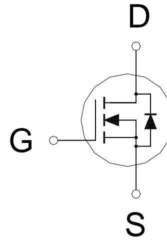
杰力科技股份有限公司
Excelliance MOS Corporation

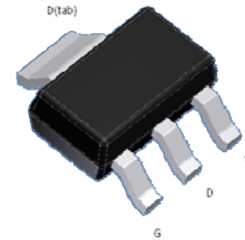
EMBA1N10Q

N-Channel Logic Level Enhancement Mode Field Effect Transistor

Product Summary:

BV_{DSS}	100V
$R_{DSON\ (MAX.)}$	110mΩ
I_D	4.5A





UIS, Rg 100% Tested

Pb-Free Lead Plating & Halogen Free

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	4.5	A
	T_C = 100 °C		3	
Pulsed Drain Current[1]		I_{DM}	18	
Avalanche Current		I_{AS}	5	
Avalanche Energy	L = 0.1mH, ID=5A, RG=25Ω	E_{AS}	1.25	mJ
Repetitive Avalanche Energy[2]	L = 0.05mH	E_{AR}	0.625	
Power Dissipation	T_C = 25 °C	P_D	6.25	W
	T_C = 100 °C		2.5	
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	$R_{\theta JC}$		20	°C / W
Junction-to-Ambient	$R_{\theta JA}$		150	

[1]Pulse width limited by maximum junction temperature.

[2]Duty cycle ≤ 1%

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	100			V
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250μA	1.0	2.0	3.0	
Gate-Body Leakage	I_{GSS}	V_{DS} = 0V, V_{GS} = ±20V			±100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 80V, V_{GS} = 0V			1	μA
		V_{DS} = 70V, V_{GS} = 0V, T_J = 125 °C			25	
On-State Drain Current[1]	$I_{D(ON)}$	V_{DS} = 10V, V_{GS} = 10V	4.5			A
Drain-Source On-State Resistance[1]	$R_{DS(ON)}$	V_{GS} = 10V, I_D = 4.5A		90	110	mΩ
		V_{GS} = 4.5V, I_D = 2A		100	130	
Forward Transconductance[1]	g_{fs}	V_{DS} = 5V, I_D = 4.5A		9		S
DYNAMIC						
Input Capacitance	C_{iss}	V_{GS} = 0V, V_{DS} = 25V, f = 1MHz		645		pF
Output Capacitance	C_{oss}			73		
Reverse Transfer Capacitance	C_{rss}			24		
Gate Resistance	R_g	V_{GS} = 15mV, V_{DS} = 0V, f = 1MHz		4.5		Ω
Total Gate Charge[1,2]	Q_g	V_{DS} = 80V, V_{GS} = 10V, I_D = 4.5A		13		nC
Gate-Source Charge[1,2]	Q_{gs}			1.9		
Gate-Drain Charge[1,2]	Q_{gd}			4.8		
Turn-On Delay Time[1,2]	$t_{d(on)}$	V_{DS} = 50V, I_D = 1A, V_{GS} = 10V, R_{GS} = 6Ω		10		nS
Rise Time[1,2]	t_r			10		
Turn-Off Delay Time[1,2]	$t_{d(off)}$			20		
Fall Time[1,2]	t_f			15		
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS (T_C = 25 °C)						
Continuous Current	I_S				4.5	A
Pulsed Current[3]	I_{SM}				18	
Forward Voltage[1]	V_{SD}	I_F = 1A, V_{GS} = 0V			1.0	V
Reverse Recovery Time	t_{rr}	I_F = 4.5A, dI_F/dt = 100A / μS		45		nS
Reverse Recovery Charge	Q_{rr}			80		nC

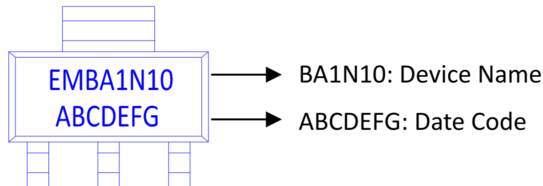
[1]Pulse test : Pulse Width ≤ 300 μsec, Duty Cycle ≤ 2%.

