

-30V, -25A P-CHANNEL POWER MOSFET

GENERAL DESCRIPTION

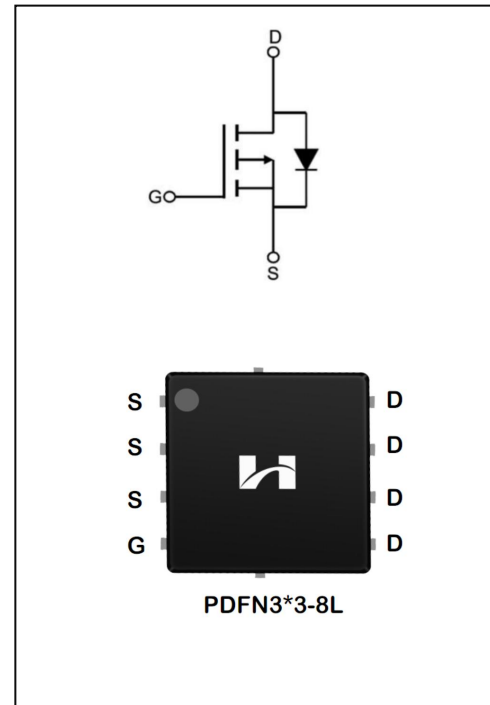
The SFN3002PT5 use advanced trench technology and design to provide excellent $R_{DS(on)}$ with low gate charge. It can be used in a wide variety applications.

Features

- ◆ $V_{DS} = -30V$, $I_D = -25A$
- ◆ $R_{DS(on)}$
TYP: $8.5m\Omega @ V_{GS} = -10V$
MAX: $11m\Omega$

Applications

- ◆ PWM Applications
- ◆ Load Switch
- ◆ Power Management



ORDERING INFORMATION

Part No.	Package	Marking	Material	Packing
SFN3002PT5	PDFN3*3-8L	SFN3002PT5	Pb free	Reel

ABSOLUTE MAXIMUM RATINGS ($T_J=25^{\circ}\text{C}$ unless otherwise noted)

Characteristics	Symbol	Ratings	Unit
Drain-Source Voltage	V_{DS}	-30	V
Gate-Source Voltage	V_{GS}	± 20	V
Drain Current	I_D	$T_C = 25^{\circ}\text{C}$	A
		$T_C = 100^{\circ}\text{C}$	
Drain Current Pulsed (Note 1)	I_{DM}	-79	A
Single Pulsed Avalanche Energy (Note 2)	E_{AS}	225	mJ
Power Dissipation($T_C=25^{\circ}\text{C}$)	P_D	21.5	W
Operation Junction Temperature Range	T_J	$-55\sim+150$	$^{\circ}\text{C}$
Storage Temperature Range	T_{stg}	$-55\sim+150$	$^{\circ}\text{C}$
Maximum lead temperature for soldering purposes, 1/8" from case for 5 seconds	TL	300	$^{\circ}\text{C}$

THERMAL CHARACTERISTICS

Characteristics	Symbol	MAX	Unit
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	5.8	$^{\circ}\text{C/W}$
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	75	$^{\circ}\text{C/W}$

