

120A, 80V N-CHANNEL MOSFET

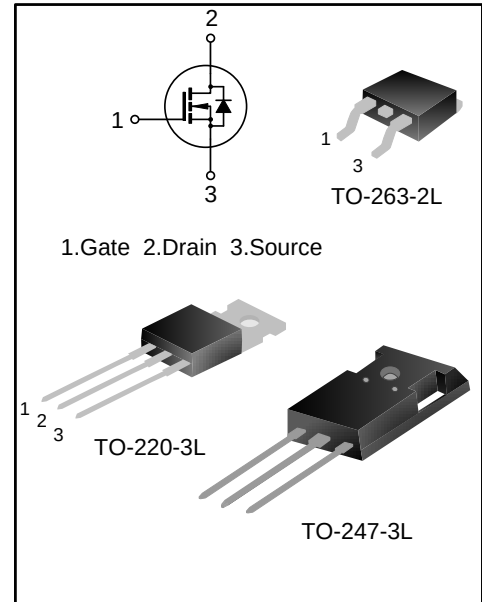
DESCRIPTION

SVG083R4NT(S)(P7) 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 UPS, Power Management for Inverter Systems.

FEATURES

- ◆ 120A, 80V, $R_{DS(on)(typ.)}=3.0m\Omega@V_{GS}=10V$
- ◆ Low gate charge
- ◆ Low C_{rss}
- ◆ Fast switching
- ◆ Improved dv/dt capability
- ◆ 100% avalanche tested
- ◆ Pb-free lead plating
- ◆ RoHS compliant



KEY PERFORMANCE PARAMETERS

Characteristics	Ratings	Unit
V_{DS}	80	V
$V_{GS(th)}$	2.0~4.0	V
$R_{DS(on),max}$	3.4	$m\Omega$
I_D	120	A
$Q_{g,typ}$	94	nC

ORDERING INFORMATION

Part No.	Package	Marking	Hazardous Substance Control	Packing Type
SVG083R4NT	TO-220-3L	083R4NT	Pb free	Tube
SVG083R4NS	TO-263-2L	083R4NS	Halogen free	Tube
SVG083R4NSTR	TO-263-2L	083R4NS	Halogen free	Tape & Reel
SVG083R4NP7	TO-247-3L	083R4NP7	Pb free	Tube

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

Characteristics	Symbol	Test conditions	Ratings			Unit
			Min.	Typ.	Max.	
Drain-Source Voltage	V _{DS}	--	80	--	--	V
Gate-Source Voltage	V _{GS}	--	-20	--	20	V
Drain Current	I _D	T _C =25°C	--	--	120	A
		T _C =100°C	--	--	76	A
Drain Current Pulsed (Note 1)	I _{DM}	T _C =25°C	--	--	480	A
Power Dissipation (TO-220-3L) (TO-263-2L) (Note 2)	P _D	T _C =25°C	--	--	179	W
Power Dissipation (TO-247-3L) (Note 2)	P _D	T _C =25°C	--	--	227	W
Single Pulsed Avalanche Energy	E _{AS}	L=0.5mH, V _{DD} =64V, R _G =25Ω, Starting temperature T _J =25°C	--	--	552	mJ
Single Pulsed Avalanche Current	I _{AS}	--	--	--	47	A
Operation Junction Temperature Range	T _J	--	-55	--	150	°C
Storage Temperature Range	T _{stg}	--	-55	--	150	°C

THERMAL CHARACTERISTICS

Table 1. TO-220-3L(SVG083R4NT)

Characteristics	Symbol	Test conditions	Ratings			Unit
			Min.	Typ.	Max.	
Thermal Resistance, Junction-case, Bottom	R _{θJC}	--	--	--	0.65	°C/W
Thermal Resistance, Junction-to-Ambient	R _{θJA}	--	--	--	62.5	°C/W
Soldering Temperature (in line)	T _{sold}	15 ⁺² ₋₀ sec, 1time	--	--	260	°C

Table 2. TO-263-2L(SVG083R4NS)

