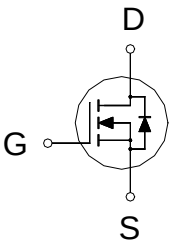
杰力科技股份有限公司
Excelliance MOS Corporation

EMB32N03VAT

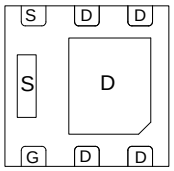
N-Channel Logic Level Enhancement Mode Field Effect Transistor

Product Summary:

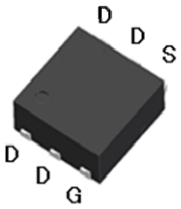
BV_{DSS}	30V
$R_{DSON\ (MAX.)}$	35mΩ
I_D	5.5A



Bottom View



PIN 1



UIS, Rg 100% Tested

Pb-Free Lead Plating & Halogen Free

GP
GREEN PRODUCT

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	5.5	A
	T_A = 70 °C		3.6	
Pulsed Drain Current[1]		I_{DM}	22	
Avalanche Current		I_{AS}	6	
Avalanche Energy	L = 0.1mH, ID=6A, RG=25Ω	E_{AS}	1.8	mJ
Repetitive Avalanche Energy[2]	L = 0.05mH	E_{AR}	0.9	
Power Dissipation	T_A = 25 °C	P_D	2.08	W
	T_A = 70 °C		1.33	
Operating Junction & Storage Temperature Range		T_j, T_{stg}	-55 to 150	°C

THERMAL RESISTANCE RATINGS

THERMAL RESISTANCE	SYMBOL	TYPICAL	MAXIMUM	UNIT
Junction-to-Case	$R_{\theta JC}$		12	°C / W
Junction-to-Ambient[3]	$R_{\theta JA}$		60	

[1]Pulse width limited by maximum junction temperature.

[2]Duty cycle ≤ 1%

[3]60°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			±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	5.5			A
Drain-Source On-State Resistance[1]	$R_{DS(ON)}$	V_{GS} = 10V, I_D = 5.5A		29	35	mΩ
		V_{GS} = 4.5V, I_D = 2.0A		40	52	
Forward Transconductance[1]	g_{fs}	V_{DS} = 5V, I_D = 5.5A		11		S
DYNAMIC						
Input Capacitance	C_{iss}	V_{GS} = 0V, V_{DS} = 15V, f = 1MHz		332		pF
Output Capacitance	C_{oss}			83		
Reverse Transfer Capacitance	C_{rss}			26		
Gate Resistance	R_g	V_{GS} = 15mV, V_{DS} = 0V, f = 1MHz		2.6		Ω
Total Gate Charge[1,2]	Q_g(V_{GS}=10V)	V_{DS} = 15V, V_{GS} = 10V, I_D = 5.5A		7.5		nC
	Q_g(V_{GS}=4.5V)			1.1		
Gate-Source Charge[1,2]	Q_{gs}			2.3		
Gate-Drain Charge[1,2]	Q_{gd}			8		
Turn-On Delay Time[1,2]	$t_{d(on)}$	V_{DS} = 15V, I_D = 1A, V_{GS} = 10V, R_{GS} = 6Ω		12		nS
Rise Time[1,2]	t_r			28		
Turn-Off Delay Time[1,2]	$t_{d(off)}$			15		
Fall Time[1,2]	t_f			7.5		
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS (T_C = 25 °C)						
Continuous Current	I_S				5.5	A
Pulsed Current[3]	I_{SM}				22	
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		60		nS
Reverse Recovery Charge	Q_{rr}			2		nC

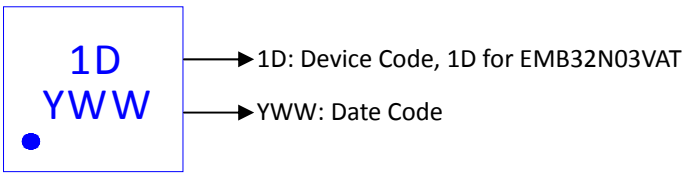
[1]Pulse test : Pulse Width ≤ 300 μsec, Duty Cycle ≤ 2%.

[2]Independent of operating temperature.

