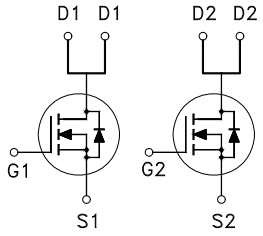
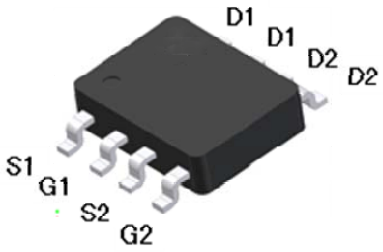
Dual N-Channel Logic Level Enhancement Mode Field Effect Transistor

Product Summary:

BV_{DSS}	30V
$R_{DSON\ (MAX.)}$	21mΩ
I_D	7.5A





UIS, Rg 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	7.5	A
	T_A = 100 °C		5.5	
Pulsed Drain Current[1]		I_{DM}	30	
Avalanche Current		I_{AS}	10	
Avalanche Energy	L = 0.1mH, ID=7.5A, RG=25Ω	E_{AS}	2.8	mJ
Repetitive Avalanche Energy[2]	L = 0.05mH	E_{AR}	1.4	
Power Dissipation	T_A = 25 °C	P_D	2	W
	T_A = 100 °C		0.8	
Operating Junction & Storage Temperature Range		T_j, T_{stg}	-55 to 150	°C

100% UIS testing in condition of V_D=15V, L=0.1mH, V_G=10V, I_L=7.5A, Rated V_{DS}=30V N-CH

THERMAL RESISTANCE RATINGS

THERMAL RESISTANCE	SYMBOL	TYPICAL	MAXIMUM	UNIT
Junction-to-Case	$R_{\theta JC}$		25	°C / W
Junction-to-Ambient[3]	$R_{\theta JA}$		62.5	

[1]Pulse width limited by maximum junction temperature.

[2]Duty cycle ≤ 1%

[3]62.5°C / W when mounted on a 1 in^2 pad of 2 oz copper.

ELECTRICAL CHARACTERISTICS (T_A = 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	30			V
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250μA	1	1.5	3	
Gate-Body Leakage	I_{GSS}	V_{DS} = 0V, V_{GS} = ±20V			±100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 24V, V_{GS} = 0V			1	μA
		V_{DS} = 20V, V_{GS} = 0V, T_J = 125 °C			25	
On-State Drain Current[1]	$I_{D(ON)}$	V_{DS} = 10V, V_{GS} = 10V	7.5			A
Drain-Source On-State Resistance[1]	$R_{DS(ON)}$	V_{GS} = 10V, I_D = 7.5A		18	21	mΩ
		V_{GS} = 4.5V, I_D = 5.5A		34	42	
Forward Transconductance[1]	g_{fs}	V_{DS} = 5V, I_D = 7.5A		16		S
DYNAMIC						
Input Capacitance	C_{iss}	V_{GS} = 0V, V_{DS} = 15V, f = 1MHz		520		pF
Output Capacitance	C_{oss}			88		
Reverse Transfer Capacitance	C_{rss}			62		
Gate Resistance	R_g	V_{GS} = 15mV, V_{DS} = 0V, f = 1MHz		2.0		Ω
Total Gate Charge[1,2]	Q_g(V_{GS}=10V)	V_{DS} = 15V, V_{GS} = 10V, I_D = 7.5A		11.5		nC
	Q_g(V_{GS}=5V)			5		
Gate-Source Charge[1,2]	Q_{gs}			1.6		
Gate-Drain Charge[1,2]	Q_{gd}			2.8		
Turn-On Delay Time[1,2]	$t_{d(on)}$	V_{DS} = 15V, I_D = 1A, V_{GS} = 10V, R_{GS} = 6Ω		9		nS
Rise Time[1,2]	t_r			12		
Turn-Off Delay Time[1,2]	$t_{d(off)}$			30		
Fall Time[1,2]	t_f			15		
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS (T_C = 25 °C)						
Continuous Current	I_S				2.3	A
Pulsed Current[3]	I_{SM}				9.2	
Forward Voltage[1]	V_{SD}	I_F = I_S, V_{GS} = 0V			1.2	V
Reverse Recovery Time	t_{rr}	I_F = I_S, dI_F/dt = 100A / μS		50		nS
Peak Reverse Recovery Current	$I_{RM(REC)}$			30		A
Reverse Recovery Charge	Q_{rr}			2		nC

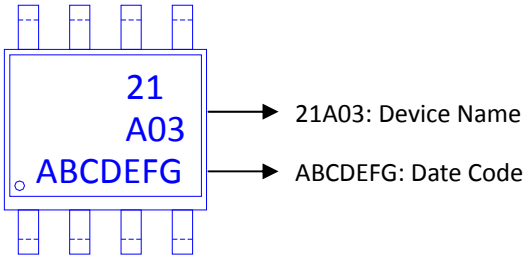
[1]Pulse test : Pulse Width ≤300μ sec, Duty Cycle ≤ 2%.