Characteristics	Symbol	Test conditions	Ratings			Unit
			Min.	Typ.	Max.	
Thermal Resistance, Junction-case, Bottom	R _{θJC}	--	--	--	0.65	°C/W
Thermal Resistance, Junction-to-Ambient	R _{θJA}	--	--	--	62.5	°C/W
Soldering Temperature (SMD)	T _{sold}	Reflow soldering: 10 ± 1sec, 3times Wave soldering: 10 ⁺² ₋₀ sec, 1time	--	--	260	°C

Table 3. TO-247-3L(SVG083R4NP7)

Characteristics	Symbol	Test conditions	Ratings			Unit
			Min.	Typ.	Max.	
Thermal Resistance, Junction-case, Bottom	$R_{\theta JC}$	--	--	--	0.55	$^{\circ}\text{C/W}$
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	--	--	--	50	$^{\circ}\text{C/W}$
Soldering Temperature (in line)	T_{sold}	15^{+2}_{-0} sec, 1time	--	--	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}	$V_{\text{GS}}=0\text{V}$, $I_{\text{D}}=250\mu\text{A}$	80	--	--	V
Drain-source Leakage Current	I_{DSS}	$V_{\text{DS}}=80\text{V}$, $V_{\text{GS}}=0\text{V}$, $T_J=25^{\circ}\text{C}$	--	--	1.0	μA
		$V_{\text{DS}}=80\text{V}$, $V_{\text{GS}}=0\text{V}$, $T_J=125^{\circ}\text{C}$	--	3.0	--	μA
Gate-source Leakage Current	I_{GSS}	$V_{\text{GS}}=\pm 20\text{V}$, $V_{\text{DS}}=0\text{V}$	--	--	± 100	nA
Gate Threshold Voltage	$V_{\text{GS(th)}}$	$V_{\text{GS}}=V_{\text{DS}}$, $I_{\text{D}}=250\mu\text{A}$	2.0	--	4.0	V
Static Drain-source On State Resistance	$R_{\text{DS(on)}}$	$V_{\text{GS}}=10\text{V}$, $I_{\text{D}}=30\text{A}$	--	3.0	3.4	m Ω
Gate Resistance	R_{g}	$f=1\text{MHz}$	--	2.0	--	Ω

Dynamic characteristics

Characteristics	Symbol	Test conditions	Ratings			Unit
			Min.	Typ.	Max.	
Input Capacitance	C_{iss}	$f=1\text{MHz}$, $V_{\text{GS}}=0\text{V}$, $V_{\text{DS}}=40\text{V}$	--	5360	--	pF
Output Capacitance	C_{oss}		--	925	--	
Reverse Transfer Capacitance	C_{rss}		--	40	--	
Turn-on Delay Time	$t_{\text{d(on)}}$	$V_{\text{DD}}=40\text{V}$, $V_{\text{GS}}=10\text{V}$, $R_{\text{G}}=3.0\Omega$, $I_{\text{D}}=50\text{A}$ (Notes 3, 4)	--	28	--	ns
Turn-on Rise Time	t_{r}		--	46	--	
Turn-off Delay Time	$t_{\text{d(off)}}$		--	67	--	
Turn-off Fall Time	t_{f}		--	25	--	
Total Gate Charge	Q_{g}	$V_{\text{DD}}=40\text{V}$, $V_{\text{GS}}=10\text{V}$, $I_{\text{D}}=50\text{A}$ (Notes 3, 4)	--	94	--	nC
Gate-source Charge	Q_{gs}		--	31	--	
Gate-drain Charge	Q_{gd}		--	26	--	
Gate-plateau Voltage	V_{plateau}		--	5.4	--	V