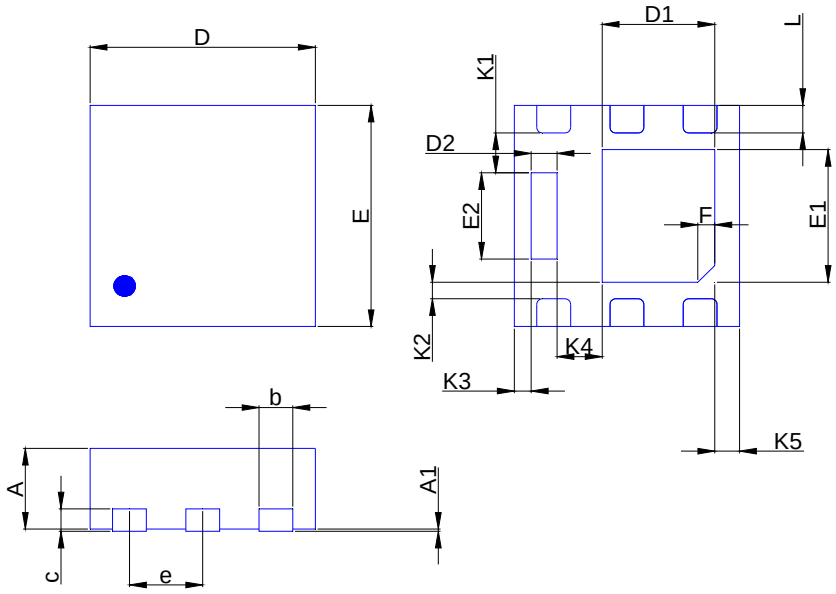
[3]Pulse width limited by maximum junction temperature.

Ordering & Marking Information:

Device Name: EMB32N03VAT for EDFN 2 x 2



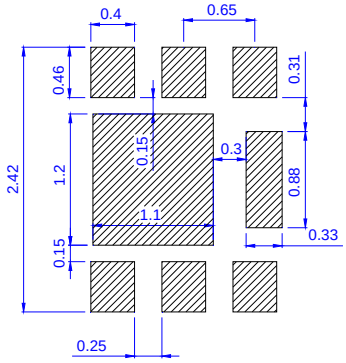
Outline Drawing

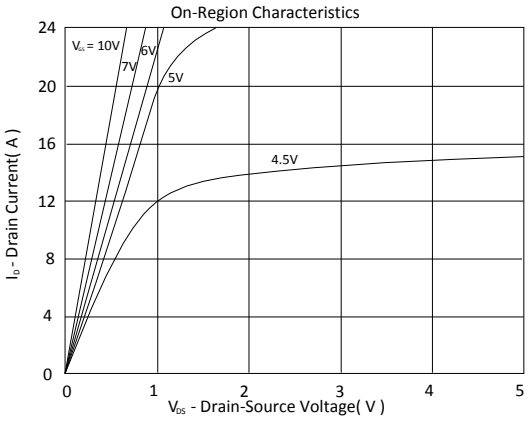


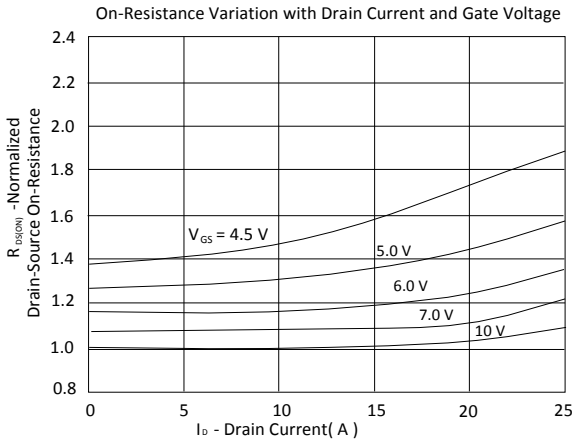
Dimension in mm

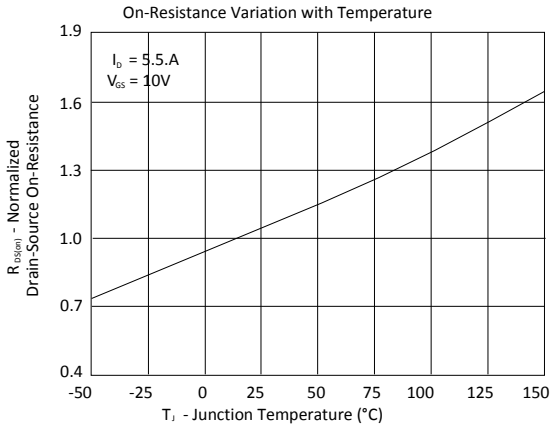
Dimension	A	A1	b	c	D	D1	D2	E	E1	E2	e	F	f	K1	K2	L	K3	K4	K5
Min.	0.50	0.00	0.25		1.9	1.0	0.13	1.9	1.1	0.65				0.306	0.10	0.2	0.10	0.27	0.17
Typ.		0.02	0.30	0.1	2.0	1.1	0.25	2.0	1.2	0.75	0.65	0.15	45°	0.356	0.15	0.25	0.15		0.22
Max.	0.65	0.05	0.35		2.1	1.2	0.35	2.1	1.3	0.88				0.406	0.20	0.3	0.20		0.27

