

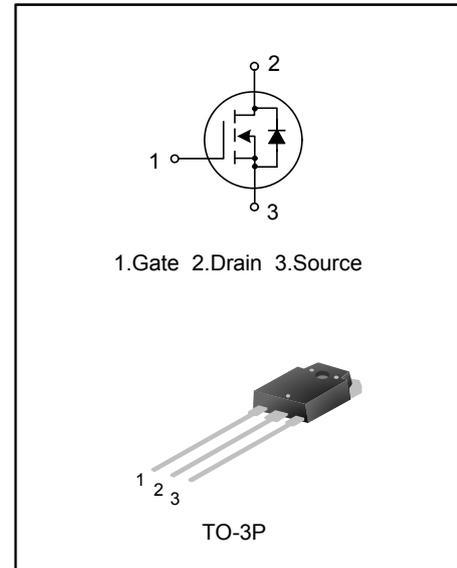
47A, 600V DP MOS POWER TRANSISTOR

GENERAL DESCRIPTION

SVS47N60PN is an N-channel enhancement mode high voltage power MOSFETs produced using Silan's DP MOS technology. It achieves low conduction loss and switching losses. It leads the design engineers to their power converters with high efficiency, high power density, and superior thermal behavior. Furthermore, it's universal applicable, i.e., suitable for hard and soft switching topologies.

FEATURES

- ◆ 47A, 600V, $R_{DS(on)(typ.)}=55m\Omega@V_{GS}=10V$
- ◆ New revolutionary high voltage technology
- ◆ Ultra low gate charge
- ◆ Periodic avalanche rated
- ◆ Extreme dv/dt rated
- ◆ High peak current capability



ORDERING INFORMATION

Part No.	Package	Marking	Hazardous Substance Control	Packing
SVS47N60PN	TO-3P	47N60	Pb free	Tube

ABSOLUTE MAXIMUM RATINGS (TC=25°C unless otherwise noted)

Characteristics	Symbol	Ratings	Unit
Drain-Source Voltage	V_{DS}	600	V
Gate-Source Voltage	V_{GS}	± 30	V
Drain Current	I_D	$T_C=25^\circ C$	47
		$T_C=100^\circ C$	30
Drain Current Pulsed	I_{DM}	188	A
Power Dissipation($T_C=25^\circ C$) -Derate above 25°C	P_D	415	W
		3.32	W/°C
Single Pulsed Avalanche Energy (Note 1)	E_{AS}	2103	mJ
Operation Junction Temperature Range	T_J	-55~+150	°C
Storage Temperature Range	T_{stg}	-55~+150	°C

THERMAL CHARACTERISTICS

Characteristics	Symbol	Ratings	Unit
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	0.3	$^{\circ}C/W$
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	50	$^{\circ}C/W$

ELECTRICAL CHARACTERISTICS ($T_C=25^{\circ}C$ unless otherwise noted)

Characteristics	Symbol	Test conditions	Min.	Typ.	Max.	Unit
Drain -Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	600	--	--	V
Drain-Source Leakage Current	I_{DSS}	$V_{DS}=600V, V_{GS}=0V$	--	--	1.0	μA
Gate-Source Leakage Current	I_{GSS}	$V_{GS}=\pm 30V, V_{DS}=0V$	--	--	± 100	nA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{GS}=V_{DS}, I_D=250\mu A$	2.0	--	4.0	V
Static Drain-Source On State Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=23.5A$	--	55	70	m Ω
Input Capacitance	C_{iss}	$V_{DS}=100V, V_{GS}=0V,$ $f=1.0MHz$	--	3902	--	pF
Output Capacitance	C_{oss}		--	237	--	
Reverse Transfer Capacitance	C_{rss}		--	3.5	--	
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=380V, V_{GS}=10V,$ $R_G=1.8\Omega, I_D=47A$ (Note 2,3)	--	20	--	ns
Turn-on Rise Time	t_r		--	47	--	
Turn-off Delay Time	$t_{d(off)}$		--	87	--	
Turn-off Fall Time	t_f		--	52	--	
Total Gate Charge	Q_g	$V_{DD}=480V, V_{GS}=10V,$ $I_D=47A$ (Note 2,3)	--	112	--	nC
Gate-Source Charge	Q_{gs}		--	24	--	
Gate-Drain Charge	Q_{gd}		--	50	--	

SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

Characteristics	Symbol	Test conditions	Min.	Typ.	Max.	Unit
Continuous Source Current	I_S	Integral Reverse P-N Junction	--	--	48	A
Pulsed Source Current	I_{SM}	Diode in the MOSFET	--	--	188	
Diode Forward Voltage	V_{SD}	$I_S=47A, V_{GS}=0V$	--	--	1.4	V
Reverse Recovery Time	T_{rr}	$I_S=47A, V_{GS}=0V,$	--	443	--	ns
Reverse Recovery Charge	Q_{rr}	$di_f/dt=100A/\mu s$ (Note 2)	--	11	--	μC

Notes:

1. $L=30mH, I_{AS}=11A, V_{DD}=100V, R_G=25\Omega,$ starting $T_J=25^{\circ}C;$
2. Pulse Test: Pulse width $\leq 300\mu s,$ Duty cycle $\leq 2\%;$
3. Essentially independent of operating temperature.

TYPICAL CHARACTERISTICS

Figure 1. On-Region Characteristics

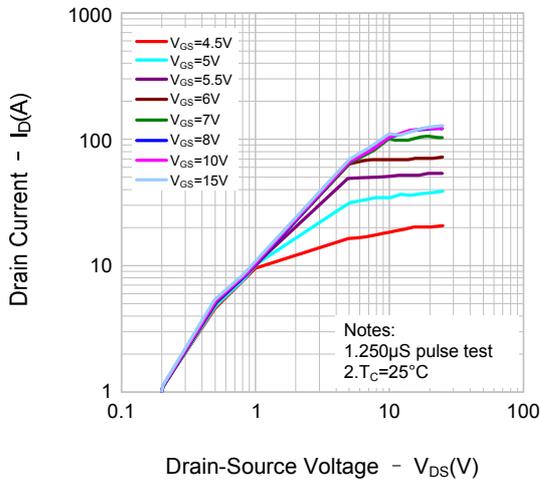


Figure 2. Transfer Characteristics

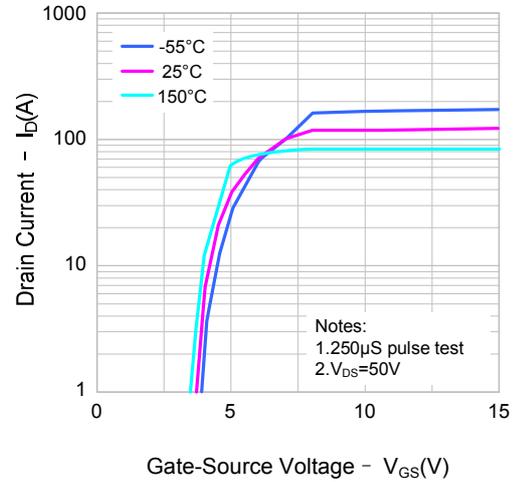


Figure 3. On-Resistance Variation vs. Drain Current

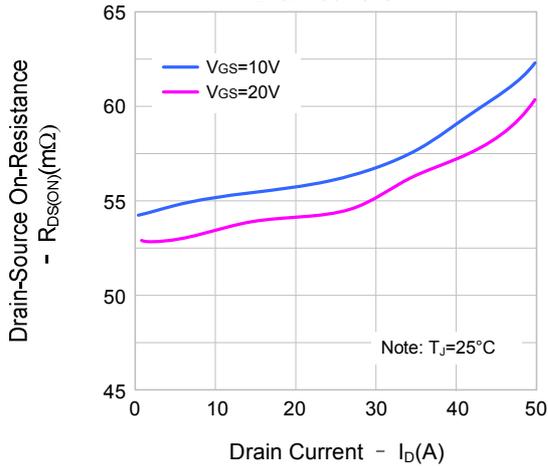


Figure 4. Body Diode Forward Voltage Variation vs. Source Current and Temperature

