

88A, 200V N-CHANNEL MOSFET

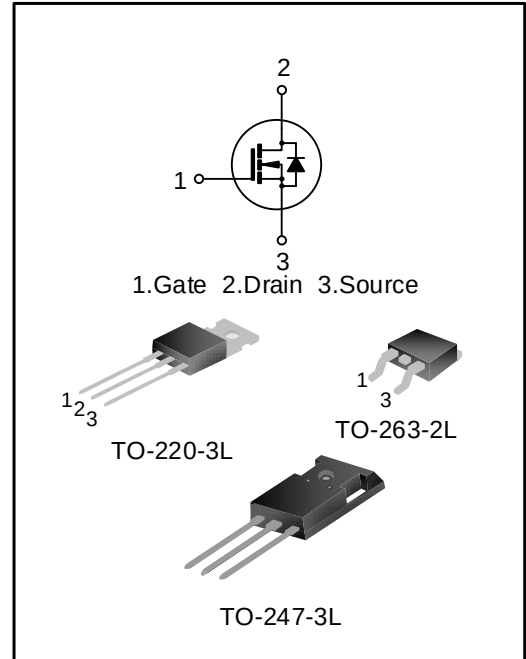
DESCRIPTION

SVGP20110NT(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 power management for UPS and Inverter Systems.

FEATURES

- ◆ 88A, 200V, $R_{DS(on)(typ.)}=9.6m\Omega@V_{GS}=10V$
- ◆ 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}	200	V
$V_{GS(th)}$	2.0~4.0	V
$R_{DS(on),max.}$	10.7	$m\Omega$
I_D	88	A
$Q_g,typ.$	64	nC

ORDERING INFORMATION

Part No.	Package	Marking	Hazardous Substance Control	Packing Type
SVGP20110NT	TO-220-3L	P20110NT	Halogen free	Tube
SVGP20110NS	TO-263-2L	P20110NS	Halogen free	Tube
SVGP20110NSTR	TO-263-2L	P20110NS	Halogen free	Tape&Reel
SVGP20110NP7	TO-247-3L	P20110NP7	Halogen 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}	--	200	--	--	V
Gate-source Voltage	V _{GS}	--	-20	--	20	V
Drain Current	I _D	T _C =25°C	--	--	88	A
		T _C =100°C	--	--	63	A
Drain Current Pulsed (Note 1)	I _{DM}	T _C =25°C	--	--	352	A
Power Dissipation (TO-220-3L) (TO-263-2L) (Note 2)	P _D	T _C =25°C	--	--	278	W
Power Dissipation (TO-247-3L) (Note 2)	P _D	T _C =25°C	--	--	313	W
Single Pulsed Avalanche Energy	E _{AS}	L=0.5mH, V _{DD} =80V, R _G =25Ω, starting temperature T _J =25°C	--	--	600	mJ
Single Pulsed Current	I _{AS}	--	--	--	49	A
Operation Junction Temperature Range	T _J	--	-55	--	150	°C
Storage Temperature Range	T _{stg}	--	-55	--	150	°C

THERMAL CHARACTERISTICS

Table1. Thermal characteristics of TO-220-3L/ TO-263-2L (SVGP20110NT/S)

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}	--	--	--	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±1sec, 3times Wave soldering: 10 ⁺² ₋₀ sec, 1time	--	--	260	°C

Table2. Thermal characteristics of TO-247-3L (SVGP20110NP7)

Characteristics	Symbol	Test conditions	Ratings			Unit
			Min.	Typ.	Max.	
Thermal Resistance, Junction-case, Bottom	R _{θJC}	--	--	--	0.40	°C/W
Thermal Resistance, Junction-ambient	R _{θJA}	--	--	--	50.0	°C/W
Soldering Temperature (in line)	T _{sold}	15 ⁺² ₋₀ sec, 1time	--	--	260	°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}	$V_{GS}=0V, I_D=250\mu A$	200	220	--	V
Drain-source Leakage Current	I_{DSS}	$V_{DS}=200V, V_{GS}=0V, T_J=25^{\circ}\text{C}$	--	--	1.0	μA
		$V_{DS}=200V, V_{GS}=0V, T_J=125^{\circ}\text{C}$	--	10	--	
Gate-source Leakage Current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$	--	--	± 100	nA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{GS}=V_{DS}, I_D=250\mu A$	2.0	--	4.0	V
Static Drain-source On State Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=88A$	--	9.6	10.7	$m\Omega$
Gate Resistance	R_g	$f=1\text{MHz}$	--	4.9	10	Ω

