



SPN60T15W

N-Channel Enhancement Mode MOSFET

DESCRIPTION

The SPN60T15W 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

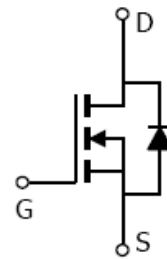
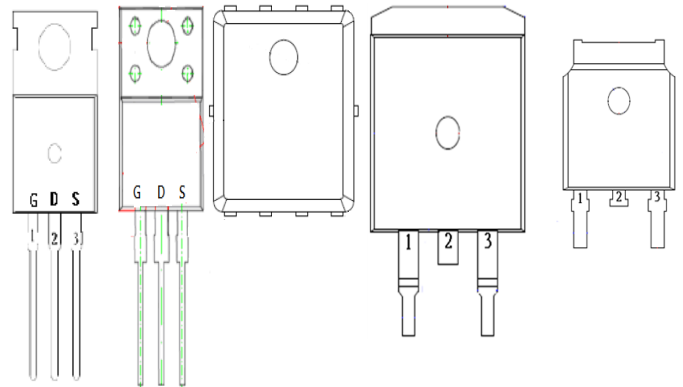
- ◆ 150V/60A, $R_{DS(ON)}=19.5m\Omega@V_{GS}=10V$
- ◆ High density cell design for extremely low $R_{DS(ON)}$
- ◆ Exceptional on-resistance and maximum DC current capability
- ◆ TO-220-3L/TO-220F-3L/TO-263-2L/PPAK5x6-8L package design

APPLICATIONS

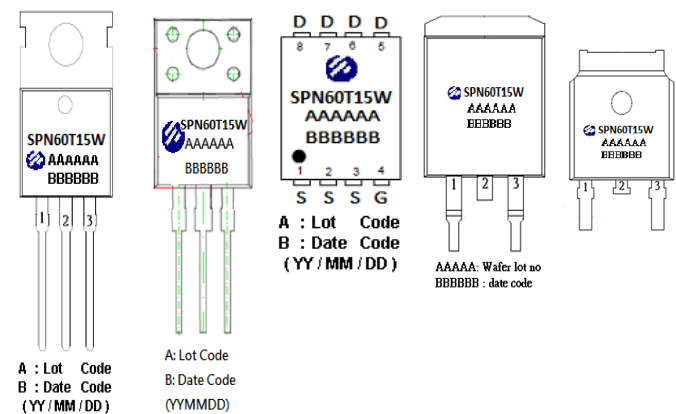
- AC/DC Synchronous Rectifier
- Load Switch
- UPS
- Power Tool
- Motor Control

PIN CONFIGURATION

TO-220 TO-220F PPAK5x6 TO-263-2L TO252-2L



PART MARKING





SPN60T15W

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TO-220/TO-220F/TO-263 PIN DESCRIPTION

Pin	Symbol	Description
1	G	Gate
2	D	Drain
3	S	Source

PPAK5x6 PIN DESCRIPTION

Pin	Symbol	Description
1	S	Source
2	S	Source
3	S	Source
4	G	Gate
5	D	Drain
6	D	Drain
7	D	Drain
8	D	Drain

ORDERING INFORMATION

Part Number	Package	Part Marking
SPN60T15WT220TGB	TO-220-3L	SPN60T15W
SPN60T15WT220FTGB	TO-220F-3L	SPN60T15W
SPN60T15WT262RGB	TO-263-2L	SPN60T15W
SPN60T15WT252RGB	TO-252	SPN60T15W
SPN60T15WDN8RGB	PPAK5x6-8L	SPN60T15W

- ※ SPN60T15WT220TGB : Tube ; Pb – Free ; Halogen – Free
- ※ SPN60T15WT220FTGB : Tube ; Pb – Free ; Halogen - Free
- ※ SPN60T15WT262RGB : Tape&Reel ; Pb – Free ; Halogen - Free
- ※ SPN60T15WT252RGB : Tape&Reel ; Pb – Free ; Halogen - Free
- ※ SPN60T15WDN8RGB : Tape&Reel ; Pb – Free ; Halogen - Free