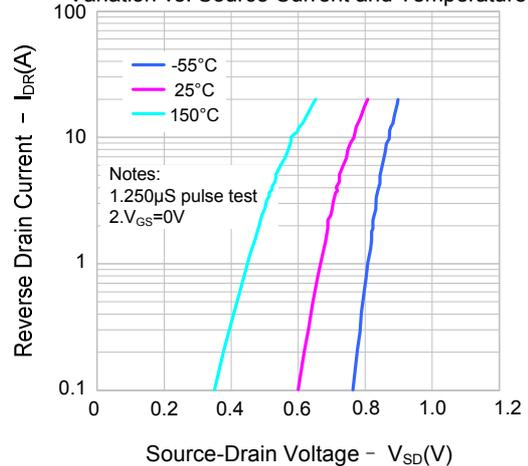


Figure 5. Capacitance Characteristics

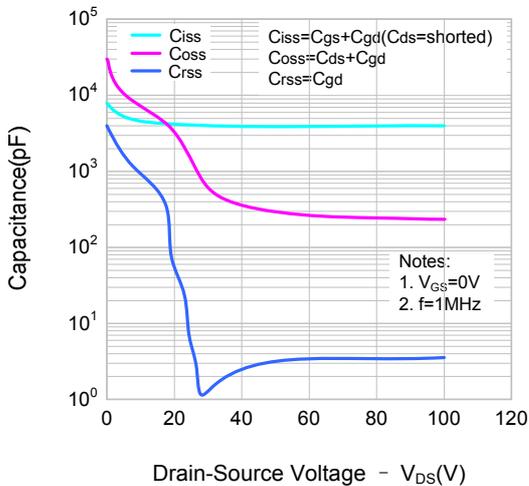
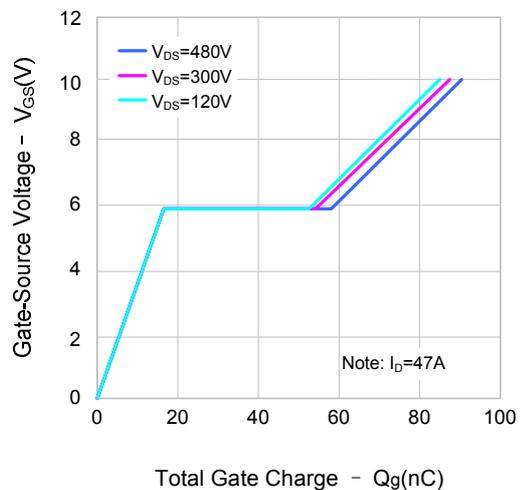


Figure 6. Gate Charge Characteristics



TYPICAL CHARACTERISTICS(continued)

