



Product Specification

BSC093N04LSG

N-Channel Enhancement Mode MOSFET

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Descriptions

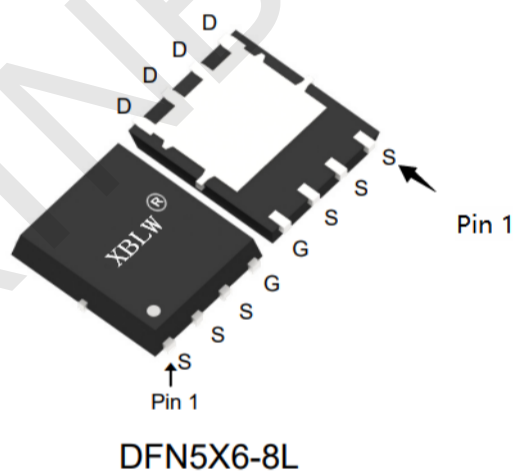
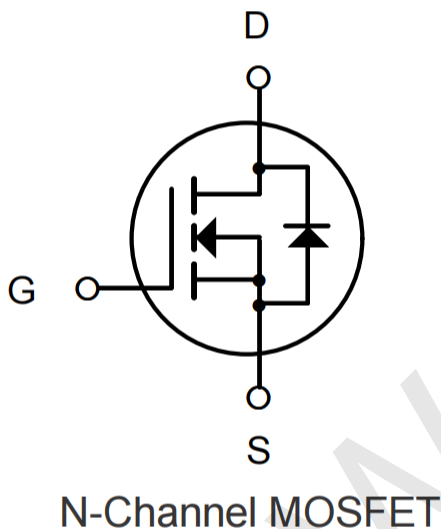
The BSC093N04LSG uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 4.5V. This device is suitable for use as a Battery protection or in other Switching application.

Features

- $V_{DS} = 40V, I_D = 55A$
- $R_{DS(ON)} < 8.5m\Omega @ V_{GS} = 10V$

Applications

- Battery protection
- Load switch
- Uninterruptible power supply



Ordering Information

Product Model	Package Type	Marking	Packing	Packing Qty
BSC093N04LSG	DFN5X6-8L	093N04LS	Tape	5000Pcs/Reel

Absolute Maximum Ratings ($T_C=25\text{ }^{\circ}\text{C}$ unless otherwise specified)

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	40	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_D@T_C=25^{\circ}\text{C}$	Continuous Drain Current, V_{GS} @ 10V ¹	55	A
$I_D@T_C=100^{\circ}\text{C}$	Continuous Drain Current, V_{GS} @ 10V ¹	41	A
I_{DM}	Pulsed Drain Current ²	280	A
EAS	Single Pulse Avalanche Energy ³	76	mJ
T_{STG}	Storage Temperature Range	-55 to 175	$^{\circ}\text{C}$
T_J	Operating Junction Temperature Range	-55 to 175	$^{\circ}\text{C}$

Electrical Characteristics ($T_c=25^{\circ}\text{C}$ unless otherwise specified)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV _{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	40	---	---	V
R _{DS(ON)}	Static Drain-Source On-Resistance ²	$V_{GS}=10V, I_D=15A$	---	6.5	8.5	mΩ
		$V_{GS}=4.5V, I_D=8A$	---	9	12	
V _{GS(th)}	Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=250\mu A$	1.2	1.8	2.5	V
I _{DSS}	Drain-Source Leakage Current	$V_{DS}=40V, V_{GS}=0V, T_J=25^{\circ}\text{C}$	---	---	1	μA
		$V_{DS}=40V, V_{GS}=0V, T_J=55^{\circ}\text{C}$	---	---	5	
I _{GSS}	Gate-Source Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$	---	---	±100	nA
R _g	Gate Resistance	$V_{DS}=0V, V_{GS}=0V, f=1\text{MHz}$	---	2.0	---	Ω
Q _g	Total Gate Charge (4.5V)	$V_{DS}=20V, V_{GS}=10V, I_D=10A$	---	19.7	---	nC
Q _{gs}	Gate-Source Charge		---	2.8	---	
Q _{gd}	Gate-Drain Charge		---	5.1	---	
T _{d(on)}	Turn-On Delay Time	$V_{DD}=15V, V_{GS}=10V, R_G=3.3\Omega, I_D=1A$	---	13.2	---	ns
T _r	Rise Time		---	2.2	---	
T _{d(off)}	Turn-Off Delay Time		---	72	---	
T _f	Fall Time		---	4.5	---	
C _{iss}	Input Capacitance	$V_{DS}=15V, V_{GS}=0V, f=1\text{MHz}$	---	6000	---	pF
C _{oss}	Output Capacitance		---	1509	---	
C _{rss}	Reverse Transfer Capacitance		---	129	---	
I _S	Continuous Source Current ^{1,5}	$V_G=V_D=0V, \text{Force Current}$	---	---	140	A
V _{SD}	Diode Forward Voltage ²	$V_{GS}=0V, I_S=1A, T_J=25^{\circ}\text{C}$	---	---	1	V