Dynamic characteristics

Characteristics	Symbol	Test conditions	Ratings			Unit
			Min.	Typ.	Max.	
Input Capacitance	C_{iss}	$f=1\text{MHz}, V_{GS}=0V, V_{DS}=100V$	--	4720	--	pF
Output Capacitance	C_{oss}		--	430	--	
Reverse Transfer Capacitance	C_{rss}		--	11	--	
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=100V, V_{GS}=10, R_G=1.6\Omega, I_D=44A$ (Notes 3, 4)	--	22	--	ns
Turn-on Rise Time	t_r		--	40	--	
Turn-off Delay Time	$t_{d(off)}$		--	66	--	
Turn-off Fall Time	t_f		--	18	--	
Total Gate Charge	Q_g	$V_{DD}=100V, V_{GS}=10V, I_D=44A$ (Notes 3, 4)	--	64	--	nC
Gate-source Charge	Q_{gs}		--	28	--	
Gate-drain Charge	Q_{gd}		--	7.9	--	
Gate-plateau Voltage	$V_{plateau}$		--	5.3	--	V

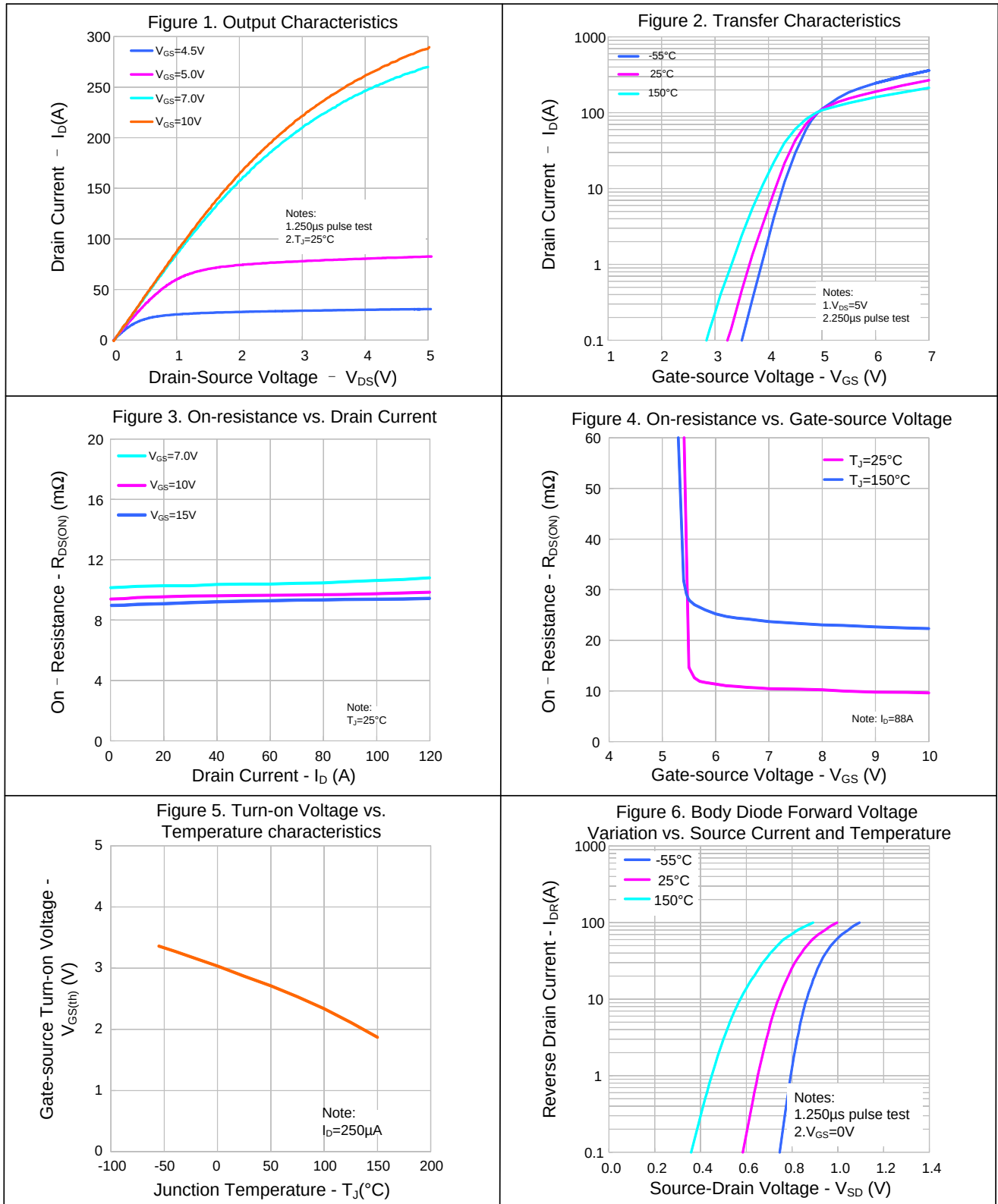
Reverse diode characteristics

Characteristics	Symbol	Test conditions	Ratings			Unit
			Min.	Typ.	Max.	
Continuous Diode Forward Current	I_S	Integral reverse P-N junction diode in the MOSFET	--	--	88	A
Diode Pulse Current	$I_{S,pulse}$		--	--	352	
Reverse Recovery Time	V_{SD}	$I_S=88A, V_{GS}=0V$	--	--	1.4	V
Reverse Recovery Charge	T_{rr}	$I_S=44A, V_{GS}=0V,$	--	130	--	ns
Reverse Recovery Peak Current	Q_{rr}	$dI/dt=100A/\mu s$ (Note 3)	--	0.7	--	μC