[2]Independent of operating temperature.

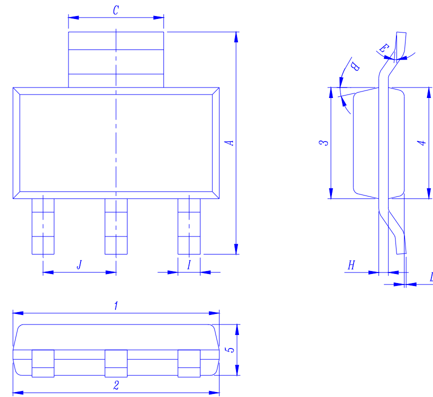
[3]Pulse width limited by maximum junction temperature.

Ordering & Marking Information:

Device Name: EMBA1N10Q for SOT-223



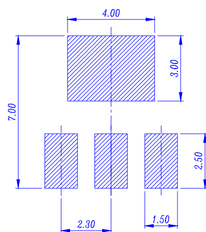
Outline Drawing



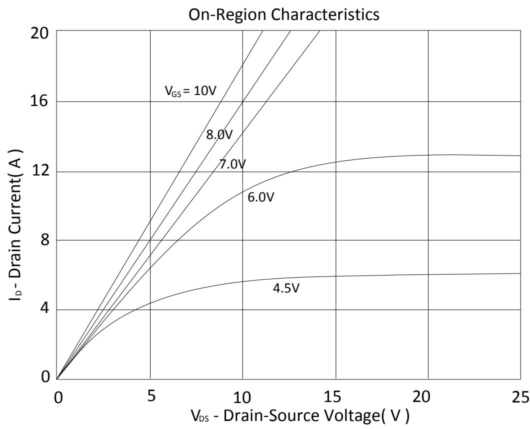
Dimension in mm

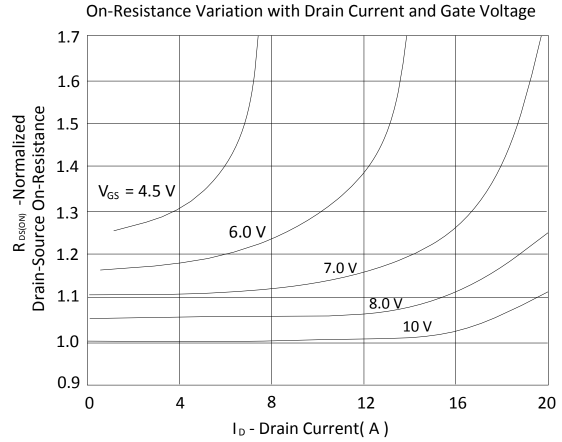
Dimension	A	C	D	E	I	H	B	J	1	2	3	4	5
Min.	6.70	2.90	0.02	0°	0.60	0.25			6.30	63.0	3.30	3.30	1.40
Typ.							13°	2.30					
Max.	7.30	3.10	0.10	10°	0.80	0.35			6.70	6.70	3.70	3.70	1.80