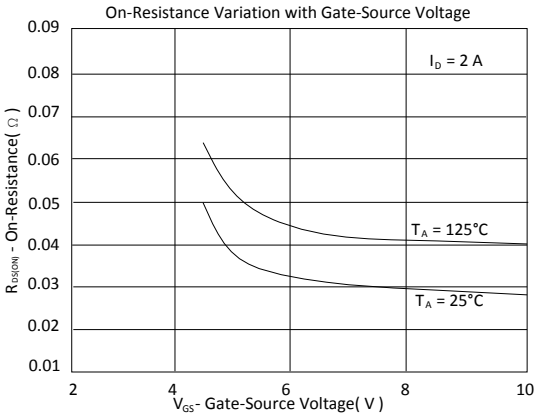
Recommended minimum pads

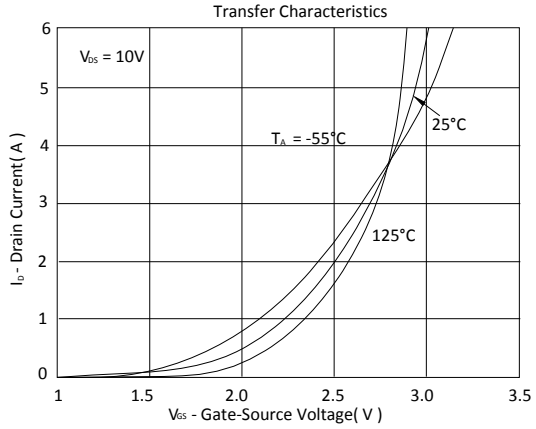


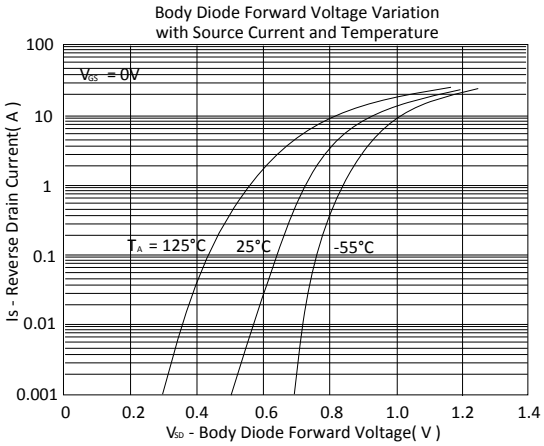

On-Region Characteristics
V_{GS} = 10V
6V
7V
5V
4.5V
I_D - Drain Current(A)
V_{DS} - Drain-Source Voltage(V)

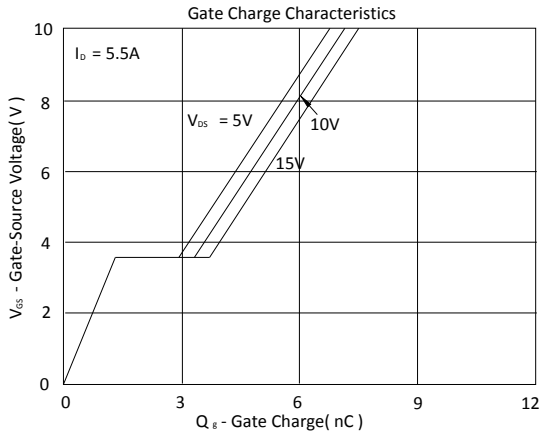

On-Resistance Variation with Drain Current and Gate Voltage
$R_{DS(ON)}$ -Normalized
Drain-Source On-Resistance
V_{GS} = 4.5 V
5.0 V
6.0 V
7.0 V
10 V
I_D - Drain Current(A)

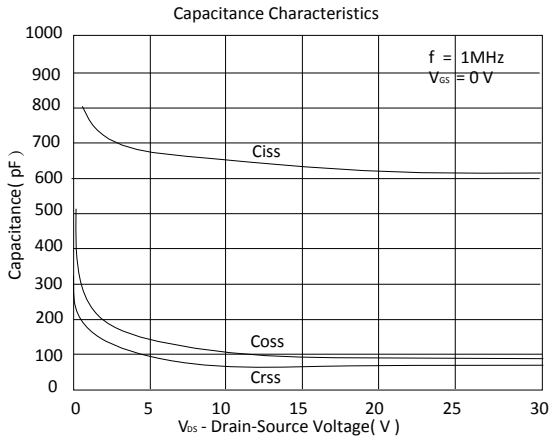

On-Resistance Variation with Temperature
I_D = 5.5.A
V_{GS} = 10V
$R_{DS(on)}$ - Normalized
Drain-Source On-Resistance
T_J - Junction Temperature (°C)