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ABSOLUTE MAXIMUM RATINGS

(T_j=25°C Unless otherwise noted)

Parameter		Symbol	Typical	Unit
Drain-Source Voltage		V _{DSS}	150	V
Gate –Source Voltage		V _{GSS}	±20	V
Continuous Drain Current(Silicon Limited) (TO-220/TO-220F/TO-263)	T _C =25°C	I _D	60	A
	T _C =100°C		42	
Continuous Drain Current(Silicon Limited) (TO-252)	T _C =25°C	I _D	56	A
	T _C =100°C		40	
Continuous Drain Current(Silicon Limited) (PPAK5x6)	T _C =25°C	I _D	47	A
	T _C =100°C		30	
Pulsed Drain Current	TO-220/TO-220F/TO-263	I _{DM}	180	A
	PPAK5x6		130	
Avalanche Energy, Single Pulse (L=0.4mH, T _C =25°C, I _{AS} =34A)		E _{AS}	231	mJ
Power Dissipation @ T _C =25°C	TO220/TO263	P _D	104	W
	TO-220F		30	
	TO-252		93	
	PPAK5x6		83	
Thermal Resistance-Junction to Case	TO220/TO263	R _{θJC}	1.2	°C/W
	TO-220F		4.2	
	TO-252		1.35	
	PPAK5x6		1.5	
Operating Junction Temperature		T _J	-55/150	°C
Storage Temperature Range		T _{STG}	-55/150	°C



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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 =250uA	150			V
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250uA	2.0	3.0	4.0	
Gate Leakage Current	I _{GSS}	V _{DS} =0V, V _{GS} =±20V			±100	nA
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =150V, V _{GS} =0V T _J =25°C			1	uA
		V _{DS} =150V, V _{GS} =0V T _J =100°C			100	
Drain-Source On-Resistance	R _{DS(on)}	V _{GS} =10V, I _D =20A		16.3	19.5	mΩ
Forward Transconductance	g _{fs}	V _{DS} =5V, I _D =20A		55		S
Gate Resistance	R _G	V _{GS} =0V, V _{DS} =Open, f=1MHz		2.2		Ω
Diode Forward Voltage	V _{SD}	I _S =20A, V _{GS} =0V		0.9	1.2	V
Dynamic						
Total Gate Charge	Q _g	V _{DS} =75V, V _{GS} =10V I _D =20A		25		nC
Gate-Source Charge	Q _{gs}			9		
Gate-Drain Charge	Q _{gd}			3		
Input Capacitance	C _{iss}	V _{DS} =75V, V _{GS} =0V f=1MHz		1960		pF
Output Capacitance	C _{oss}			130		
Reverse Transfer Capacitance	C _{rss}			8		
Turn-On Time	t _{d(on)}	V _{DD} =75V, V _{GS} =10V I _D =20A, R _G =10Ω		9		nS
	t _r			8		
Turn-Off Time	t _{d(off)}			15		
	t _f			9		
Reverse Recovery Time	t _{rr}	V _R =75V, I _F =20A, dI _F /dt=100A/uS		60		nS
Reverse Recovery Charge	Q _{rr}			120		nC



