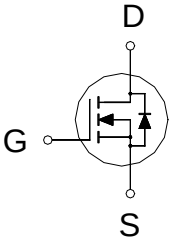
N-Channel Logic Level Enhancement Mode Field Effect Transistor

Product Summary:

BV_{DSS}	100V
$R_{DSON\ (MAX.)}$	500mΩ
I_D	0.9A



UIS 100% Tested

Pb-Free Lead Plating & Halogen Free

ABSOLUTE MAXIMUM RATINGS (T_A = 25 °C Unless Otherwise Noted)

PARAMETERS/TEST CONDITIONS		SYMBOL	LIMITS	UNIT
Gate-Source Voltage		V_{GS}	±20	V
Continuous Drain Current	T_A = 25 °C	I_D	0.9	A
	T_A = 100 °C		0.55	
Pulsed Drain Current[1]		I_{DM}	3.6	
Power Dissipation	T_A = 25 °C	P_D	1.04	W
	T_A = 100 °C		0.66	
Operating Junction & Storage Temperature Range		T_j, T_{stg}	-55 to 150	°C

THERMAL RESISTANCE RATINGS

THERMAL RESISTANCE	SYMBOL	TYPICAL	MAXIMUM	UNIT
Junction-to-Ambient[3]	$R_{\theta JA}$ (T ≤ 10sec)		83	°C / W
	$R_{\theta JA}$ (Steady State)		120	

[1]Pulse width limited by maximum junction temperature.

[2]Duty cycle ≤ 1%

[3]The device mounted on a 1 in^2 pad of 2 oz copper.

ELECTRICAL CHARACTERISTICS (T_J = 25 °C, Unless Otherwise Noted)

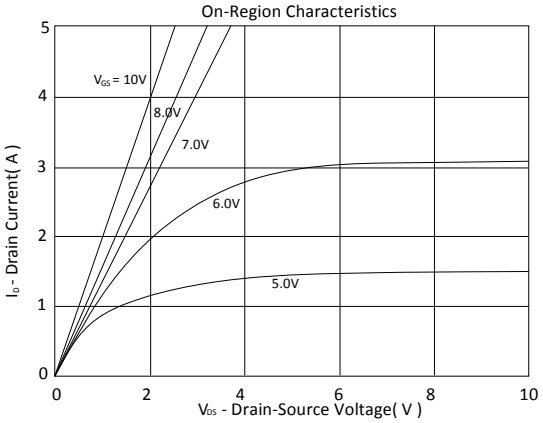
PARAMETER	SYMBOL	TEST CONDITIONS	LIMITS			UNIT
			MIN	TYP	MAX	
STATIC						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D = 250μA	100			V
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250μA	1	2	3	
Gate-Body Leakage	I_{GSS}	V_{DS} = 0V, V_{GS} = ±20V			±100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 80V, V_{GS} = 0V			1	μA
		V_{DS} = 70V, V_{GS} = 0V, T_J = 125 °C			25	
On-State Drain Current[1]	$I_{D(ON)}$	V_{DS} = 5V, V_{GS} = 10V	0.9			A
Drain-Source On-State Resistance[1]	$R_{DS(ON)}$	V_{GS} = 10V, I_D = 0.9A		450	500	mΩ
		V_{GS} = 5V, I_D = 0.5A		485	570	
Forward Transconductance[1]	g_{fs}	V_{DS} = 5V, I_D = 0.9A		2		S
DYNAMIC						
Input Capacitance	C_{iss}	V_{GS} = 0V, V_{DS} = 50V, f = 1MHz		328		pF
Output Capacitance	C_{oss}			35		
Reverse Transfer Capacitance	C_{rss}			21		
Total Gate Charge[1,2]	Q_g	V_{DS} = 50V, V_{GS} = 10V, I_D = 0.9A		7.6		nC
Gate-Source Charge[1,2]	Q_{gs}			1.1		
Gate-Drain Charge[1,2]	Q_{gd}			2.7		
Turn-On Delay Time[1,2]	$t_{d(on)}$	V_{DS} = 50V, I_D = 0.9A, V_{GS} = 10V, R_{GS} = 6Ω		12		nS
Rise Time[1,2]	t_r			15		
Turn-Off Delay Time[1,2]	$t_{d(off)}$			25		
Fall Time[1,2]	t_f			20		
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS (T_C = 25 °C)						
Continuous Current	I_S				0.9	A
Pulsed Current[3]	I_{SM}				3.6	
Forward Voltage[1]	V_{SD}	I_F = I_S, V_{GS} = 0V			1.2	V
Reverse Recovery Time	t_{rr}			30		nS
Reverse Recovery Charge	Q_{rr}			60		nC

[1]Pulse test : Pulse Width ≤ 300 μsec, Duty Cycle ≤ 2%.

