

294A, 25V N-CHANNEL MOSFET

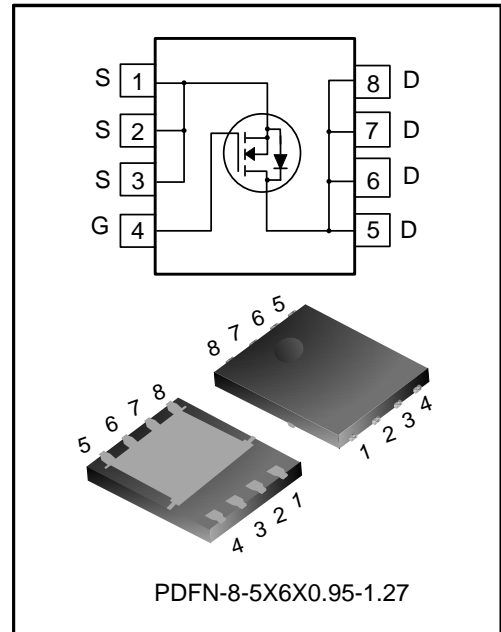
DESCRIPTION

SVGP02R58NL5 is an N-channel enhancement mode power MOS field effect transistor which is produced using Silan's LVMOS technology. The improved process and cell structure have been especially tailored to minimize on-state resistance, provide superior switching performance.

This device is widely used in power management for UPS and Inverter Systems.

FEATURES

- ◆ 294A, 25V, $R_{DS(on)(typ.)}=0.48m\Omega@V_{GS}=10V$
- ◆ Low gate charge
- ◆ Low C_{rss}
- ◆ Fast switching
- ◆ Extreme dv/dt rated
- ◆ 100% avalanche tested
- ◆ Pb-free lead plating
- ◆ RoHS compliant



KEY PERFORMANCE PARAMETERS

Characteristics	Ratings	Unit
V_{DS}	25	V
$V_{GS(th)}$	1.0~2.1	V
$R_{DS(on),max}$	0.58	$m\Omega$
I_D	294	A
$Q_{g,typ}$	134	nC

ORDERING INFORMATION

Part No.	Package	Marking	Hazardous Substance Control	Packing Type
SVGP02R58NL5TR	PDFN-8-5X6X0.95-1.27	P02R58N	Halogen free	Tape&reel

ABSOLUTE MAXIMUM RATINGS (UNLESS OTHERWISE NOTED, $T_J=25^{\circ}\text{C}$)

Characteristics	Symbol	Test conditions	Ratings			Unit
			Min.	Typ.	Max.	
Drain-source Voltage	V_{DS}	--	25	--	--	V
Gate-source Voltage	V_{GS}	--	-12	--	16	V
Drain Current (Note 1)	I_D	$T_C=25^{\circ}\text{C}$	--	--	294	A
		$T_C=100^{\circ}\text{C}$	--	--	186	
Drain Current Pulsed (Note 2)	I_{DM}	$T_C=25^{\circ}\text{C}$	--	--	1176	A
Power Dissipation (Note 3)	P_D	$T_C=25^{\circ}\text{C}$	--	--	125	W
Single Pulsed Avalanche Energy	E_{AS}	$L=0.5\text{mH}$, $V_{DD}=20\text{V}$, $R_G=25\Omega$, starting temperature $T_J=25^{\circ}\text{C}$	--	--	506	mJ
Single Pulsed Avalanche Current	I_{AS}	--	--	--	45	A
Operation Junction Temperature Range	T_J	--	-55	--	150	$^{\circ}\text{C}$
Storage Temperature Range	T_{stg}	--	-55	--	150	$^{\circ}\text{C}$

THERMAL CHARACTERISTICS

Characteristics	Symbol	Test conditions	Ratings			Unit
			Min.	Typ.	Max.	
Thermal Resistance, Junction-case, Bottom	$R_{\theta JC}$	--	--	--	1.0	$^{\circ}\text{C/W}$
Thermal Resistance, Junction-ambient	$R_{\theta JA}$	--	--	--	50	$^{\circ}\text{C/W}$
Soldering Temperature (SMD)	T_{sold}	Reflow soldering: 10 ± 1 sec, 3times	--	--	260	$^{\circ}\text{C}$

