

174A, 40V N-CHANNEL MOSFET

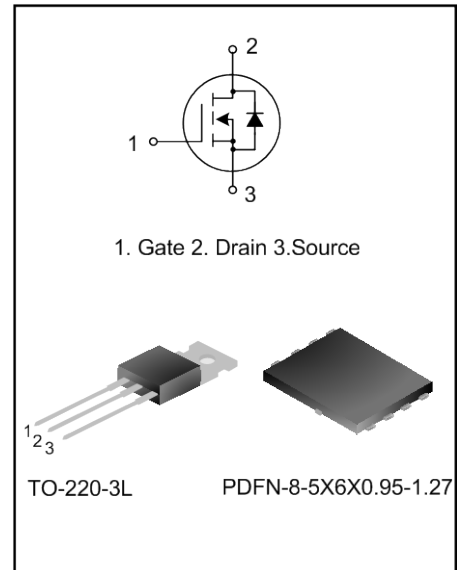
DESCRIPTION

SVT042R5NL5(T) is an N-channel enhancement mode power MOS field effect transistor which is produced using advanced 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

- ◆ 174A,40V, $R_{DS(on)(typ.)}=1.8m\Omega@V_{GS}=10V$
- ◆ Low gate charge
- ◆ Low Crss
- ◆ Fast switching
- ◆ Improved dv/dt capability



ORDERING INFORMATION

Part No.	Package	Marking	Hazardous Substance Control	Packing
SVT042R5NL5TR	PDFN-8-5X6X0.95-1.27	042R5NL5	Halogen free	Tape&Reel
SVT042R5NT	TO-220-3L	042R5NT	Pb free	Tube

ABSOLUTE MAXIMUM RATINGS (Unless otherwise noted, $T_C=25^\circ\text{C}$)

Characteristics	Symbol	Ratings		Unit
		SVT042R5NL5	SVT042R5NT	
Drain-Source Voltage	V_{DS}	40		V
Gate-Source Voltage	V_{GS}	± 20		V
Drain Current	$T_C=25^\circ\text{C}$	240		A
	$T_C=100^\circ\text{C}$	150		
	$T_C=25^\circ\text{C}$ (Package Limited))	100	174	
Drain Current Pulsed	I_{DM}	696		A
Power Dissipation($T_C=25^\circ\text{C}$) -Derate above 25°C	P_D	120	250	W
		0.96	2	W/ $^\circ\text{C}$
Single Pulsed Avalanche Energy(Note 1)	E_{AS}	612		mJ
Operation Junction Temperature Range	T_J	$-55\sim+150$		$^\circ\text{C}$
Storage Temperature Range	T_{stg}	$-55\sim+150$		$^\circ\text{C}$

THERMAL CHARACTERISTICS

Characteristics	Symbol	Ratings		Unit
		SVT042R5NL5	SVT042R5NT	
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	1.04	0.5	$^{\circ}\text{C/W}$
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	50	62.5	$^{\circ}\text{C/W}$

ELECTRICAL CHARACTERISTICS (Unless otherwise noted, $T_c=25^{\circ}\text{C}$)

Characteristics	Symbol	Test conditions	Min.	Typ.	Max.	Unit
Drain -Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	40	--	--	V
Drain-Source Leakage Current	I_{DSS}	$V_{DS}=40V, V_{GS}=0V$	--	--	1.0	μA
Gate-Source Leakage Current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$	--	--	± 100	nA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{GS}=V_{DS}, I_D=250\mu A$	2.2	--	3.8	V
Static Drain- Source On State Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=50A$ (PDFN5*6)	--	1.8	2.4	m Ω
		$V_{GS}=10V, I_D=100A$ (TO-220)		2.0	2.5	
Gate Resistance	R_G	$f=1\text{MHz}$		4.0		Ω
Input Capacitance	C_{iss}	$f=1\text{MHz}, V_{GS}=0V,$ $V_{DS}=25V$	--	5700	--	pF
Output Capacitance	C_{oss}		--	770	--	
Reverse Transfer Capacitance	C_{rss}		--	520	--	
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=20V, V_{GS}=10V, R_G=2.7\Omega,$ $I_D=30A$ (Note 2,3)	--	27	--	ns
Turn-on Rise Time	t_r		--	89	--	
Turn-off Delay Time	$t_{d(off)}$		--	135	--	
Turn-off Fall Time	t_f		--	117	--	
Total Gate Charge	Q_g	$V_{DD}=32V, V_{GS}=10V, I_D=50A$ (Note 2,3)	--	108	--	nC
Gate-Source Charge	Q_{gs}		--	34.4	--	
Gate-Drain Charge	Q_{gd}		--	30.6	--	

