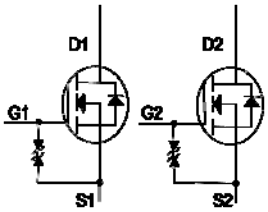
杰力科技股份有限公司
Excelliance MOS Corporation

EMZB21A03V

Dual N-Channel Logic Level Enhancement Mode Field Effect Transistor

Product Summary:

BV_{DSS}	30V
$R_{DSON\ (MAX.)}$	21mΩ
I_D	9A



UIS, Rg 100% Tested

Pb-Free Lead Plating & Halogen Free

ESD Protection

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	9	A
	T_A = 100 °C		6.3	
Pulsed Drain Current[1]		I_{DM}	36	
Avalanche Current		I_{AS}	10	
Avalanche Energy	L = 0.1mH, ID=10A, RG=25Ω	E_{AS}	5	mJ
Repetitive Avalanche Energy[2]	L = 0.05mH	E_{AR}	2.5	
Power Dissipation	T_A = 25 °C	P_D	2.27	W
	T_A = 100 °C		0.9	
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	$R_{\theta JC}$		7.5	°C / W
Junction-to-Ambient[3]	$R_{\theta JA}$		55	

[1]Pulse width limited by maximum junction temperature.

[2]Duty cycle ≤ 1%

[3]55°C / W when 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	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			±10	μA
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	9			A
Drain-Source On-State Resistance[1]	$R_{DS(ON)}$	V_{GS} = 10V, I_D = 9A		17	21	mΩ
		V_{GS} = 4.5V, I_D = 5A		24	32	
Forward Transconductance[1]	g_{fs}	V_{DS} = 5V, I_D = 9A		16		S
DYNAMIC						
Input Capacitance	C_{iss}	V_{GS} = 0V, V_{DS} = 15V, f = 1MHz		530		pF
Output Capacitance	C_{oss}			102		
Reverse Transfer Capacitance	C_{rss}			81		
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 = 9A		11		nC
	$Q_g(V_{GS}=4.5V)$			5.7		
Gate-Source Charge[1,2]	Q_{gs}			1.7		
Gate-Drain Charge[1,2]	Q_{gd}			3		
Turn-On Delay Time[1,2]	$t_{d(on)}$	V_{DS} = 15V, I_D = 1A, V_{GS} = 10V, R_{GS} = 6Ω		11		nS
Rise Time[1,2]	t_r			16		
Turn-Off Delay Time[1,2]	$t_{d(off)}$			36		
Fall Time[1,2]	t_f			20		
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		45		nS
Peak Reverse Recovery Current	$I_{RM(REC)}$			28		A
Reverse Recovery Charge	Q_{rr}			3		nC

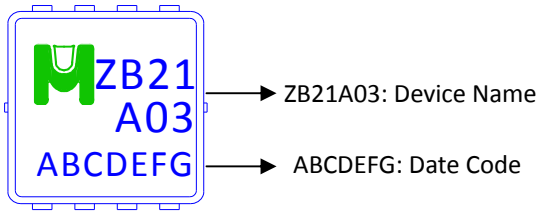
[1]Pulse test : Pulse Width ≤ 300 μsec, Duty Cycle ≤ 2%.

[2]Independent of operating temperature.

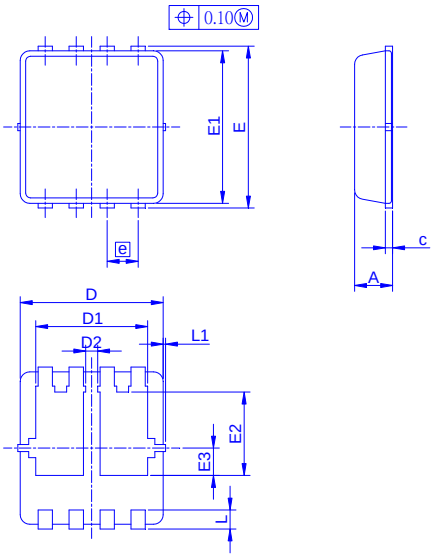
[3]Pulse width limited by maximum junction temperature.

