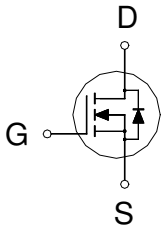
杰力科技股份有限公司
Excelliance MOS Corporation

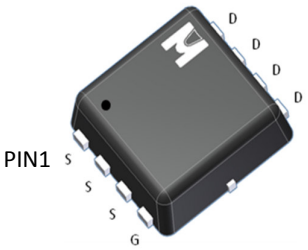
EMB04N03V

N-Channel Logic Level Enhancement Mode Field Effect Transistor

Product Summary:

BV_{DSS}	30V
$R_{DSON\ (MAX.)}$	4.0mΩ
I_D	32A





N-Channel MOSFET

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_C = 25 °C	I_D	32	A
	T_A = 25 °C		20	
	T_C = 100 °C		22	
Pulsed Drain Current[1]		I_{DM}	128	
Avalanche Current		I_{AS}	32	
Avalanche Energy	L = 0.1mH, I_{AS} =32A, R_G=25Ω	E_{AS}	51.2	mJ
Repetitive Avalanche Energy[2]	L = 0.05mH	E_{AR}	25.6	
Power Dissipation	T_C = 25 °C	P_D	21	W
	T_C = 100 °C		8.3	
Power Dissipation	T_A = 25 °C	P_D	2.5	W
	T_A = 100 °C		1	
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	$R_{\theta JC}$		6	°C / W
Junction-to-Ambient	$R_{\theta JA}$		50	

[1]Pulse width limited by maximum junction temperature.

[2]Duty cycle ≤ 1%

[3]50°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	32			A
Drain-Source On-State Resistance[1]	$R_{DS(ON)}$	V_{GS} = 10V, I_D = 20A		3.2	4.0	mΩ
		V_{GS} = 4.5V, I_D = 15A		4.9	6.6	
Forward Transconductance[1]	g_{fs}	V_{DS} = 5V, I_D = 16A		26		S
DYNAMIC						
Input Capacitance	C_{iss}	V_{GS} = 0V, V_{DS} = 15V, f = 1MHz		2806		pF
Output Capacitance	C_{oss}			378		
Reverse Transfer Capacitance	C_{rss}			202		
Gate Resistance	R_g	V_{GS} = 15mV, V_{DS} = 0V, f = 1MHz		2.4		Ω
Total Gate Charge[1,2]	Q_g(V_{GS}=10V)	V_{DS} = 15V, V_{GS} = 10V, I_D = 16A		42		nC
	Q_g(V_{GS}=4.5V)			21		
Gate-Source Charge[1,2]	Q_{gs}			4.7		
Gate-Drain Charge[1,2]	Q_{gd}			9.3		
Turn-On Delay Time[1,2]	$t_{d(on)}$	V_{DS} = 15V, I_D = 1A, V_{GS} = 10V, R_{GS} = 2.7Ω		18		nS
Rise Time[1,2]	t_r			15		
Turn-Off Delay Time[1,2]	$t_{d(off)}$			55		
Fall Time[1,2]	t_f			20		
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS (T_C = 25 °C)						
Continuous Current	I_S				32	A
Pulsed Current[3]	I_{SM}				128	
Forward Voltage[1]	V_{SD}	I_F = 16A, V_{GS} = 0V			1.3	V
Reverse Recovery Time	t_{rr}	I_F = I_S, dI_F/dt = 100A / µS		30		nS
Peak Reverse Recovery Current	$I_{RM(REC)}$			200		A
Reverse Recovery Charge	Q_{rr}			10		nC

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

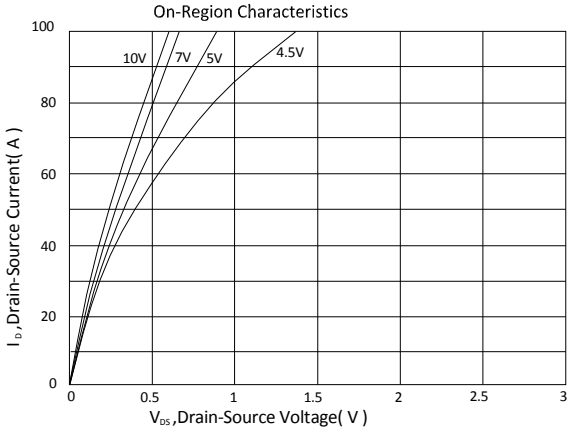
[2]Independent of operating temperature.

[3]Pulse width limited by maximum junction temperature.

