

## 63A, 40V DUAL N-CHANNEL MOSFET

### DESCRIPTION

SVGQ046R8NLPD is dual 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 and high avalanche breakdown tolerance. This device is widely used in power management for UPS and Inverter Systems.

### FEATURES

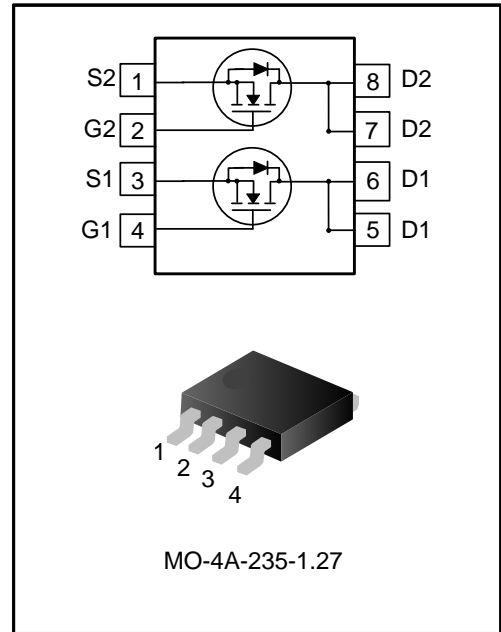
- ♦ AEC-Q101 qualified
- ♦ 63A, 40V,  $R_{DS(on)(typ.)}=5.6m\Omega@V_{GS}=10V$
- ♦ Low gate charge
- ♦ Low  $C_{rss}$
- ♦ Fast switching
- ♦ Extreme  $dv/dt$  rated
- ♦ 100% avalanche tested
- ♦ Pb-free lead plating
- ♦ RoHS compliant
- ♦ Max. junction temperature:  $T_{jmax.}=175\text{ }^{\circ}\text{C}$

### KEY PERFORMANCE PARAMETERS

Characteristics	Ratings	Unit
$V_{DS}$	40	V
$V_{GS(th)}$	2.4~3.4	V
$R_{DS(on),max}$	6.8	$m\Omega$
$I_D$	63	A
$Q_{g,typ}$	18	nC

### ORDERING INFORMATION

Part No.	Package	Marking	Hazardous Substance Control	Packing Type
SVGQ046R8NLPDTR	MO-4A-235-1.27	Q046R8NLP	Halogen free	Tape & Reel



## ABSOLUTE MAXIMUM RATINGS (UNLESS OTHERWISE NOTED, $T_J=25^{\circ}\text{C}$ )

Characteristics	Symbol	Test conditions	Ratings			Unit
			Min.	Typ.	Max.	
Drain-source Voltage	$V_{DS}$	--	--	--	40	V
Gate-source Voltage	$V_{GS}$	--	-20	--	20	V
Drain Current (Note 1)	$I_D$	$T_C=25^{\circ}\text{C}$	--	--	63	A
		$T_C=100^{\circ}\text{C}$	--	--	44	A
Drain Current Pulsed (Note 2)	$I_{DM}$	$T_C=25^{\circ}\text{C}$	--	--	252	A
Power Dissipation (Note 3)	$P_D$	$T_C=25^{\circ}\text{C}$	--	--	50	W
Single Pulsed Avalanche Energy	$E_{AS}$	$L=0.1\text{mH}$ , $V_{DD}=32\text{V}$ , $R_G=25\Omega$ , starting temperature $T_J=25^{\circ}\text{C}$	--	--	35	mJ
Single Pulsed Avalanche Current	$I_{AS}$	--	--	--	26.6	A
Operation Junction Temperature Range	$T_J$	--	-55	--	175	$^{\circ}\text{C}$
Storage Temperature Range	$T_{stg}$	--	-55	--	175	$^{\circ}\text{C}$

