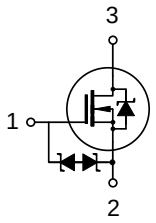
30mA, 600V N-CHANNEL DEPLETION-MODE FIELD-EFFECT TRANSISTOR

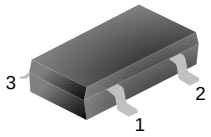
GENERAL DESCRIPTION

SVD501DEAG is an N-channel depletion-mode power MOS field effect transistor which is produced using Silan VDMOS technology. The improved process and cell structure have been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode.

It's widely used in electronic ballasts and low power SMPS.



1.Gate 2.Source 3.Drain



SOT-23

FEATURES

- 30mA, 600V
- Depletion-mode (Normally-on)
- Improved ESD ability
- Fast switching
- Improved dv/dt capability

ORDERING INFORMATION

Part No.	Package	Marking	Hazardous substance control	Packing Type
SVD501DEAGTR	SOT-23	501DE	Halogen free	Tape & Reel

ABSOLUTE MAXIMUM RATINGS (T_C=25°C UNLESS OTHERWISE NOTED)

Characteristics		Symbol	Rating	Unit
Drain-Source Voltage		V_{DS}	600	V
Gate-Source Voltage		V_{GS}	±20	V
Drain Current	T_C=25°C	I_D	0.03	A
	T_C=70°C		0.024	
Drain Current Pulsed		I_{DM}	0.12	A
Power Dissipation(T_C=25°C)		P_D	0.8	W
- Derate above 25°C			0.007	W/°C
Operation Junction Temperature Range		T_J	-55～+150	°C
Storage Temperature Range		T_{stg}	-55～+150	°C

THERMAL CHARACTERISTICS

Characteristics	Symbol	Rating	Unit
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	150	°C/W
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	250	°C/W

ELECTRICAL CHARACTERISTICS (T_C=25°C UNLESS OTHERWISE NOTED)

Characteristics	Symbol	Test conditions	Min.	Typ.	Max.	Unit
Drain -Source Breakdown Voltage	BV_{DSS}	V_{GS}=-5V, I_D=250μA	600	--	--	V
Drain-Source Leakage Current	$I_{D(off)}$	V_{DS}=600V, V_{GS}=-5V	--	--	0.1	μA
Gate-Source Leakage Current	I_{GSS}	V_{GS}=±20V, V_{DS}=0V	--	--	±10	μA
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=3V, I_D=8μA	-2.7	--	-1.0	V
On-state drain current	I_{DSS}	V_{GS}=0V, V_{DS}=25V	12	--	--	mA
Static Drain- Source On State Resistance	$R_{DS(on)}$	V_{GS}=0V, I_D=3mA	--	310	500	Ω
		V_{GS}=10V, I_D=16mA	--	330	500	
Input Capacitance	C_{iss}	V_{DS}=25V, V_{GS}=-5V, f=1.0MHz	--	10	--	pF
Output Capacitance	C_{oss}		--	2.9	--	
Reverse Transfer Capacitance	C_{rss}		--	0.12	--	
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=300V, I_D=0.01A	--	12	--	ns
Turn-on Rise Time	t_r	V_{GS}=-5~7V	--	60	--	
Turn-off Delay Time	$t_{d(off)}$	R_G=6Ω	--	25	--	
Turn-off Fall Time	t_f	(Note 1,2)	--	100	--	
Total Gate Charge	Q_g	V_{DS}=400V, I_D=0.01A	--	2.8	--	nC
Gate-Source Charge	Q_{gs}	V_{GS}=-5V~7V	--	0.55	--	
Gate-Drain Charge	Q_{gd}	(Note 1,2)	--	1.6	--	

SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

Characteristics	Symbol	Test conditions	Min.	Typ.	Max.	Unit
Continuous Source Current	I_S	Integral Reverse P-N Junction	--	--	0.03	A
Pulsed Source Current	I_{SM}	Diode in the MOSFET	--	--	0.12	
Diode Forward Voltage	V_{SD}	I_F=16mA, V_{GS}=-5V	--	--	1.2	V
Reverse Recovery Time	T_{rr}	I_F=0.01A, V_R=300V,	--	--	367	ns
Reverse Recovery Charge	Q_{rr}	dI_F/dt=100A/μs (Note 2)	--	--	963	nC

Notes:

1. Pulse Test: Pulse width ≤ulse Test: cycle Tes
2. Essentially independent of operating temperature.

TYPICAL CHARACTERISTICS

Figure 1. On-Region Characteristics

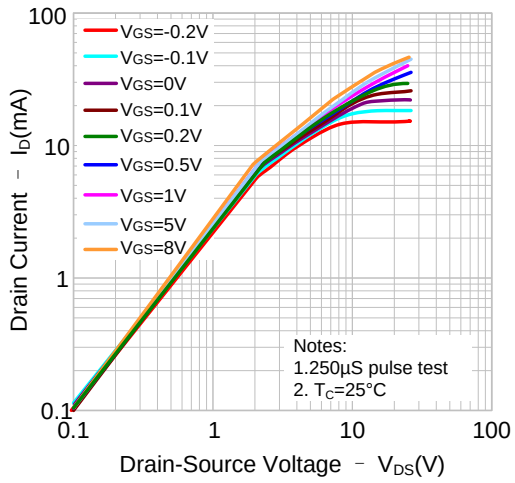


Figure 2. Transfer Characteristics

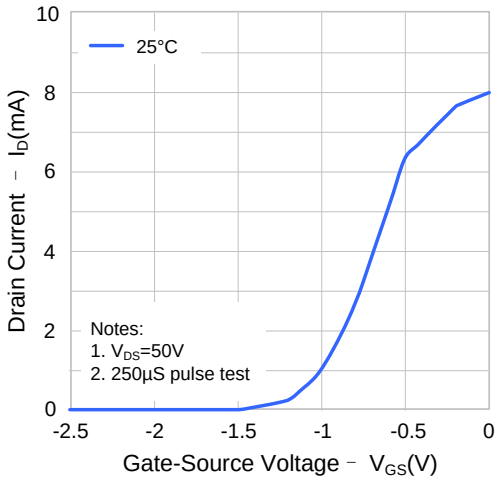


Figure 3. On-Resitance Variation vs. Drain Current and Gate Voltage

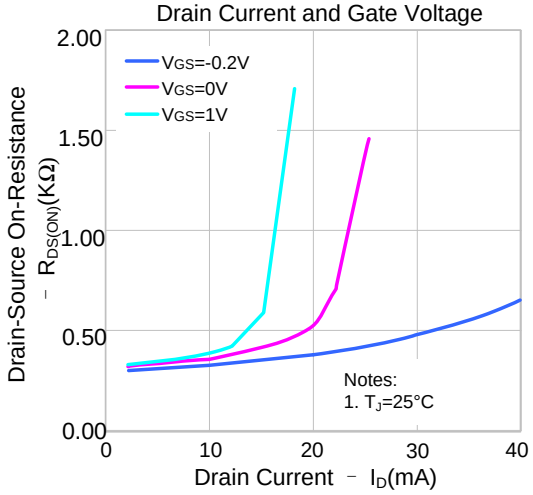


Figure 4. Forward characteristics of reverse diode

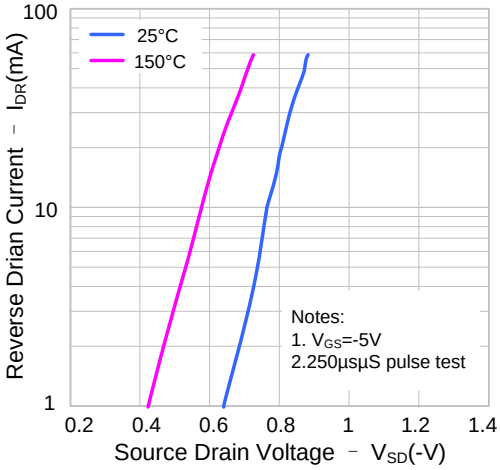


Figure 5. Capacitance Characteristics

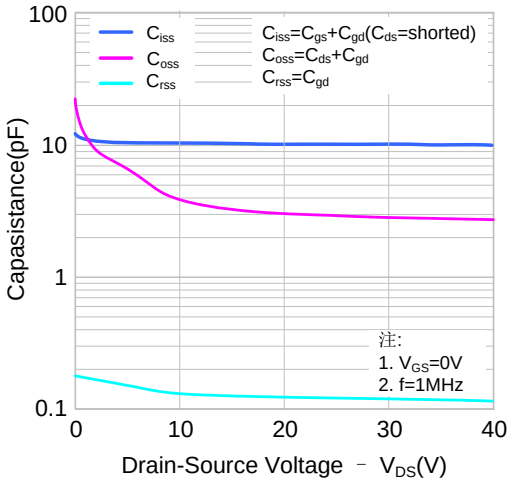
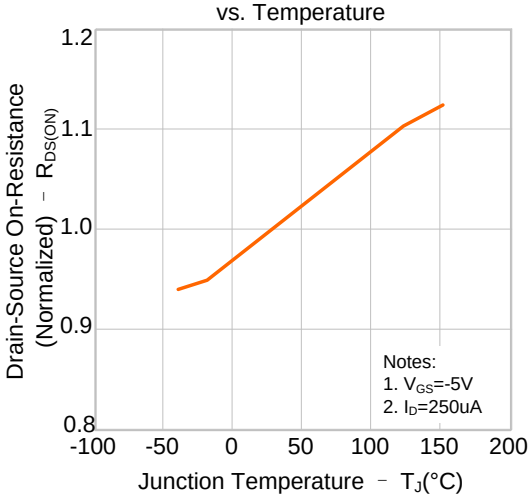