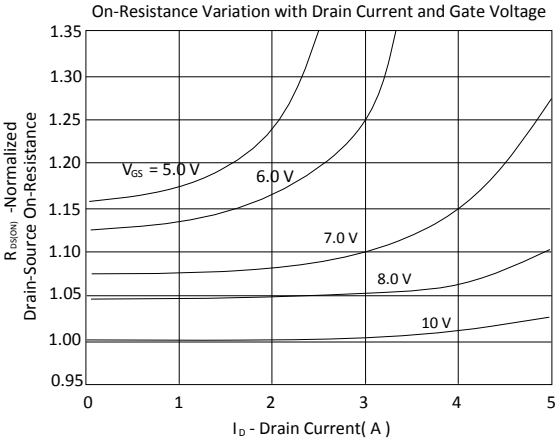
[2]Independent of operating temperature.

[3]Pulse width limited by maximum junction temperature.

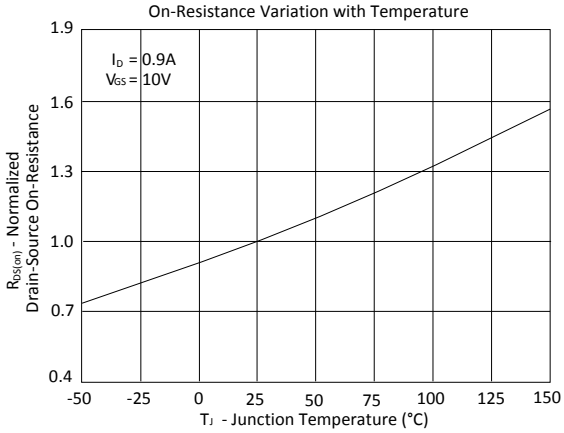
On-Region Characteristics



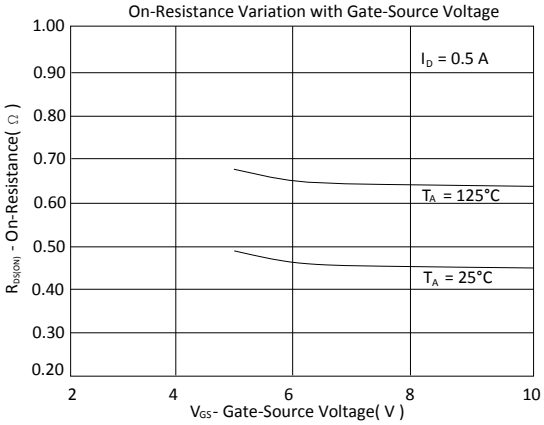
On-Resistance Variation with Drain Current and Gate Voltage



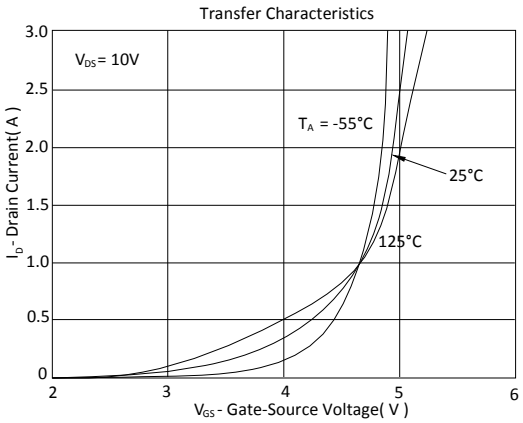
On-Resistance Variation with Temperature