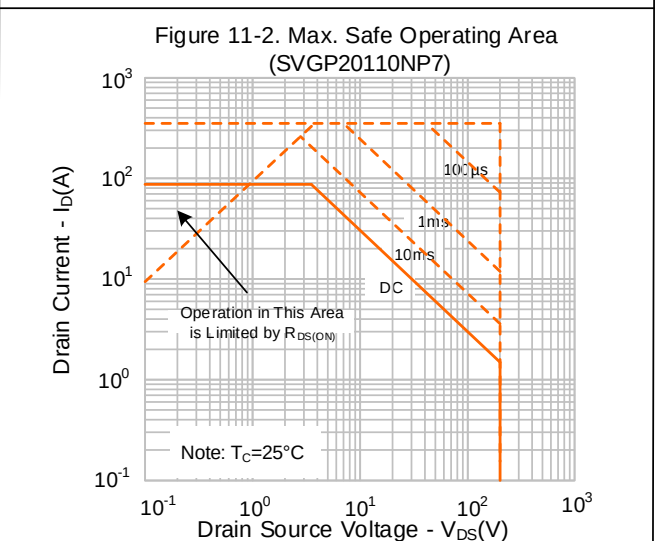
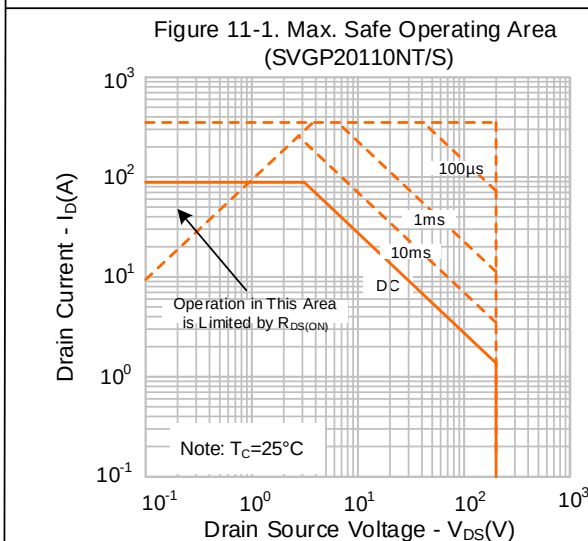
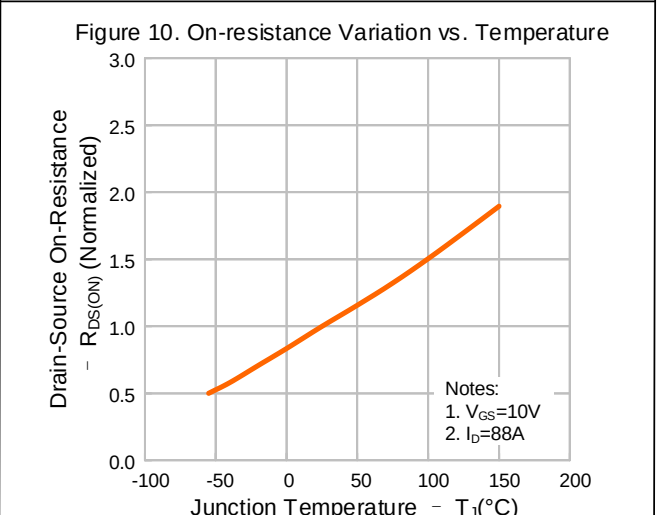