Ordering & Marking Information:

Device Name: EMZB21A03V for EDFN 3 x 3



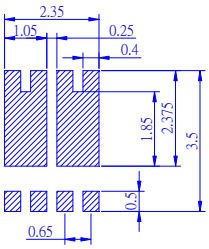
Outline Drawing

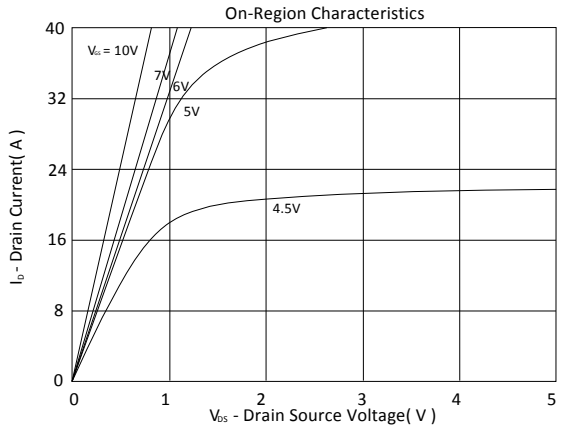


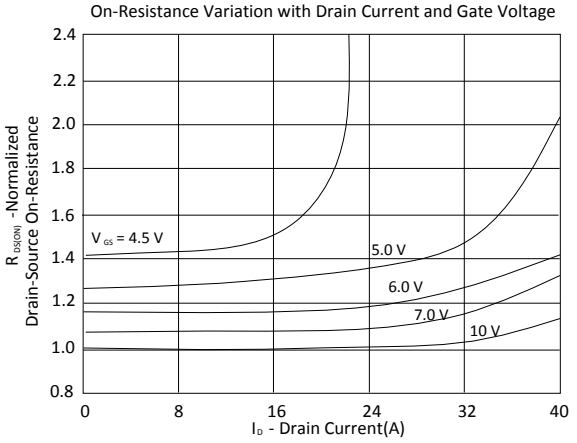
Dimension in mm

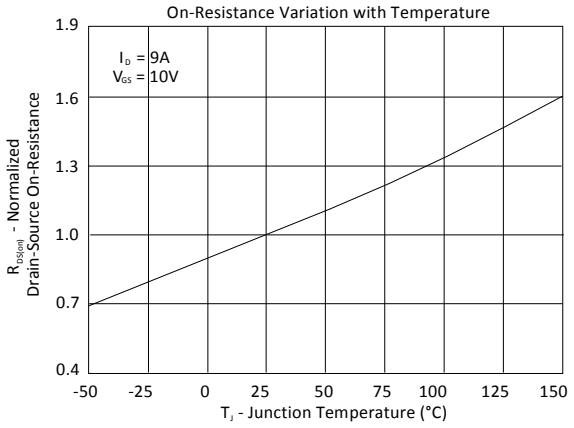
Dimension	A	A1	b	c	D	D1	D2	E	E1	E2	E3	e	L	L1	Θ1
Min.	0.70	0	0.24	0.10	2.95	2.25		3.15	2.95	1.65			0.30	0	0°
Typ.	0.80		0.30	0.152	3.00	2.35	0.225	3.20	3.00	1.75	0.575	0.65	0.40		10°
Max.	0.90	0.05	0.35	0.25	3.05	2.45		3.25	3.05	1.85			0.50	0.10	12°