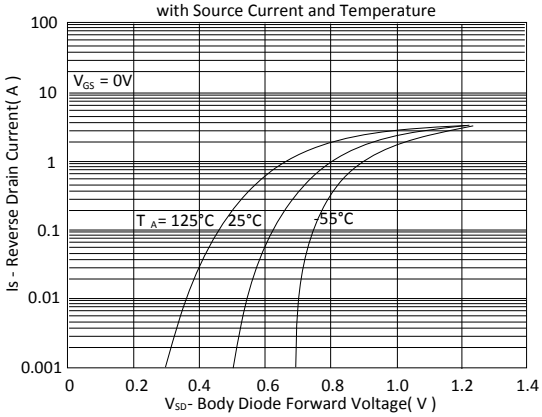
On-Resistance Variation with Gate-Source Voltage

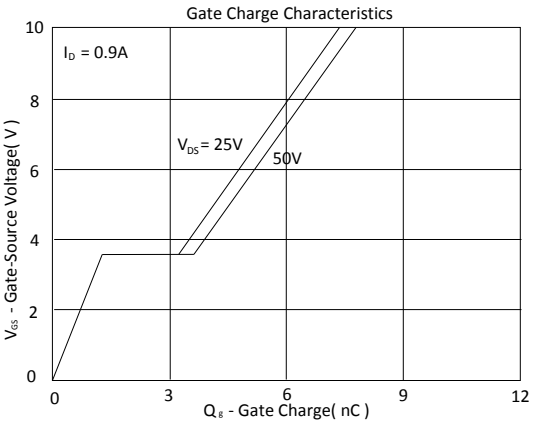


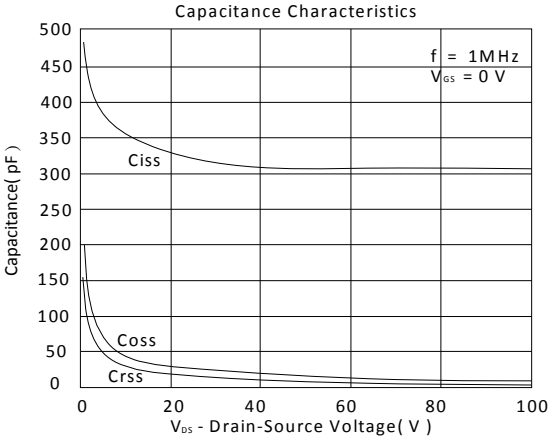
Transfer Characteristics

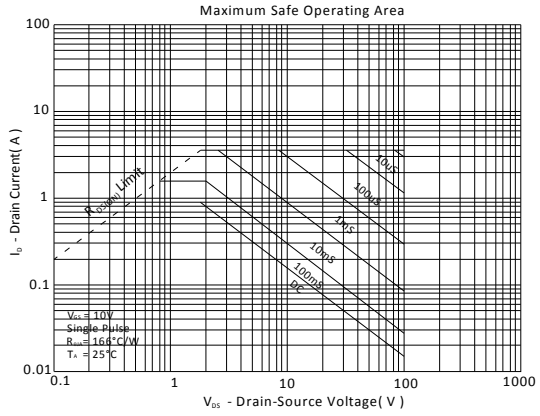


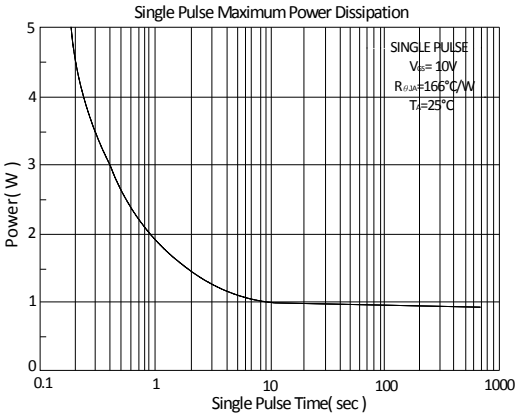
Body Diode Forward Voltage Variation
with Source Current and Temperature

