

180A, 100V N-CHANNEL MOSFET

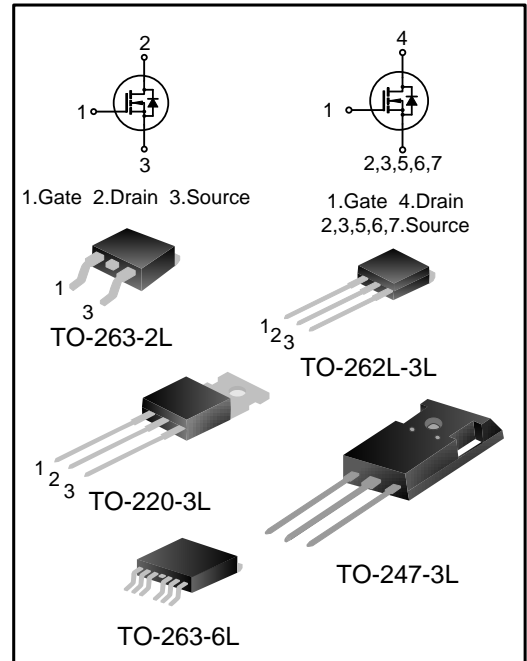
DESCRIPTION

SVG103R0NT(S)(KL)(S6)(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 power management for UPS and Inverter Systems.

FEATURES

- ◆ 180A, 100V, $R_{DS(on)(typ.)}=2.5m\Omega@V_{GS}=10V$
- ◆ 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}	100	V
$V_{GS(th)}$	2.2~3.8	V
$R_{DS(on),max.}$	3.0	$m\Omega$
$I_{D,pulse}$	720	A
$Q_{g,typ}$	171	nC

ORDERING INFORMATION

Part No.	Package	Marking	Hazardous Substance Control	Packing Type
SVG103R0NT	TO-220-3L	103R0NT	Pb free	Tube
SVG103R0NS	TO-263-2L	103R0NS	Halogen free	Tube
SVG103R0NSTR	TO-263-2L	103R0NS	Halogen free	Tape&Reel
SVG103R0NKL	TO-262L-3L	103R0NKL	Pb free	Tube
SVG103R0NS6TR	TO-263-6L	103R0NS6	Halogen free	Tape&Reel
SVG103R0NP7	TO-247-3L	103R0NP7	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}	--	100	--	--	V
Gate-source Voltage	V _{GS}	--	-20	--	20	V
Drain Current	I _D	T _C =25°C	--	--	180	A
		T _C =100°C	--	--	128	A
Drain Current Pulsed (Note 1)	I _{DM}	T _C =25°C	--	--	720	A
Power Dissipation(TO-220-3L) (TO-263-2L)(TO-262L-3L) (TO-263-6L) (Note 2)	P _D	T _C =25°C	--	--	223	W
Power Dissipation(TO-247-3L) (Note 2)	P _D	T _C =25°C	--	--	278	W
Single Pulsed Avalanche Energy	E _{AS}	L=0.5mH, V _{DD} =80V, R _G =25Ω, starting temperature T _J =25°C	--	--	961	mJ
Single Pulsed Avalanche Current	I _{AS}	--	--	--	62	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/TO-263-2L/TO-262L-3L/TO-263-6L(SVG103R0NT/S/KL/S6) Thermal characteristics

Characteristics	Symbol	Test conditions	Ratings			Unit
			Min.	Typ.	Max.	
Thermal Resistance, Junction-case, Bottom	R _{θJC}	--	--	0.42	0.56	°C/W
Thermal Resistance, Junction-ambient	R _{θJA}	--	--	--	62.5	°C/W
Soldering Temperature (in line)	T _{sold}	15 ⁺² ₀ sec, 1time	--	--	260	°C
Soldering Temperature (SMD)	T _{sold}	Reflow soldering: 10±1 sec, 3times Wave soldering: 10 ⁺² ₀ sec, 1time	--	--	260	°C

Table 2. TO-247-3L(SVG103R0NP7) Thermal characteristics

Characteristics	Symbol	Test conditions	Ratings			Unit
			Min.	Typ.	Max.	
Thermal Resistance, Junction-case, Bottom	R _{θJC}	--	--	--	0.45	°C/W
Thermal Resistance, Junction-ambient	R _{θJA}	--	--	--	50	°C/W
Soldering Temperature (in line)	T _{sold}	15 ⁺² ₀ sec, 1time	--	--	260	°C

ELECTRICAL CHARACTERISTICS (UNLESS OTHERWISE NOTED, T_J=25°C)
Static characteristics

