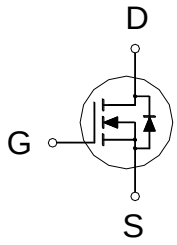
杰力科技股份有限公司
Excelliance MOS Corporation

EMB09N03H

N-Channel Logic Level Enhancement Mode Field Effect Transistor

Product Summary:

BV_{DSS}	30V
$R_{DSON\ (MAX.)}$	9mΩ
I_D	50A



UIS, Rg 100% Tested

RoHS & Halogen Free & TSCA Compliant

ABSOLUTE MAXIMUM RATINGS (T_C = 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	50	A
	T_C = 100 °C		35	
Pulsed Drain Current[1]		I_{DM}	140	
Avalanche Current		I_{AS}	37.5	
Avalanche Energy	L = 0.1mH, ID=37.5A, RG=25Ω	E_{AS}	70	mJ
Repetitive Avalanche Energy[2]	L = 0.05mH	E_{AR}	15	
Power Dissipation	T_C = 25 °C	P_D	50	W
	T_C = 100 °C		20	
Operating Junction & Storage Temperature Range		T_j, T_{stg}	-55 to 150	°C

100% UIS testing in condition of V_D=30V, L=0.1mH, V_G=10V, I_L=22A, Rated V_{DS}=30V N-CH

THERMAL RESISTANCE RATINGS

THERMAL RESISTANCE	SYMBOL	TYPICAL	MAXIMUM	UNIT
Junction-to-Case	$R_{\theta JC}$		2.5	°C / W
Junction-to-Ambient[3]	$R_{\theta JA}$		50	

[1]Pulse width limited by maximum junction temperature.

[2]Duty cycle < 1%

[3]The value of $R_{\theta JA}$ is measured with the device mounted on 1in^2 FR-4 board with 2oz.

Copper, in a still air environment with T_A =25°C.

[4]Guarantee by Engineering test

ELECTRICAL CHARACTERISTICS (T_C = 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	1.7	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	50			A
Drain-Source On-State Resistance[1]	$R_{DS(ON)}$	V_{GS} = 10V, I_D = 25A		7.5	9	mΩ
		V_{GS} = 4.5V, I_D = 15A		11	13.5	
Forward Transconductance[1]	g_{fs}	V_{DS} = 5V, I_D = 20A		20		S
DYNAMIC						
Input Capacitance	C_{iss}	V_{GS} = 0V, V_{DS} = 15V, f = 1MHz		828		pF
Output Capacitance	C_{oss}			196		
Reverse Transfer Capacitance	C_{rss}			174		
Gate Resistance	R_g	V_{GS} = 15mV, V_{DS} = 0V, f = 1MHz		1.7		Ω
Total Gate Charge[1,2]	Q_g(V_{GS}=10V)	V_{DS} = 15V, V_{GS} = 10V, I_D = 25A		17.6		nC
	Q_g(V_{GS}=4.5V)			12.5		
Gate-Source Charge[1,2]	Q_{gs}			2.8		
Gate-Drain Charge[1,2]	Q_{gd}			7.4		
Turn-On Delay Time[1,2]	$t_{d(on)}$	V_{DS} = 15V, I_D = 5A, V_{GS} = 10V, R_G = 3Ω		8		nS
Rise Time[1,2]	t_r			18		
Turn-Off Delay Time[1,2]	$t_{d(off)}$			20		
Fall Time[1,2]	t_f			3		
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS (T_C = 25 °C)						
Continuous Current	I_S				50	A
Pulsed Current[3]	I_{SM}				140	
Forward Voltage[1]	V_{SD}	I_F = I_S, V_{GS} = 0V			1.3	V
Reverse Recovery Time	t_{rr}	I_F = I_S, dI_F/dt = 100A / μS		22		nS
Peak Reverse Recovery Current	$I_{RM(REC)}$			180		A
Reverse Recovery Charge	Q_{rr}			12		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: EMB09N03H for EDFN 5 x 6