Figure 6. Drain-Source On-Resistance vs. Temperature



TYPITAL CHARACTERISTICS (CONTINUED)

Figure 7. Breakdown Voltage vs. Temperature

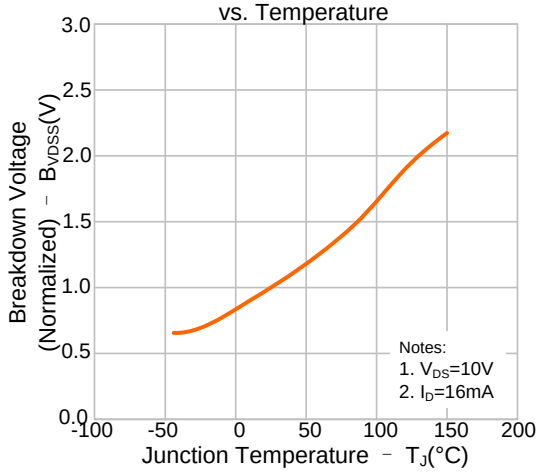


Figure 8. Gate Threshold Voltage vs.Temperature

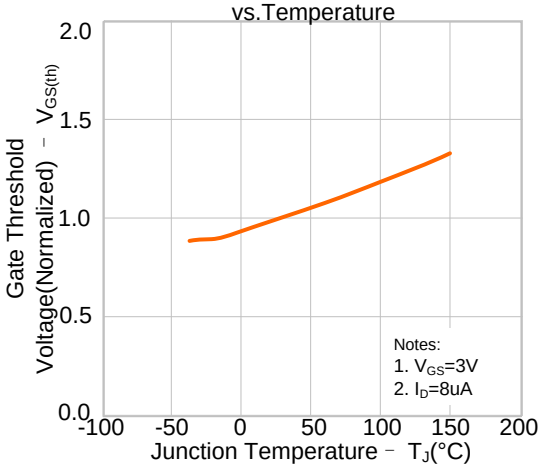


Figure 9. Power Dissipation vs. Case Temperature

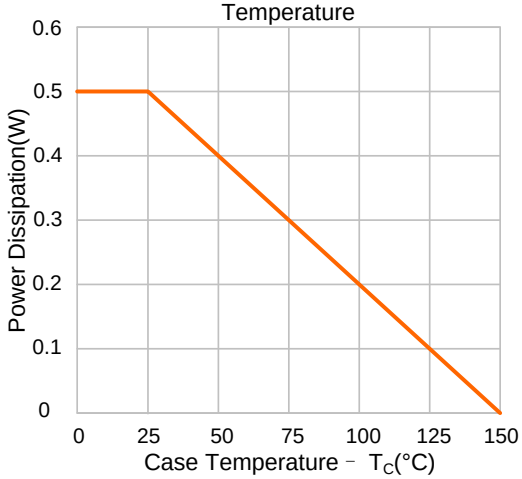


Figure 10. Max. Safe Operating Area

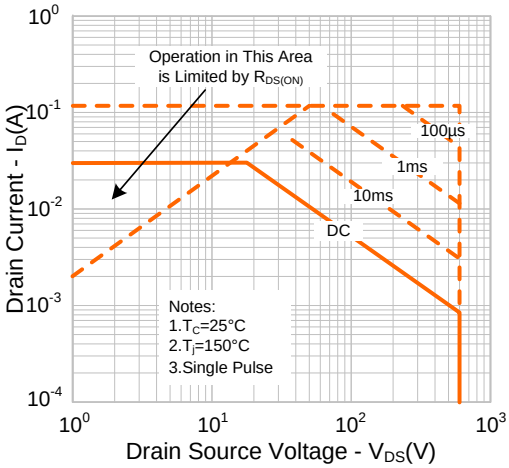


Figure 11. Maximum Drain Current vs. Case Temperature

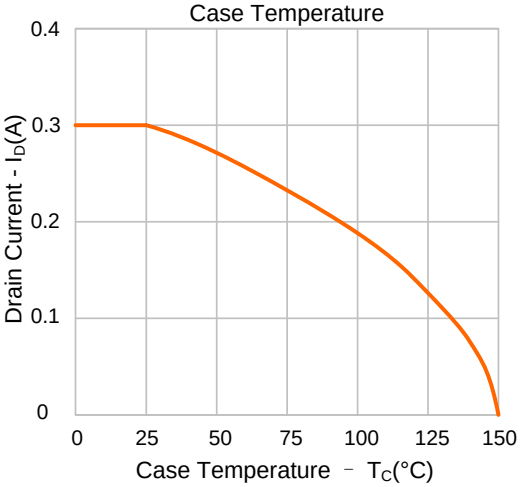
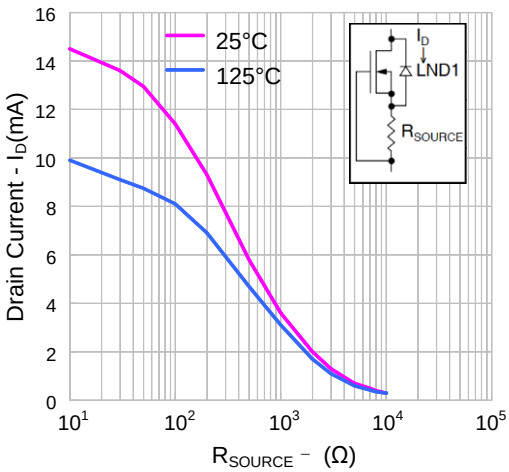
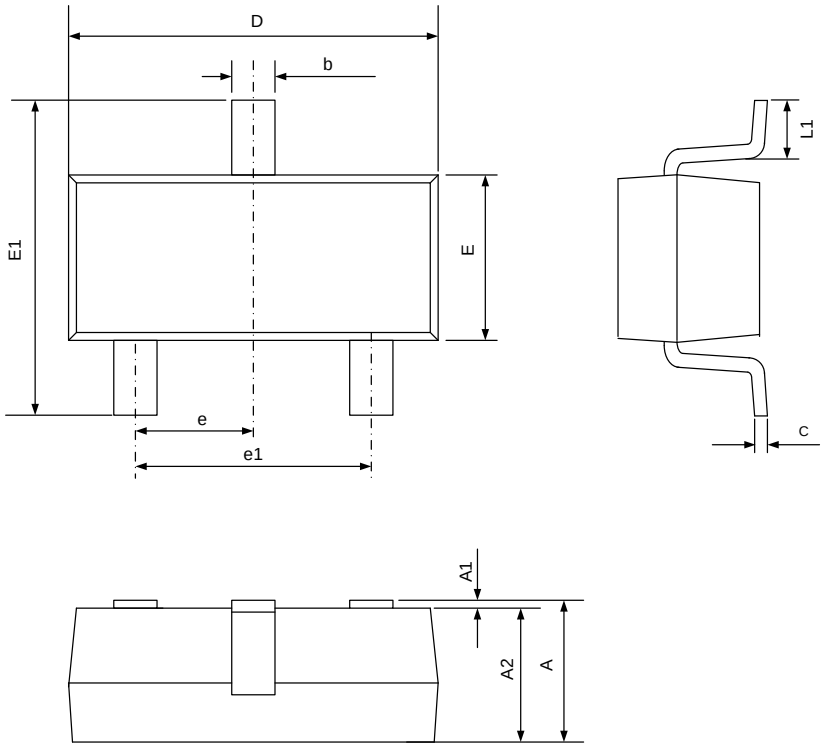


Figure 12. I_D vs. R_{SOURCE}



PACKAGE OUTLINE

SOT-23 **UNIT: mm**



SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A		1.3MAX	
A1	0	—	0.10
A2	0.80	1.00	1.20
b	0.35	0.40	0.55
c	0.08	—	0.20
D	2.70	2.90	3.10
E	1.10	1.30	1.50
E1	2.10	2.40	2.70
e		0.95BSC	
e1	1.70	1.90	2.10
L1	0.20	0.40	0.60

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Rev.: 1.7

Revision History:

1. Modify individual parameters
2. Add the figure 12

Rev.: 1.6

Revision History:

1. Modify individual parameters
2. Modify TYPITAL CHARACTERISTICS

Rev.: 1.5

Revision History:

1. Modify Tc of Drain Current
2. Modify BV_{DSS}

Rev.: 1.4

Revision History:

1. Modify the curve

Rev.: 1.3

Revision History:

1. Modify Typical Characteristics

Rev.: 1.2

Revision History:

1. Modify “ELECTRICAL CHARACTERISTICS”

Rev.: 1.1

Revision History:

1. Update figure 3 and figure 7

Rev.: 1.0

Revision History:

1. Initial release

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