ELECTRICAL CHARACTERISTICS

Characteristics	Symbol	Test conditions	Min.	Typ.	Max.	Unit
Off Characteristics						
Drain -Source Breakdown Voltage	B _V DSS	V _{GS} =0V, I _D =-250μA	-30	--	--	V
Drain-Source Leakage Current	I _{DSS}	V _{DS} =-30V, V _{GS} =0V	--	--	1.0	uA
Gate-Source Leakage Current	I _{GSS}	V _{GS} =20V, V _{DS} =0V	--	--	100	nA
Gate-Source Leakage Current	I _{GSS}	V _{GS} =-20V, V _{DS} =0V	--	--	-100	
On Characteristics						
Gate Threshold Voltage	V _{GS(th)}	V _{GS} = V _{DS} , I _D =-250μA	-1.0	-1.5	-2.0	V
Static Drain- Source On State Resistance	R _{DS(on)}	V _{GS} =-10V, I _D =-15A	--	8.5	11	mΩ
	R _{DS(on)}	V _{GS} =-4.5V, I _D =-10A	--	12	15	
Dynamic Characteristics						
Gate Resistance	R _g	V _{GS} =0V; f=1.0MHZ	--	5.5	--	Ω
Input Capacitance	C _{iss}	V _{DS} =-25V V _{GS} =0 f=1.0MHZ	--	2447	--	pF
Output Capacitance	C _{oss}		--	253	--	
Reverse Transfer Capacitance	C _{rss}		--	277	--	
Switching Characteristics						
Turn-on Delay Time	t _{d(on)}	V _{DD} =-15V, V _{GS} =-10V R _G =2.5Ω, I _D =-20.0A (Note 2.3)	--	15	--	ns
Turn-on Rise Time	t _r		--	21	--	
Turn-off Delay Time	t _{d(off)}		--	94	--	
Turn-off Fall Time	t _f		--	66	--	

Total Gate Charge	Q_g	$V_{DS}=-15V, I_D=-20.0A$ $V_{GS}=-10V$ (Note 2.3)	--	30.2	--	nc
Gate-Source Charge	Q_{gs}		--	5.4	--	
Gate-Drain Charge	Q_{gd}		--	7.5	--	

SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

Characteristics	Symbol	Test conditions	Min.	Typ.	Max.	Unit
Continuous Source Current	I_S	Integral Reverse P-N Junction Diode in the MOSFET	--	--	-25	A
Pulsed Source Current	I_{SM}		--	--	-78	
Diode Forward Voltage	V_{SD}	$I_S=-20A, V_{GS}=0V$	--	--	1.4	V

- 1.Pulse width limited by maximum junction temperature
- 2.Pulse Test: Pulse width $\leq 300\mu s$, Duty cycle $\leq 2\%$
- 3.Essentially independent of operating temperature
- 4.EAS codition: $T=25^\circ C, V_{DD}=-20V, V_G=-10V, L=0.5mH, R_G=25\Omega, I_{AS}=-17A$