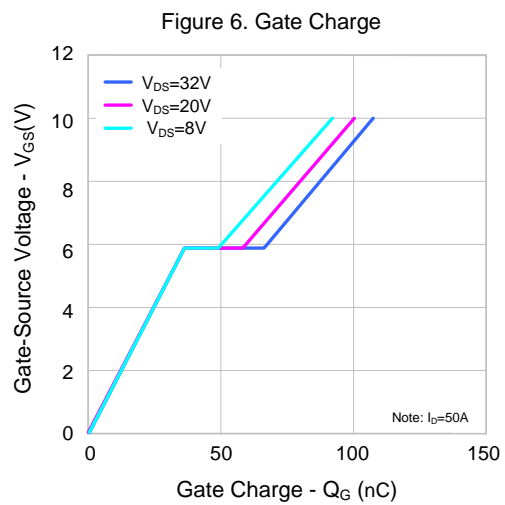
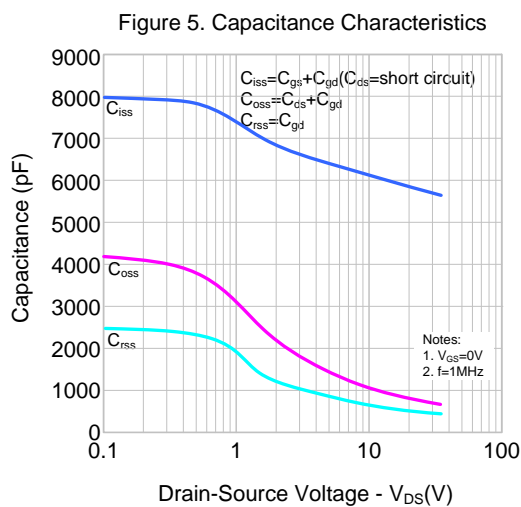
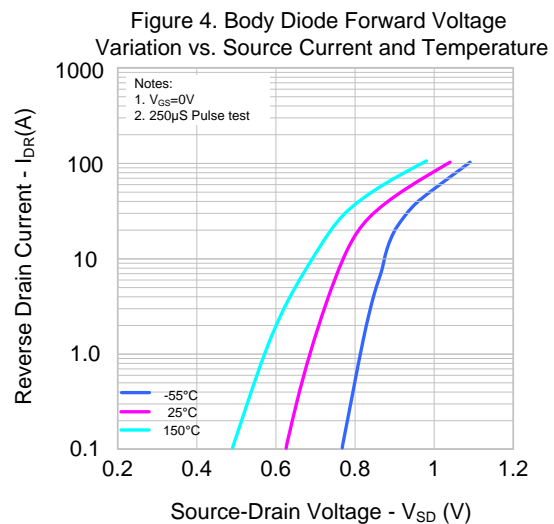
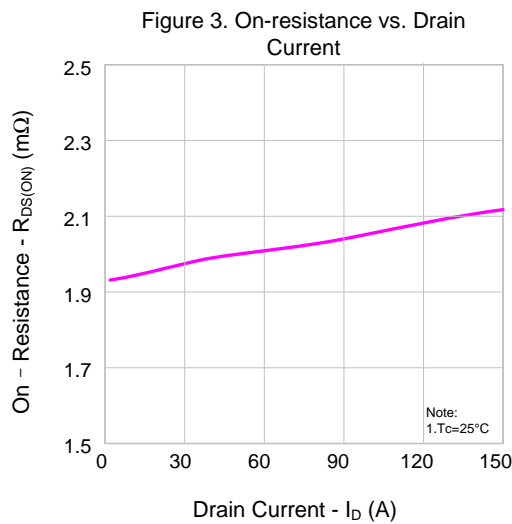
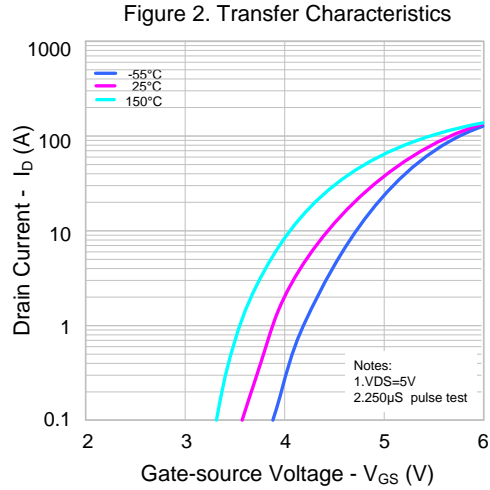
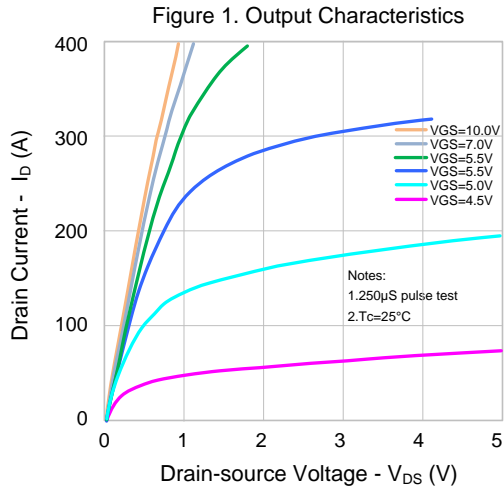
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