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TYPICAL CHARACTERISTICS

Fig 1. Typical Output Characteristics

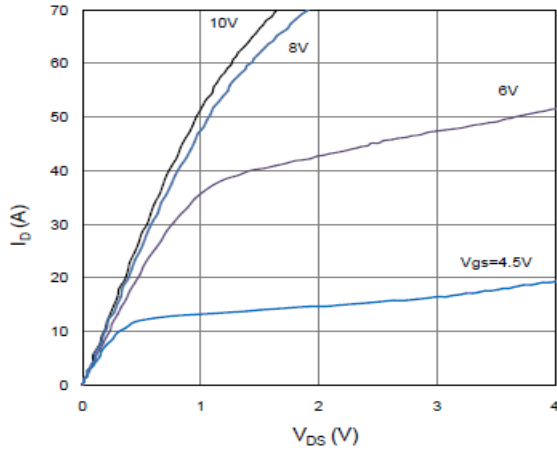


Figure 2. On-Resistance vs. Gate-Source Voltage

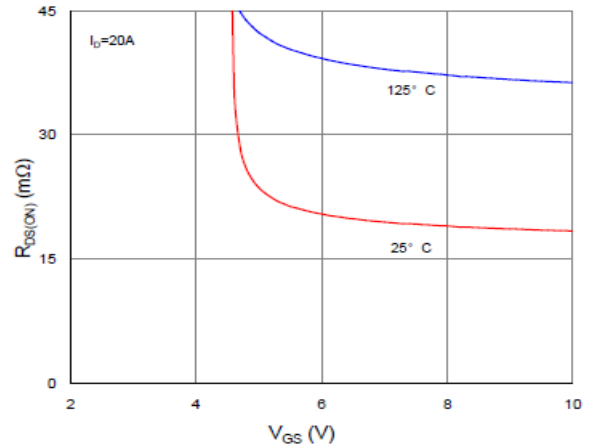


Figure 3. On-Resistance vs. Drain Current and Gate Voltage

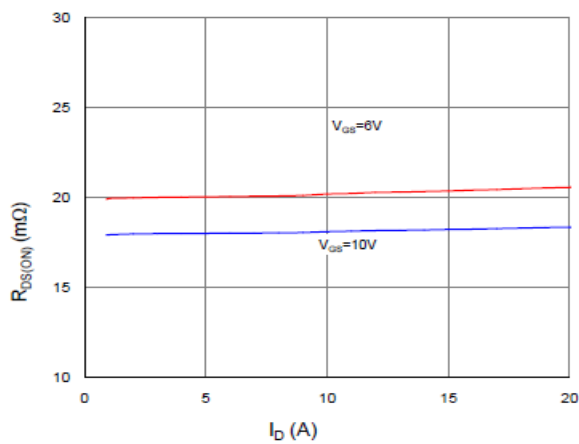


Figure 4. Normalized On-Resistance vs. Junction Temperature

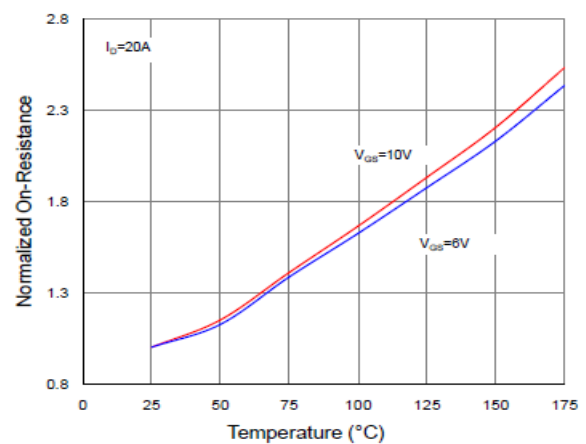


Figure 5. Typical Transfer Characteristics

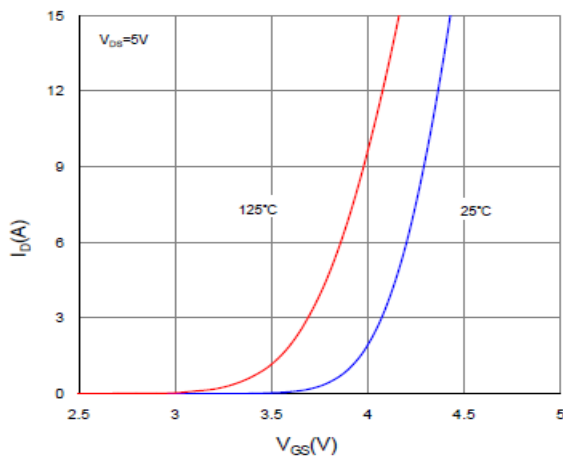
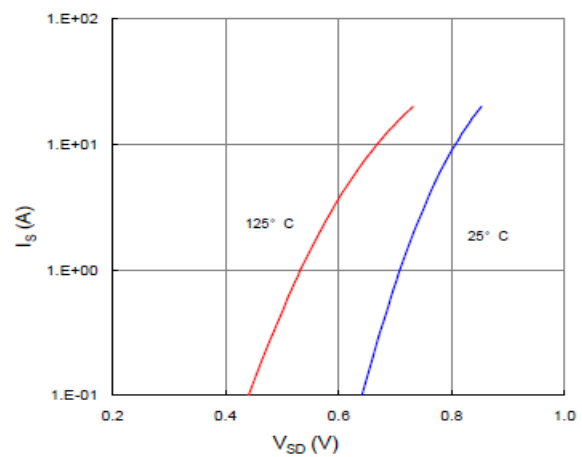