## THERMAL CHARACTERISTICS

Characteristics	Symbol	Test conditions	Ratings			Unit
			Min.	Typ.	Max.	
Thermal Resistance, Junction-case, Bottom	$R_{\theta JC}$	--	--	--	3.0	$^{\circ}\text{C/W}$
Thermal Resistance, Junction-ambient	$R_{\theta JA}$	--	--	--	50	$^{\circ}\text{C/W}$
Soldering Temperature(SMD)	$T_{sold}$	Reflow soldering: $10 \pm 1$ sec, 3times	--	--	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	$BV_{DSS}$	$V_{GS}=0V, I_D=250\mu A$	40	--	--	V
Drain-source Leakage Current	$I_{DSS}$	$V_{DS}=40V, V_{GS}=0V, T_J=25^{\circ}\text{C}$	--	--	1.0	$\mu A$
		$V_{DS}=40V, V_{GS}=0V, T_J=150^{\circ}\text{C}$	--	2.5	--	
Gate-source Leakage Current	$I_{GSS}$	$V_{GS}=\pm 20V, V_{DS}=0V$	--	--	$\pm 100$	nA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{GS}=V_{DS}, I_D=250\mu A$	2.4	--	3.4	V
Static Drain-source On State Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=25A$	--	5.6	6.8	$m\Omega$
Grid resistance	$R_g$	$f=1\text{MHz}$	--	2.3	--	$\Omega$

### Dynamic characteristics

Characteristics	Symbol	Test conditions	Ratings			Unit
			Min.	Typ.	Max.	
Input Capacitance	$C_{iss}$	$f=1\text{MHz}, V_{GS}=0V, V_{DS}=25V$	--	1053	--	pF
Output Capacitance	$C_{oss}$		--	357	--	
Reverse Transfer Capacitance	$C_{rss}$		--	28	--	
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=20V, V_{GS}=10V, R_G=3.5\Omega, I_D=50A$ (Notes 4, 5)	--	7.3	--	ns
Turn-on Rise Time	$t_r$		--	25	--	
Turn-off Delay Time	$t_{d(off)}$		--	16	--	
Turn-off Fall Time	$t_f$		--	11	--	
Total Gate Charge	$Q_g$	$V_{DD}=32V, V_{GS}=10V, I_D=50A$ (Notes 4, 5)	--	18	--	nC
Gate-source Charge	$Q_{gs}$		--	7.4	--	
Gate-drain Charge	$Q_{gd}$		--	4.1	--	
Gate-plateau Voltage	$V_{plateau}$		--	6.0	--	V