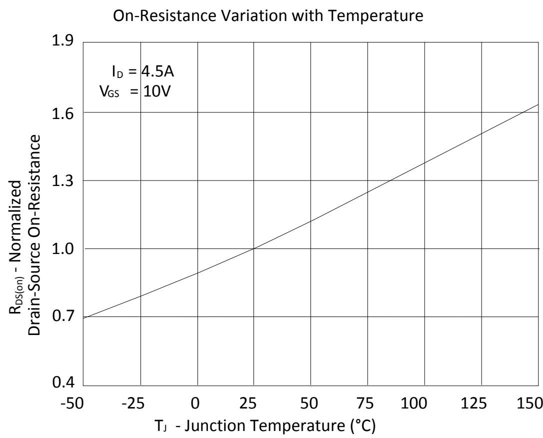
Recommended minimum pads

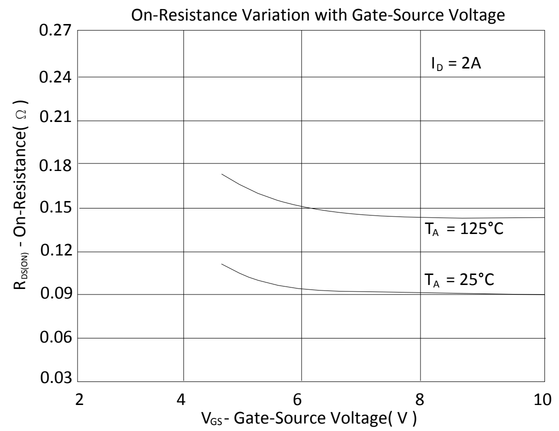


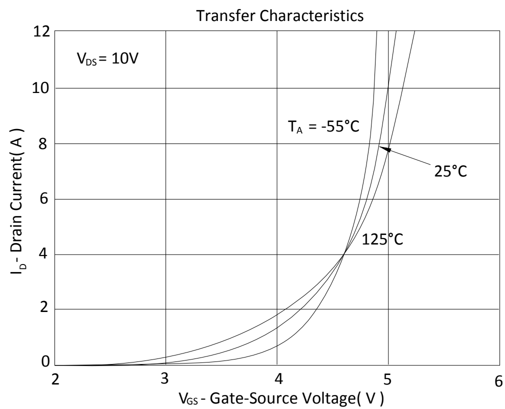
TYPICAL CHARACTERISTICS

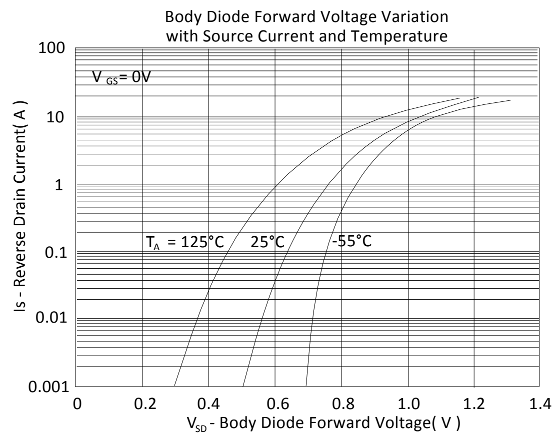


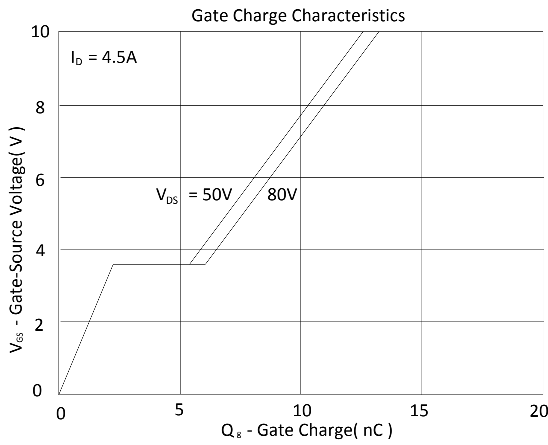




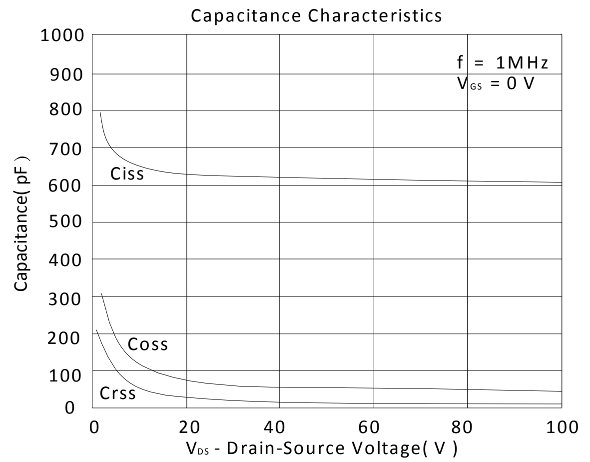




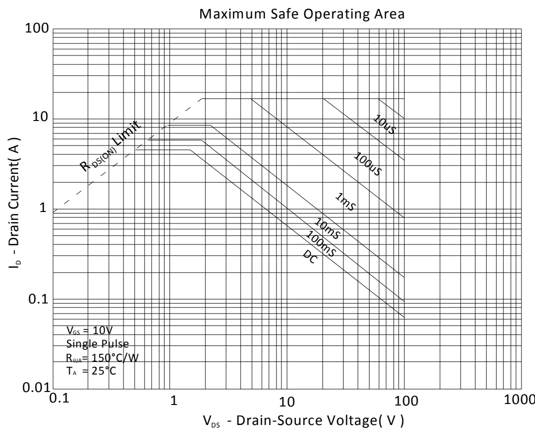




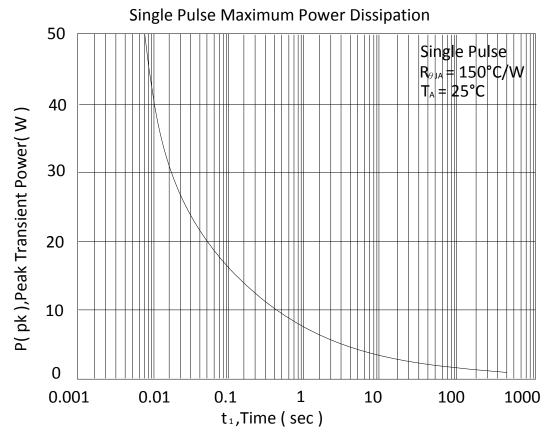
Gate Charge Characteristics
I_D = 4.5A
V_DS = 50V
80V
V_GS - Gate-Source Voltage(V)
Q_g - Gate Charge(nC)