Figure 6. Typical Source-Drain Diode Forward Voltage





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TYPICAL CHARACTERISTICS

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

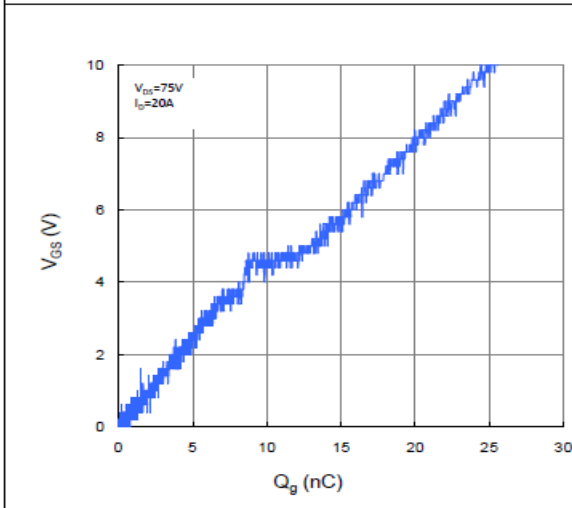


Figure 8. Typical Capacitance vs. Drain-to-Source Voltage

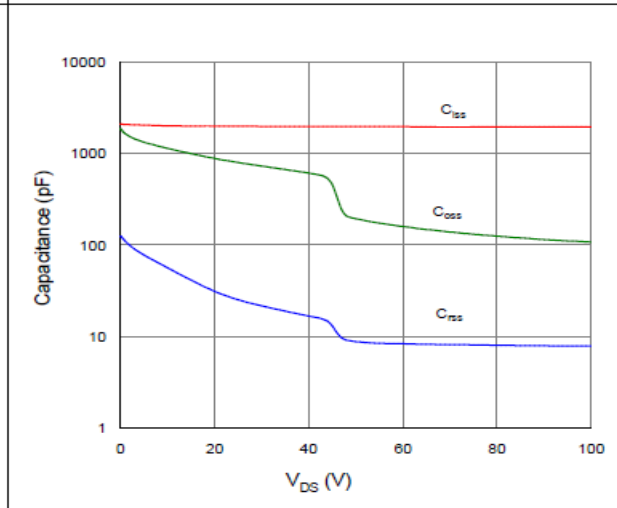