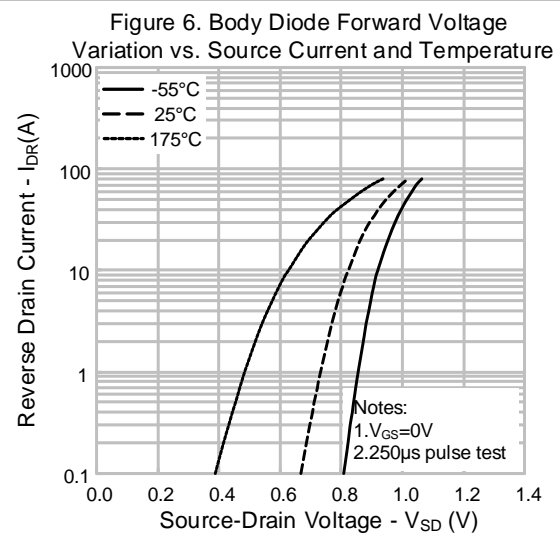
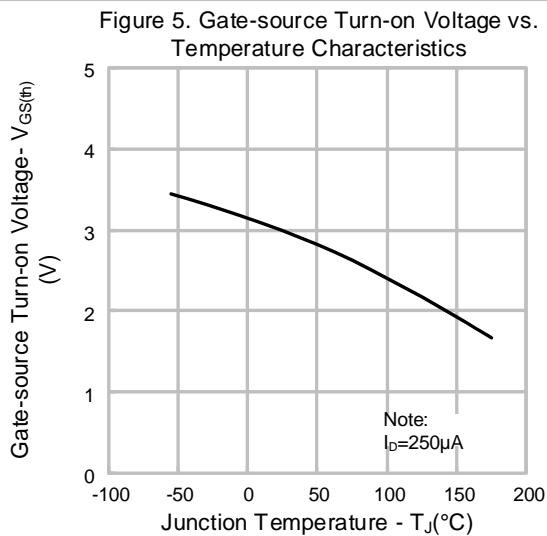
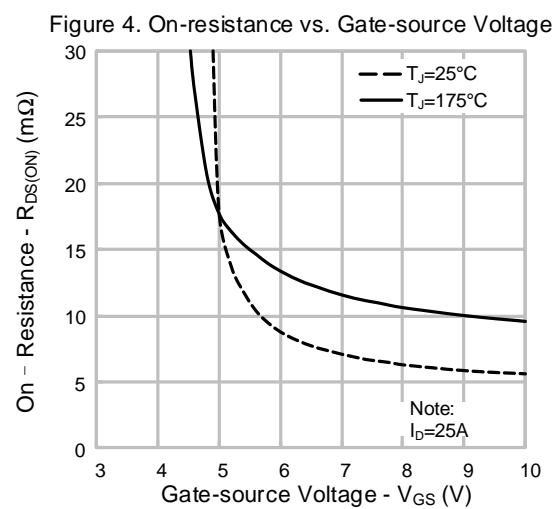
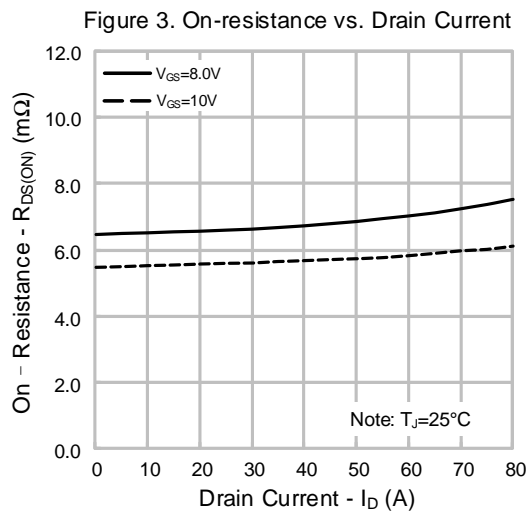
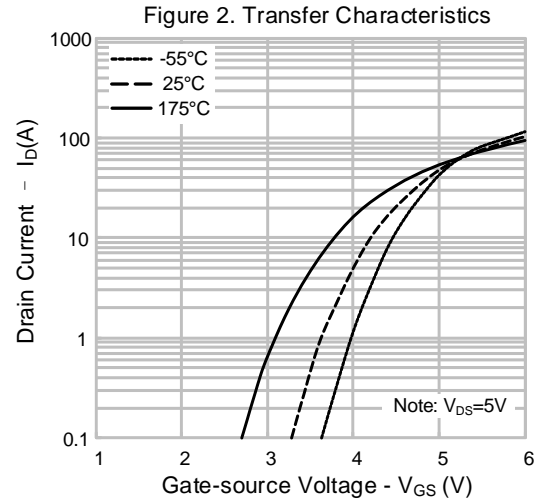
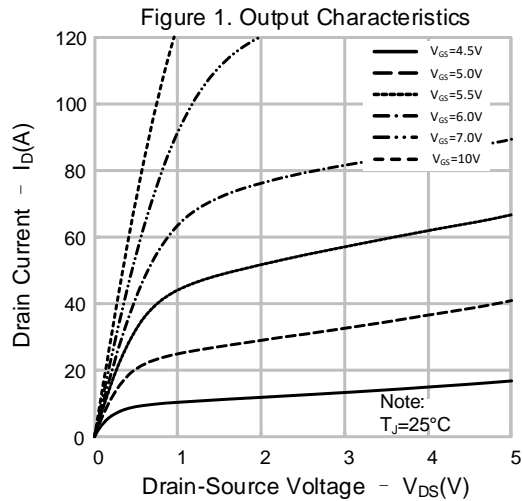
### Reverse diode characteristics

Characteristics	Symbol	Test conditions	Min.	Typ.	Max.	Unit
Continuous Diode Forward Current	$I_S$	Integral reverse P-N junction diode in the MOSFET	--	--	63	A
Diode Pulse Current	$I_{S,pulse}$		--	--	252	
Source-Drain Diode Voltage Drop	$V_{SD}$	$I_S=25A, V_{GS}=0V$	--	--	1.4	V
Reverse Recovery Time	$T_{rr}$	$I_S=50A, V_{GS}=0V, V_R=40V,$	--	30	--	ns
Reverse Recovery Charge	$Q_{rr}$	$dI_F/dt=100A/\mu s$ (Note 4)	--	19	--	nC