ELECTRICAL CHARACTERISTICS (UNLESS OTHERWISE NOTED, $T_J=25^{\circ}\text{C}$)

Static characteristics

Characteristics	Symbol	Test conditions	Ratings			Unit
			Min.	Typ.	Max.	
Drain-source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	25	--	--	V
Drain-source Leakage Current	I_{DSS}	$V_{DS}=25V, V_{GS}=0V, T_J=25^{\circ}\text{C}$	--	--	1.0	μA
		$V_{DS}=25V, V_{GS}=0V, T_J=125^{\circ}\text{C}$	--	7.0	--	μA
Gate-source Leakage Current	I_{GSS}	$V_{GS}=+16/-12V, V_{DS}=0V$	--	--	± 100	nA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{GS}=V_{DS}, I_D=250\mu A$	1.0	--	2.1	V
Static Drain-source On State Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=20A$	--	0.48	0.58	$m\Omega$
Gate Resistance	R_g	$f=1\text{MHz}$	--	0.6	--	Ω

Dynamic characteristics

Characteristics	Symbol	Test conditions	Ratings			Unit
			Min.	Typ.	Max.	
Input Capacitance	C_{iss}	$f=1\text{MHz}, V_{GS}=0V, V_{DS}=12V$	--	9210	--	pF
Output Capacitance	C_{oss}		--	2935	--	
Reverse Transfer Capacitance	C_{rss}		--	286	--	
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=20V, V_{GS}=10V, R_G=1.0\Omega, I_D=20A$ (Notes 4,5)	--	21	--	ns
Turn-on Rise Time	t_r		--	48	--	
Turn-off Delay Time	$t_{d(off)}$		--	79	--	
Turn-off Fall Time	t_f		--	16	--	
Total Gate Charge	Q_g	$V_{DD}=10V, V_{GS}=10V, I_D=20A$ (Notes 4,5)	--	134	--	nC
Gate-source Charge	Q_{gs}		--	30	--	
Gate-drain Charge	Q_{gd}		--	14	--	
Gate-plateau Voltage	$V_{plateau}$		--	3.0	--	