Characteristics	Symbol	Test conditions	Ratings			Unit
			Min.	Typ.	Max.	
Drain-source Breakdown Voltage	BV _{DSS}	V _{GS} =0V, I _D =250μA	100	--	--	V
Drain-source Leakage Current	I _{DSS}	V _{DS} =100V, V _{GS} =0V, T _J =25°C	--	--	1.0	μA
		V _{DS} =100V, V _{GS} =0V, T _J =125°C	--	7.0	--	
Gate-source Leakage Current	I _{GSS}	V _{GS} =±20V, V _{DS} =0V	--	--	±100	nA
Gate Threshold Voltage	V _{GS(th)}	V _{GS} =V _{DS} , I _D =250μA	2.2	--	3.8	V
Static Drain-source On State Resistance	R _{DS(on)}	V _{GS} =10V, I _D =90A	--	2.5	3.0	mΩ
Gate Resistance	R _g	f=1MHz	--	2.4	--	Ω

Dynamic characteristics

Characteristics	Symbol	Test conditions	Ratings			Unit
			Min.	Typ.	Max.	
Input Capacitance	C _{iss}	f=1MHz, V _{GS} =0V, V _{DS} =50V	--	10542	--	pF
Output Capacitance	C _{oss}		--	1264	--	
Reverse Transfer Capacitance	C _{rss}		--	38	--	
Turn-on Delay Time	t _{d(on)}	V _{DD} =50V, V _{GS} =10V, R _G =3Ω, I _D =90A (Notes 3, 4)	--	44	--	ns
Turn-on Rise Time	t _r		--	70	--	
Turn-off Delay Time	t _{d(off)}		--	99	--	
Turn-off Fall Time	t _f		--	46	--	
Total Gate Charge	Q _g	V _{DD} =50V, V _{GS} =10V, I _D =90A (Notes 3, 4)	--	171	--	nC
Gate-source Charge	Q _{gs}		--	61	--	
Gate-drain Charge	Q _{gd}		--	47	--	
Gate-plateau Voltage	V _{plateau}		--	5.7	--	V

