

SVC6H890N-DIE

Power MOSFET, N-Channel, 80 V, Die

Features

- 175°C Operating Temperature Rated
- AEC-Q101 Qualified

V_{DSS} (Max)	80 V
R_{DS(on)} TYP	0.41 mΩ
Die Size	63 mm ²
Die Thickness	200 μm

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

Symbol	Rating	Value	Unit
V _{DSS}	Drain-to-Source Voltage	80	V
V _{GS}	Gate-to-Source Voltage	±20	V
I _D	Continuous Drain Current R _{θJC} T _A = 25°C (Note 1)	620	A
I _{DM}	Pulsed Drain Current (T _A = 25°C, t _p = 10 μs) (Note 2)	2660	A
T _{J(max)} , T _{STG}	Operating Junction and Storage Temperature	-55 to +175	°C

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

1. Current may be limited by source bond wire; calculated with an R_{θJC} = 0.3°C/W.
2. Calculated with an R_{θJC} = 0.016°C/W



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ORDERING INFORMATION

SVC6H890N

Consult die distributor or factory before ordering to verify long-term availability of these die products.

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ELECTRICAL CHARACTERISTICS (T_C = 25°C unless otherwise noted)

Symbol	Parameter	Test Condition	Min	Typ	Max	Unit
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OFF CHARACTERISTICS

V _{(BR)DSS}	Drain-source Breakdown Voltage	V _{GS} = 0 V, I _D = 1 mA	80			V
V _{(BR)DSS} / T _J	Drain-to-Source Breakdown Voltage Temperature Coefficient			114		mV/°C
I _{DSS}	Drain-to-Source Leakage Current	V _{GS} = 0 V, V _{DS} = 80 V, T _J = 25°C			20	μA
		V _{GS} = 0 V, V _{DS} = 80 V, T _J = 125°C			615	
I _{GSS}	Gate-to-Source Leakage Current	V _{DS} = 0 V, V _{GS} = +20 V, -16 V			±100	nA

ON CHARACTERISTICS

V _{GS(TH)}	Gate Threshold Voltage	V _{GS} = V _{DS} , I _D = 1.4 mA	2.3		3.7	V
V _{GS(TH)} /T _J	Gate Threshold Voltage Temperature Coefficient			-7.75		mV/°C
R _{DS(on)}	Drain-to-Source On Resistance (Note 3)	V _{GS} = 10 V, I _D = 50 A		0.41	0.53	mΩ

CHARGES AND CAPACITANCES (Note 4)

C _{iss}	Input Capacitance	V _{GS} = 0 V, f = 1 MHz, V _{DS} = 48 V		23	31	nF
C _{oss}	Output Capacitance			3.1	4.2	
C _{rss}	Reverse Transfer Capacitance			0.175	0.350	
Q _{G(TOT)}	Total Gate Charge	V _{DS} = 64 V, I _D = 50 A V _{GS} = 10 V		373	485	nC
Q _{GS}	Gate-to-Source Charge			104	147	
Q _{GD}	Gate-to-Drain Charge			80	160	
V _{GP}	Plateau Voltage			4.4		V

DRAIN-SOURCE DIODE CHARACTERISTICS

V _{SD}	Forward Diode Voltage	V _{GS} = 0 V, I _S = 50 A		0.79		V
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Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