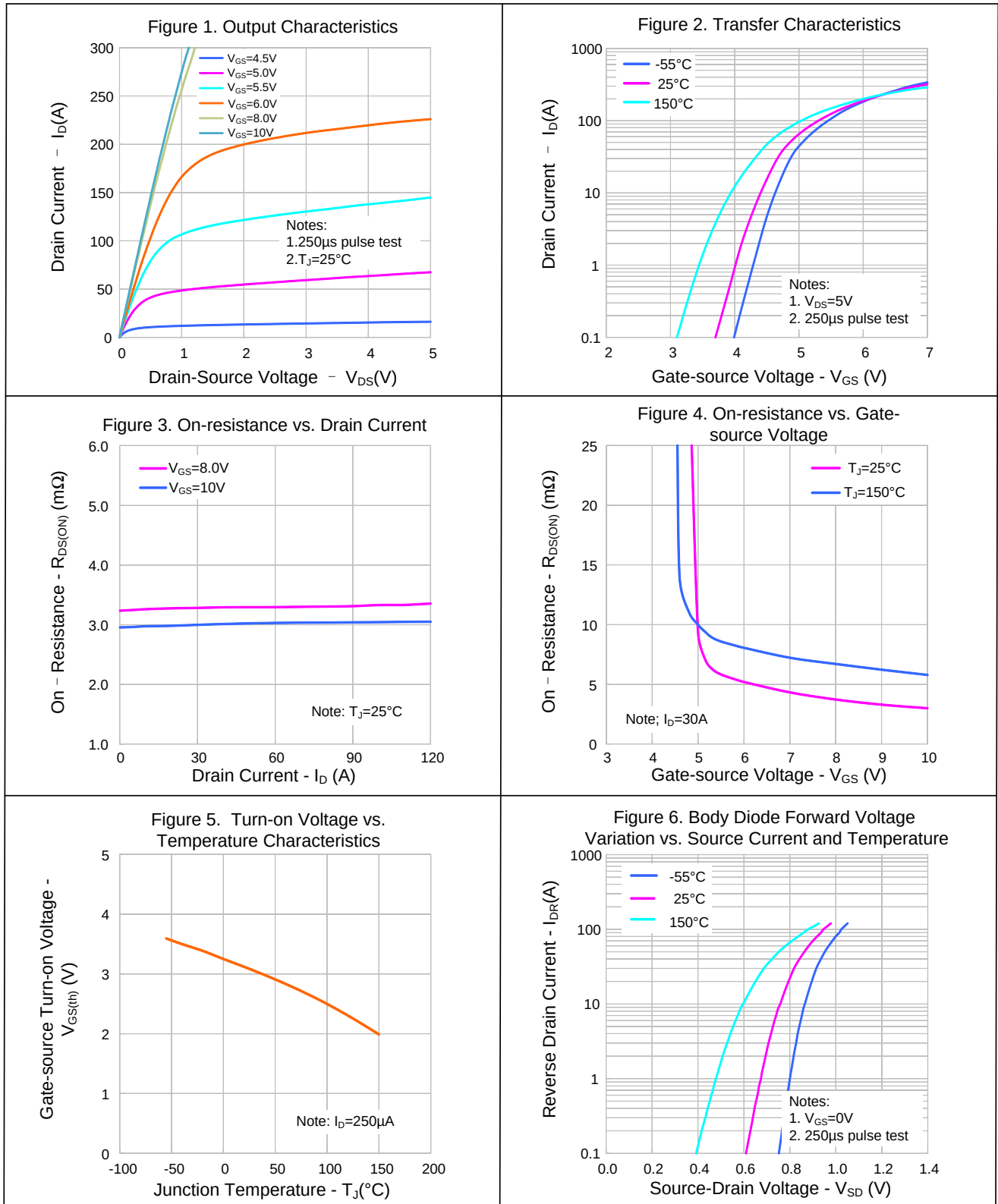
Reverse diode characteristics

Characteristics	Symbol	Test conditions	Ratings			Unit
			Min.	Typ.	Max.	
Continuous Diode Forward Current	I_S	$T_C=25^{\circ}\text{C}$, Integral reverse P-N junction diode in the MOSFET	--	--	120	A
Diode Pulse Current	$I_{S,pulse}$		--	--	480	
Diode Forward Voltage	V_{SD}	$I_S=60\text{A}$, $V_{GS}=0\text{V}$	--	--	1.4	V
Reverse Recovery Time	T_{rr}	$I_S=50\text{A}$, $V_{GS}=0\text{V}$, $V_R=50\text{V}$, $dI_F/dt=100\text{A}/\mu\text{s}$ (Note 3)	--	64	--	ns
Reverse Recovery Charge	Q_{rr}		--	116	--	nC