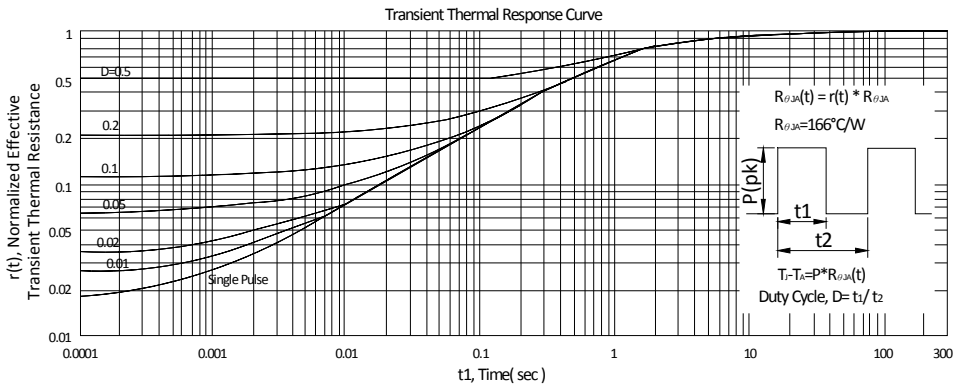



Gate Charge Characteristics
I_D = 0.9A
V_{DS}= 25V
50V
V_{GS} - Gate-Source Voltage(V)
Q_g - Gate Charge(nC)


Capacitance Characteristics
f = 1MHz
V_{GS} = 0 V
Ciss
Coss
Crss
Capacitance(pF)
V_{DS} - Drain-Source Voltage(V)

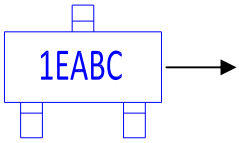

Maximum Safe Operating Area
$R_{DS(ON)}$ Limit
10ms
100ms
1s
10s
100s
DC
V_{GS} = 10V
Single Pulse
$R_{\theta JA}$= 166°C/W
T_A = 25°C
I_D - Drain Current(A)
V_{DS} - Drain-Source Voltage(V)


Single Pulse Maximum Power Dissipation
SINGLE PULSE
V_{GS}= 10V
$R_{\theta JA}$=166°C/W
T_A=25°C
Power(W)
Single Pulse Time(sec)


Transient Thermal Response Curve
D=0.5
0.2
0.1
0.05
0.02
0.01
Single Pulse
$R_{\theta JA}(t) = r(t) * R_{\theta JA}$
$R_{\theta JA}$=166°C/W
P(pk)
t1
t2
$T_J-T_A=P*R_{\theta JA}(t)$
Duty Cycle, D= t_1/t_2
r(t), Normalized Effective Transient Thermal Resistance
t1, Time(sec)

Ordering & Marking Information:

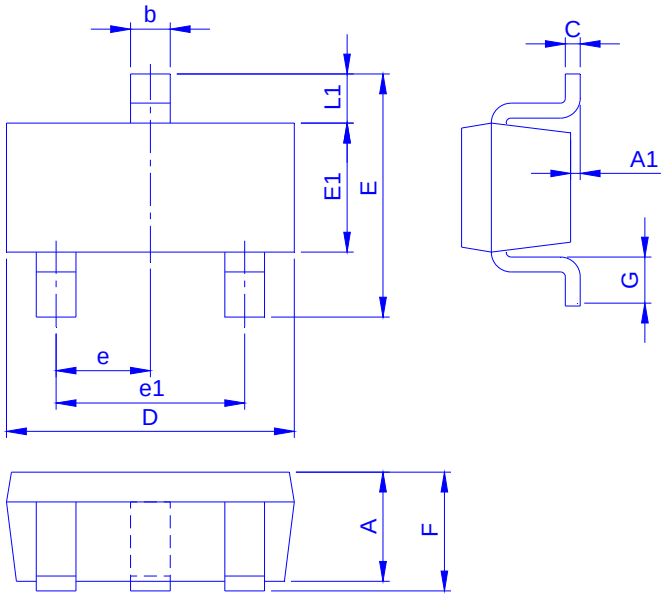
Device Name: LB0N10QS for SOT-23



1E: Device Code, 1E for LB0N10QS

ABC: Date Code

Outline Drawing



Dimension in mm

Dimension	A	A1	b	C	D	E	E1	e	e1	F	G	L1
Min.	0.70	0	0.3	0.08	2.80	2.25	1.2	0.90		0.80	0.3	0.50
Typ.					2.90			0.95	1.9			
Max.	1.15	0.1	0.5	0.20	3.02	3.00	1.7	1.00		1.25	0.6	0.75

Footprint