Typical Performance Characteristics

Figure 1: Output Characteristics

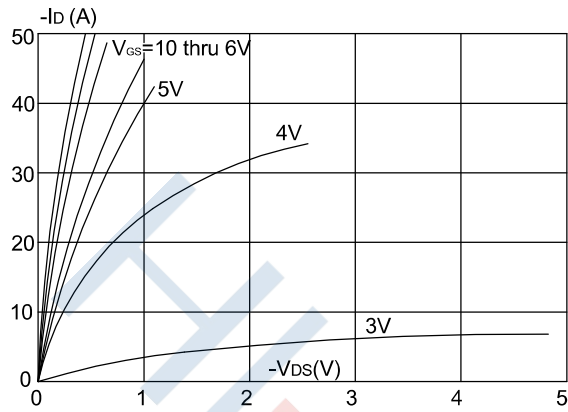


Figure 2: Typical Transfer Characteristics

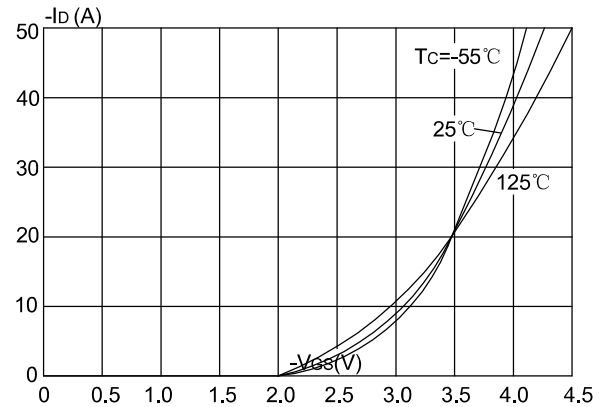


Figure 3: On-resistance vs. Drain Current

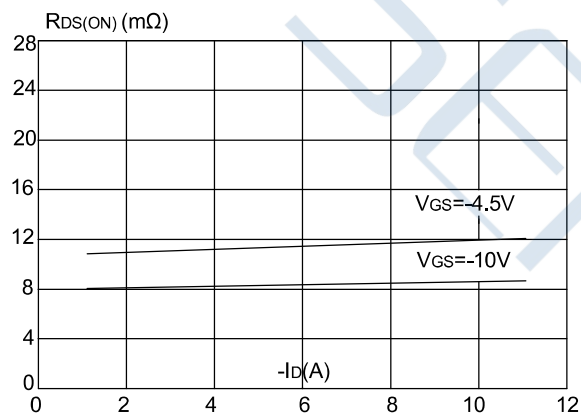


Figure 4: Body Diode Characteristics

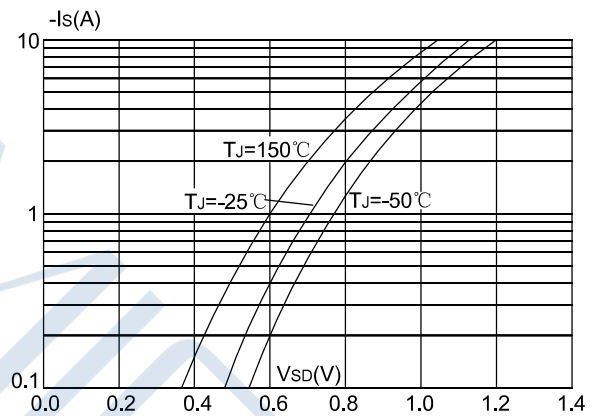


Figure 5: Gate Charge Characteristics

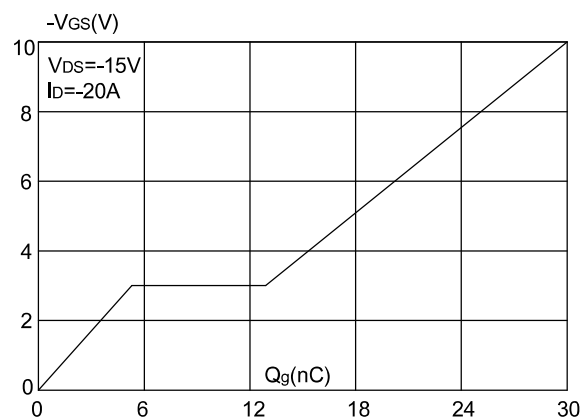
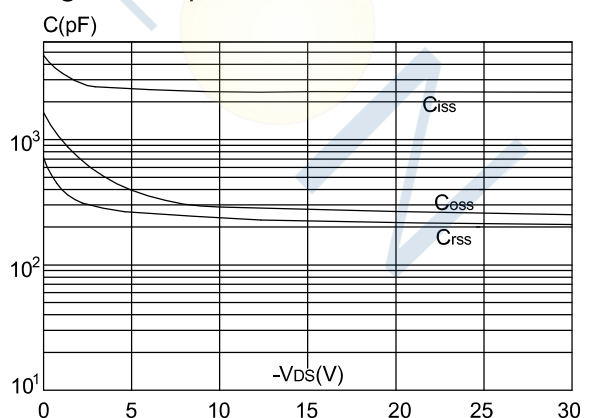