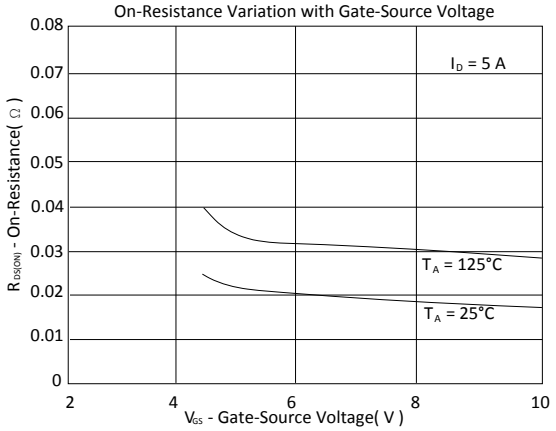
Recommended minimum pads

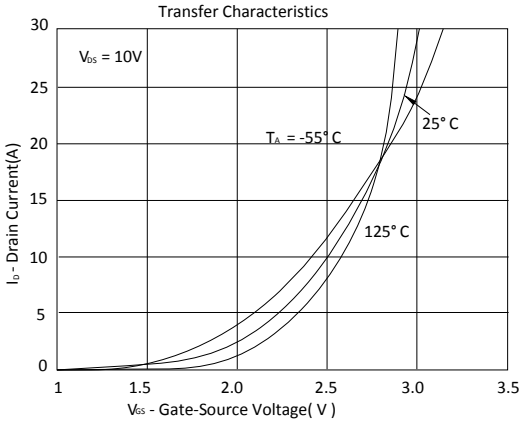


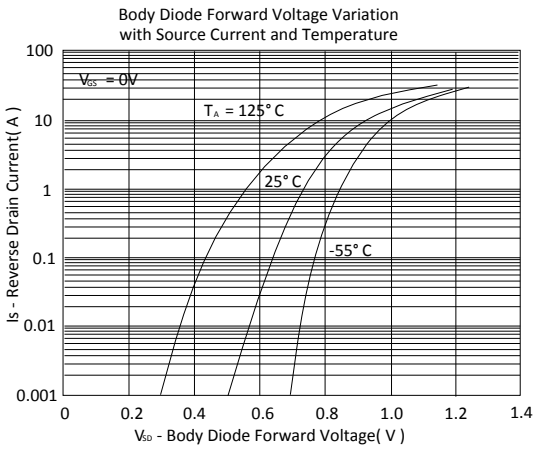

On-Region Characteristics
VGS = 10V
7V
6V
5V
4.5V
ID - Drain Current(A)
VDS - Drain Source Voltage(V)
0
8
16
24
32
40
0
1
2
3
4
5

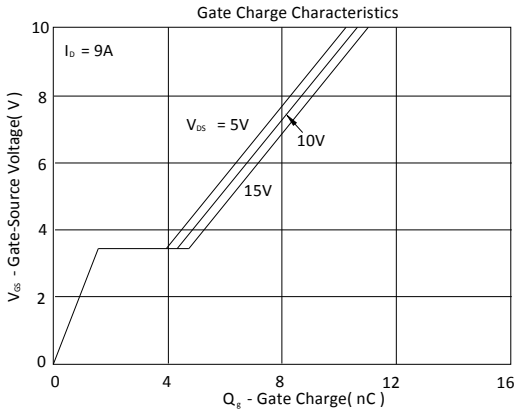

On-Resistance Variation with Drain Current and Gate Voltage
VGS = 4.5 V
5.0 V
6.0 V
7.0 V
10 V
RDS(ON) -Normalized
Drain-Source On-Resistance
ID - Drain Current(A)
0.8
1.0
1.2
1.4
1.6
1.8
2.0
2.2
2.4
0
8
16
24
32
40

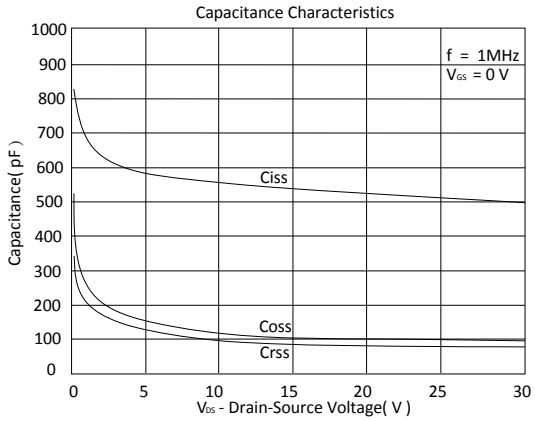

On-Resistance Variation with Temperature
ID = 9A
VGS = 10V
RDS(ON) - Normalized
Drain-Source On-Resistance
TJ - Junction Temperature (°C)
0.4
0.7
1.0
1.3
1.6
1.9
-50
-25
0
25
50
75
100
125
150

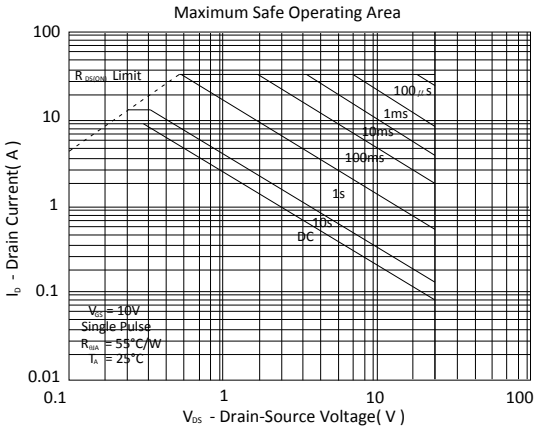

On-Resistance Variation with Gate-Source Voltage
ID = 5 A
TA = 125°C
TA = 25°C
RDS(ON) - On-Resistance(Ω)
VGS - Gate-Source Voltage(V)
0
0.01
0.02
0.03
0.04
0.05
0.06
0.07
0.08
2
4
6
8
10