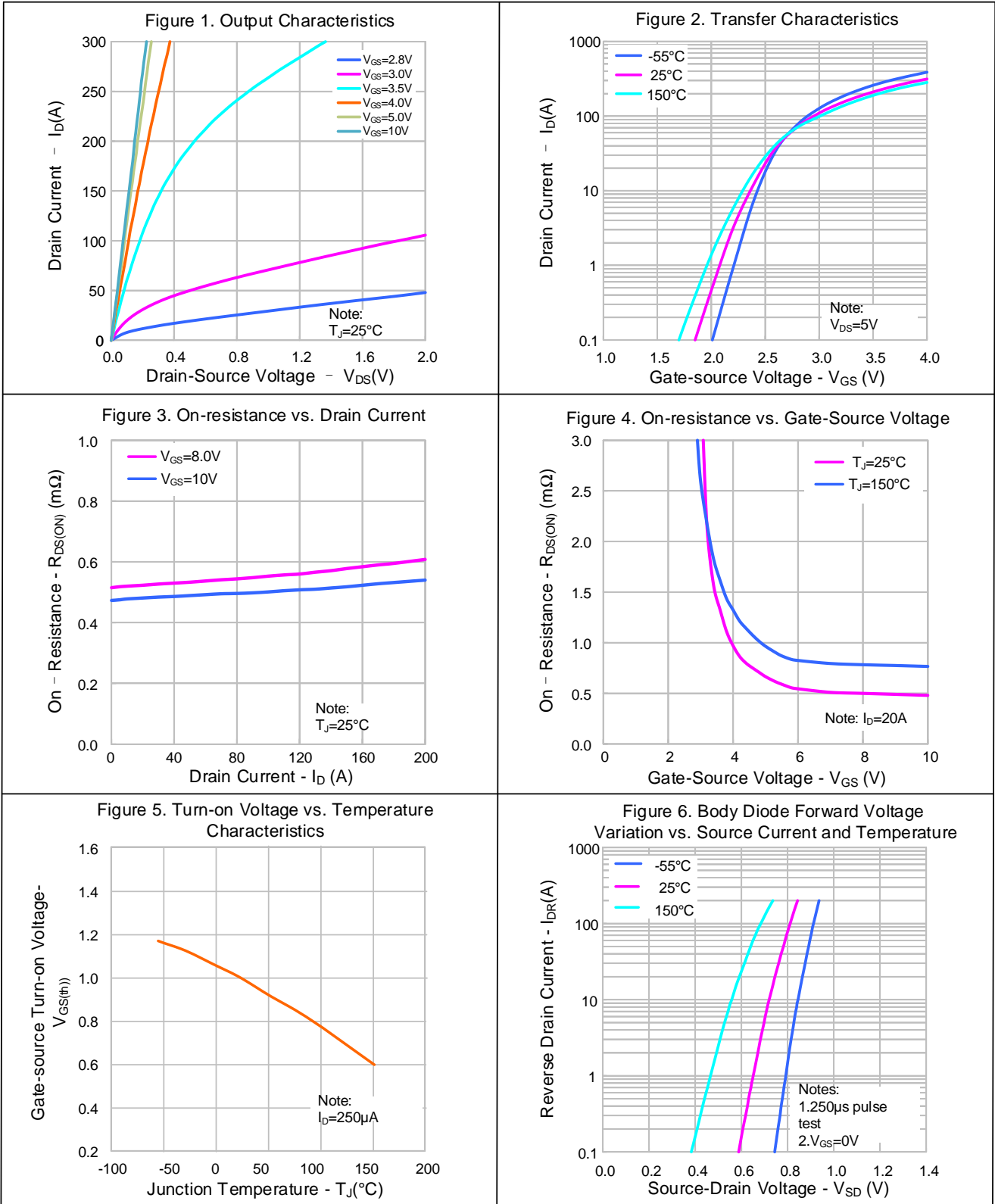
Reverse diode characteristics

Characteristics	Symbol	Test conditions	Ratings			Unit
			Min.	Typ.	Max.	
Continuous Source Current	I_S	Integral Reverse P-N Junction	--	--	294	A
Diode pulse current	$I_{S,pulse}$	Diode in the MOSFET	--	--	1176	
Diode Forward Voltage	V_{SD}	$I_S=5.0A, V_{GS}=0V$	--	--	1.4	V
Reverse Recovery Time	T_{rr}	$I_S=20A, V_{GS}=0V, V_R=25V$	--	64	--	ns
Reverse Recovery Charge	Q_{rr}	$dl_f/dt=100A/\mu s$ (Note 4)	--	105	--	nC