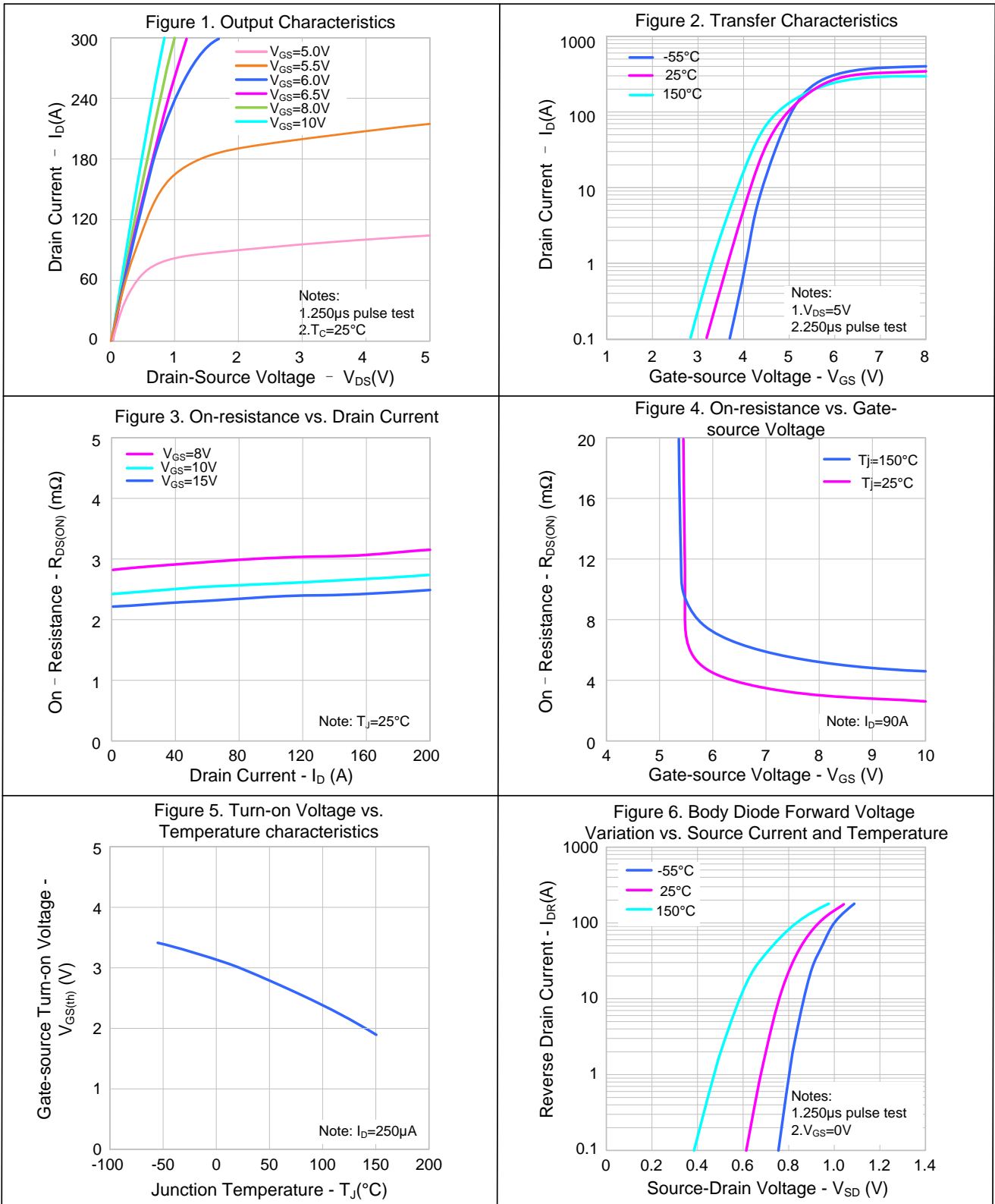
Reverse diode characteristics

Characteristics	Symbol	Test conditions	Ratings			Unit
			Min.	Typ.	Max.	
Continuous Diode Forward Current	I _S	T _C =25°C, integral reverse P-N junction diode in the MOSFET	--	--	180	A
Diode Pulse Current	I _{S,pulse}		--	--	720	
Diode Forward Voltage	V _{SD}	I _S =90A, V _{GS} =0V	--	--	1.4	V
Reverse Recovery Time	T _{rr}	I _S =90A, V _{GS} =0V, dI _F /dt=100A/μs (Note 3)	--	97	--	ns
Reverse Recovery Charge	Q _{rr}		--	0.28	--	μC
Reverse Recovery Peak Current	I _{rrm}		--	5.3	--	A