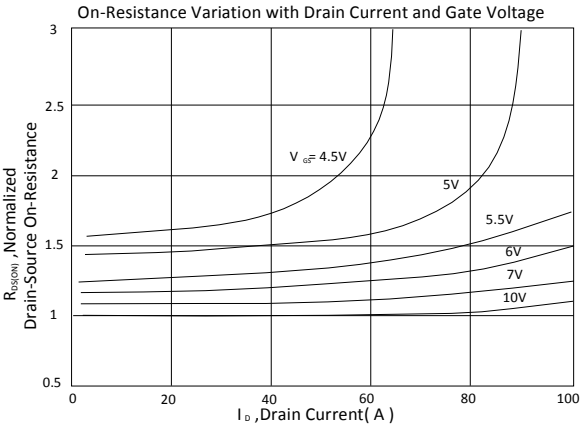
EMC will review datasheet by quarter, and update new version.

TYPICAL CHARACTERISTICS

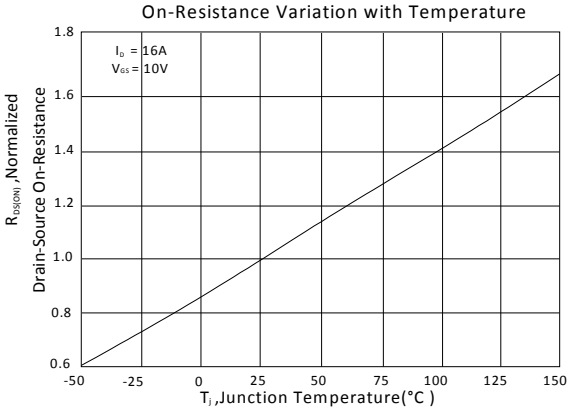
On-Region Characteristics



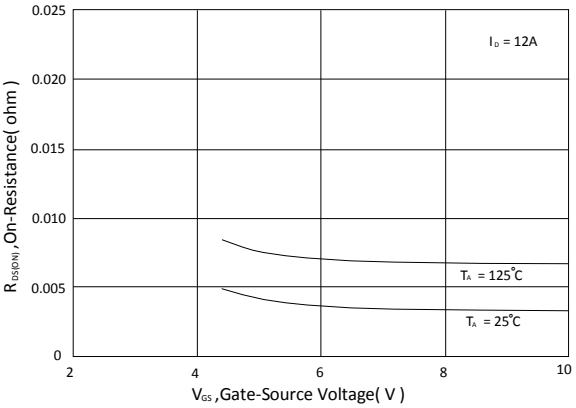
On-Resistance Variation with Drain Current and Gate Voltage



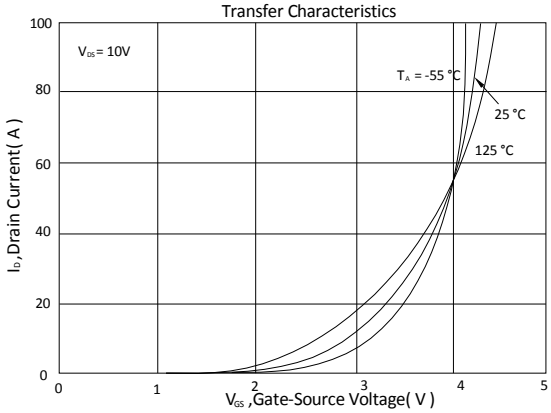
On-Resistance Variation with Temperature



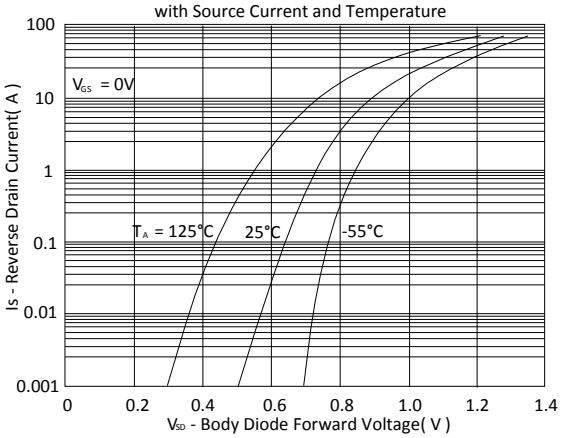
On-Resistance Variation with Gate-Source Voltage