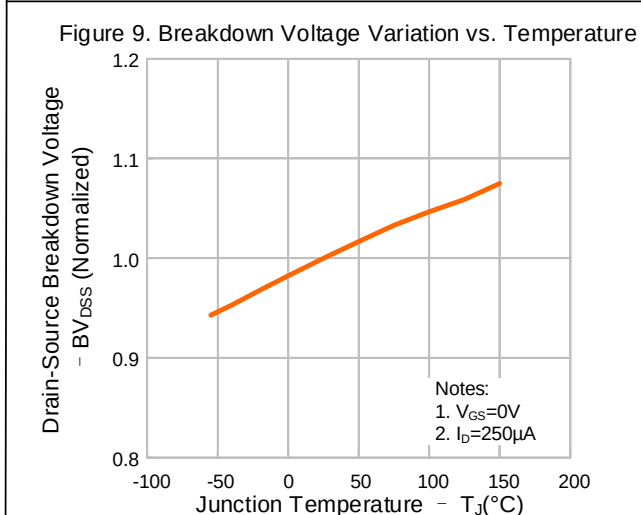
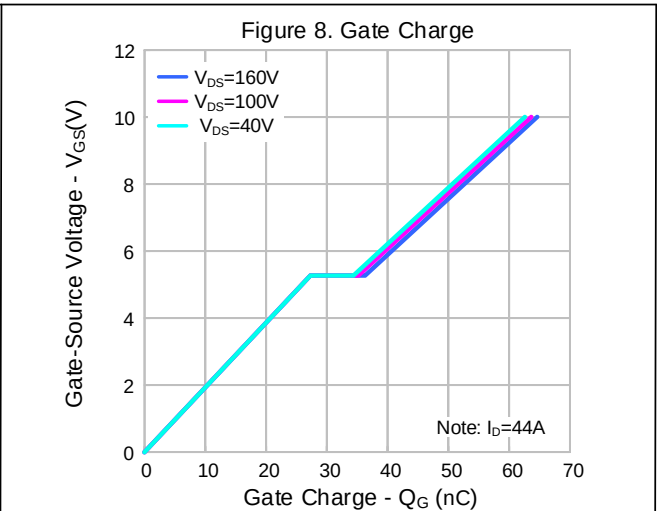
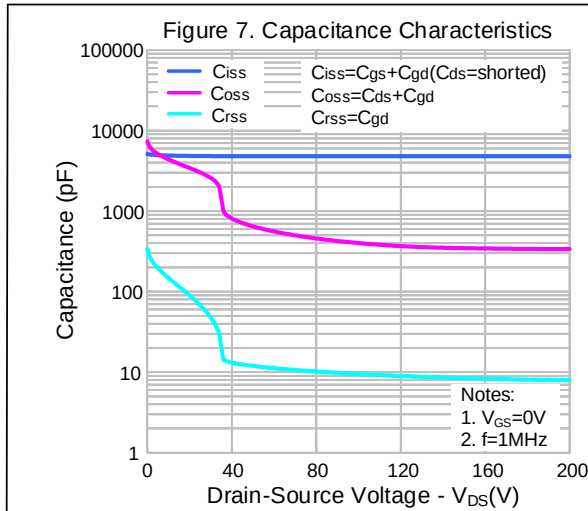
Notes:

- Pulse time $5\mu s$;
- The dissipation power will change with temperature, derating above 25°C :
 $2.22W/^{\circ}\text{C}$ $W/^{\circ}\text{C}$ (TO-220-3L) (TO-263-2L) $2.5W/^{\circ}\text{C}$ (TO-247-3L);
- Pulse Test: Pulse width $\leq 300\mu s$, Duty cycle $\leq 2\%$;
- Essentially independent of operating temperature.

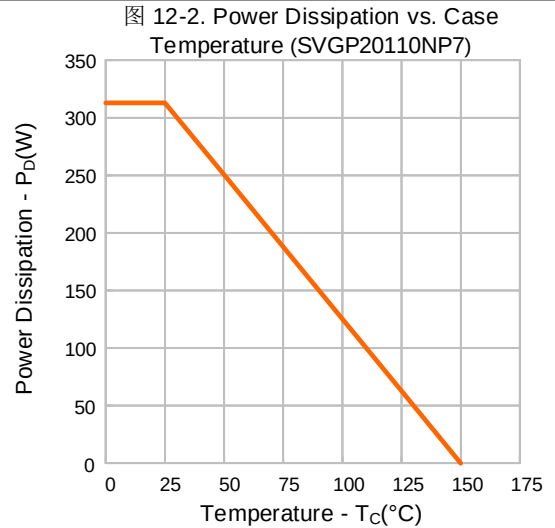
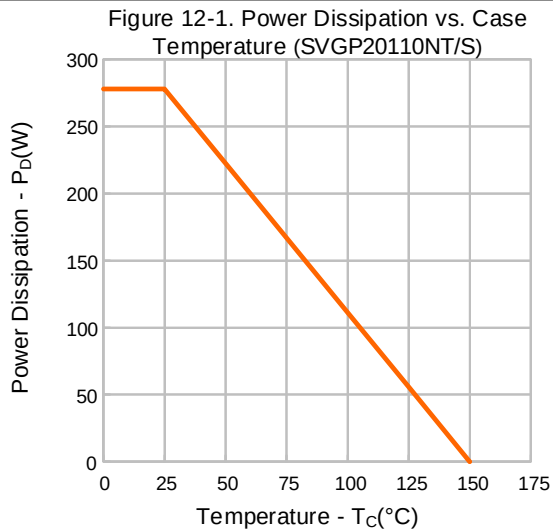
TYPICAL CHARACTERISTICS



TYPICAL CHARACTERISTICS (CONTINUED)

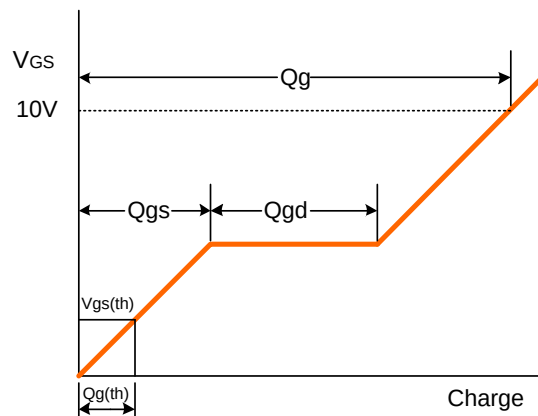
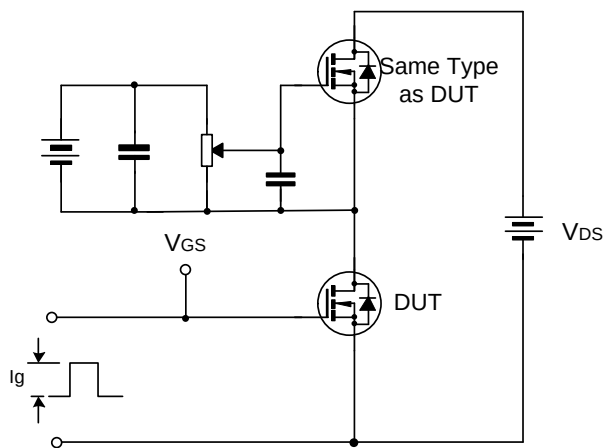