→ B09N03: Device Name

→ ABCDEFG: Date Code

A: Assembly House

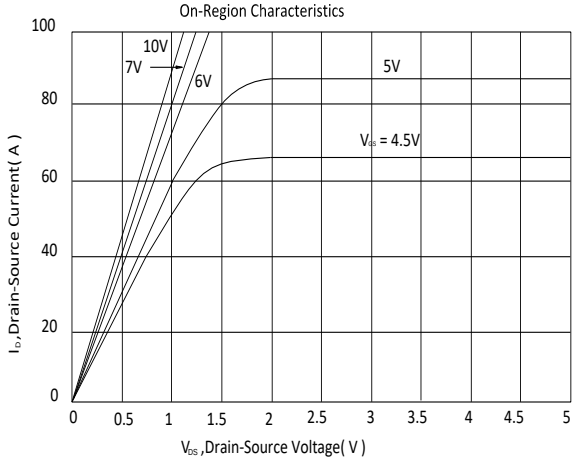
B: Year(A:2008 B:2009 C:2010….)

C: Month(A:01 B:02 C:03 D:04 E:05 F:06 G:07 H:08 I:09 J:10 K:11 L:12)

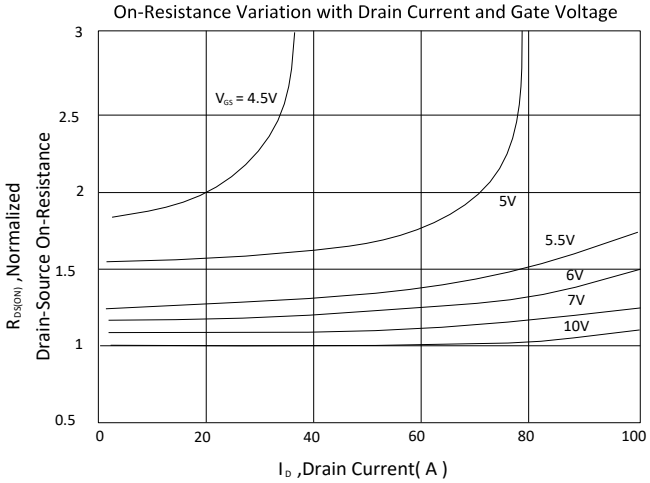
DEFG: Serial No.

TYPICAL CHARACTERISTICS

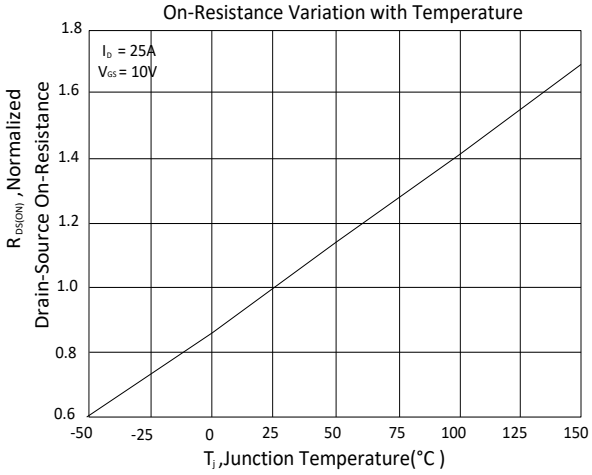
On-Region Characteristics



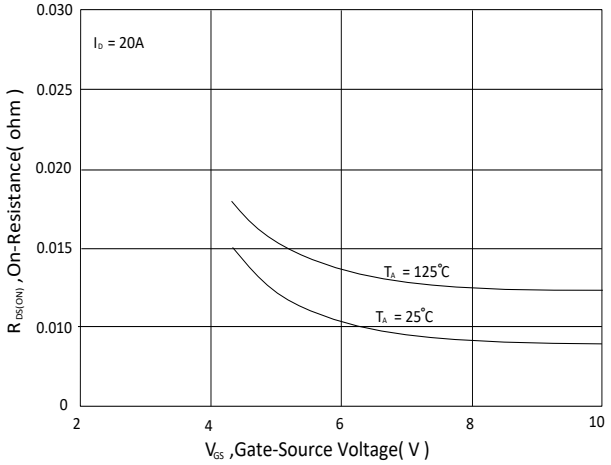
On-Resistance Variation with Drain Current and Gate Voltage