[2]Independent of operating temperature.

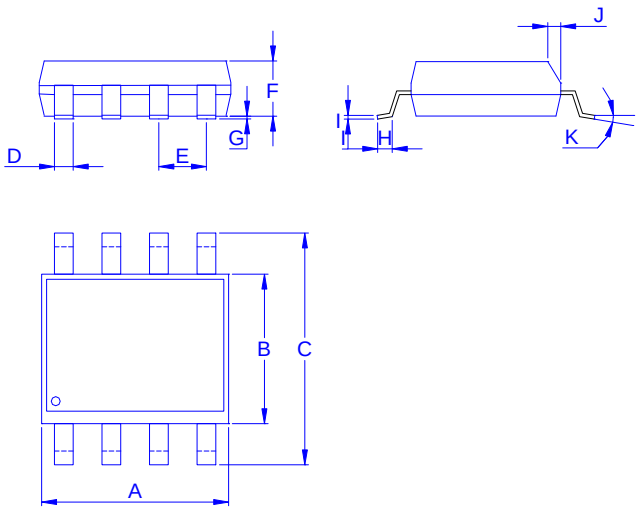
[3]Pulse width limited by maximum junction temperature.

Ordering & Marking Information:

Device Name: LB21N03HD for SOP-8



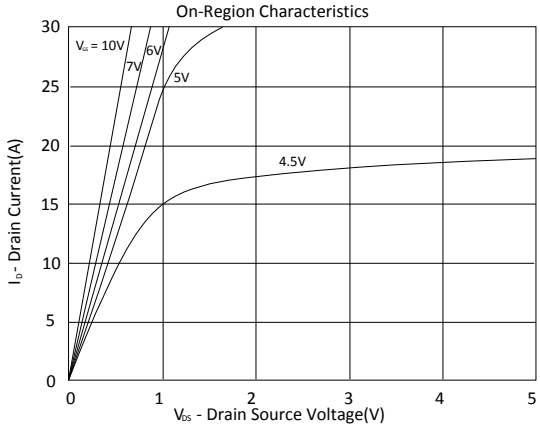
Outline Drawing



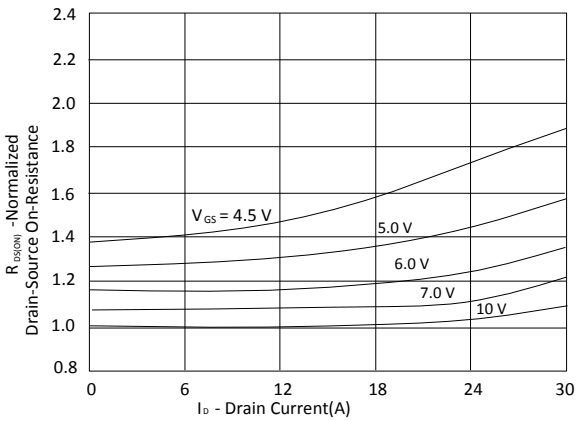
Dimension in mm

Dimension	A	B	C	D	E	F	G	H	I	J	K
in.	4.70	3.70	5.80	0.33		1.20	0.08	0.40	0.19	0.25	0°
Typ.					1.27						
Max.	5.10	4.10	6.20	0.51		1.62	0.28	0.83	0.26	0.50	8°