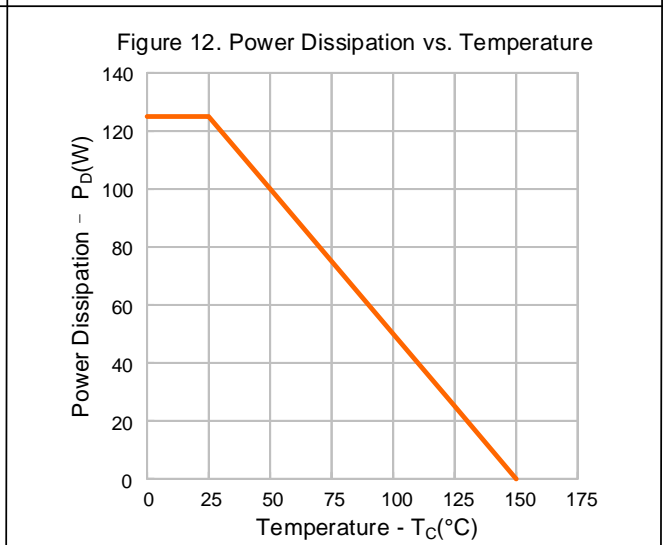
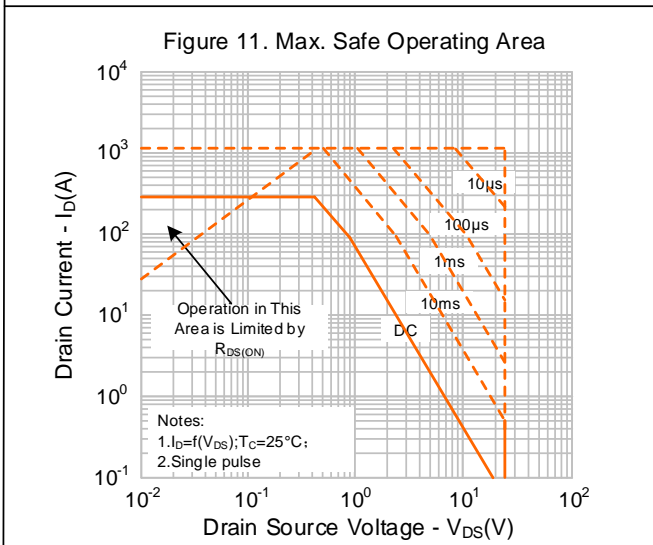
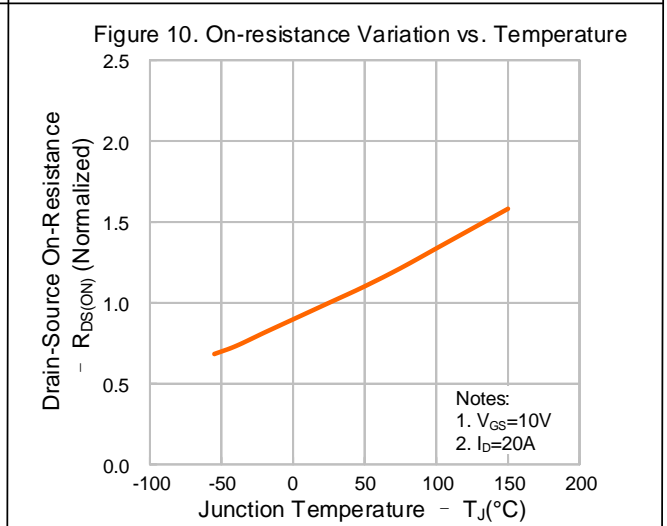