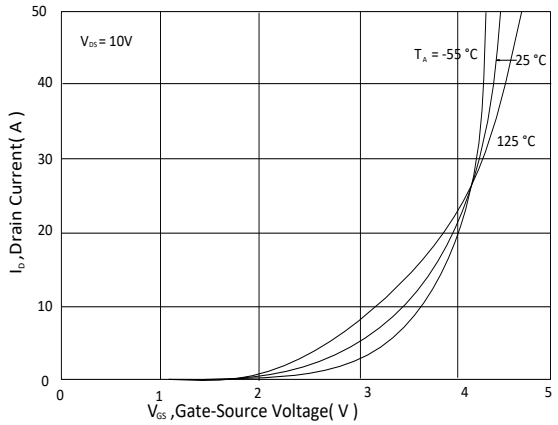
On-Resistance Variation with Temperature



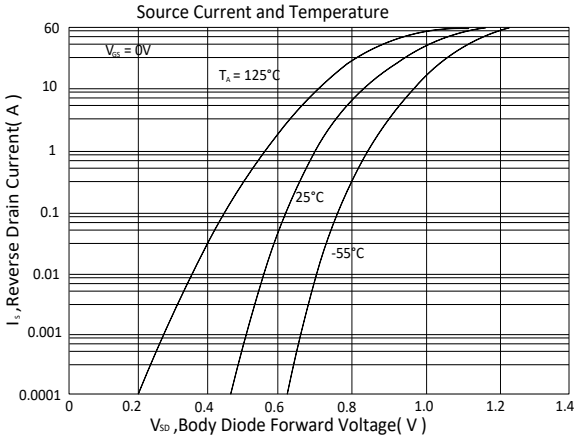
On-Resistance Variation with Gate-Source Voltage