3. Maximum defined on historical data; not subject to production test.

4. Defined by design based on limited amount of data for reference purposes only; not subject to production test.

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TYPICAL CHARACTERISTICS

Figures 1 - 5 are from Simulation

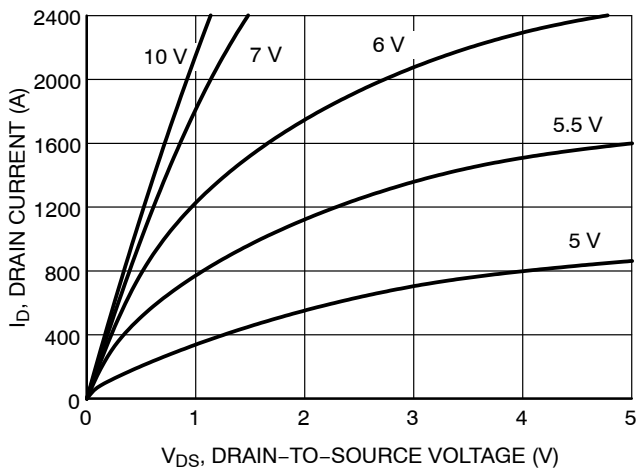


Figure 1. On-Region Characteristics

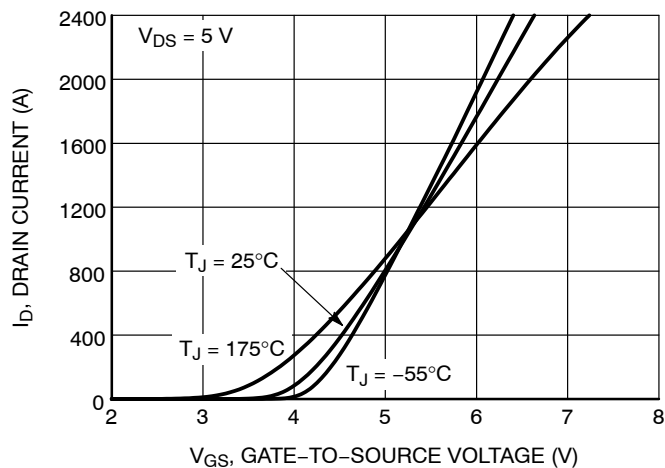


Figure 2. Transfer Characteristics

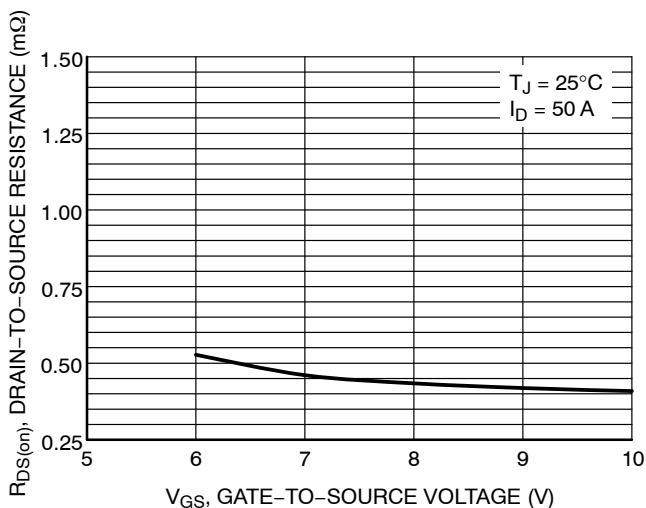


