

240A, 40V N-CHANNEL MOSFET

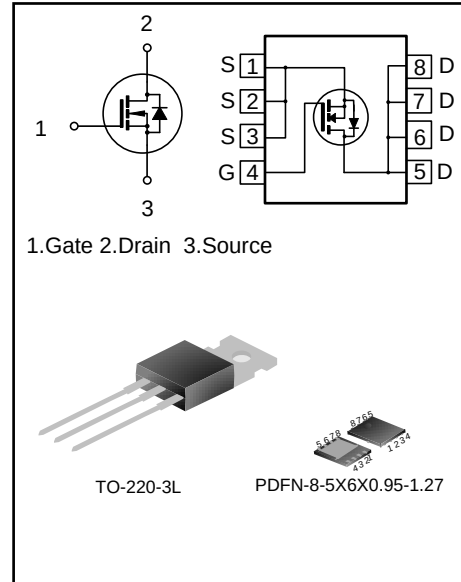
DESCRIPTION

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

- ♦ 240A, 40V, Low gate charge
- ♦ Low Crss
- ♦ Fast switching
- ♦ Improved dv/dt capability



ORDERING INFORMATION

Part No.	Package	Marking	Hazardous Substance Control	Packing Type
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_J=25°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°C	I _D	240		A
	T _C =100°C		150		
	T _C =25°C(Package Limited))		100	174	
Drain Current Pulsed		I _{DM}	960		A
Power Dissipation(T _C =25°C) -Derate above 25°C		P _D	120	250	W
			0.96	2	W/°C
Single Pulsed Avalanche Energy (Note 1)		E _{AS}	612		mJ
Operation Junction Temperature Range		T _J	-55~+150		°C
Storage Temperature Range		T _{stg}	-55~+150		°C

THERMAL CHARACTERISTICS

Characteristics	Symbol	Ratings		Unit
		SVT042R5NL5	SVT042R5NT	
Thermal Resistance, Junction-to-Case	R _{θJC}	1.04	0.5	°C/W
Thermal Resistance, Junction-to-Ambient	R _{θJA}	50	62.5	°C/W

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

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	$f=1MHz$	--	4.0	--	Ω
Input Capacitance	C_{iss}	$f=1MHz, V_{GS}=0V, V_{DS}=25V$	--	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	--	
Gate-Drain Charge	Q_{gd}		--	31	--	

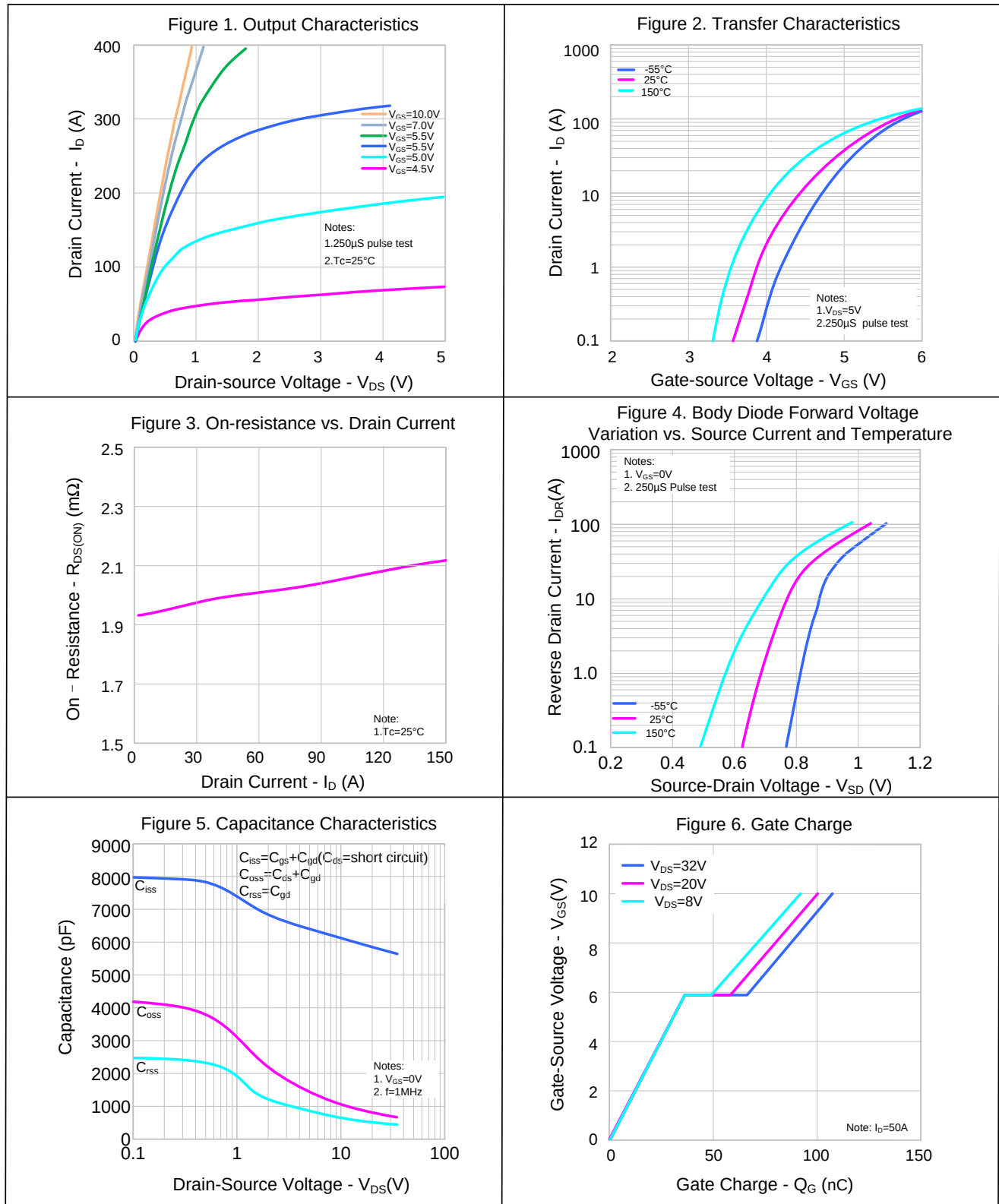
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