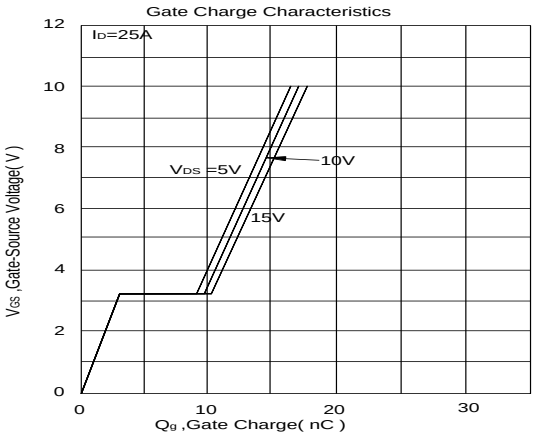


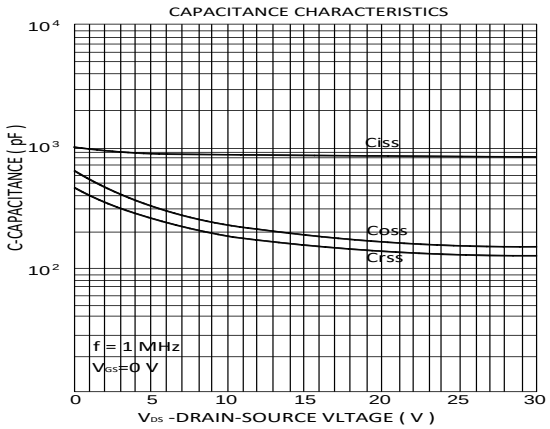
Transfer Characteristics

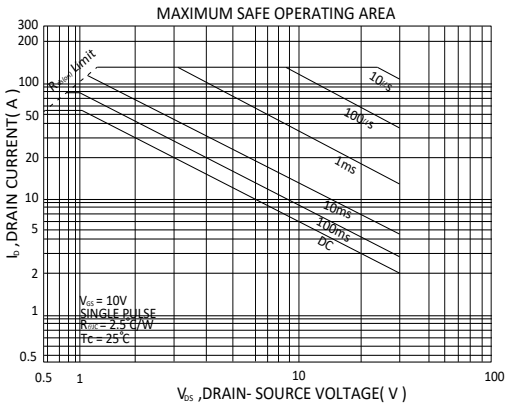


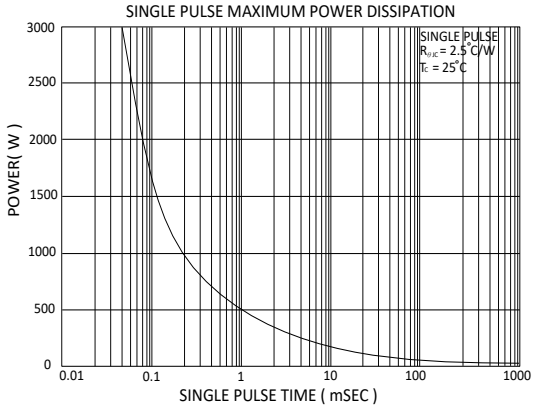
Body Diode Forward Voltage Variation with Source Current and Temperature

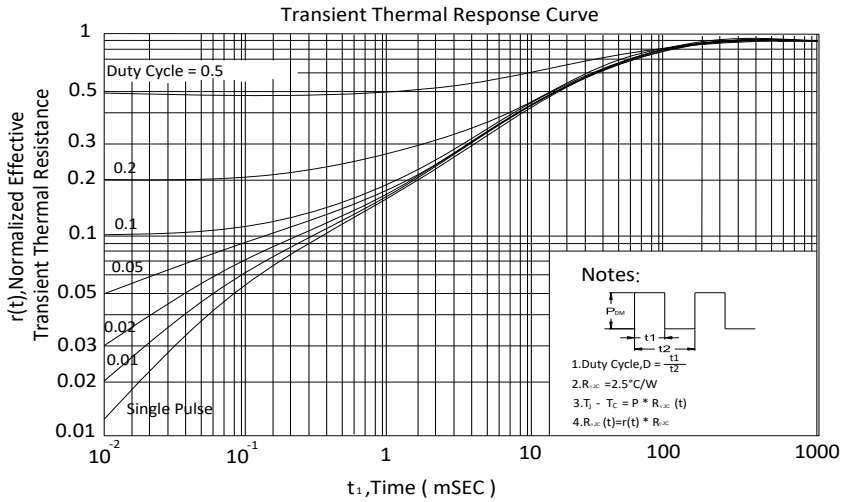



Gate Charge Characteristics
ID=25A
VDS =5V
10V
15V
VGS ,Gate-Source Voltage(V)
Qg ,Gate Charge(nC)

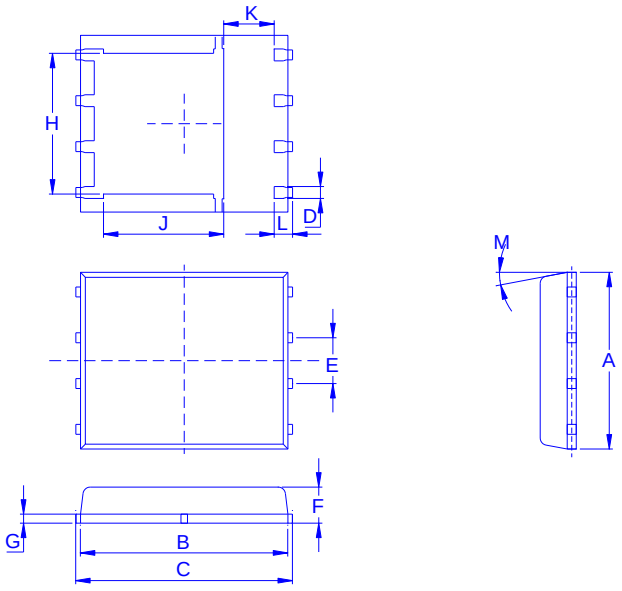

CAPACITANCE CHARACTERISTICS
Ciss
Coss
Crss
f = 1 MHz
VGS=0 V
C-CAPACITANCE (pF)
VDS -DRAIN-SOURCE VLTAGE (V)


MAXIMUM SAFE OPERATING AREA
RDS(ON) Limit
10μs
100μs
1ms
10ms
100ms
DC
VGS = 10V
SINGLE PULSE
RθJC = 2.5 C/W
TC = 25°C
ID , DRAIN CURRENT(A)
VDS ,DRAIN- SOURCE VOLTAGE(V)