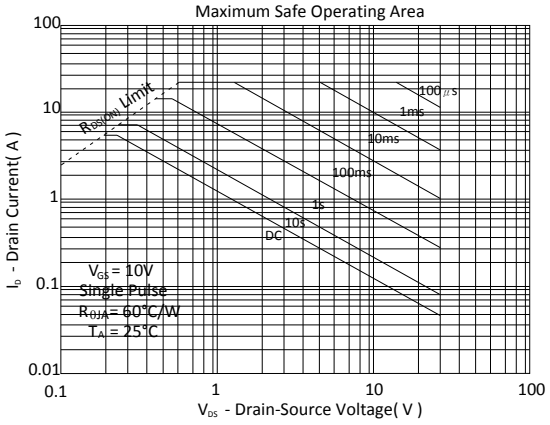

On-Resistance Variation with Gate-Source Voltage
I_D = 2 A
T_A = 125°C
T_A = 25°C
$R_{DS(ON)}$ - On-Resistance(Ω)
V_{GS} - Gate-Source Voltage(V)

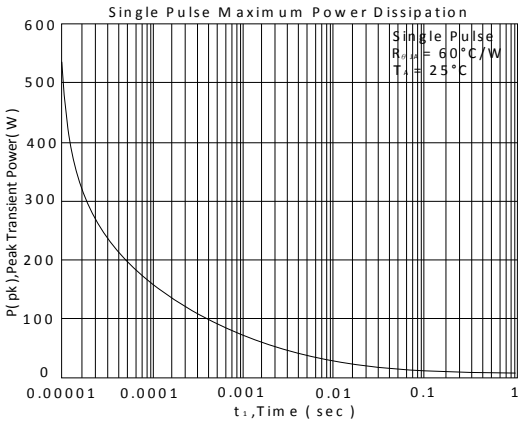

Transfer Characteristics
V_{DS} = 10V
T_A = -55°C
25°C
125°C
I_D - Drain Current(A)
V_{GS} - Gate-Source Voltage(V)

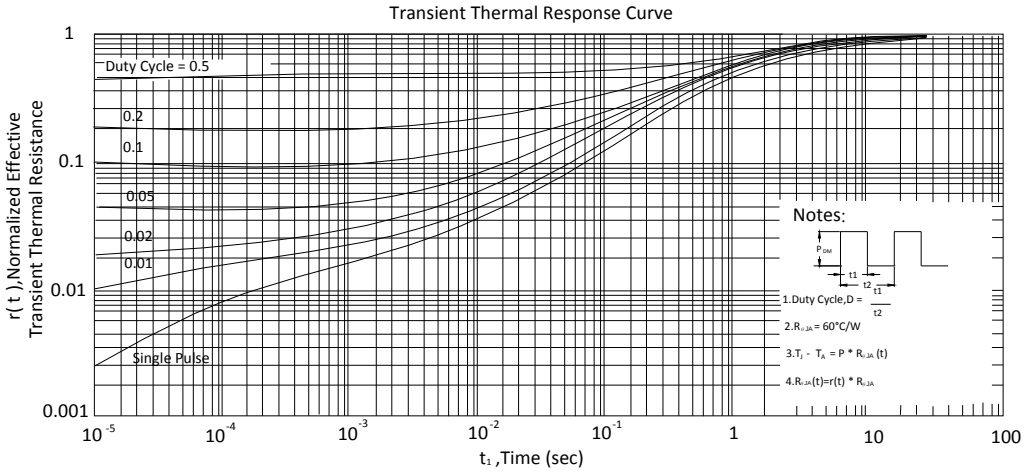

Body Diode Forward Voltage Variation
with Source Current and Temperature
V_{GS} = 0V
T_A = 125°C
25°C
-55°C
Is - Reverse Drain Current(A)
V_{SD} - Body Diode Forward Voltage(V)


Gate Charge Characteristics
I_D = 5.5A
V_DS = 5V
10V
15V
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
Rds(on) Limit
100μs
1ms
10ms
100ms
1s
10s
DC
V_GS = 10V
Single Pulse
R_θJA = 60°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 = 60°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 = 60°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)