Note :

- 1.The data tested by surface mounted on a 1 inch² FR-4 board with 20Z copper.
- 2.The data tested by pulsed , pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.
- 3.The EAS data shows Max. rating . The test condition is $V_{DD}=25V, V_{GS}=10V, L=0.1\text{mH}, I_{AS}=31A$.
- 4.The power dissipation is limited by 150°C junction temperature.
- 5.The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation.

Typical Characteristics

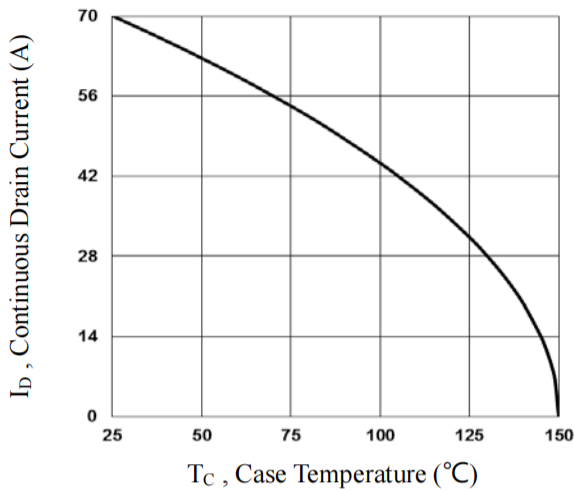


Fig 1. Continuous Drain Current vs. T_C

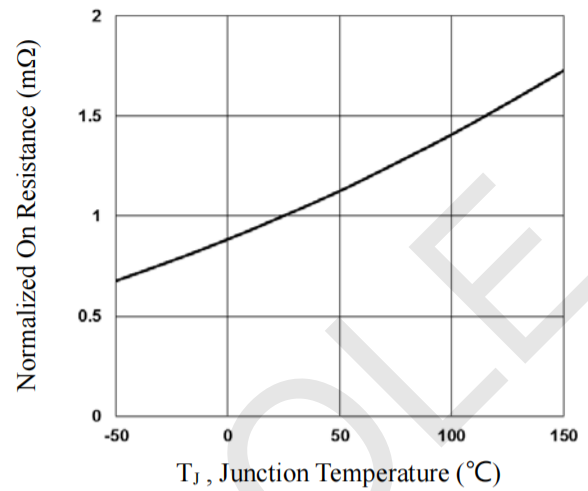