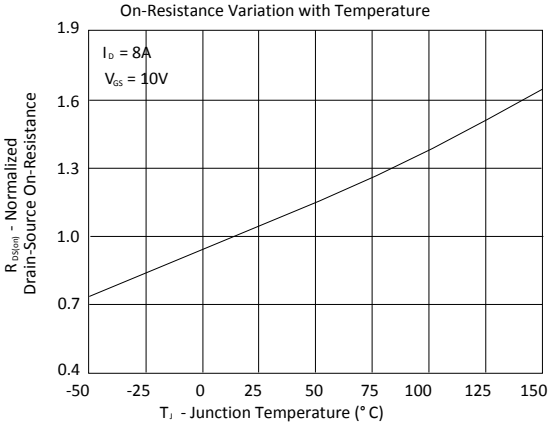
On-Region Characteristics



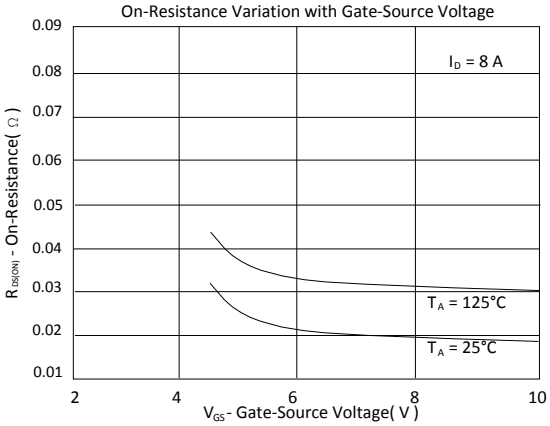
On-Resistance Variation with Drain Current and Gate Voltage



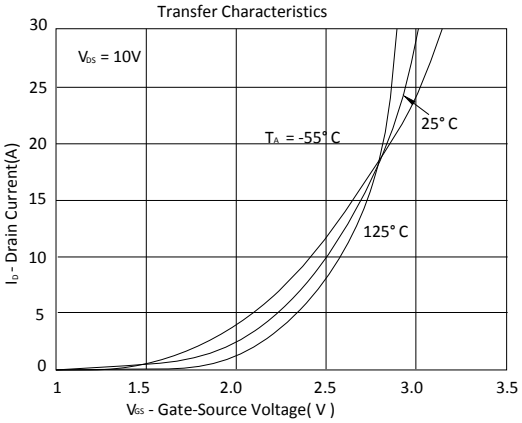
On-Resistance Variation with Temperature



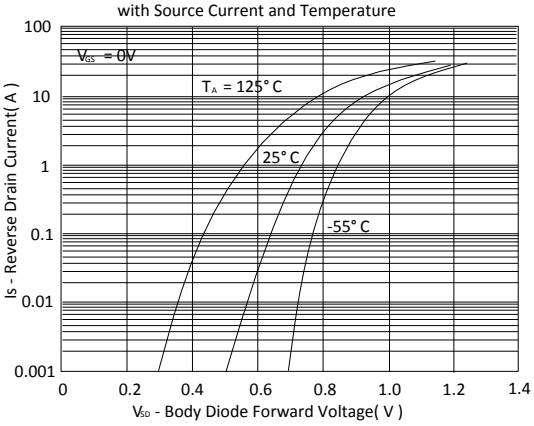
On-Resistance Variation with Gate-Source Voltage