Figure 3. On-Resistance vs. Gate-to-Source Voltage

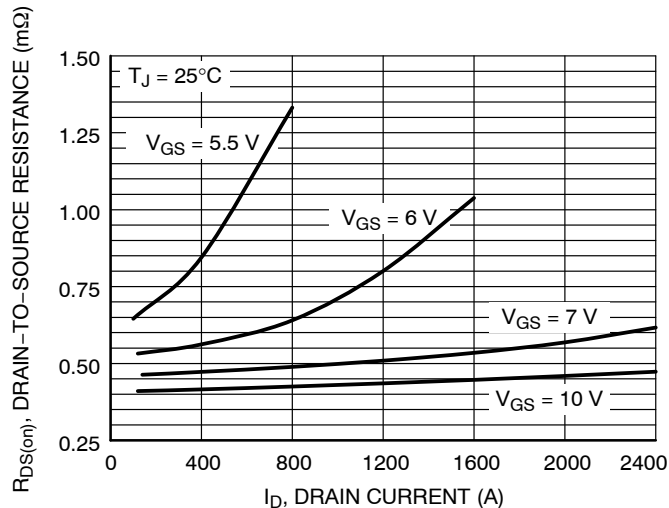


Figure 4. On-Resistance vs. Drain Current and Gate Voltage

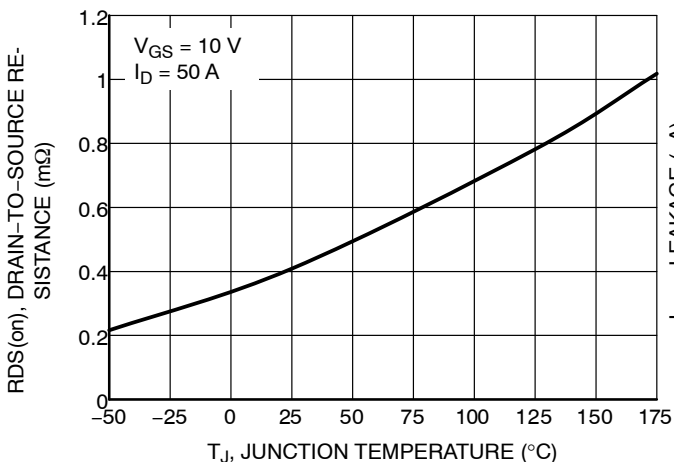


Figure 5. Drain-to-Source Resistance Variation with Temperature

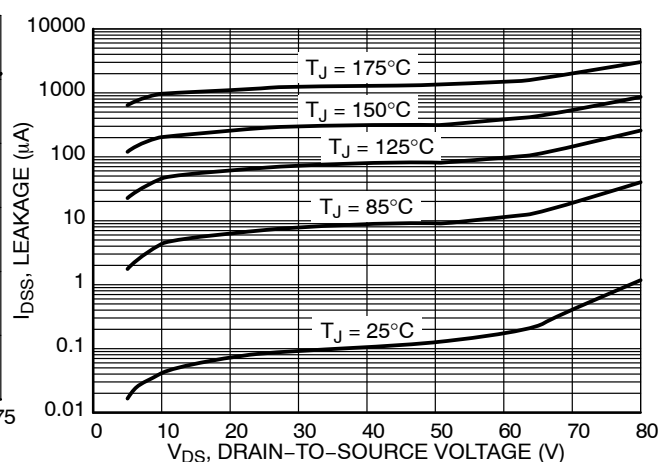


Figure 6. Drain-to-Source Leakage Current vs. Voltage

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TYPICAL CHARACTERISTICS

Figures 7, 10, 11 are from Simulation

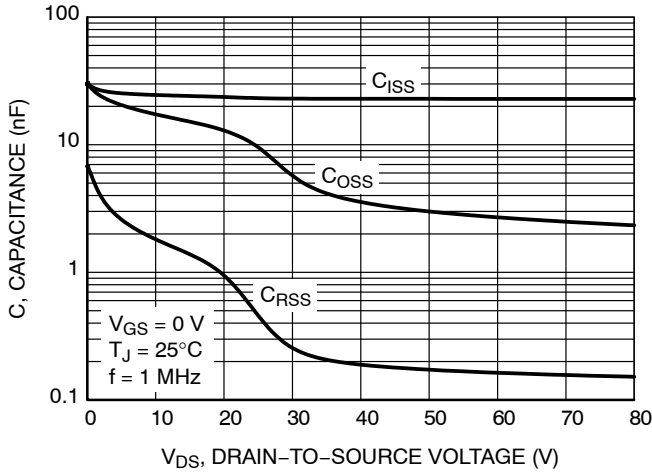