Characteristics	Symbol	Test conditions	Min.	Typ.	Max.	Unit
Continuous Source Current	I_S	Integral Reverse P-N Junction	--	--	174	A
Pulsed Source Current	I_{SM}	Diode in the MOSFET	--	--	696	
Diode Forward Voltage	V_{SD}	$I_S=50A, V_{GS}=0V$	--	--	1.0	V
Reverse Recovery Time	T_{rr}	$I_S=50A, V_{GS}=0V,$	--	30	--	ns
Reverse Recovery Charge	Q_{rr}	$dI/dt=100A/\mu s$	--	0.03	--	μC

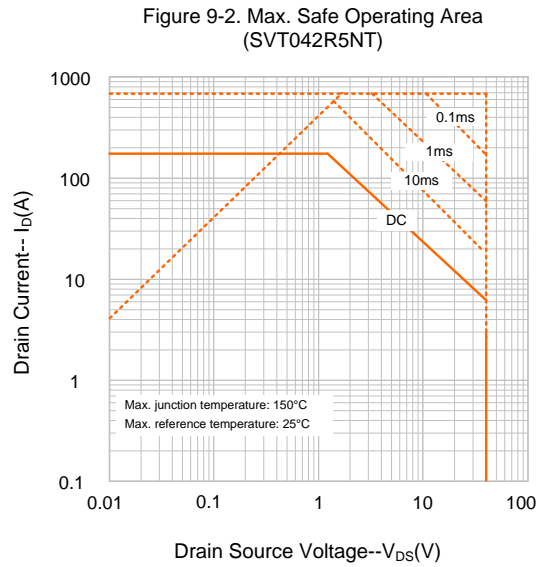
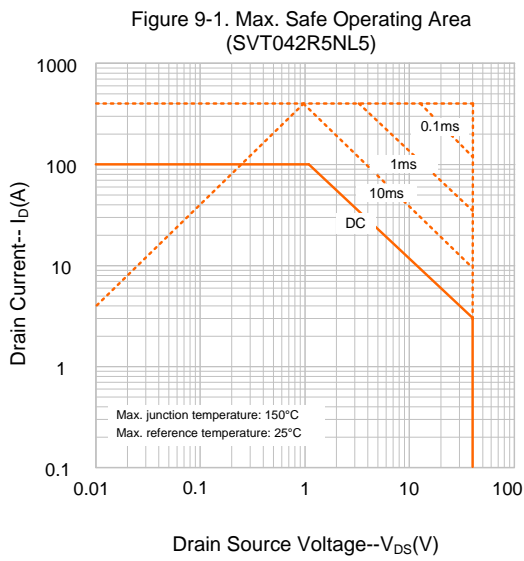
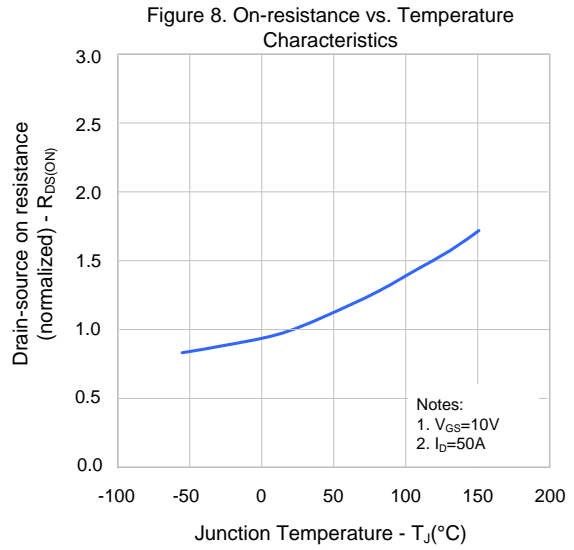
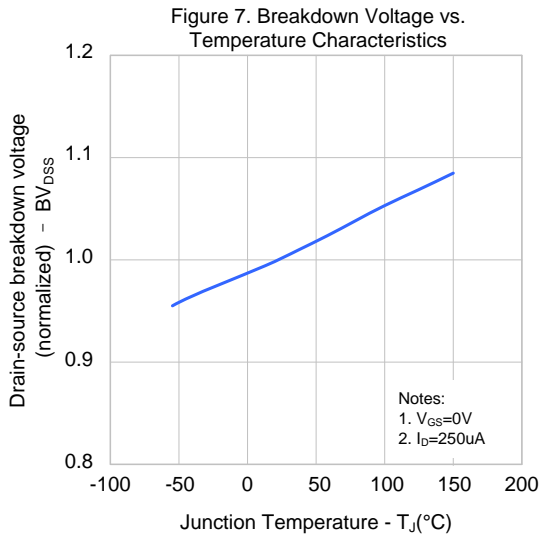
Notes:

- 1.L=1mH, $V_{DD}=38V, R_G=10\Omega$, starting $T_J=25^{\circ}\text{C}$;
- 2.Pulse Test: Pulse width $\leq 300\mu s$, Duty cycle $\leq 2\%$;
- 3.Essentially independent of operating temperature.

TYPICAL CHARACTERISTICS

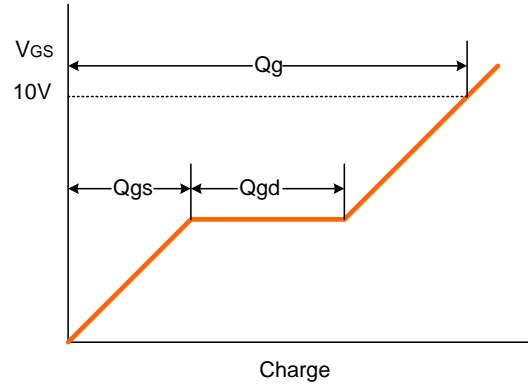
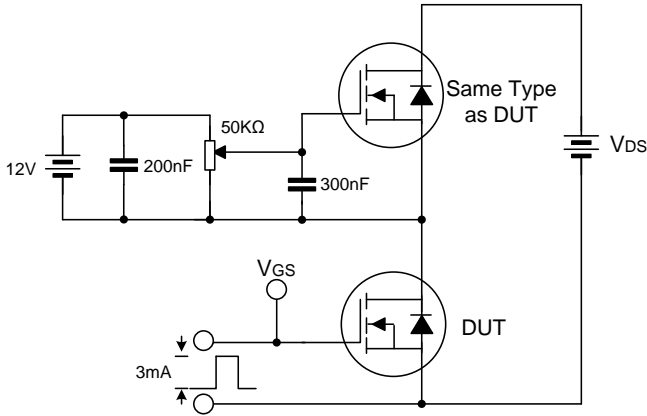


TYPICAL CHARACTERISTICS(continued)

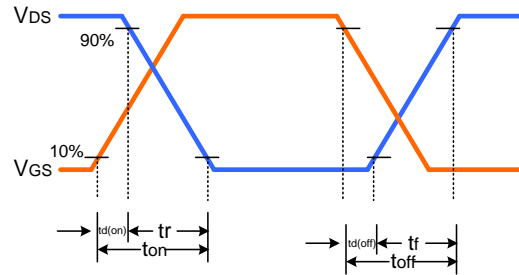
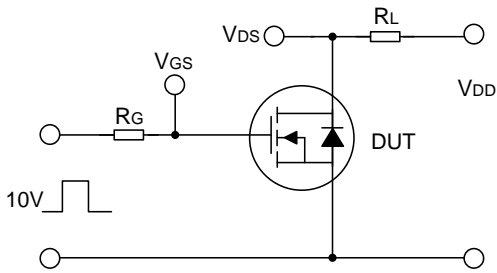