Figure 9. Maximum Safe Operating Area

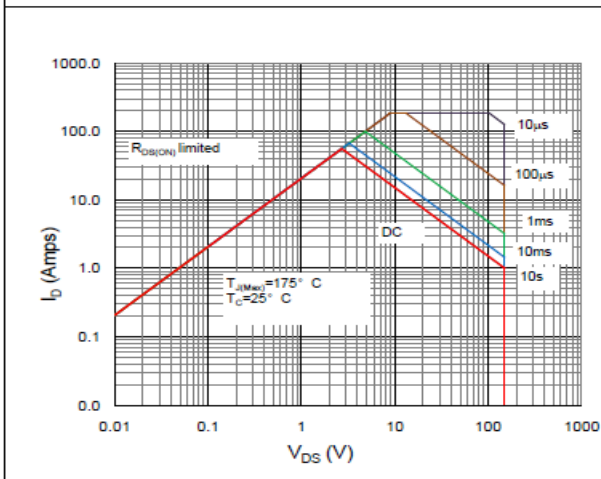


Figure 10. Maximum Drain Current vs. Case Temperature

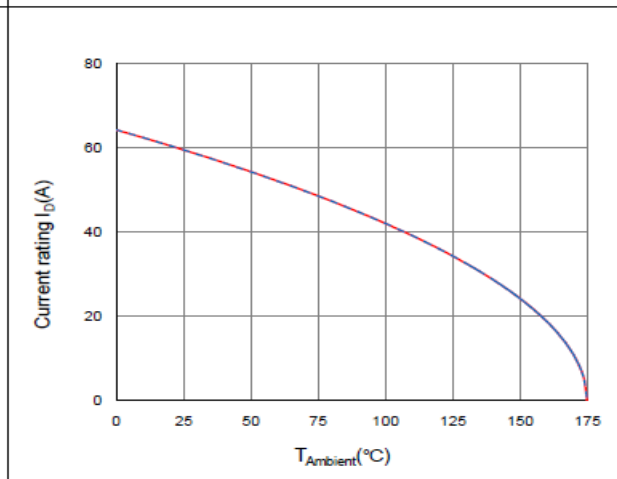
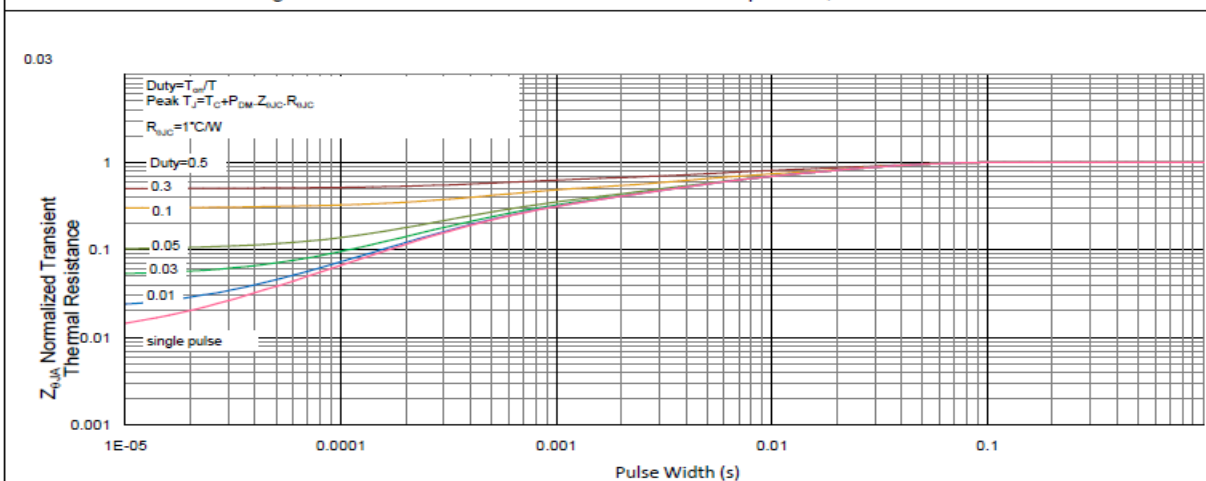


Figure 11. Normalized Maximum Transient Thermal Impedance, Junction-to-Ambient





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