Figure 7. Capacitance Variation

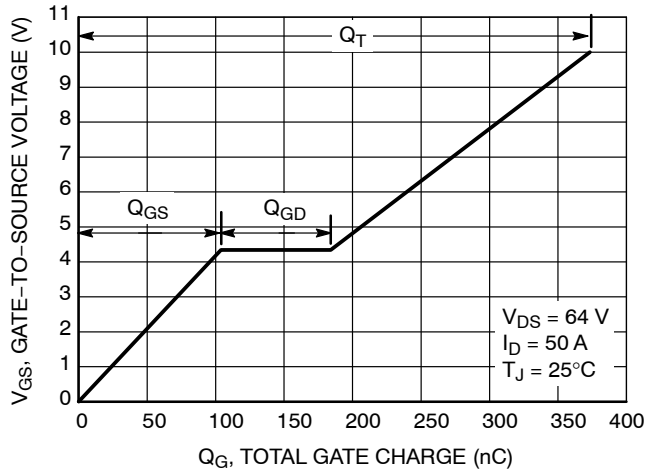


Figure 8. Gate-to-Source Voltage vs. Total Charge

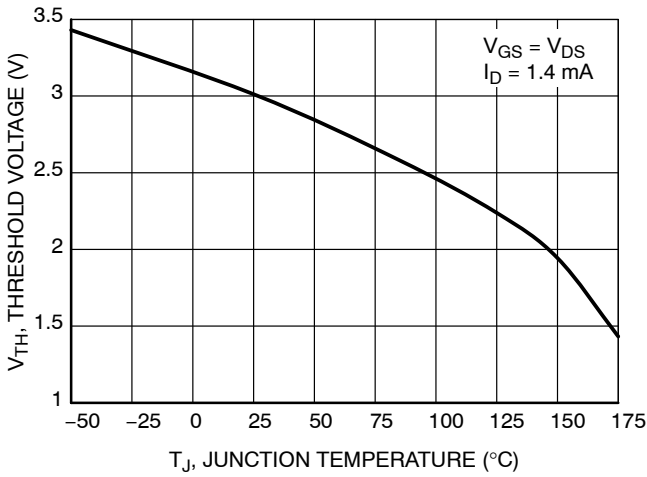


Figure 9. Threshold Voltage Variation with Temperature

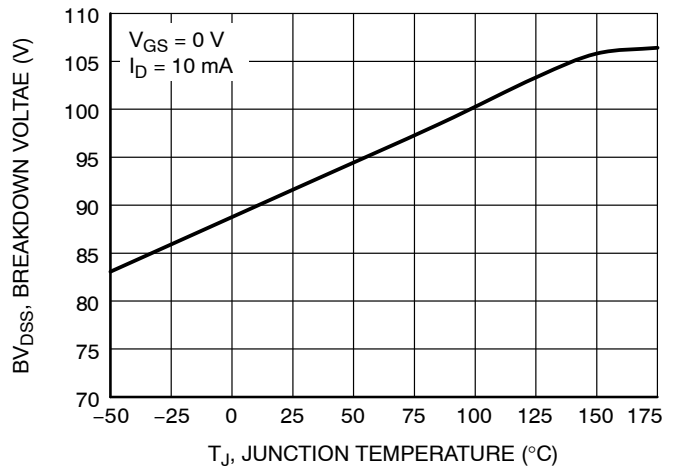


Figure 10. Breakdown Voltage Variation with Temperature

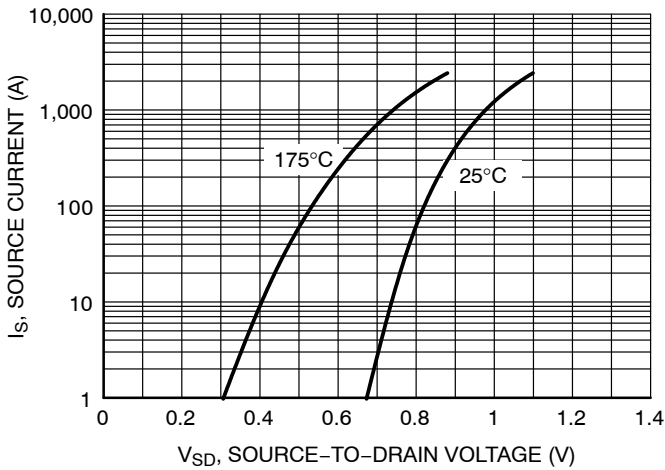


Figure 11. Diode Forward Voltage vs Current

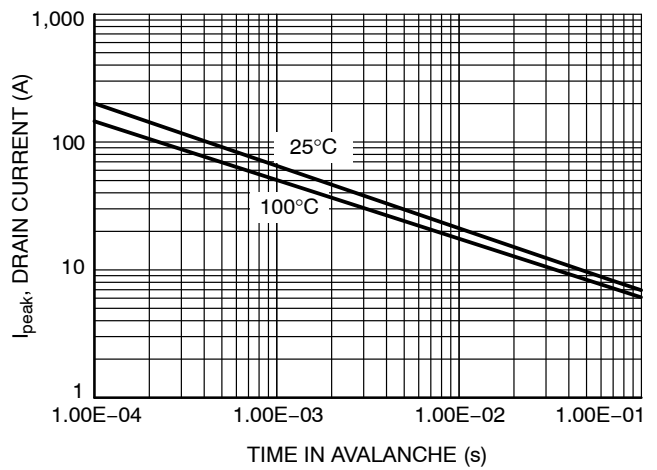