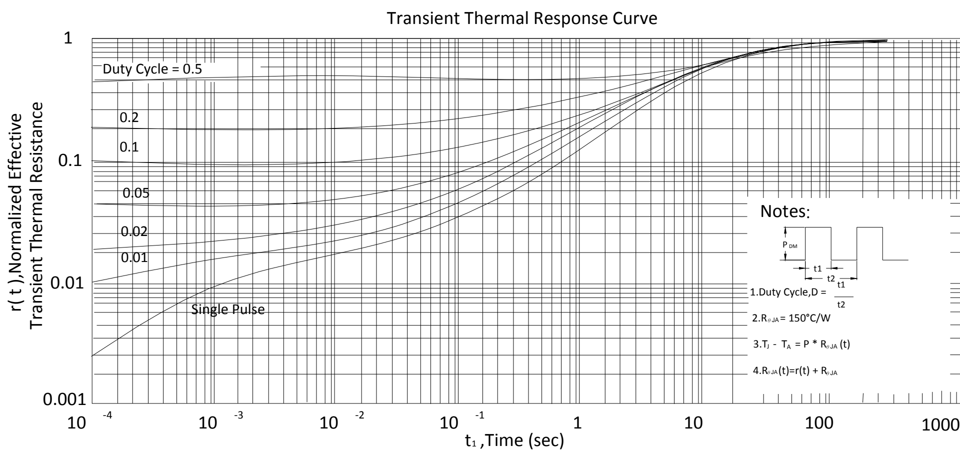
Capacitance Characteristics
f = 1MHz
V_GS = 0 V
Ciss
Coss
Crss
Capacitance(pF)
V_DS - Drain-Source Voltage(V)



Maximum Safe Operating Area
R_DS(ON) Limit
10us
100us
1ms
10ms
100ms
DC
V_GS = 10V
Single Pulse
R_θJA = 150°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 = 150°C/W
T_A = 25°C
P(pk),Peak Transient Power(W)
t_1 ,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 = 150°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
t_1 ,Time (sec)