Figure 6: Capacitance Characteristics



Typical Performance Characteristics

Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

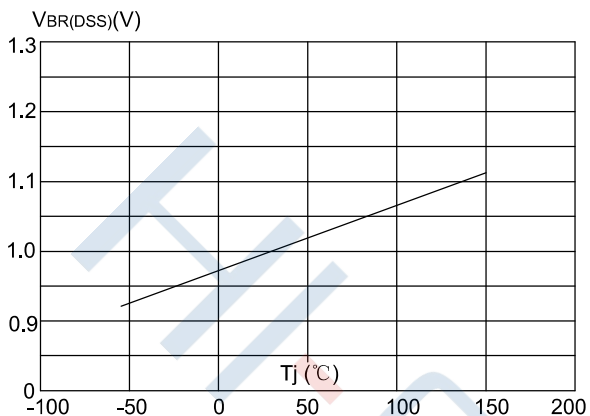


Figure 8: Normalized on Resistance vs. Junction Temperature

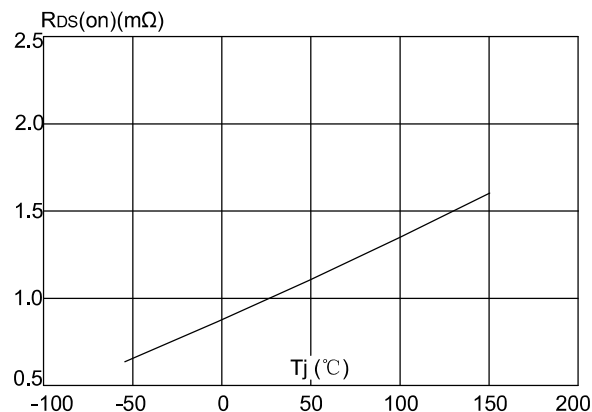


Figure 9: Maximum Safe Operating Area

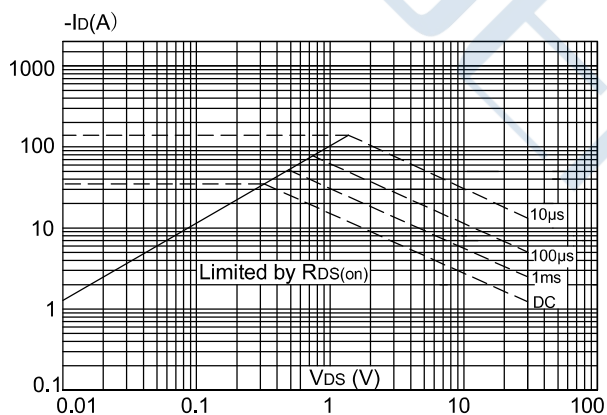


Figure 10: Maximum Continuous Drain Current vs. Case Temperature

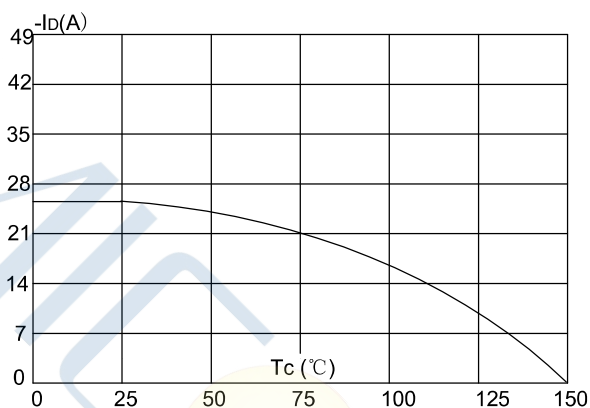
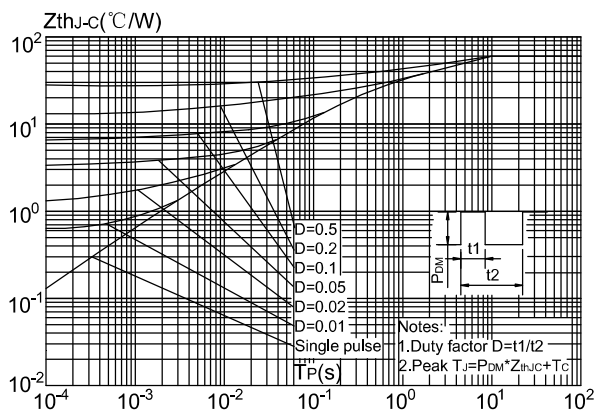
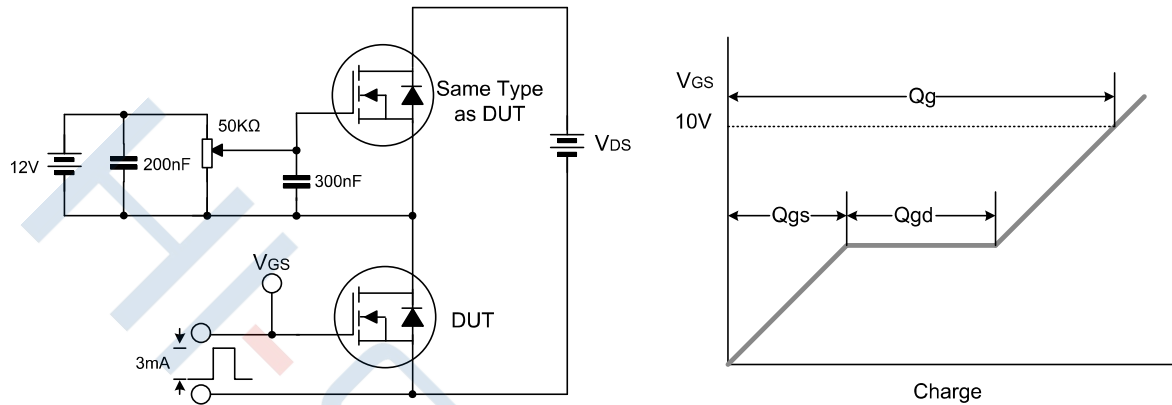