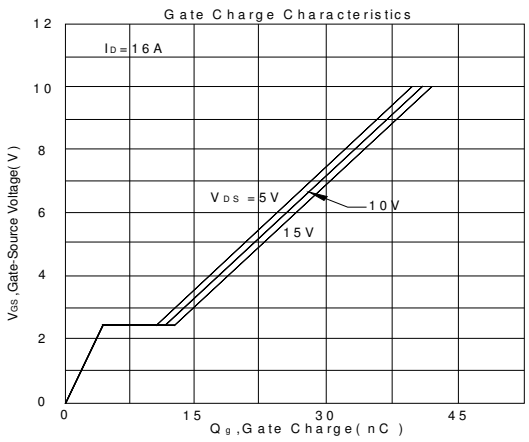


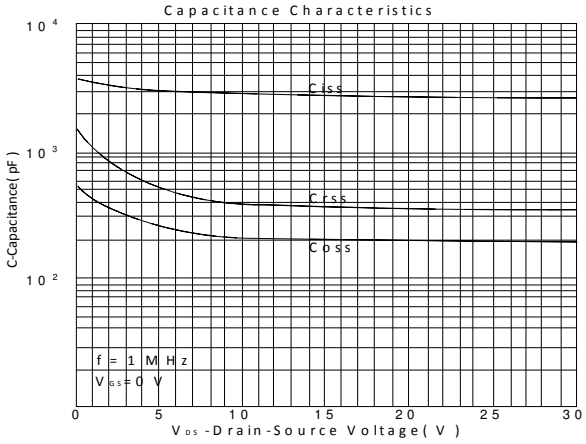
Transfer Characteristics

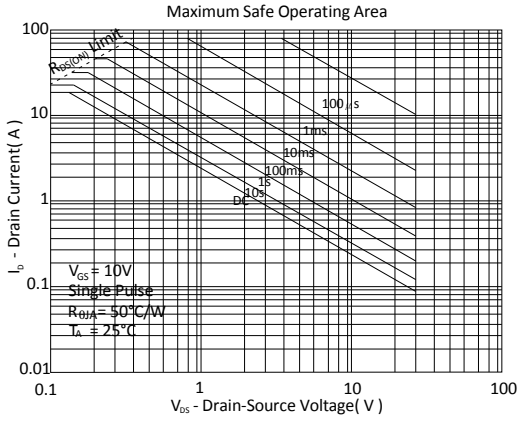


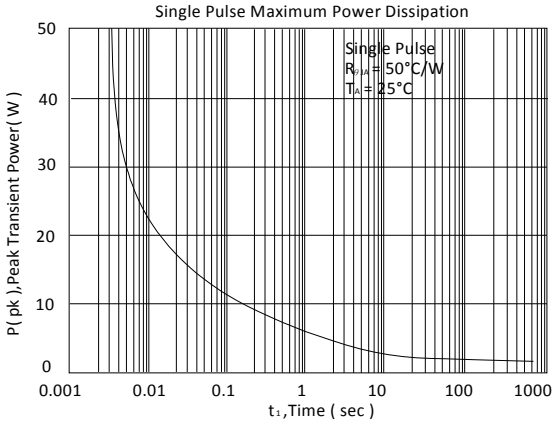
Body Diode Forward Voltage Variation
with Source Current and Temperature

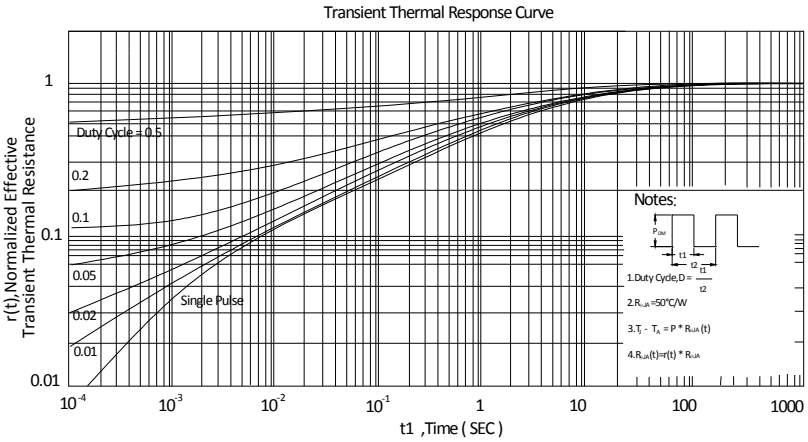



Gate Charge Characteristics
I D = 16 A
V DS = 5 V
10 V
15 V
VGS ,Gate-Source Voltage(V)
Qg ,Gate Charge(nC)


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

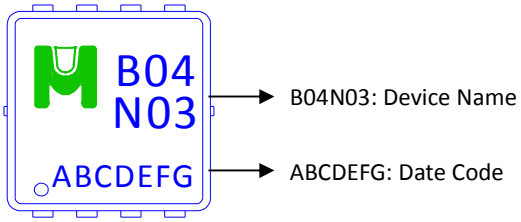

Maximum Safe Operating Area
RDS(ON) Limit
100 μs
1ms
10ms
100ms
1S
10S
DC
VGS = 10V
Single Pulse
RθJA = 50°C/W
TA = 25°C
ID - Drain Current(A)
VDS - Drain-Source Voltage(V)