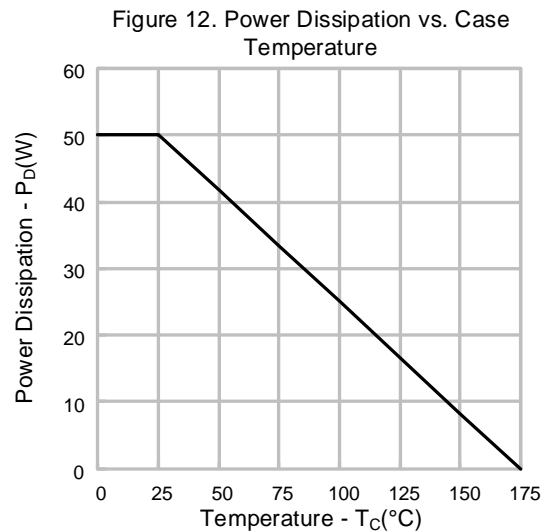
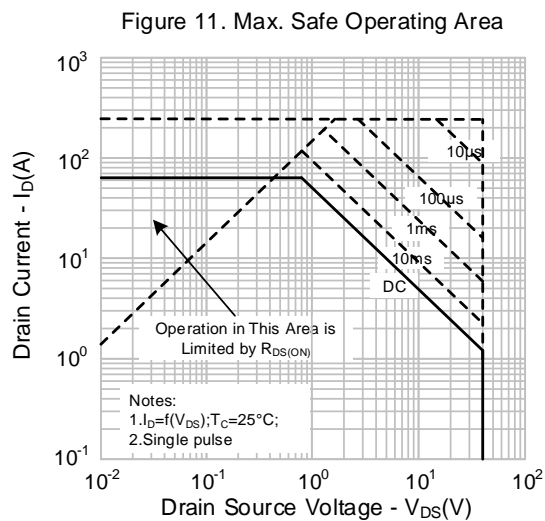
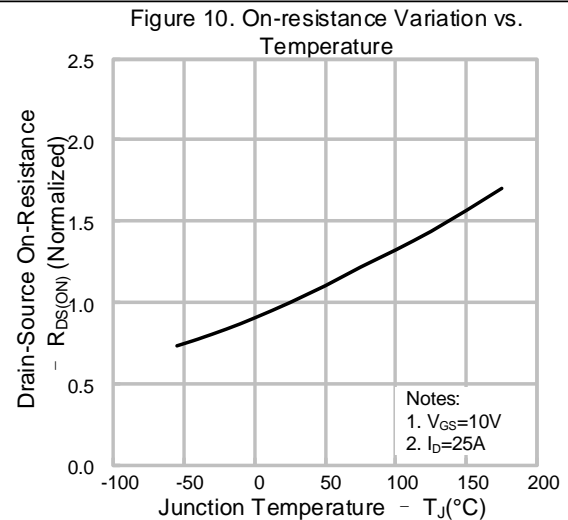
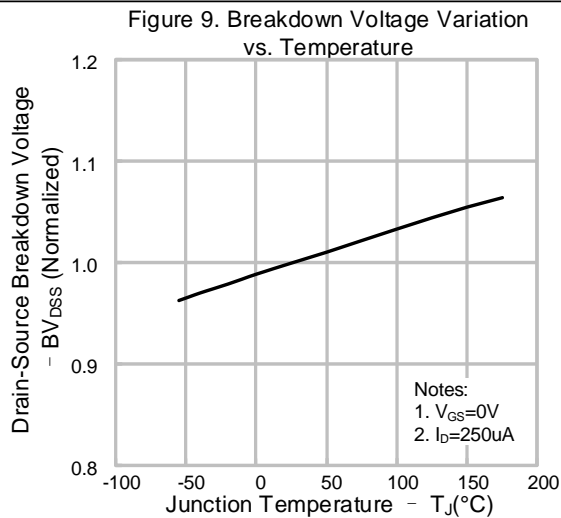
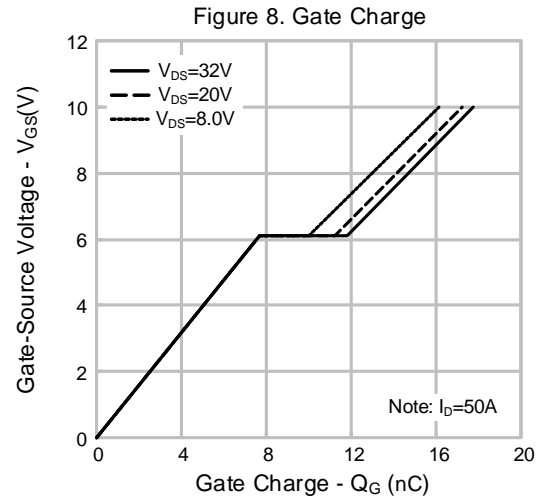
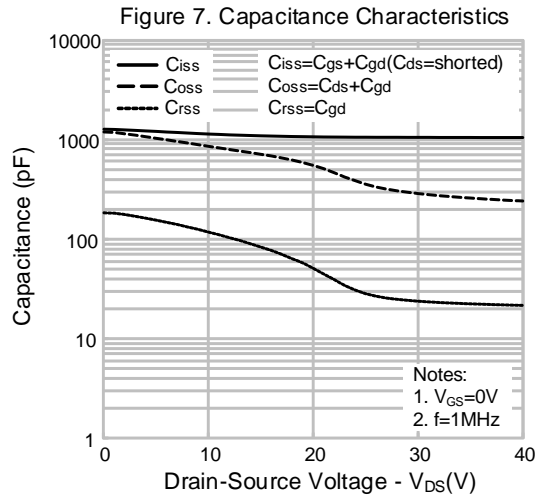
### Notes:

- The rated value only refers to the maximum absolute value at the case temperature of  $25^{\circ}\text{C}$  in the specification. If the case temperature is higher than  $25^{\circ}\text{C}$ , it should be derated according to the actual environmental conditions;
- Pulse time  $5\mu s$ ;
- The dissipation power will change with temperature, derating above  $25^{\circ}\text{C}$ :  $0.33W/^{\circ}\text{C}$ ;
- Pulse Test: Pulse width  $\leq 300\mu s$ , Duty cycle  $\leq 2\%$ ;
- Essentially independent of operating temperature.

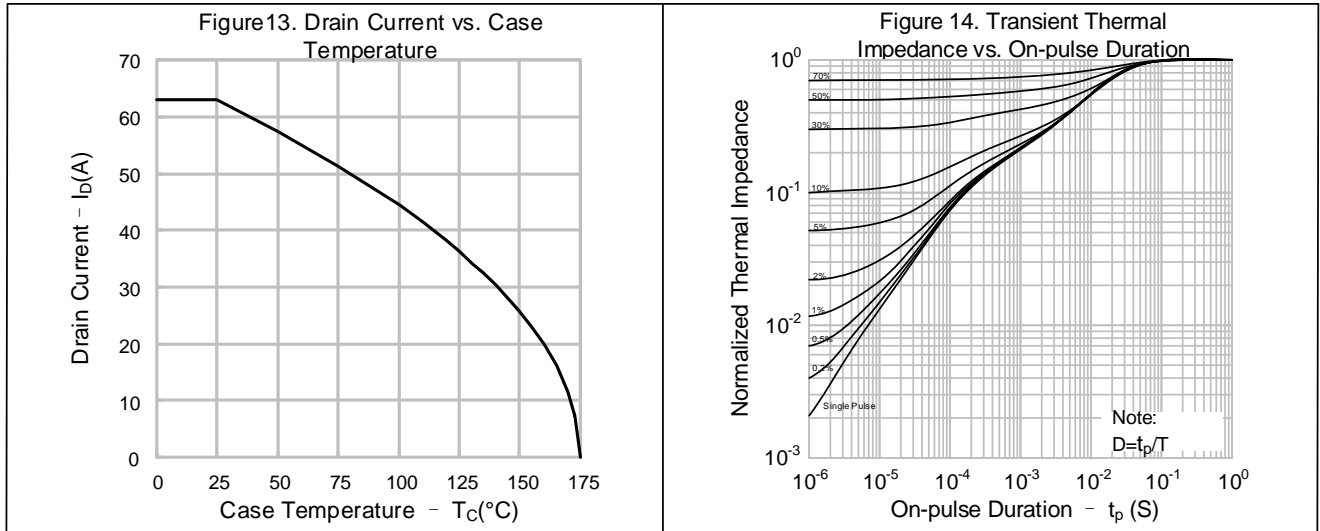
## TYPICAL CHARACTERISTICS



TYPICAL CHARACTERISTICS (CONTINUED)