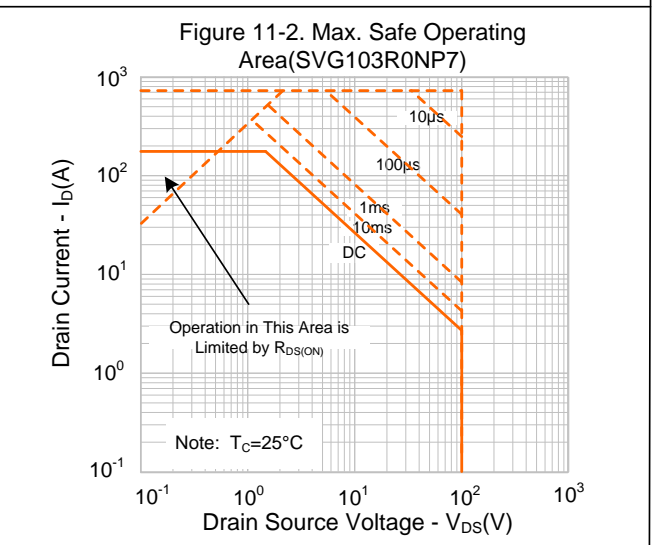
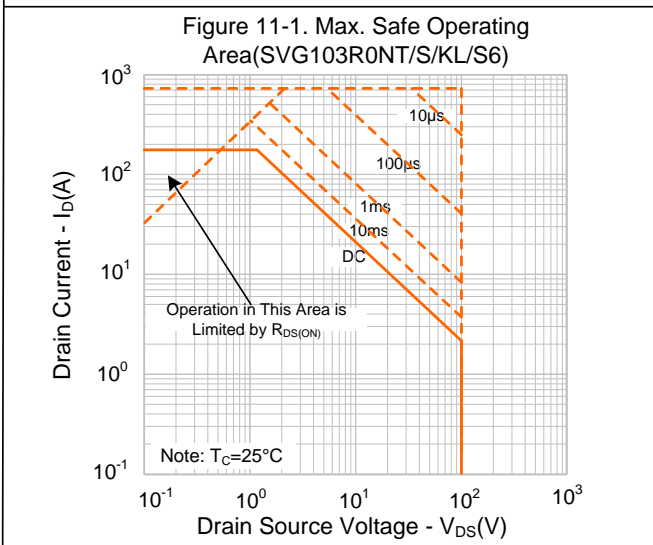
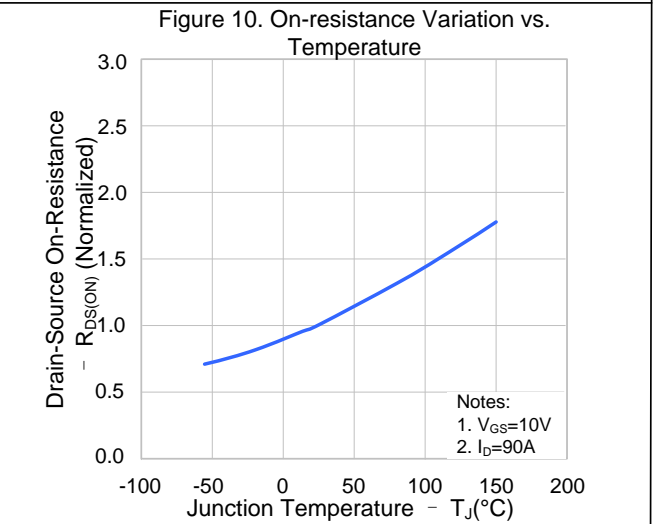
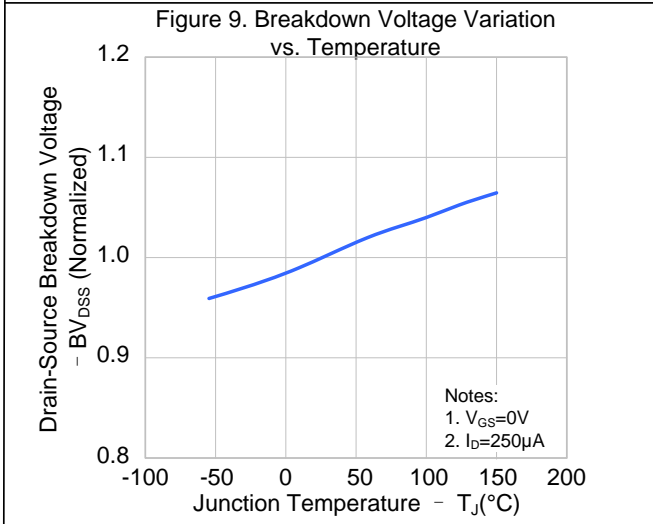
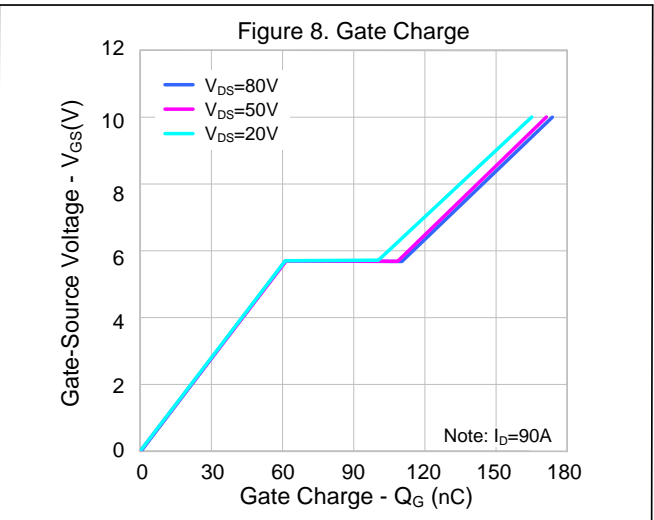
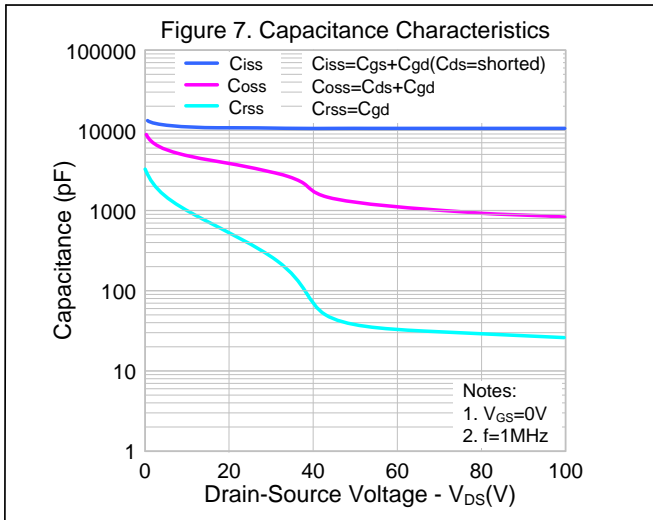
Notes:

- Pulse time 5μs;
- The dissipation power will change with temperature, derating above 25°C:
1.78W/°C(TO-220-3L)(TO-263-2L)(TO-262L-3L)(TO-263-6L)/ 2.22W/°C(TO-247-3L);
- Pulse Test: Pulse width ≤300μs, Duty cycle≤2%;
- Essentially independent of operating temperature.