Figure 12. Maximum Drain Current vs Time in Avalanche

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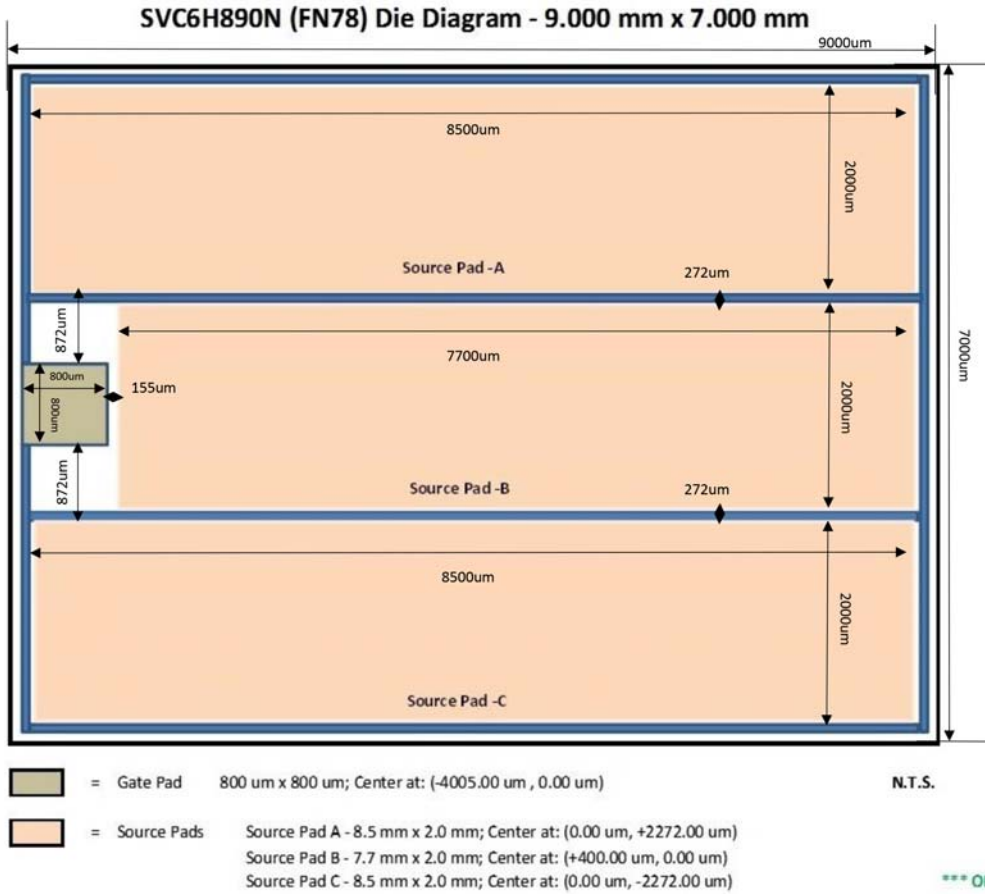
DIE CONSTRUCTION PARAMETERS

Table 1. DIE CONSTRUCTION PARAMETERS

Parameter	Value
Die Thickness	200 μm
Saw Street Width	80 μm
Passivation Front Side	Polymide
Metallization Front Side	AlCu 4 μm
Metallization Back Side	TiNiAg 1.15/2/8 k \AA (Evaporation)

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DIE LAYOUT



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