Characteristics	Symbol	Test conditions	Min.	Typ.	Max.	Unit
Continuous Source Current	I_S	Integral Reverse P-N Junction Diode in the MOSFET	--	--	240	A
Pulsed Source Current	I_{SM}		--	--	960	
Diode Forward Voltage	V_{SD}	$I_S=50A, V_{GS}=0V$	--	--	1.0	V
Reverse Recovery Time	T_{rr}	$I_S=50A, V_{GS}=0V,$ $dI/dt=100A/\mu s$ (Note 2)	--	30	--	ns
Reverse Recovery Charge	Q_{rr}		--	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)

Figure 7. Breakdown Voltage vs. Temperature Characteristics

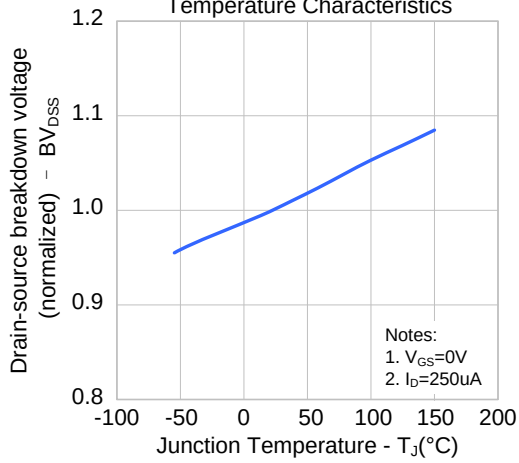


Figure 8. On-resistance vs. Temperature Characteristics

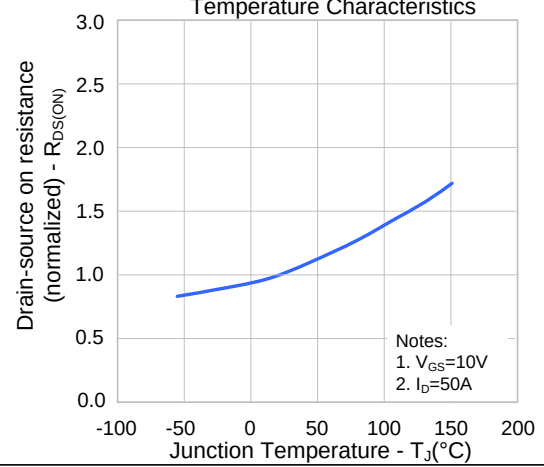


Figure 9-1. Max. Safe Operating Area (SVT042R5NL5)