Figure 7. Breakdown Voltage Variation vs. Temperature

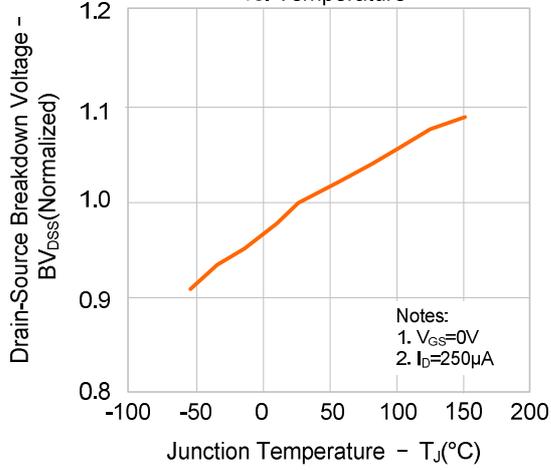


Figure 8. On-resistance Variation vs. Temperature

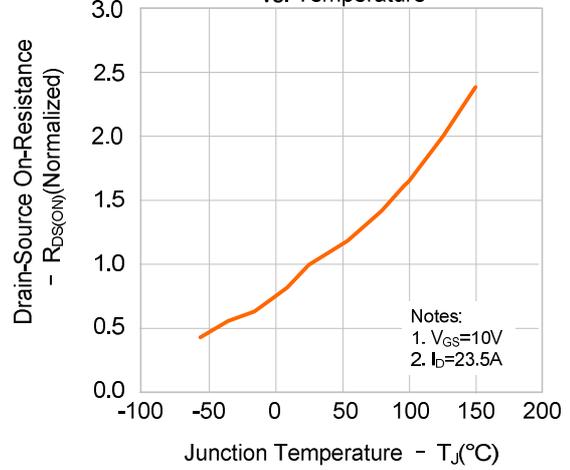


Figure 9. Max. Safe Operating Area

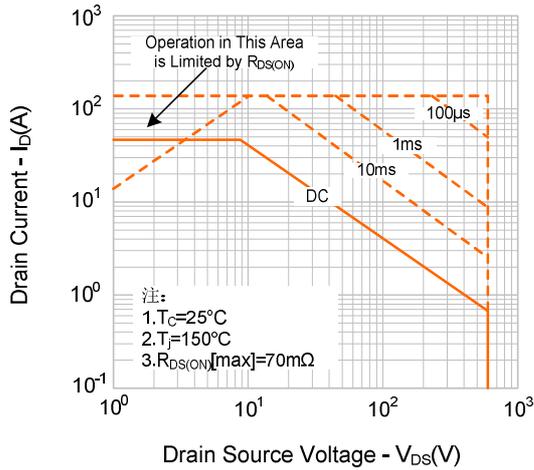
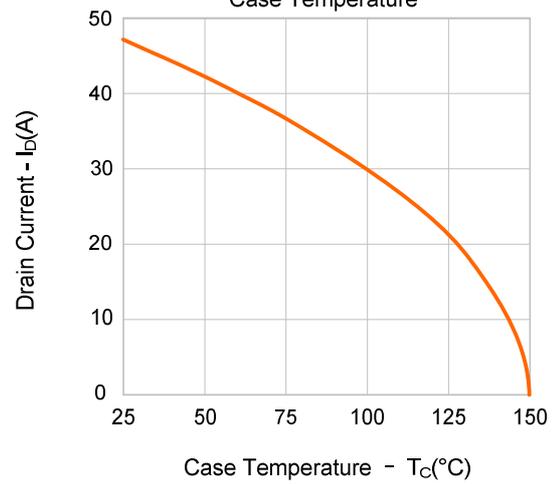
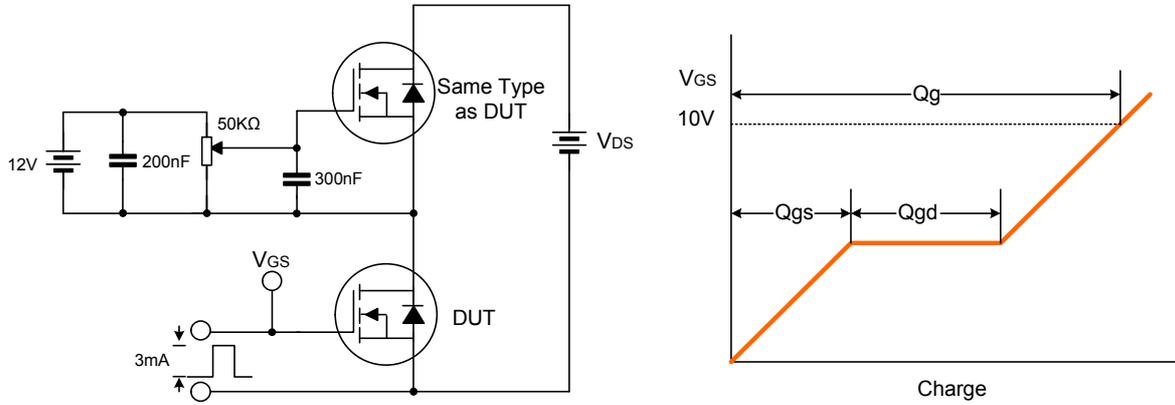