Single Pulse Maximum Power Dissipation
Single Pulse
RθJA = 50°C/W
TA = 25°C
P(pk),Peak Transient Power(W)
t1 ,Time (sec)

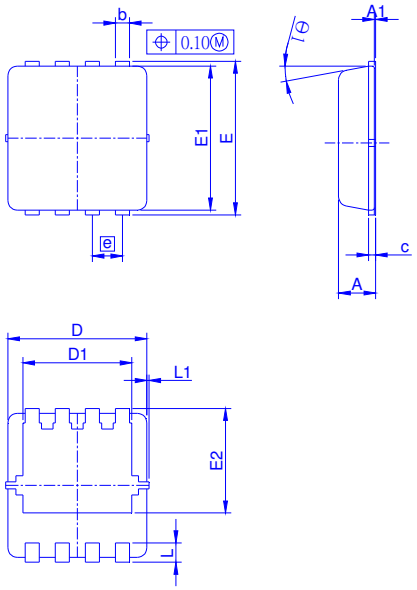

Transient Thermal Response Curve
Duty Cycle = 0.5
0.2
0.1
0.05
0.02
0.01
Single Pulse
Notes:
1.Duty Cycle,D = t1/t2
2.RθJA =50°C/W
3.TJ - TA = P * RθJA (t)
4.RθJA(t)=r(t) * RθJA
r(t),Normalized Effective Transient Thermal Resistance
t1 ,Time (SEC)

Ordering & Marking Information:

Device Name: EMB04N03V for EDFN3X3



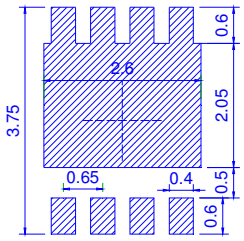
Outline Drawing



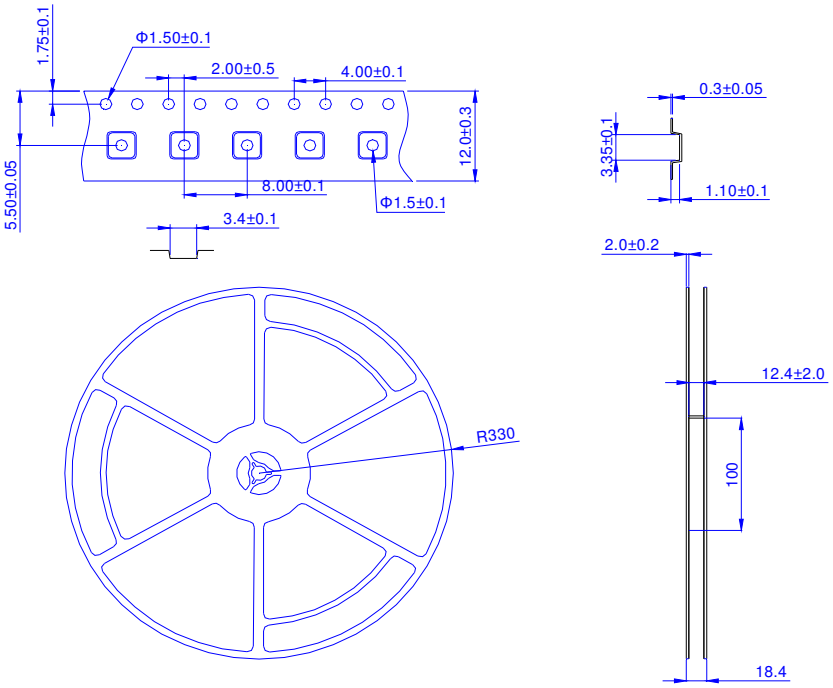
Dimension in mm

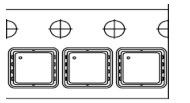
Dimension	A	A1	b	c	D	D1	E	E1	E2	e	L	L1	Θ1
Min.	0.65	0	0.20	0.10	2.90	2.15	3.10	2.90	1.53	0.55	0.25	-	0°
Typ.	0.75	-	0.30	0.15	3.00	2.45	3.20	3.00	1.97	0.65	0.40	0.075	10°
Max.	0.90	0.05	0.40	0.25	3.30	2.74	3.50	3.30	2.59	0.75	0.60	0.150	14°

Recommended minimum pads



Tape&Reel Information: 5000pcs/Reel



產品別	EDFN3X3
Reel 尺寸	13”
編帶方式	FEED DIRECTION 
前空格	50
後空格	50
裝箱數	
滿捲數量	5K
捲/內盒比	1 : 1
內盒滿箱數	5K
內/外箱比	10 : 1
外箱滿箱數	50K