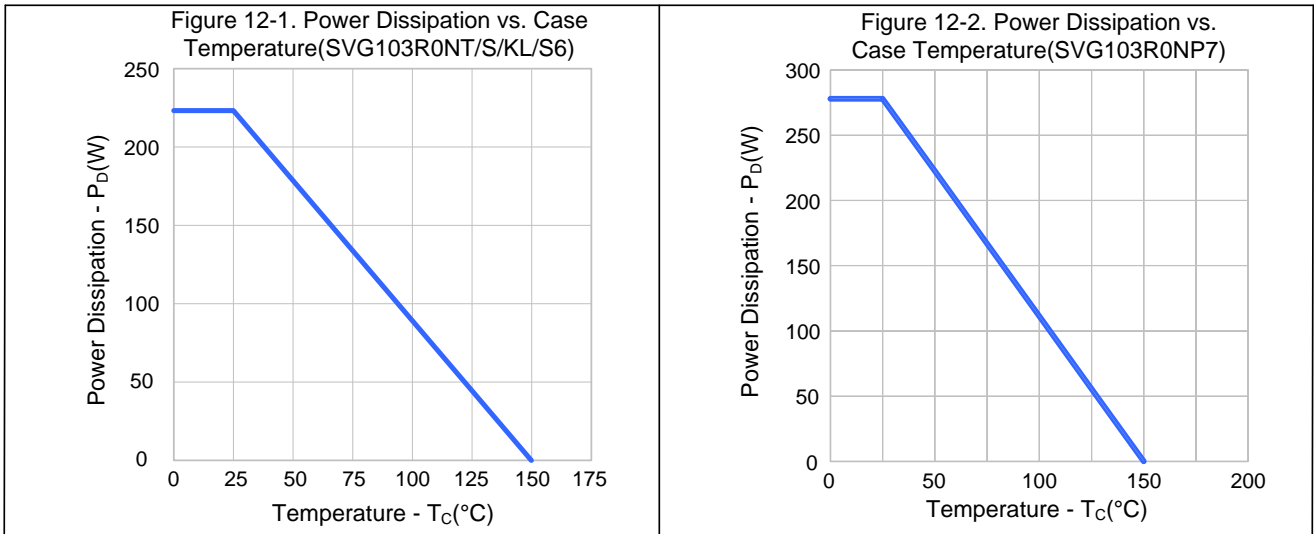
TYPICAL CHARACTERISTICS



TYPICAL CHARACTERISTICS (CONTINUED)

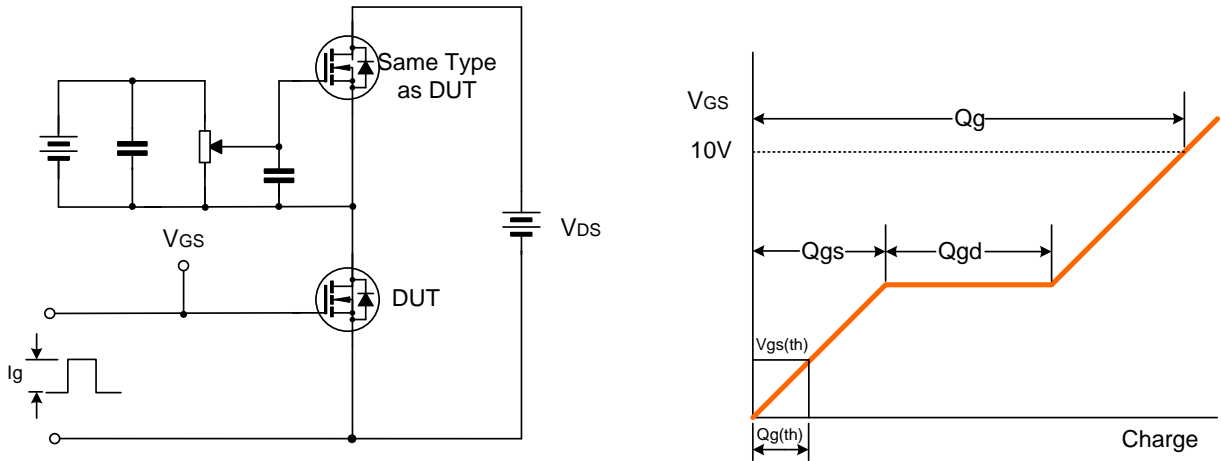


TYPICAL CHARACTERISTICS (CONTINUED)