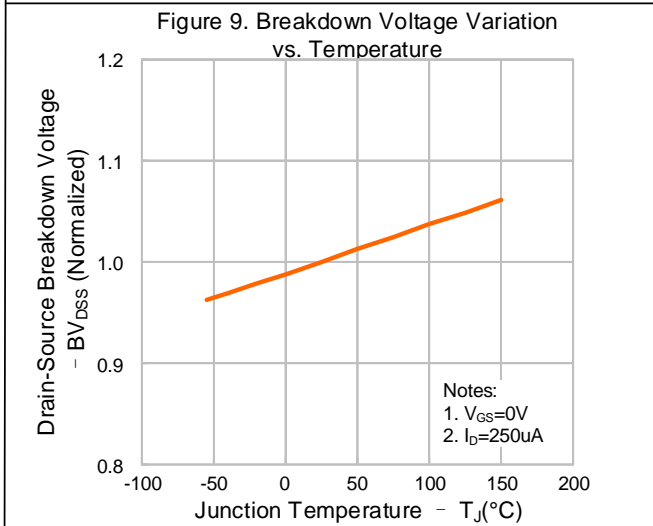
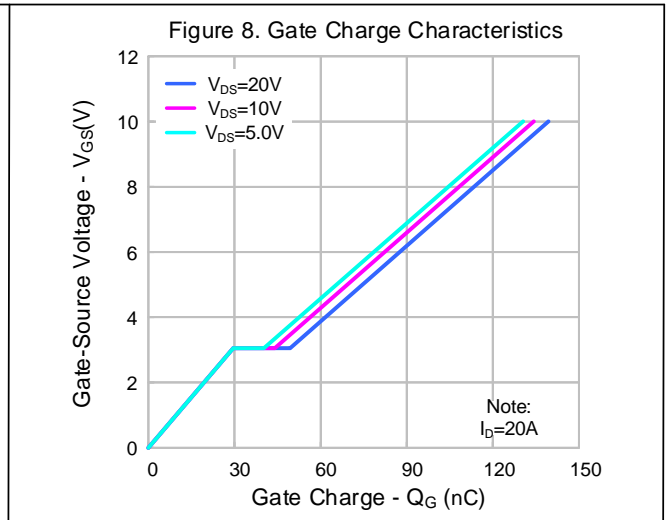
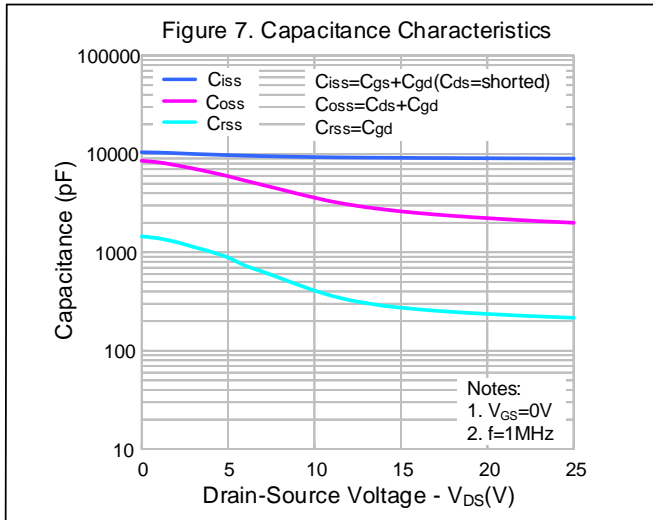
Notes:

- The rated value only refers to the maximum absolute value at the case temperature of 25°C in the specification. If the case temperature is higher than 25°C , it should be derated according to the actual environmental conditions;
- Pulse time $5\mu s$;
- The dissipation power will change with temperature, derating above 25°C : $1.0W/^{\circ}\text{C}$;
- Pulse Test: Pulse width $\leq 300\mu s$, Duty cycle $\leq 2\%$;
- Essentially independent of operating temperature.

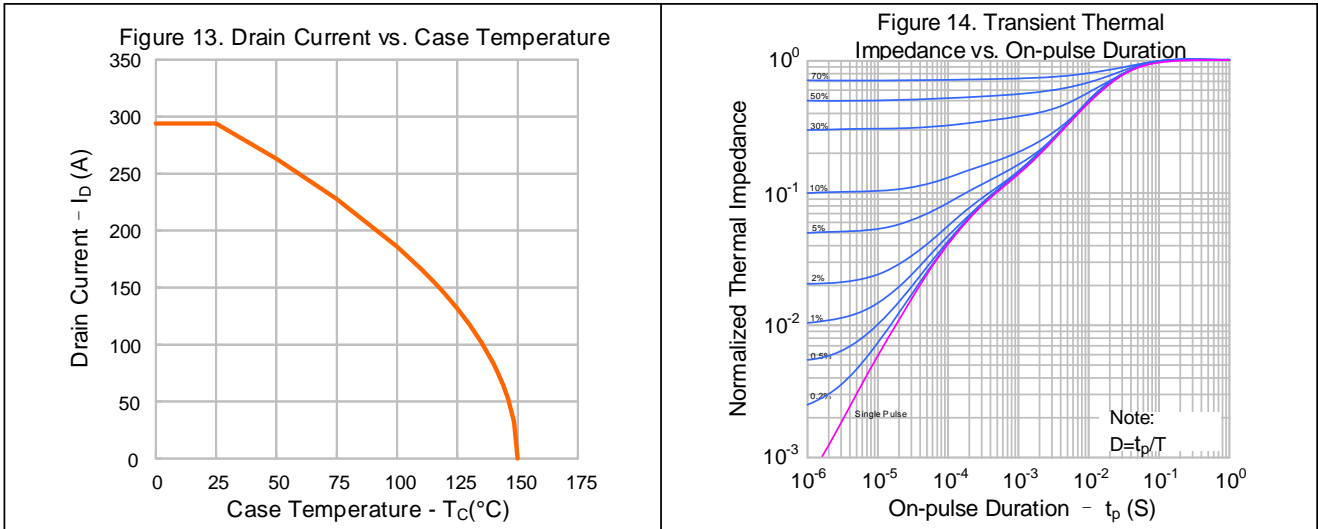
TYPICAL CHARACTERISTICS



TYPICAL CHARACTERISTICS (CONTINUED)

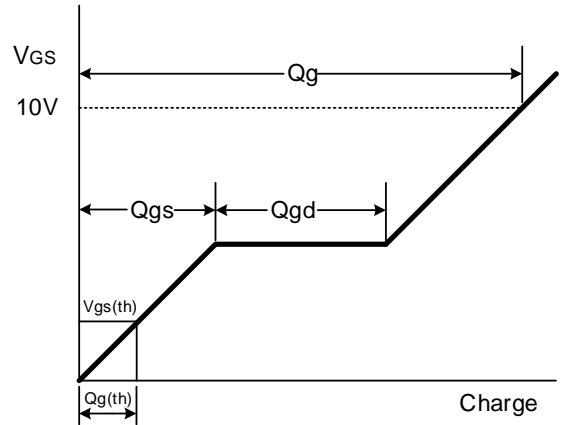
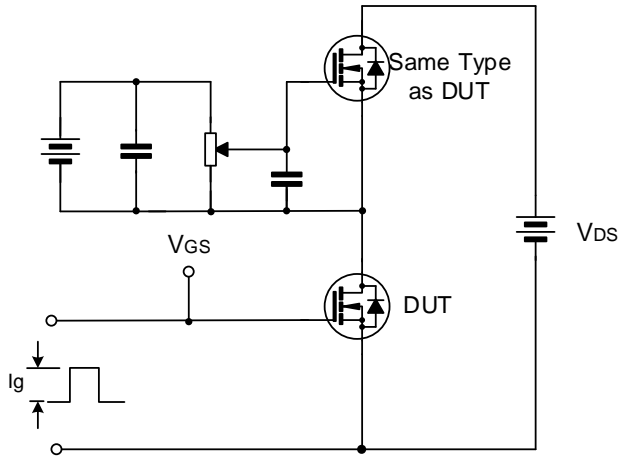


TYPICAL CHARACTERISTICS (CONTINUED)

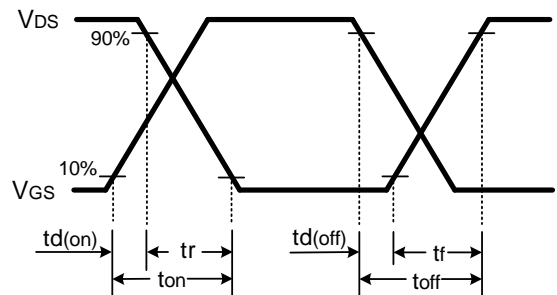
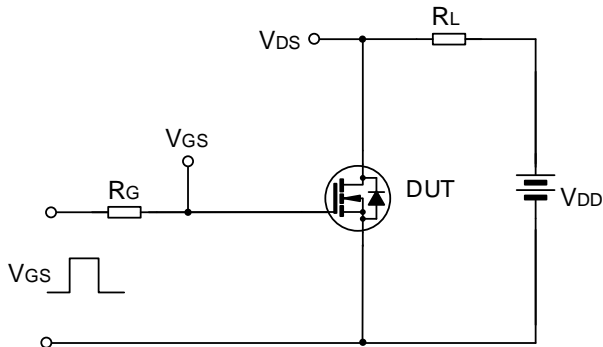