Fig 2. Normalized $R_{DS(on)}$ vs. T_J

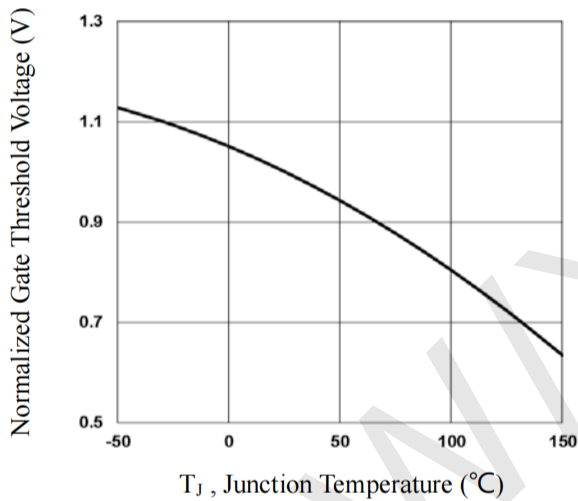


Fig 3. Normalized V_{th} vs. T_J

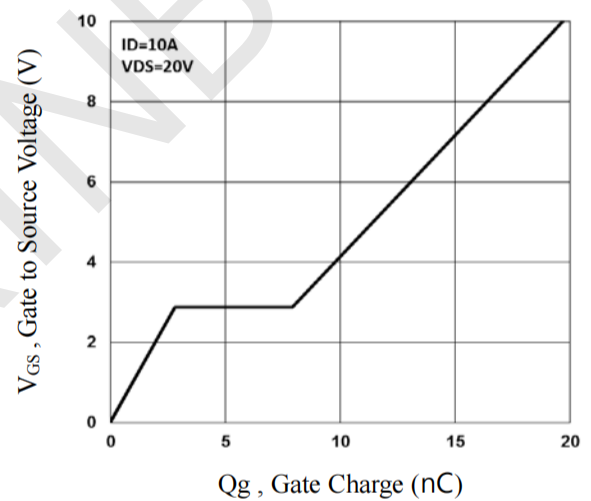


Fig 4. Gate Charge Waveform

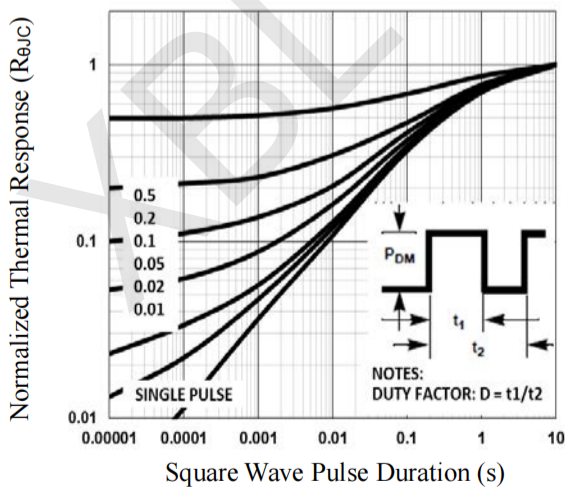


Fig 5. Normalized Transient Impedance

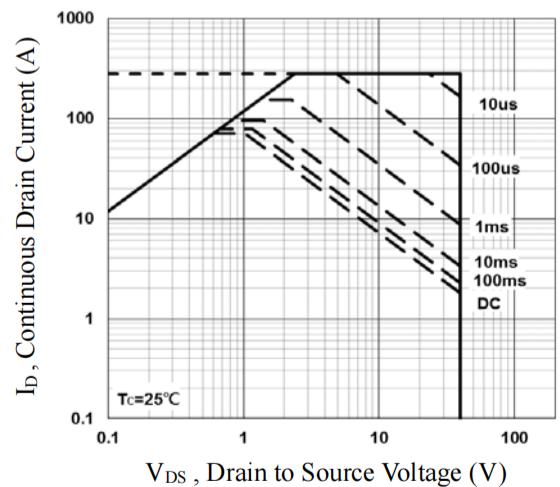


Fig 6. Maximum Safe Operation Area

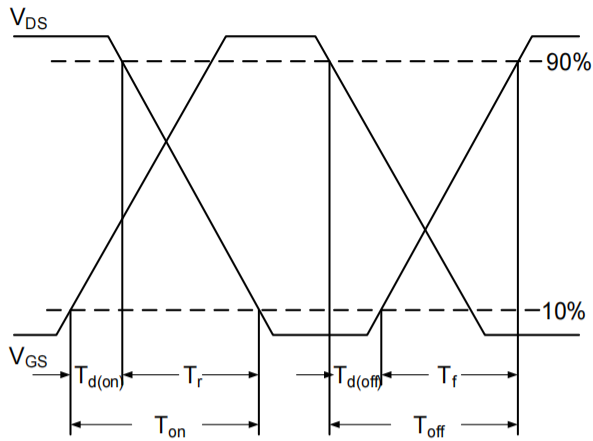


Fig 7. Switching Time Waveform

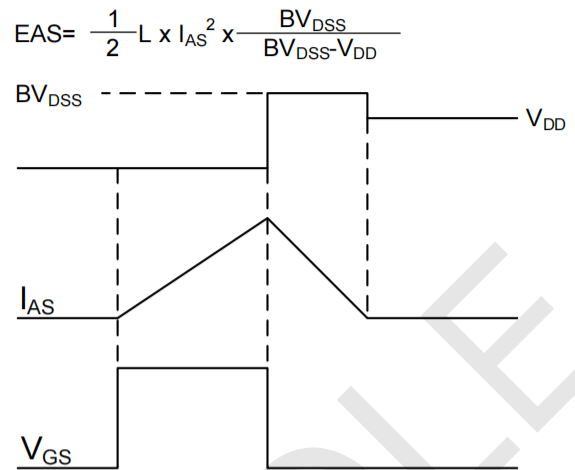
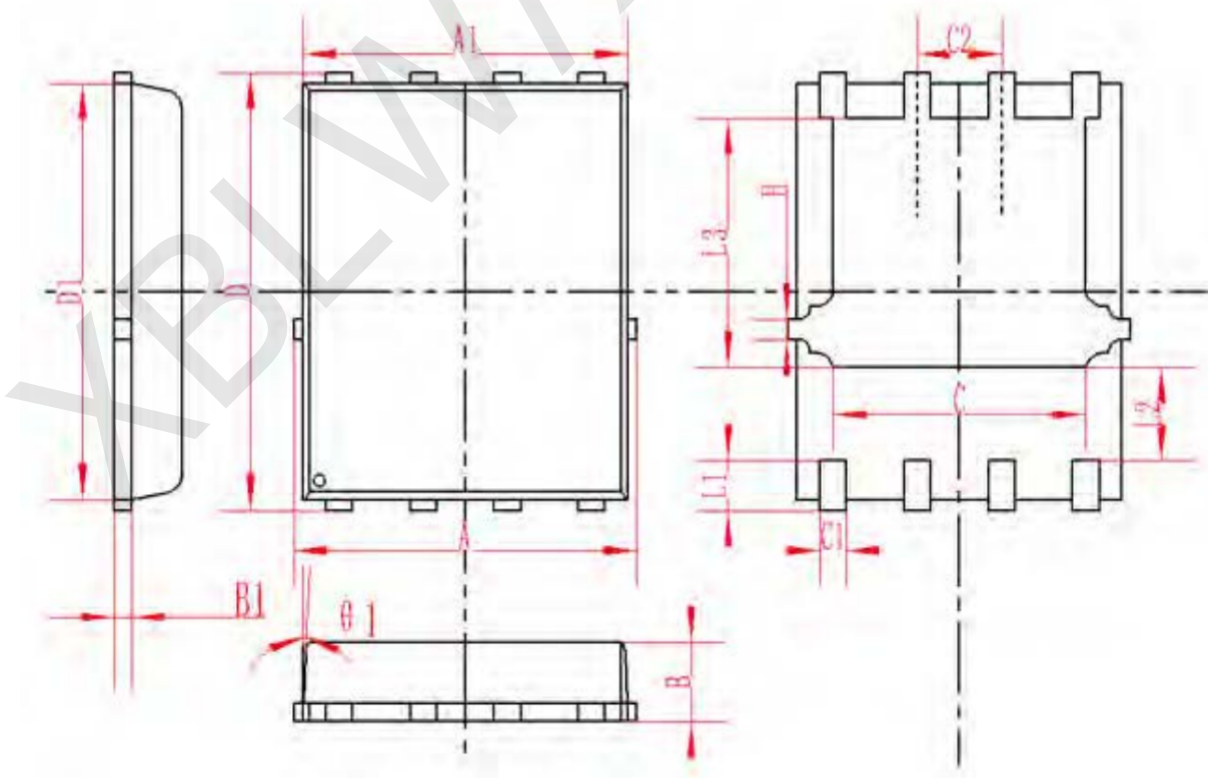


Fig 8. EAS Waveform

Package Information

DFN5X6-8L

SYMBOL	MM			INCH		
	MIN	NOM	MAX	MIN	NOM	MAX
A	4.95	5	5.05	0.195	0.197	0.199
A1	4.82	4.9	4.98	0.190	0.193	0.196
D	5.98	6	6.02	0.235	0.236	0.237
D1	5.67	5.75	5.83	0.223	0.226	0.230
B	0.9	0.95	1	0.035	0.037	0.039
B1	0.254REF			0.010REF		
C	3.95	4	4.05	0.156	0.157	0.159
C1	0.35	0.4	0.45	0.014	0.016	0.018
C2	1.27TYP			0.5TYP		
θ1	8°	10°	12°	8°	10°	12°
L1	0.63	0.64	0.65	0.025	0.025	0.026
L2	1.2	1.3	1.4	0.047	0.051	0.055
L3	3.415	3.42	3.425	0.134	0.135	0.135
H	0.24	0.25	0.26	0.009	0.010	0.010



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