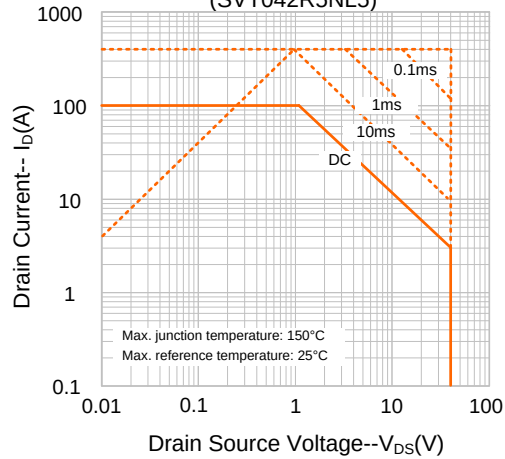
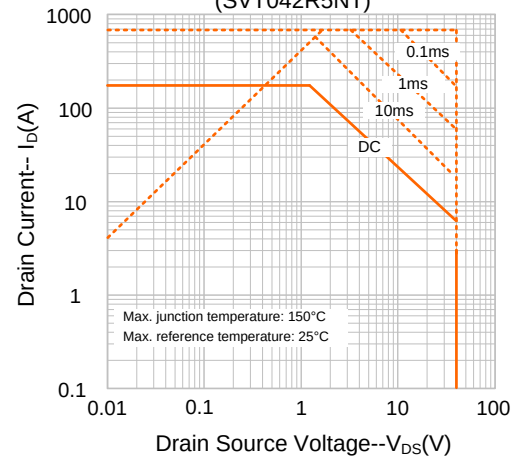
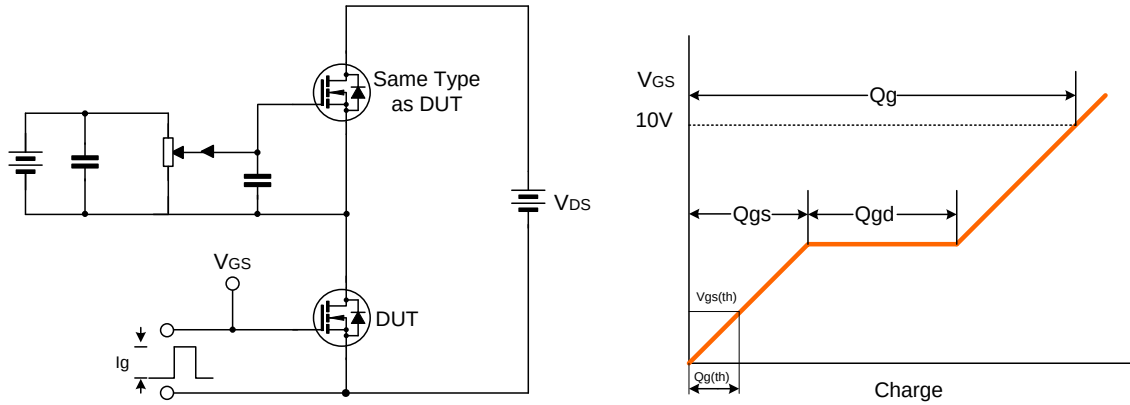


Figure 9-2. Max. Safe Operating Area (SVT042R5NT)