TYPICAL CHARACTERISTICS (CONTINUED)

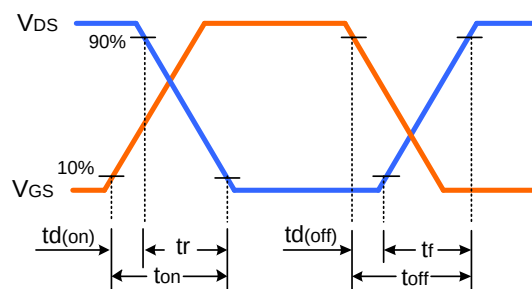
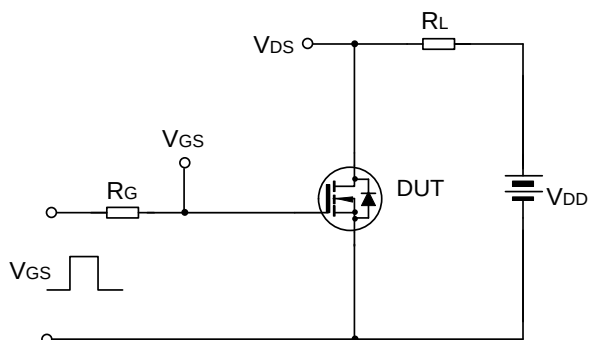


TYPICAL TEST CIRCUIT

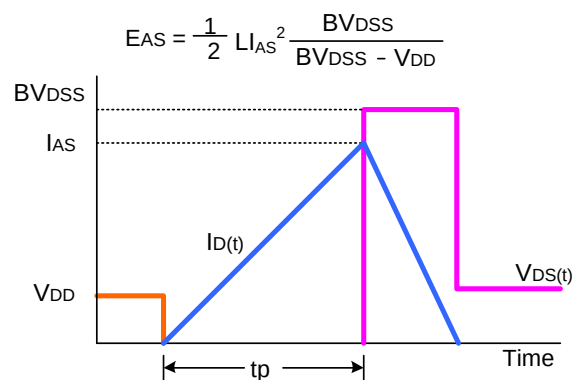
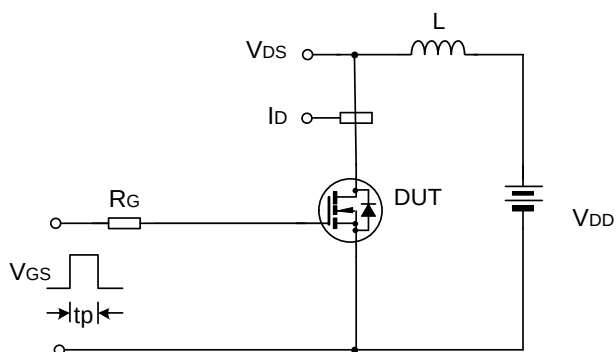
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveform



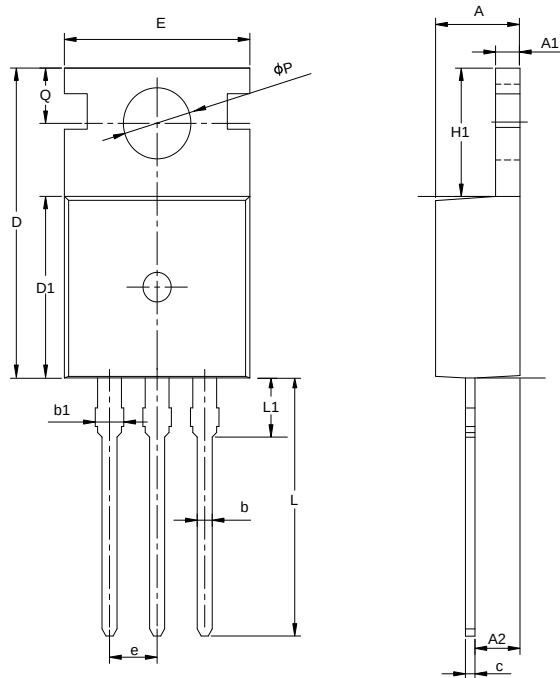
Unclamped Inductive Switching Test Circuit & Waveform