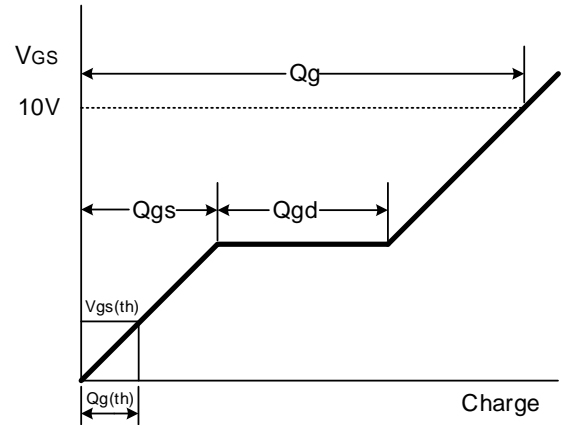
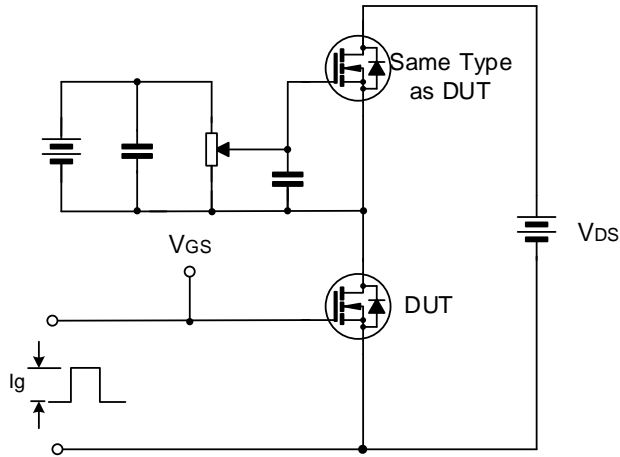


**TYPICAL CHARACTERISTICS (CONTINUED)**

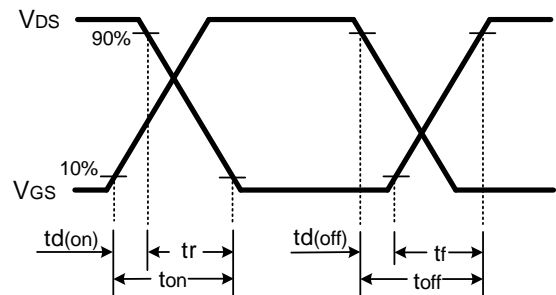
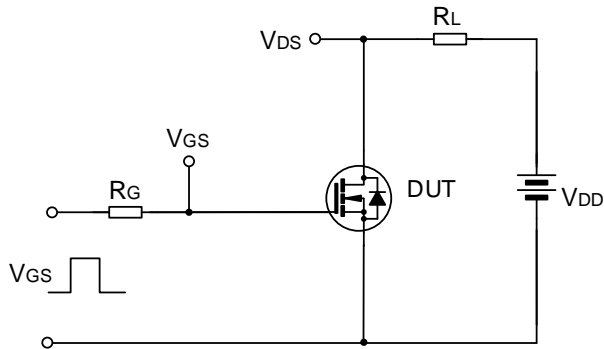


