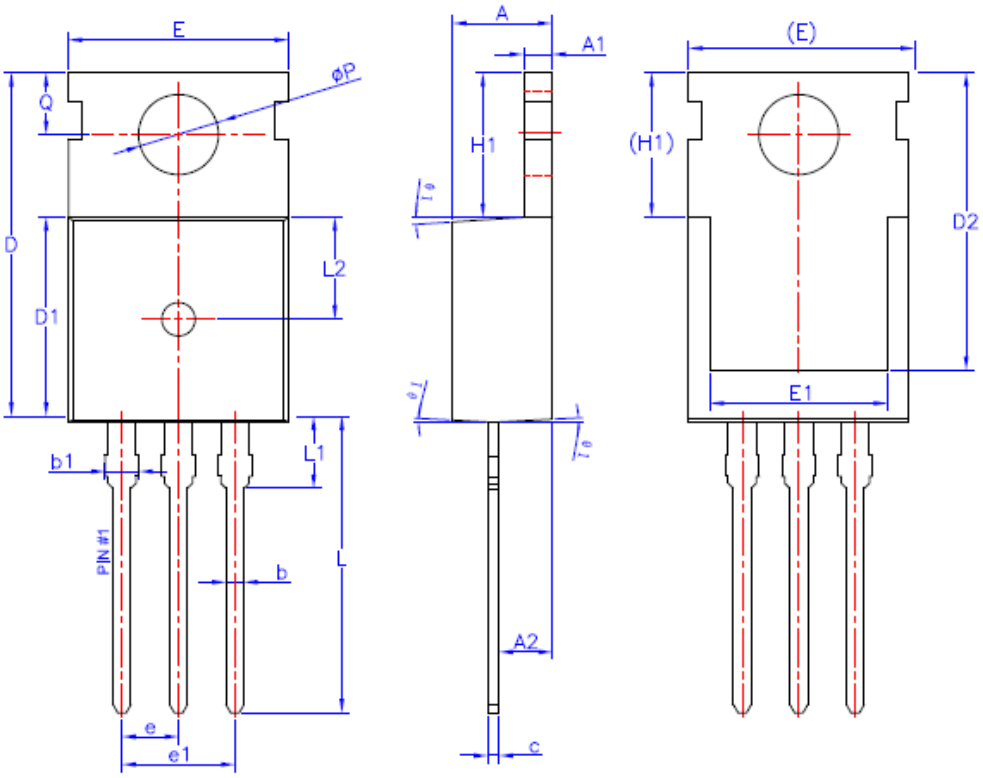


Figure 11. Normalized Maximum Transient Thermal Impedance, Junction-to-Case

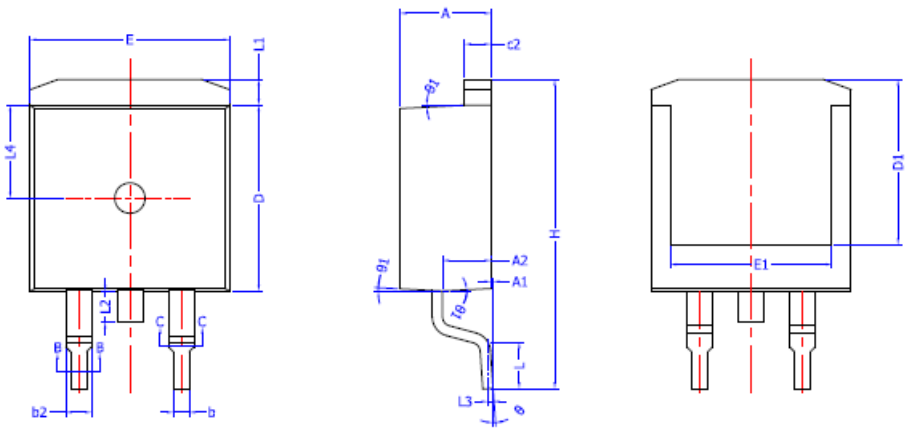


TO-220-3L PACKAGE OUTLINE



SYMBOL	MIN	NOM	MAX
A	4.50	4.70	4.83
A1	2.34	2.54	2.74
A2		0.7REF	
A3	2.56	2.76	2.93
b	0.70	--	0.90
b1	1.18	--	1.40
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	10.00
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	
φ P	3.08	3.18	3.28
Q	3.20	-	3.40
θ 1	1°	3°	5°

TO-263-2L PACKAGE OUTLINE



COMMON DIMENSIONS
(UNITS OF MEASURE =MILLIMETER)

SYMBOL	MIN	NOM	MAX
A	4,40	4,50	4,60
A1	0	0,10	0,25
A2	2,20	2,40	2,60
b	0,76	—	0,89
b1	0,75	0,80	0,85
b2	1,23	—	1,37
b3	1.22	1.27	1.32
c	0.47	—	0.60
c1	0.46	0.51	0.56
c2	1,25	1,30	1,35
D	9,10	9,20	9,30
D1	8,00	—	—
E	9,80	9,90	10,00
E1	7,80	—	—
e	2,54 BSC		
H	14.90	15.30	15.70
L	2.00	2.30	2.60
L1	1.17	1.27	1.40
L2	—	—	1,75
L3	0,25BSC		
L4	4,60 REF		
θ	0°	—	8°
θ1	1°	3°	5°

NOTES:
ALL DIMENSIONS REFER TO JEDEC STANDARD TO-263 AB
DO NOT INCLUDE MOLD FLASH OR PROTRUSIONS.

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