PACKAGE OUTLINE

TO-220-3L

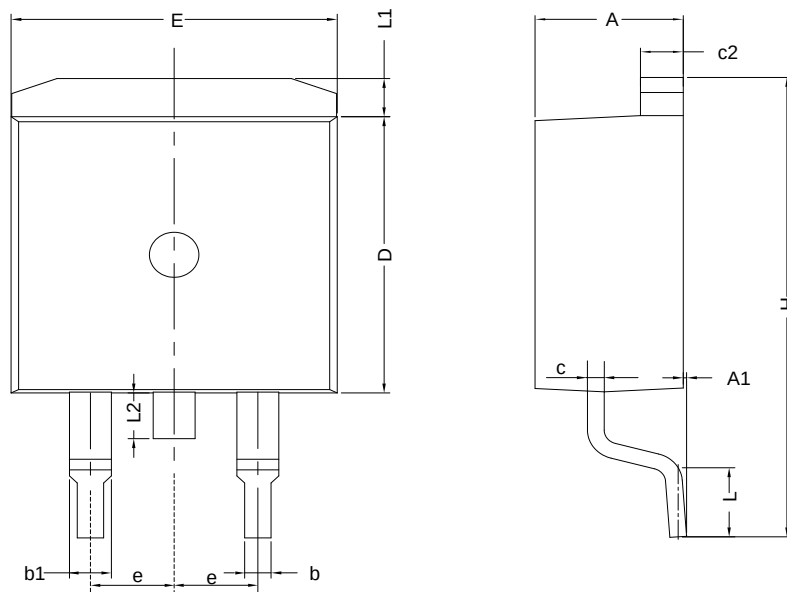
UNIT: mm



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

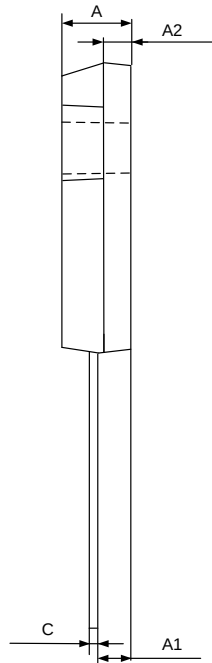
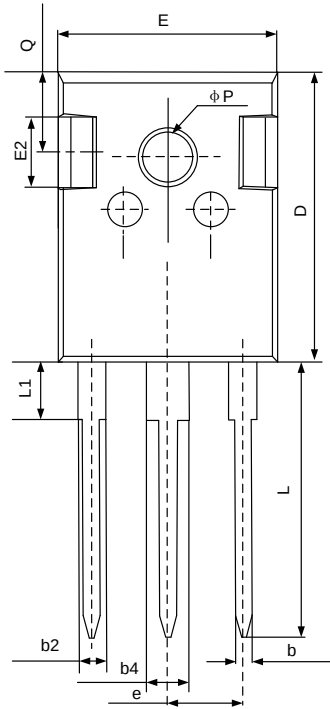


SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	4.30	4.57	4.72
A1	0	0.10	0.25
b	0.71	0.81	0.91
b1	1.17	—	1.50
c	0.30	—	0.60
c2	1.17	1.27	1.37
D	8.50	—	9.35
E	9.80	—	10.45
e	2.54BSC		
H	14.70	—	15.75
L	2.00	2.30	2.74
L1	1.12	1.27	1.42
L2	—	—	1.75

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.
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6. Product promotion is endless, our company will wholeheartedly provide customers with better products!
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Rev.: 1.2

Revision History:

1. Add package of SVGP20110NP7(TO-247-3L)
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Rev.: 1.1

Revision History:

1. Add package of SVGP20110NS(TO-263-2L)
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Rev.: 1.0

Revision History:

1. First release
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