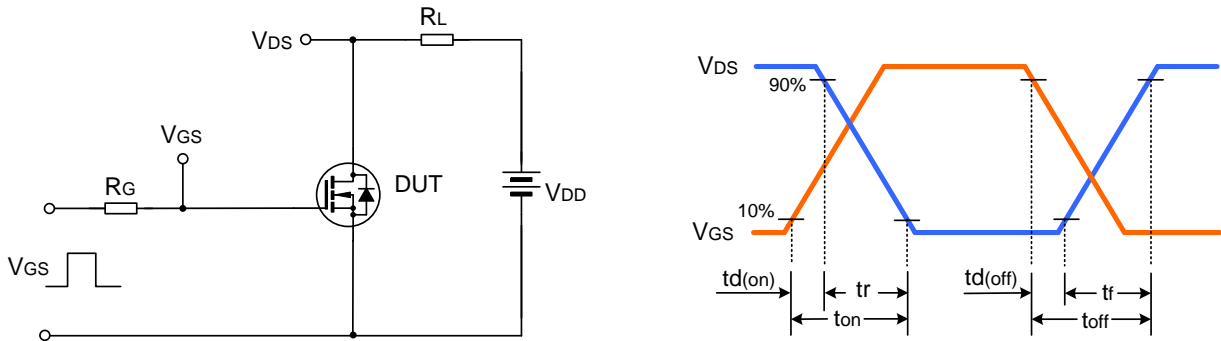


TYPICAL TEST CIRCUIT

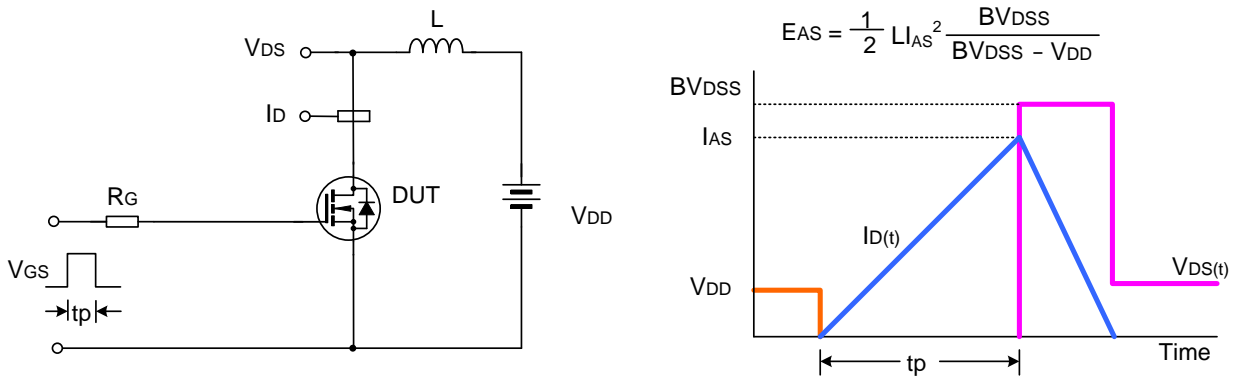
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveform

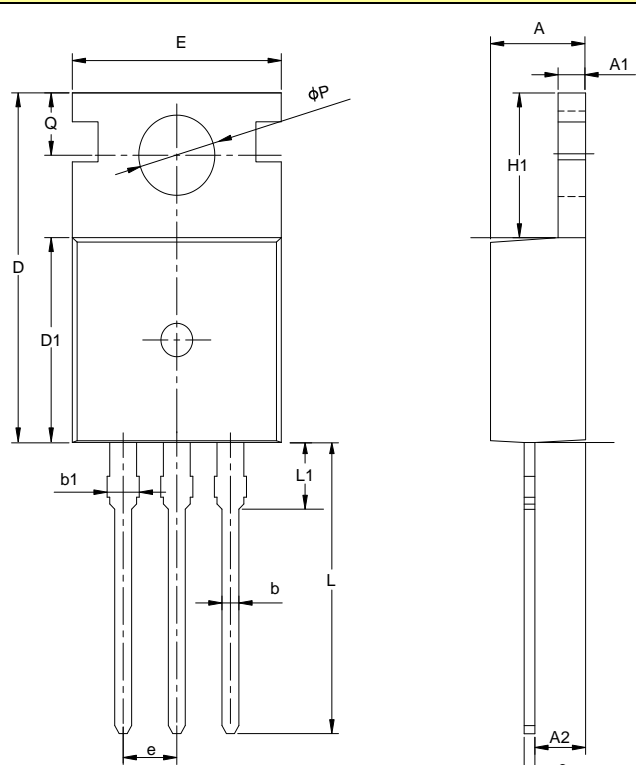


Unclamped Inductive Switching Test Circuit & Waveform



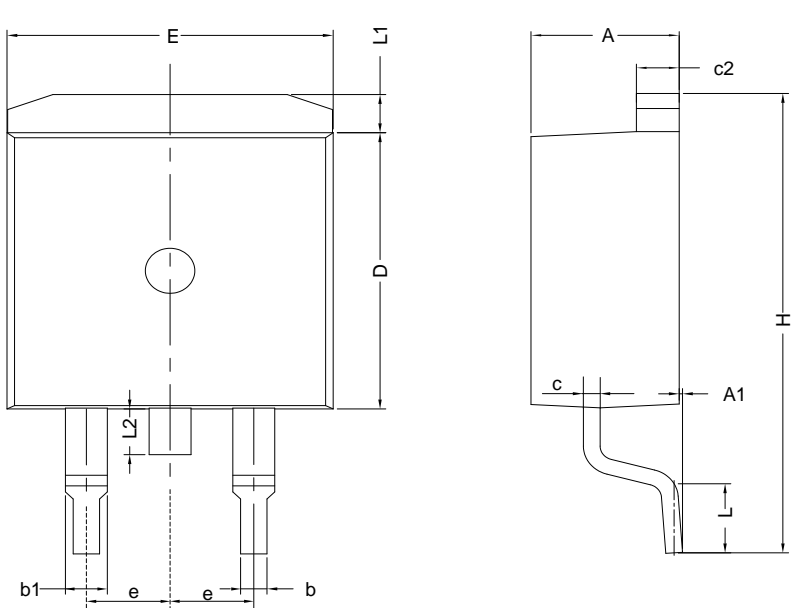
PACKAGE OUTLINE

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

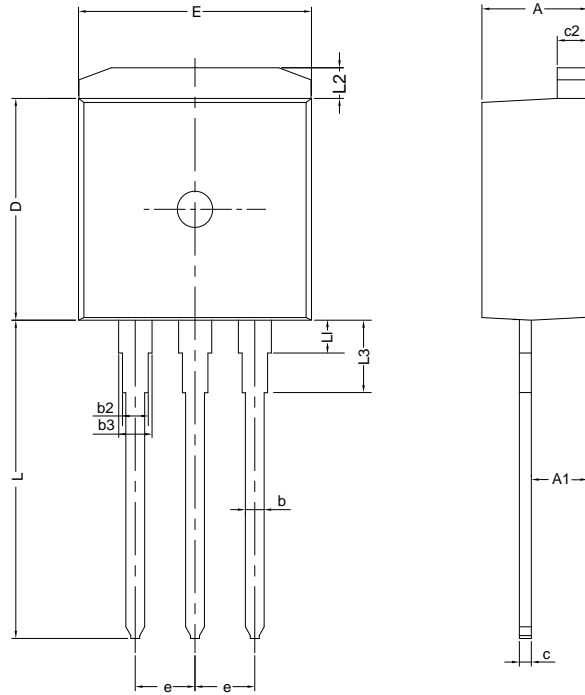
TO-263-2L UNIT: mm



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

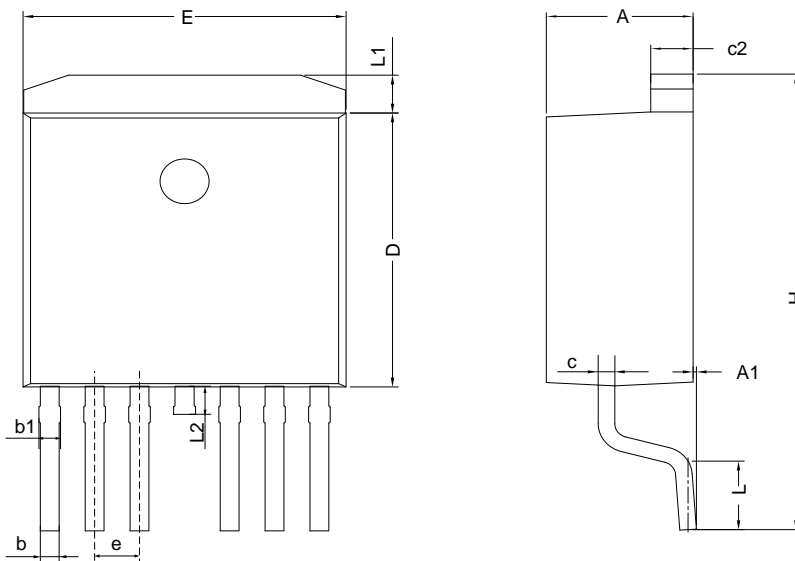
PACKAGE OUTLINE (CONTINUED)