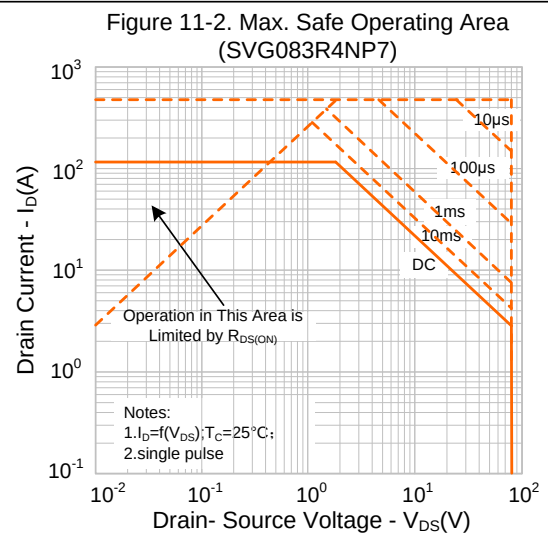
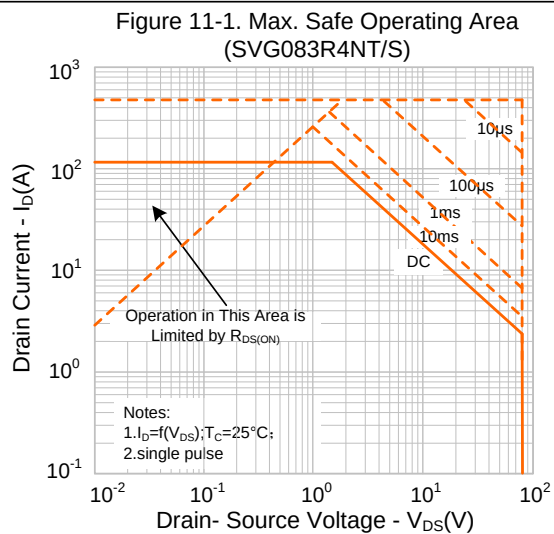
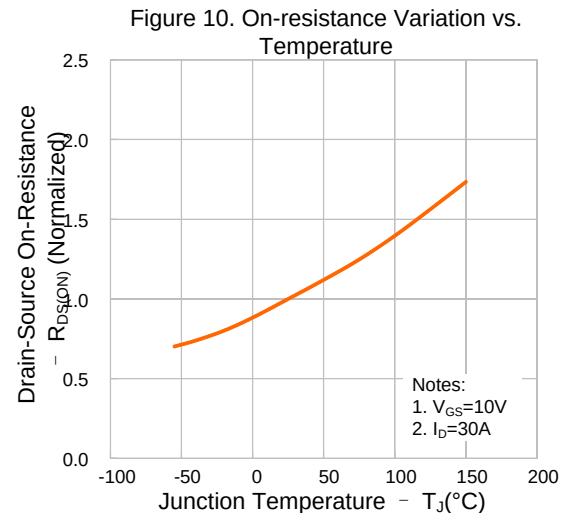
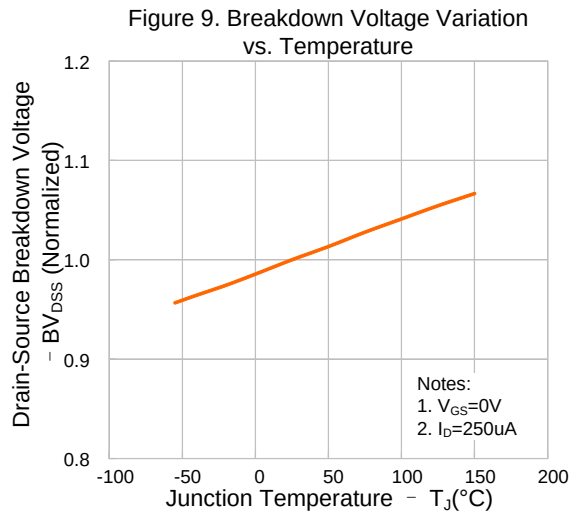
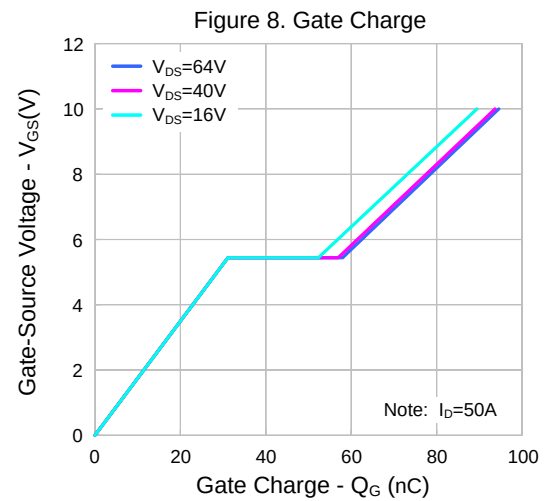
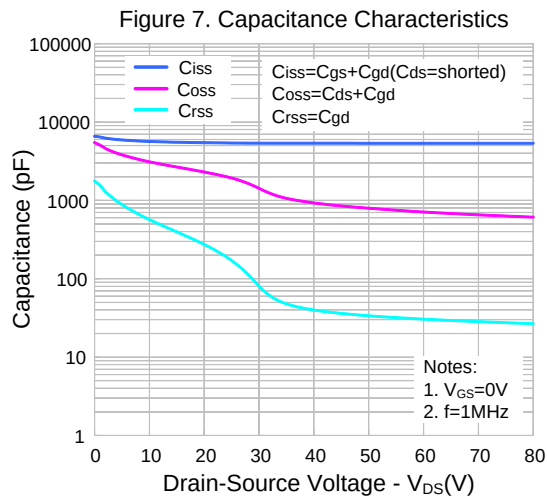
Notes:

1. Pulse time $5\mu\text{s}$;
2. The dissipation power will change with temperature, derating above 25°C : $1.54\text{W}/^{\circ}\text{C}(\text{TO-220-3L})(\text{TO-263-2L})/1.82\text{W}/^{\circ}\text{C}(\text{TO-247-3L})$;
3. Pulse Test: Pulse width $\leq 300\mu\text{s}$, Duty cycles $\leq 2\%$;
4. Essentially independent of operating temperature.

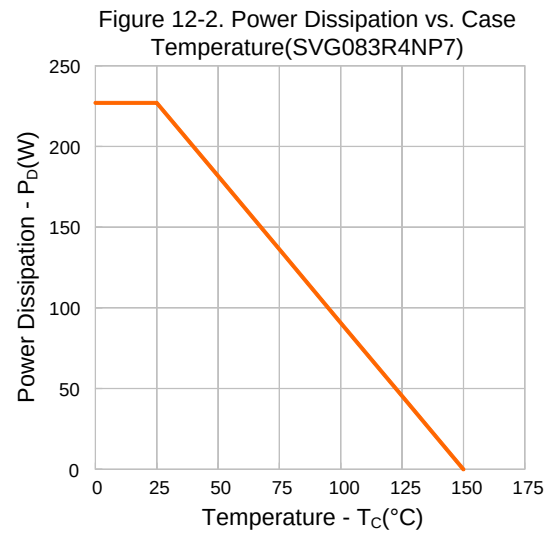
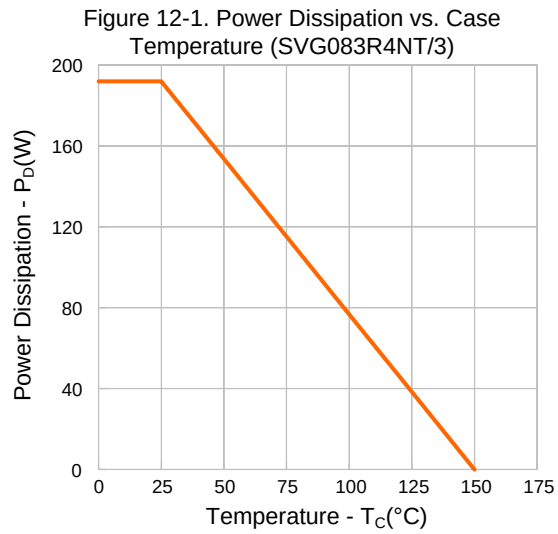
TYPICAL CHARACTERISTICS