SINGLE PULSE MAXIMUM POWER DISSIPATION
SINGLE PULSE
RθJC = 2.5°C/W
TC = 25°C
POWER(W)
SINGLE PULSE TIME (mSEC)


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.RθJC =2.5°C/W
3.TJ - TC = P * RθJC (t)
4.RθJC (t)=r(t) * RθJC
r(t),Normalized Effective Transient Thermal Resistance
t1 ,Time (mSEC)

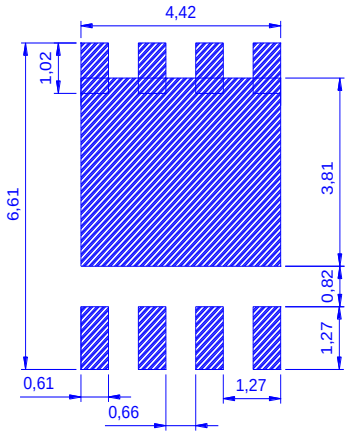
Outline Drawing



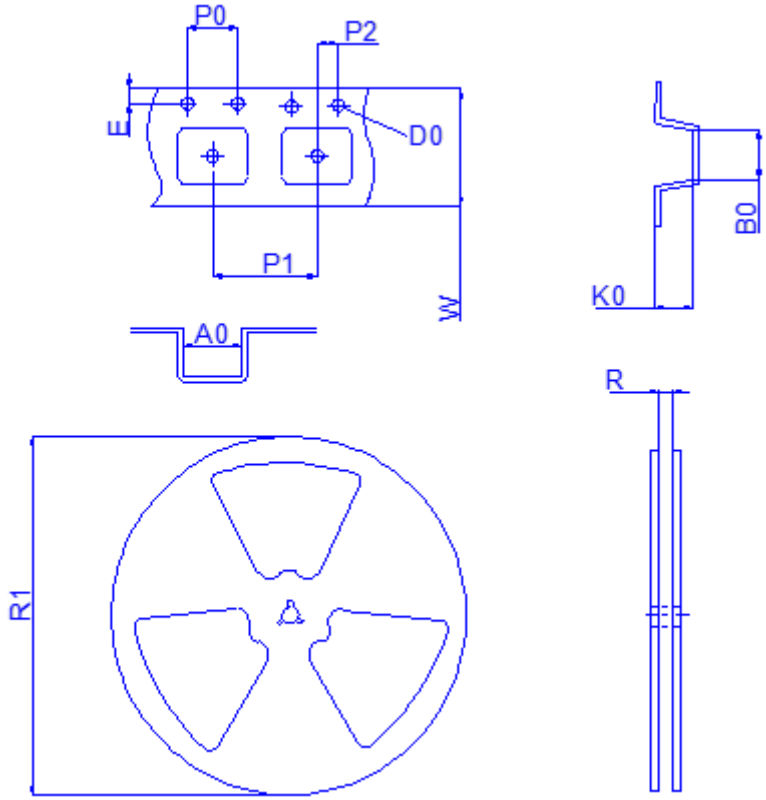
Dimension in mm

Dimension	A	B	C	D	E	F	G	H	J	K	L	M
Min	4.8	5.55	5.9	0.3	1.17	0.85	0.15	3.61	3.18	1	0.38	0°
Typ.	4.9	5.7	6	0.4	1.27	0.95	0.2	3.87	3.44	1.2	0.4	
Max	5.4	5.85	6.15	0.51	1.37	1.17	0.34	4.31	3.78	1.39	0.71	12°

Recommended minimum pads



Tape&Reel Information:2500pcs/Reel



Package	EDFN5X6
Reel	13"
Device orientation	FEED DIRECTION

Dimension in mm

Dimension	Carrier tape									Reel	
	A0	B0	D0	E	K0	P0	P1	P2	W	R	R1
Typ.	6.4	5.3	1.5	1.8	1.6	4	8	2	12	12.4	330
±	0.2	0.2	0.1	0.1	0.6	0.1	0.1	0.1	0.3	2	2