TO-262L-3L **UNIT: mm**



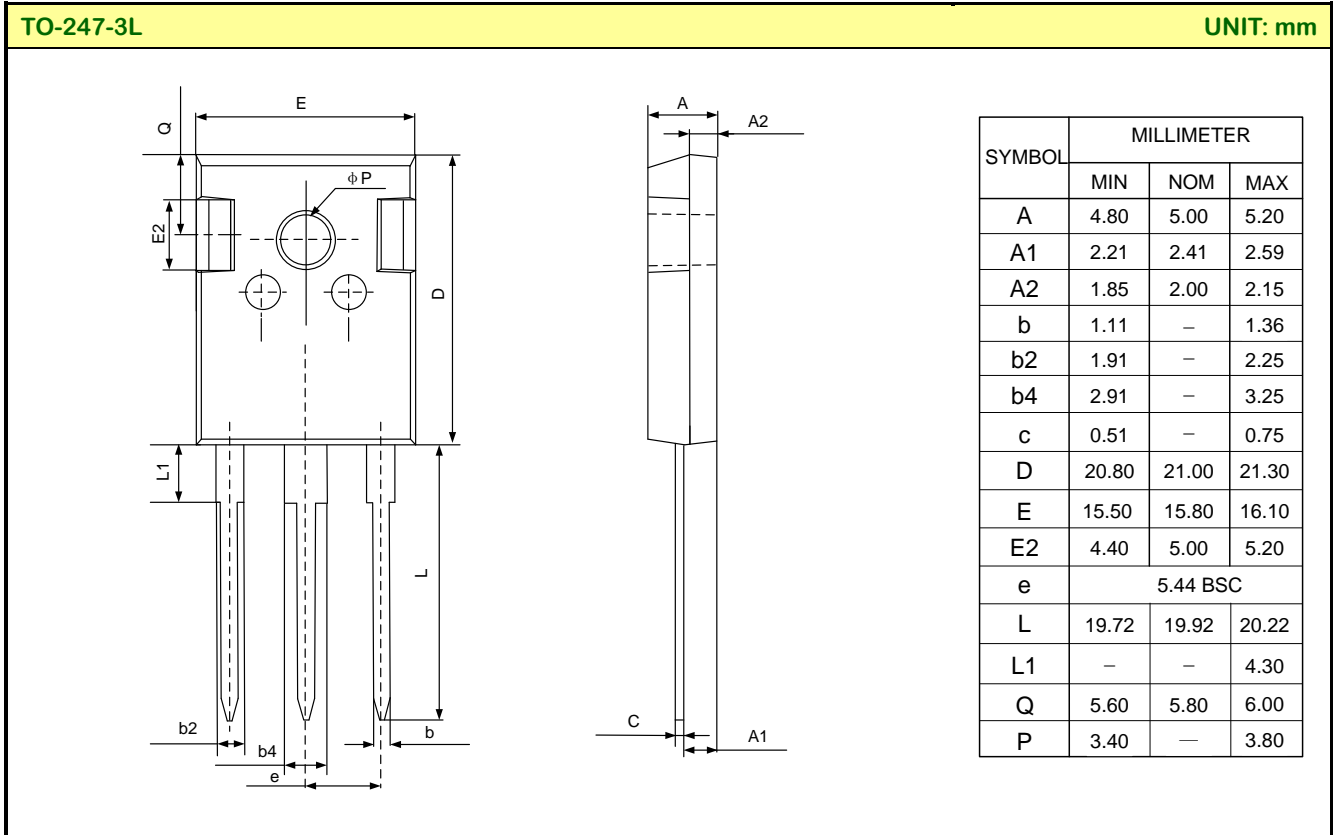
SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	4.30	4.50	4.70
A1	2.20	—	2.92
b	0.71	0.80	0.88
b2	0.90	1.01	1.08
b3	1.20	—	1.50
c	0.34	—	0.76
c2	1.22	1.30	1.35
D	8.38	—	9.30
E	9.80	10.16	10.54
e	2.54 BSC		
L	12.80	—	14.10
L1	1.40	1.50	1.60
L2	1.12	—	1.42
L3	3.00	3.20	3.40

TO-263-6L **UNIT: mm**



SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	4.20	4.40	4.60
A1	0	0.13	0.25
b	0.50	0.60	0.70
b1	0.55	0.70	0.90
c	0.40	0.50	0.60
c2	1.20	1.30	1.40
D	9.00	9.25	9.50
E	9.80	10.00	10.20
e	1.27 BSC		
H	14.50	15.00	15.50
L	2.40	2.70	3.00
L1	0.80	1.00	1.20
L2	0.80	1.00	1.20

PACKAGE OUTLINE (CONTINUED)



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.
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Rev.: **1.4**

Revision History:

1. Add package of SVG103R0NP7(TO-247-3L)
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Rev.: **1.3**

Revision History:

1. Add package of SVG103R0NS6(TO-263-6L)
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Rev.: **1.2**

Revision History:

1. Correct Single Pulsed Current to Single Pulsed Avalanche Current
-

Rev.: **1.1**

Revision History:

1. Add package of SVG103R0NKL(TO-262L-3L)
-

Rev.: **1.0**

Revision History:

1. First release
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