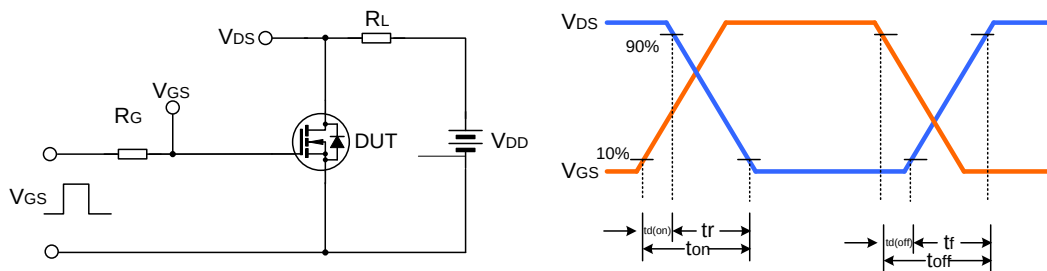


TYPICAL TEST CIRCUIT

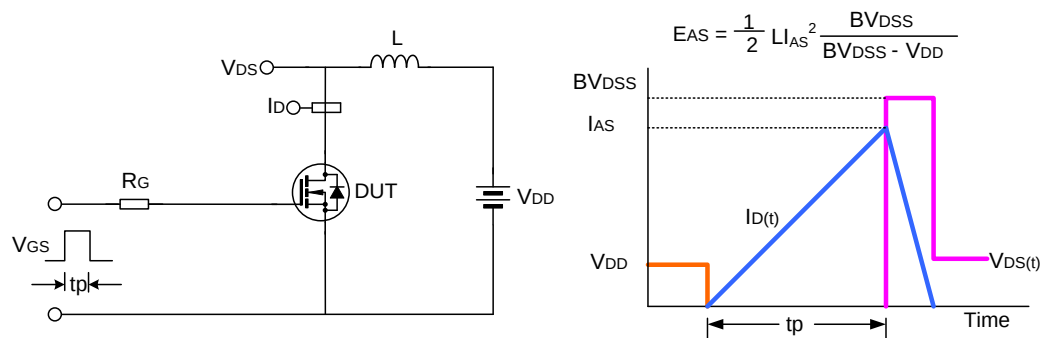
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveform



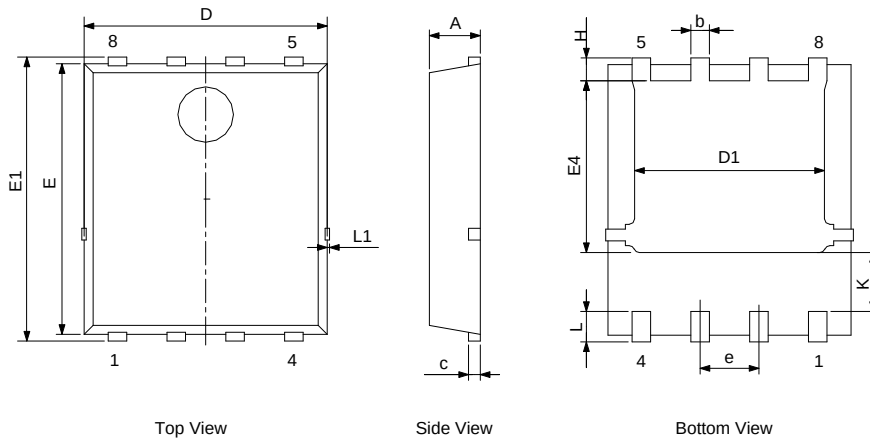
Unclamped Inductive Switching Test Circuit & Waveform



PACKAGE OUTLINE

PDFN-8-5X6X0.95-1.27

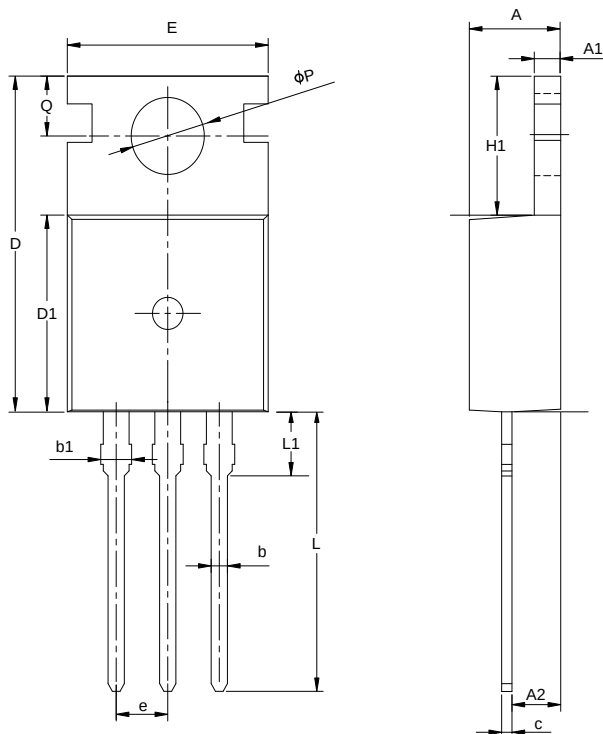
UNIT: mm



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

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

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>

Part No.: SVT042R5NL5

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Rev.: 1.5

Revision History:

1. Delete nomenclature
2. Update package outline
3. Update curve teemplate

Rev.: 1.4

Revision History:

1. Modify PDFN-8-5X6X0.95-1.27

Rev.: 1.3

Revision History:

1. Change Current specification from 174A to 240A
2. Delete RDSON of FEATURES
3. Modify the Max value of I_S to 240A

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

Rev.: 1.1

Revision History:

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

Rev.: 1.0

Revision History:

1. First release