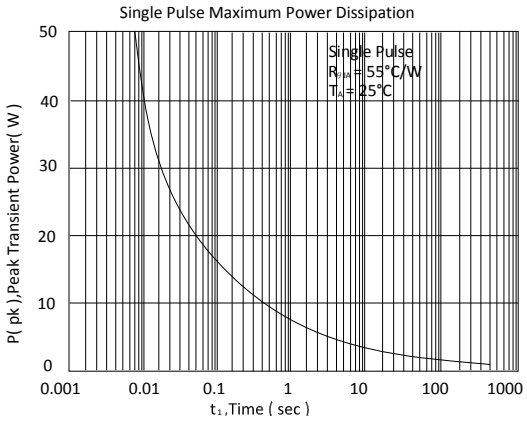

Transfer Characteristics
VDS = 10V
TA = -55° C
25° C
125° C
ID - Drain Current(A)
VGS - Gate-Source Voltage(V)
0
5
10
15
20
25
30
1
1.5
2.0
2.5
3.0
3.5

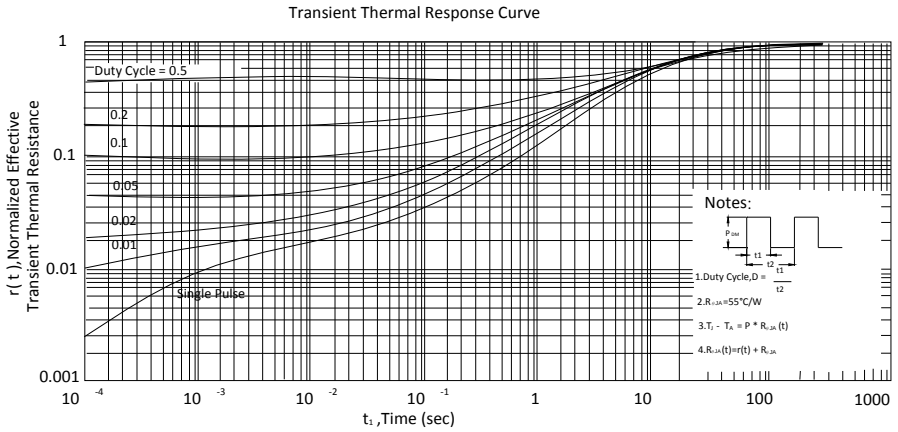

Body Diode Forward Voltage Variation
with Source Current and Temperature
VGS = 0V
TA = 125° C
25° C
-55° C
IS - Reverse Drain Current(A)
VSD - Body Diode Forward Voltage(V)
0.001
0.01
0.1
1
10
100
0
0.2
0.4
0.6
0.8
1.0
1.2
1.4


Gate Charge Characteristics
I_D = 9A
V_DS = 5V
10V
15V
V_GS - Gate-Source Voltage(V)
Q_g - Gate Charge(nC)
0
2
4
6
8
10
0
4
8
12
16


Capacitance Characteristics
f = 1MHz
V_GS = 0 V
Ciss
Coss
Crss
Capacitance(pF)
V_DS - Drain-Source Voltage(V)
0
100
200
300
400
500
600
700
800
900
1000
0
5
10
15
20
25
30


Maximum Safe Operating Area
R_DS(ON) Limit
100μs
1ms
10ms
100ms
1s
10s
DC
V_GS = 10V
Single Pulse
R_θJA = 55°C/W
T_A = 25°C
I_D - Drain Current(A)
V_DS - Drain-Source Voltage(V)
0.01
0.1
1
10
100
0.1
1
10
100


Single Pulse Maximum Power Dissipation
Single Pulse
R_θJA = 55°C/W
T_A = 25°C
P(pk),Peak Transient Power(W)
t1 ,Time (sec)
0
10
20
30
40
50
0.001
0.01
0.1
1
10
100
1000


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=55°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)
0.001
0.01
0.1
1
10^-4
10^-3
10^-2
10^-1
1
10
100
1000