TYPICAL CHARACTERISTICS (CONTINUED)

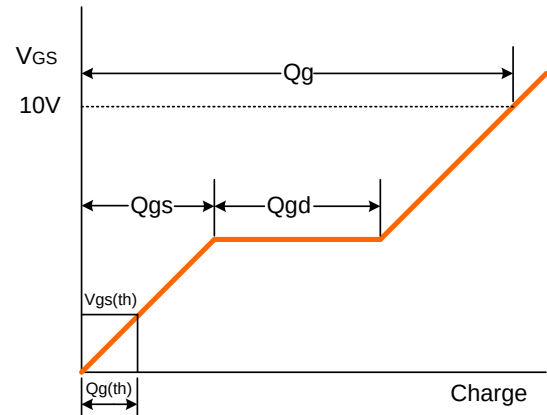
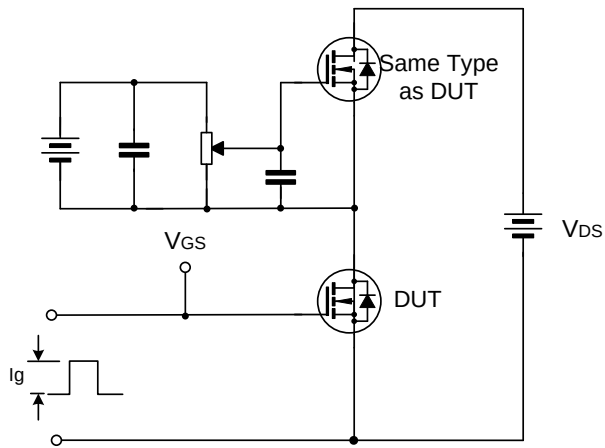


TYPICAL CHARACTERISTICS (CONTINUED)

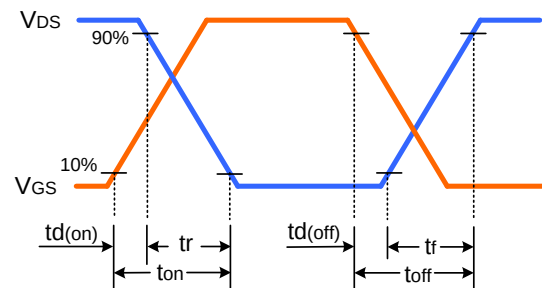
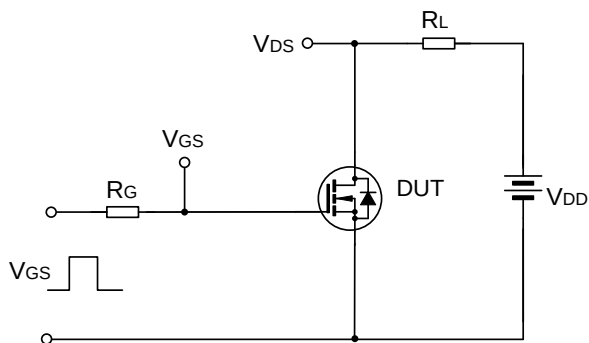