## TYPICAL TEST CIRCUIT

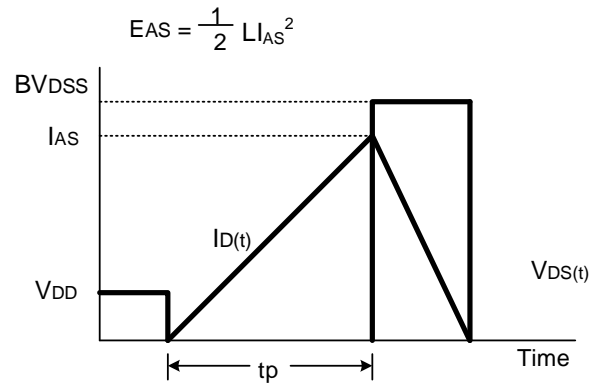
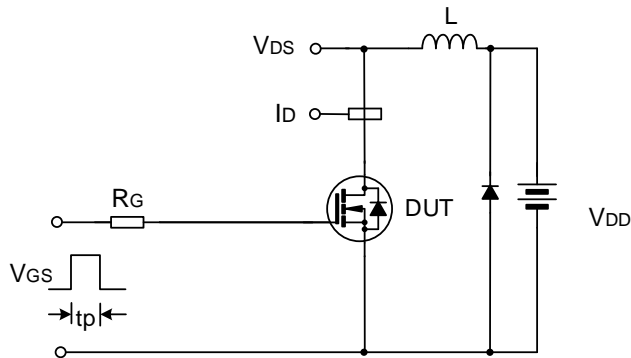
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveform



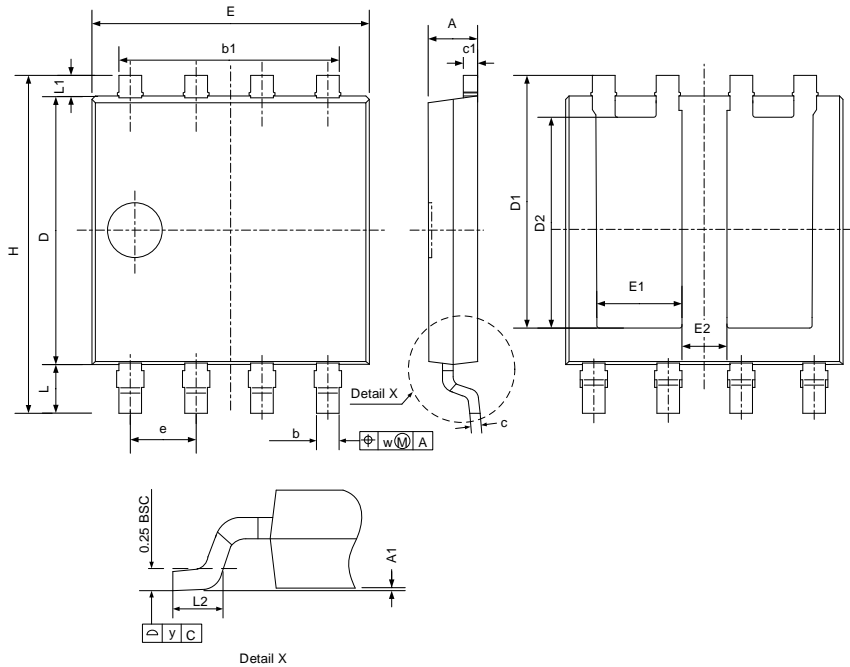
Unclamped Inductive Switching Test Circuit & Waveform



## PACKAGE OUTLINE

MO-4A-235-1.27

UNIT: mm



SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	0.95	1.03	1.10
A1	0	0.05	0.10
b	0.35	0.42	0.50
b1	4.10	4.21	4.40
c	0.19	0.22	0.25
c1	0.24	0.27	0.30
D	4.45	4.59	4.70
D1	—	—	4.80
D2	3.50 REF		
E	4.95	5.10	5.30
E1	1.60	—	1.80
E2	—	—	0.85
e	1.27 BSC		
H	5.90	6.10	6.20
L	0.80	1.08	1.30
L1	0.30	0.44	0.55
L2	0.40	0.60	0.85
w	0.25		
y	0.10		



## MOS DEVICES OPERATE NOTES:

Electrostatic charges may exist in many things. Please take following preventive measures to prevent effectively the MOS electric circuit as a result of the damage which is caused by discharge:

- The operator must put on wrist strap which should be earthed to against electrostatic.
- Equipment cases should be earthed.
- All tools used during assembly, including soldering tools and solder baths, must be earthed.
- MOS devices should be packed in antistatic/conductive containers for transportation.



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Rev.: 1.1

Revision History:

1. Update features
- 

Rev.: 1.0

Revision History:

1. First release
-