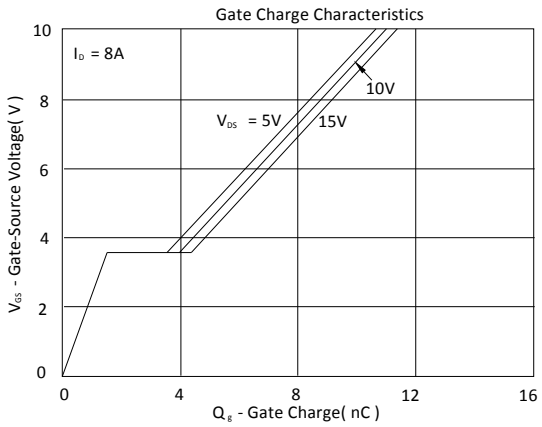


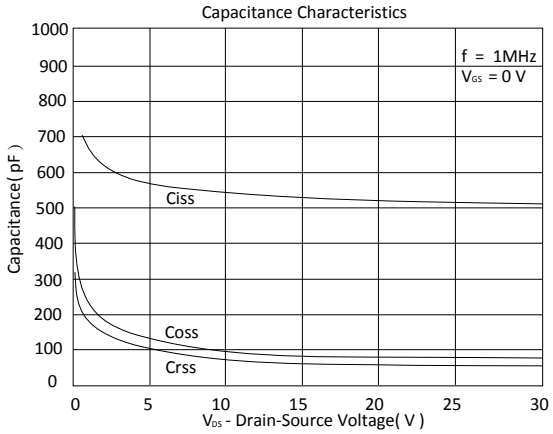
Transfer Characteristics

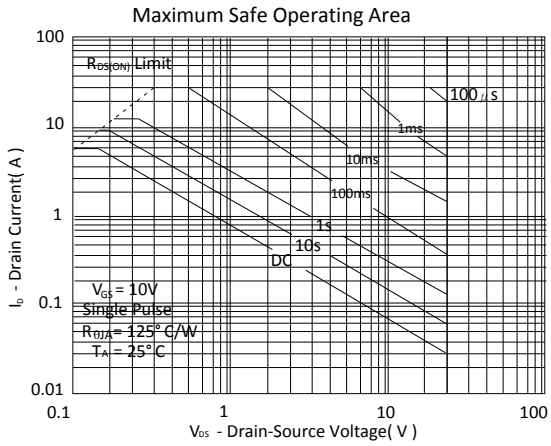


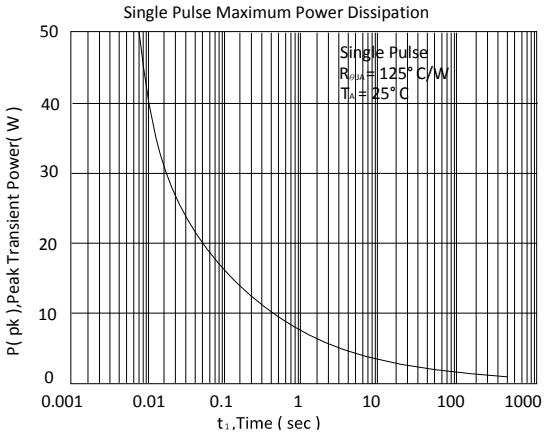
Body Diode Forward Voltage Variation
with Source Current and Temperature

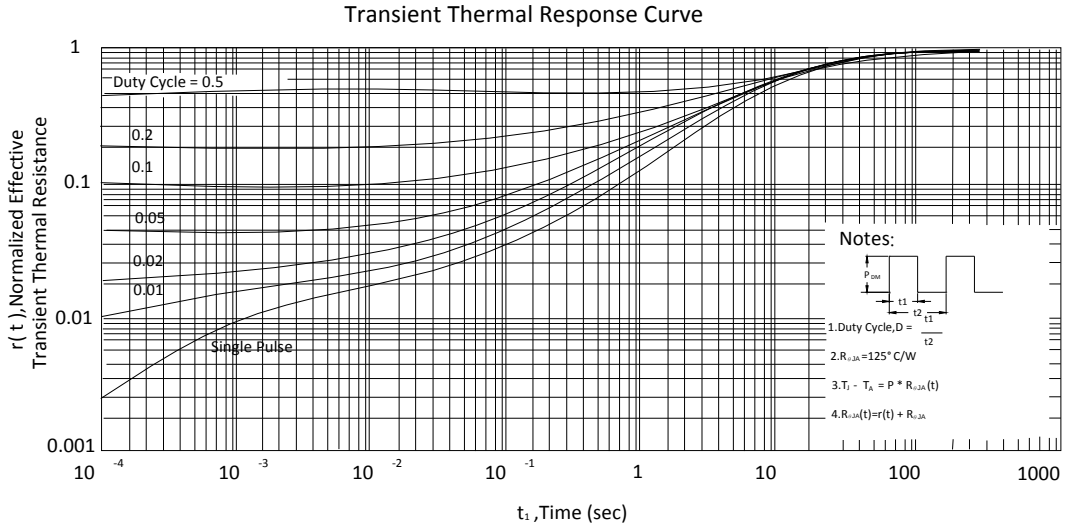



Gate Charge Characteristics
I_D = 8A
V_DS = 5V
15V
10V
V_GS - Gate-Source Voltage(V)
Q_g - Gate Charge(nC)


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
100μs
1ms
10ms
100ms
1s
10s
DC
V_GS = 10V
Single Pulse
R_θJA = 125° C/W
T_A = 25°C
I_D - Drain Current(A)
V_DS - Drain-Source Voltage(V)


Single Pulse Maximum Power Dissipation
Single Pulse
R_θJA = 125° C/W
T_A = 25°C
P(pk),Peak Transient Power(W)
t1 ,Time (sec)


Transient Thermal Response Curve
Duty Cycle = 0.5
0.2
0.1
0.05
0.02
0.01
Single Pulse
Notes:
1.Duty Cycle,D = t1/t2
2.R_θJA=125° C/W
3.T_J - T_A = P * R_θJA(t)
4.R_θJA(t)=r(t) + R_θJA
r(t),Normalized Effective Transient Thermal Resistance
t1 ,Time (sec)