TYPICAL TEST CIRCUIT

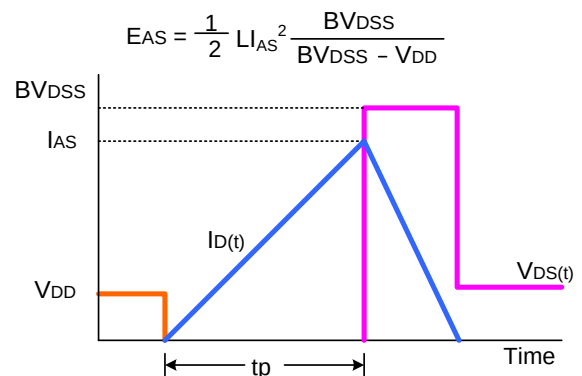
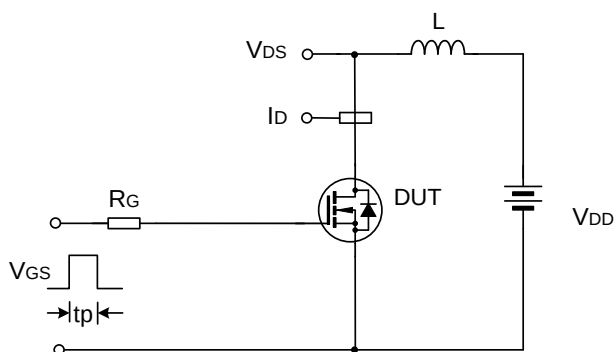
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveform



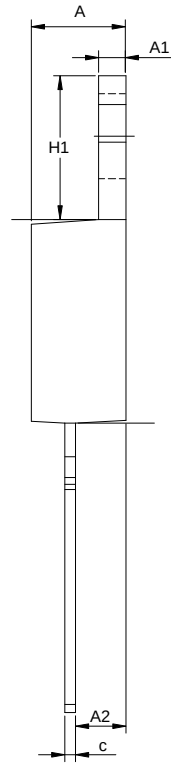
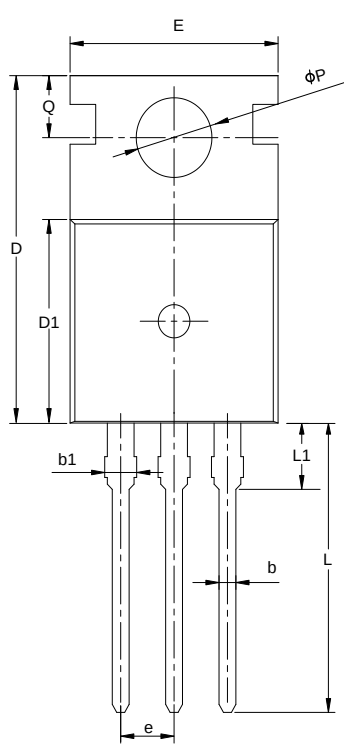
Unclamped Inductive Switching Test Circuit & Waveform



PACKAGE OUTLINE

TO-220-3L

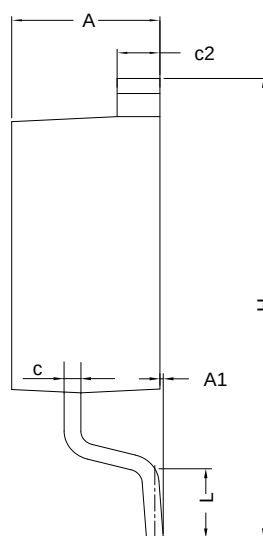
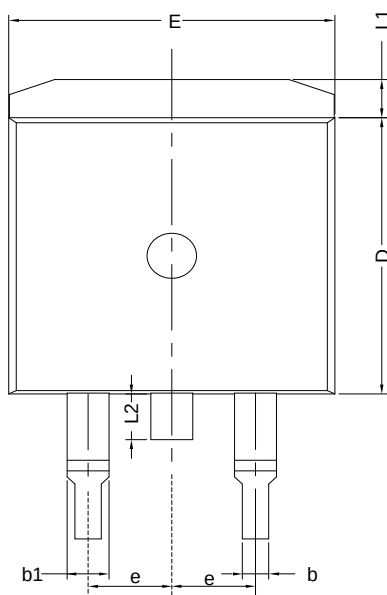
UNIT: mm



SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	4.30	4.50	4.70
A1	1.00	1.30	1.50
A2	1.80	2.40	2.80
b	0.60	0.80	1.00
b1	1.00	—	1.60
c	0.30	—	0.70
D	15.10	15.70	16.10
D1	8.10	9.20	10.00
E	9.60	9.90	10.40
e	2.54BSC		
H1	6.10	6.50	7.00
L	12.60	13.08	13.60
L1	—	—	3.95
ϕP	3.40	3.70	3.90
Q	2.60	—	3.20

TO-263-2L

UNIT: mm

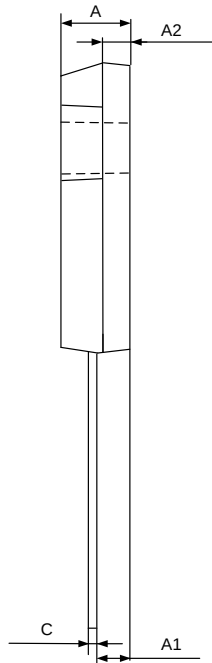
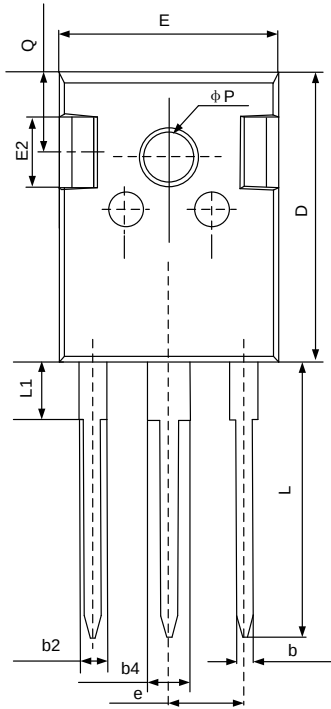


SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	4.30	4.57	4.72
A1	0	0.10	0.25
b	0.71	0.81	0.91
b1	1.17	—	1.50
c	0.30	—	0.60
c2	1.17	1.27	1.37
D	8.50	—	9.35
E	9.80	—	10.45
e	2.54BSC		
H	14.70	—	15.75
L	2.00	2.30	2.74
L1	1.12	1.27	1.42
L2	—	—	1.75

PACKAGE OUTLINE (CONTINUED)

TO-247-3L

UNIT: mm



SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	4.80	5.00	5.20
A1	2.21	2.41	2.59
A2	1.85	2.00	2.15
b	1.11	—	1.36
b2	1.91	—	2.25
b4	2.91	—	3.25
c	0.51	—	0.75
D	20.80	21.00	21.30
E	15.50	15.80	16.10
E2	4.40	5.00	5.20
e	5.44 BSC		
L	19.72	19.92	20.22
L1	—	—	4.30
Q	5.60	5.80	6.00
P	3.40	—	3.80

Important notice :

1. The instructions are subject to change without notice!
2. Customers should obtain the latest relevant information before placing orders and should verify that such information is complete and current. Please read the instructions carefully before using our products, including the circuit operation precautions.
3. Our products are consumer electronic products or the other civil electronic products.
4. When using our products, please do not exceed the maximum rating of the products, otherwise the reliability of the whole machine will be affected. There is a certain possibility of failure or malfunction of any semiconductor product under specific conditions. The buyer is responsible for complying with safety standards and taking safety measures when using our products for system design, sample and whole machine manufacturing, so as to avoid potential failure risk that may cause personal injury or property loss.
5. It is strongly recommended to identify the trademark when buying our products. Please contact us if there is any question.
6. Product promotion is endless, our company will wholeheartedly provide customers with better products!
7. Website: <http://www.silan.com.cn>

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Rev.: 1.0

Revision History:

1. First release