TYPICAL TEST CIRCUIT

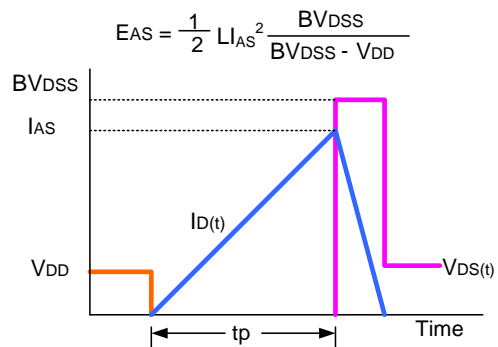
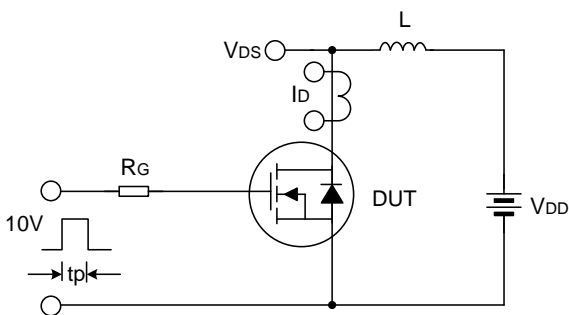
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveform



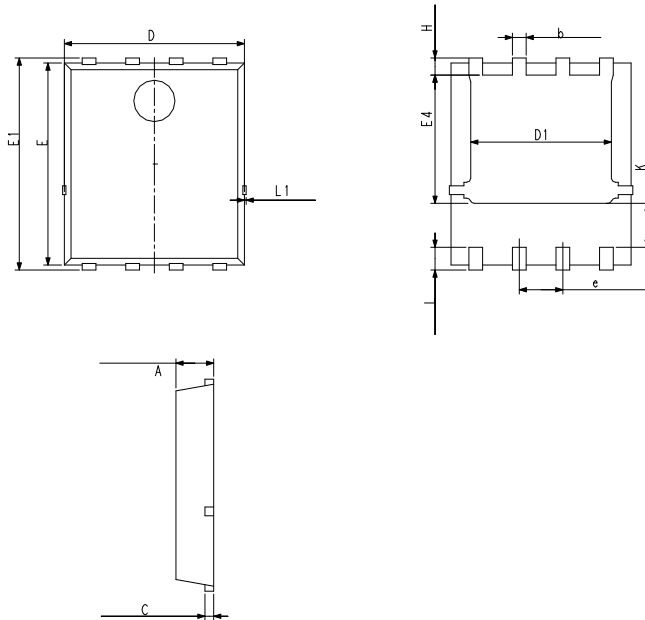
Unclamped Inductive Switching Test Circuit & Waveform



PACKAGE OUTLINE

PDFN-8-5X6X0.95-1.27

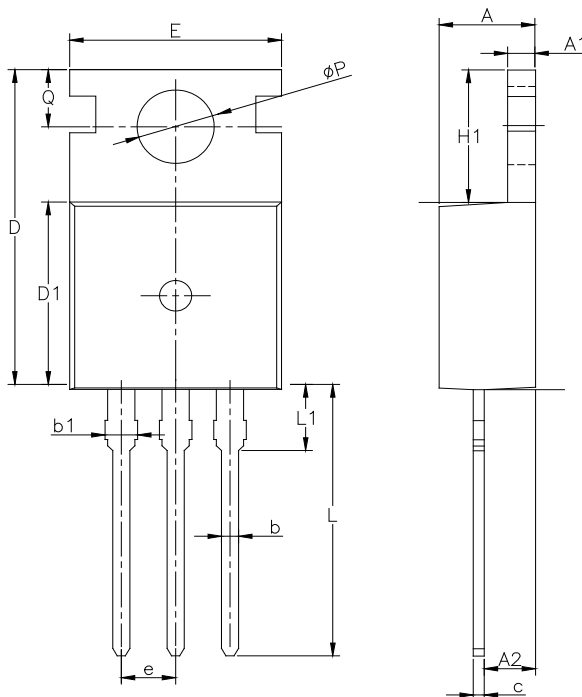
UNIT: mm



SYMBOL	Min	NOM	Max
A	0.90	1.10	1.30
c	0.154	0.254	0.354
D	4.90	5.20	5.50
E	5.56	5.86	6.16
D1	3.80	4.10	4.30
E1	5.85	6.15	6.45
b	0.20	0.40	0.60
K	1.10	1.30	1.50
e	1.07	1.27	1.37
E4	3.52	3.72	3.92
L	0.36	0.66	0.76
L1	--	--	0.12
H	0.30	0.50	0.70

TO-220-3L

UNIT: mm



SYMBOL	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

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Rev.: 1.2

Revision History:

1. Update the value of I_D
 2. Update the SOA
 3. Update the package outline of TO-220-3L
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Rev.: 1.1

Revision History:

1. Add the package outline of TO-220-3L
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Rev.: 1.0

Revision History:

1. First release
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