Figure 10. Maximum Drain Current vs. Case Temperature

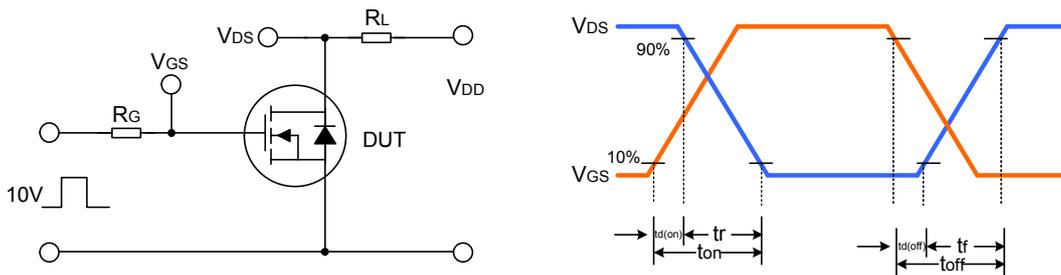


TYPICAL TEST CIRCUIT

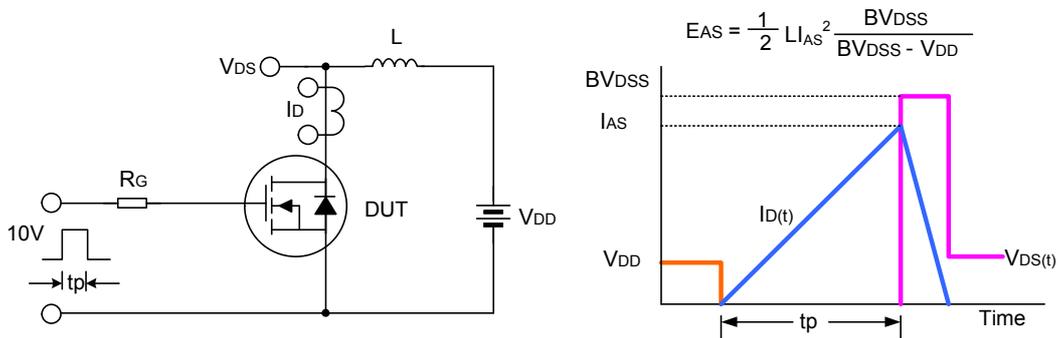
Gate Charge Test Circuit & Waveform



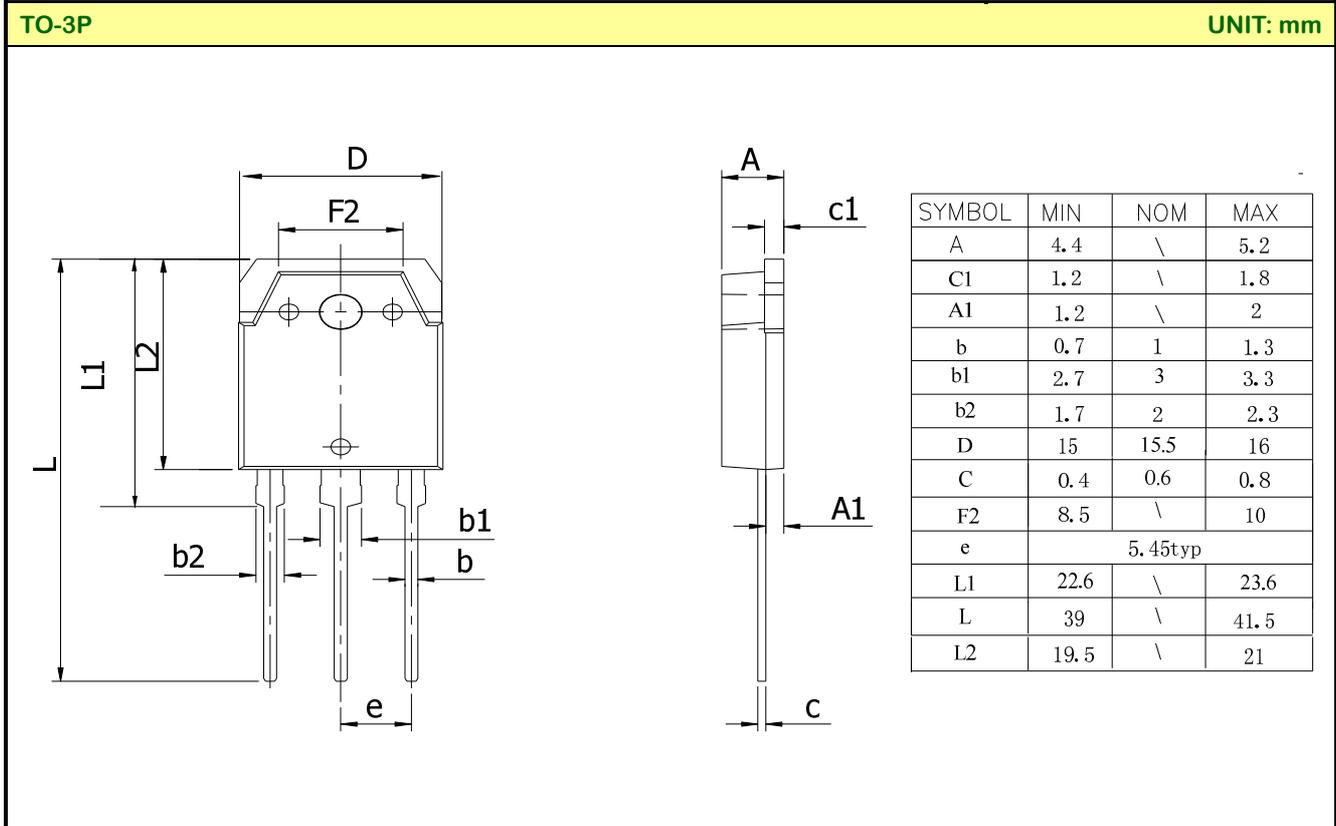
Resistive Switching Test Circuit & Waveform



Unclamped Inductive Switching Test Circuit & Waveform



PACKAGE OUTLINE



Disclaimer :

- Silan reserves the right to make changes to the information herein for the improvement of the design and performance without prior notice! Customers should obtain the latest relevant information before placing orders and should verify that such information is complete and current.
- All semiconductor products malfunction or fail with some probability under special conditions. When using Silan products in system design or complete machine manufacturing, it is the responsibility of the buyer to comply with the safety standards strictly and take essential measures to avoid situations in which a malfunction or failure of such Silan products could cause loss of body injury or damage to property.
- Silan will supply the best possible product for customers!

Part No.: SVS47N60PN Document Type: Datasheet
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Rev.: 1.6

Revision History:

1. Update Fig5
-

Rev.: 1.5

Revision History:

1. Modify Electrical characteristics
-

Rev.: 1.4

Revision History:

1. Delete the package of TO-3PN
-

Rev.: 1.3

Revision History:

1. Modify the figure 6
-

Rev.: 1.2

Revision History:

1. Modify the value of Qrr
-

Rev.: 1.1

Revision History:

1. Add the package of TO-3PN
-

Rev.: 1.0

Revision History:

1. First release
-