TYPICAL TEST CIRCUIT

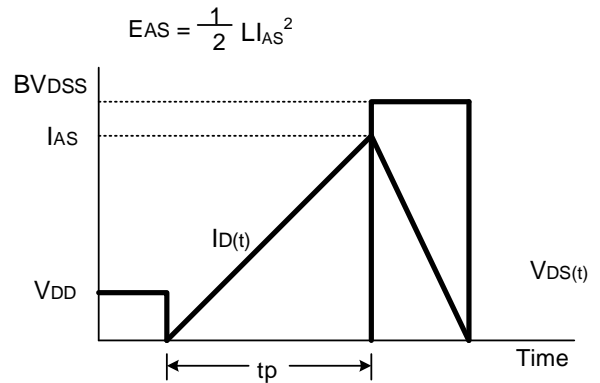
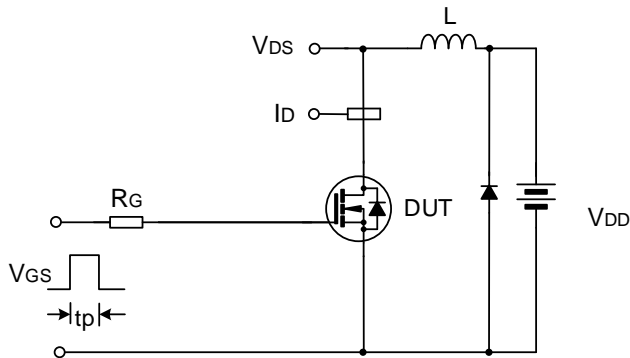
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveform



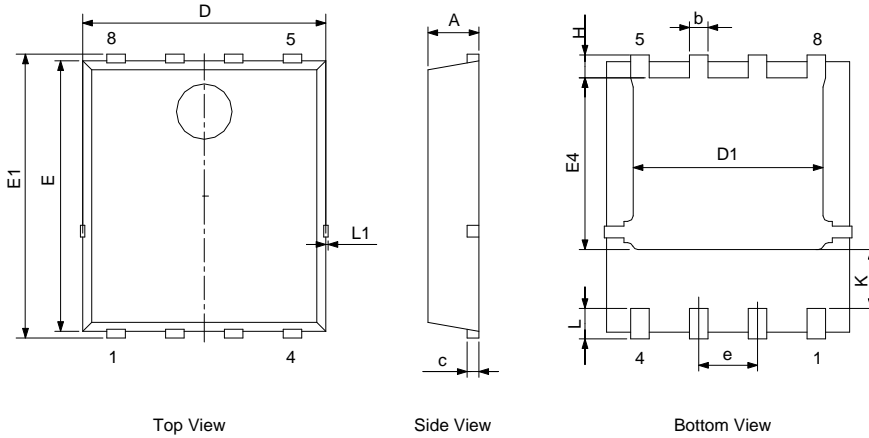
Unclamped Inductive Switching Test Circuit & Waveform



PACKAGE OUTLINE

PDFN-8-5X6X0.95-1.27

UNIT: mm



SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	0.90	—	1.20
c	0.154	0.25	0.354
D	4.80	—	5.40
E	5.66	—	6.06
D1	3.76	—	4.30
E1	5.90	—	6.35
b	0.30	—	0.55
K	1.10	1.30	1.50
e	1.07	1.27	1.37
E4	3.34	—	3.92
L	0.30	0.60	0.71
L1	—	—	0.12
H	0.40	—	0.71



MOS DEVICES OPERATE NOTES:

Electrostatic charges may exist in many things. Please take following preventive measures to prevent effectively the MOS electric circuit as a result of the damage which is caused by discharge:

- The operator must put on wrist strap which should be earthed to against electrostatic.
- Equipment cases should be earthed.
- All tools used during assembly, including soldering tools and solder baths, must be earthed.
- MOS devices should be packed in antistatic/conductive containers for transportation.

Important notice:

1. Silan reserves the right to make changes of this instruction without notice.
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Rev: 1.0

Revision History:

1. First release
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