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

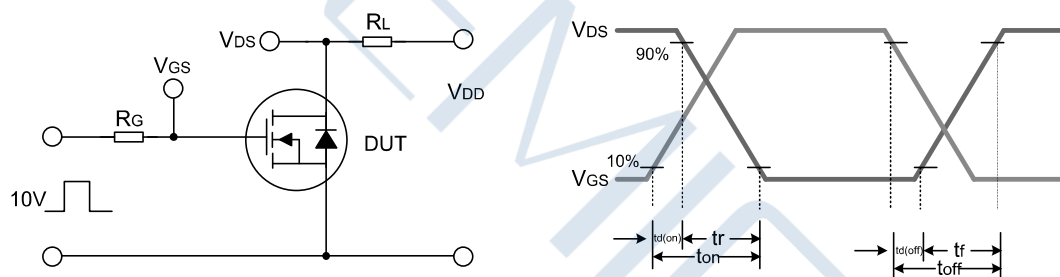


Test Circuit

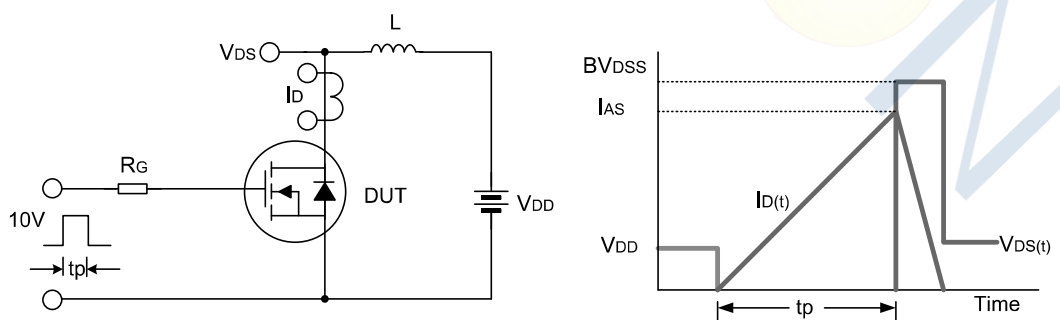
Gate Charge Test Circuit & Waveform



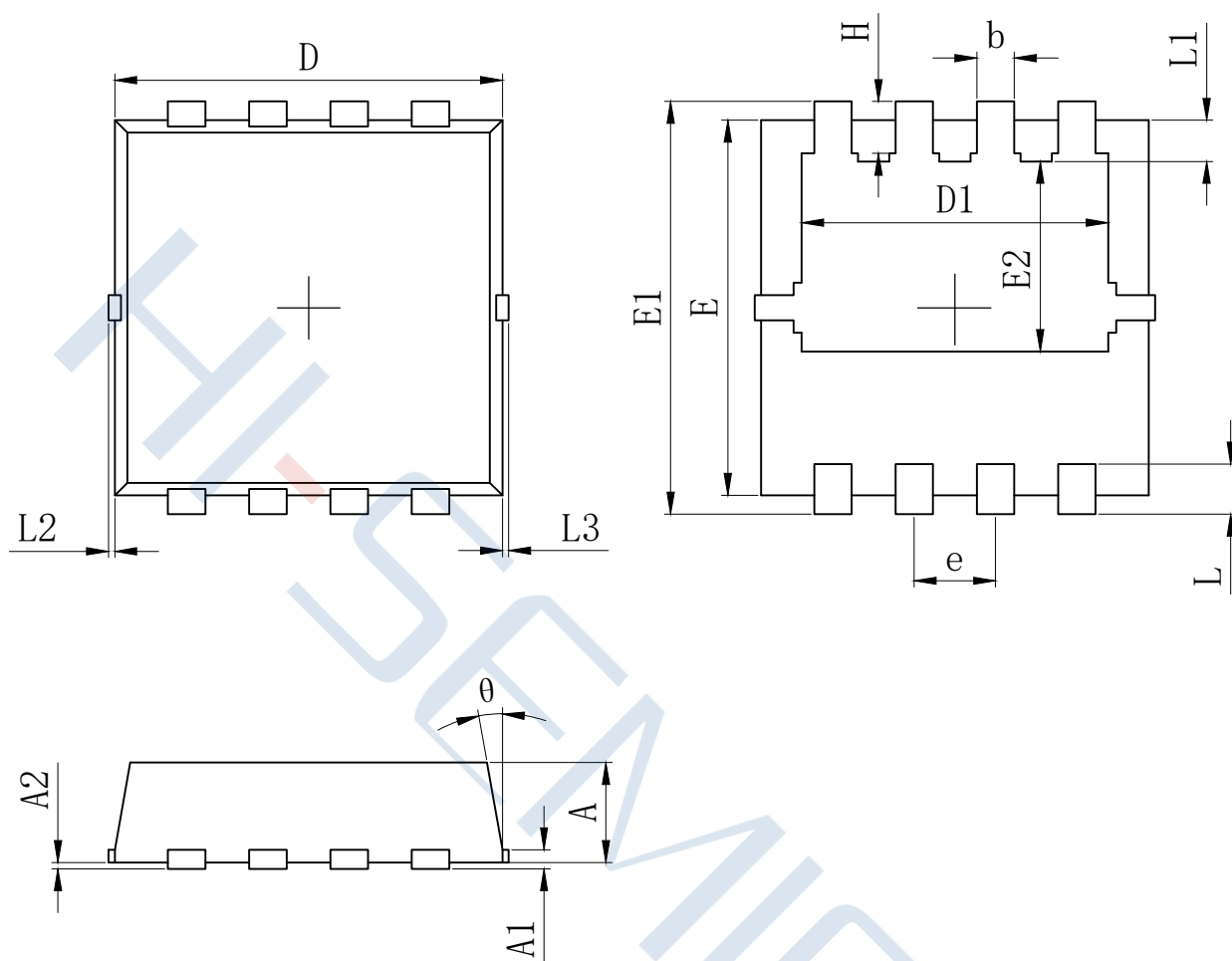
Resistive Switching Test Circuit & Waveform



Unclamped Inductive Switching Test Circuit & Waveform



Package Dimensions of PDFN3*3-8L



SYMBOL	MILLIMETER		
	MIN	Typ.	MAX
A	0.700	0.800	0.900
A1	0.152 REF.		
A2	0~0.05		
D	3.000	3.100	3.200
D1	2.300	2.450	2.600
E	2.900	3.000	3.100
E1	3.150	3.300	3.450
E2	1.320	1.520	1.720
b	0.200	0.300	0.400
e	0.550	0.650	0.750
L	0.300	0.400	0.500
L1	0.180	0.330	0.480
L2	0~0.100		
L3	0~0.100		
H	0.315	0.415	0.515
θ	8°	10°	12°

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