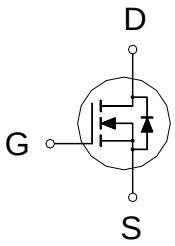
杰力科技股份有限公司
Excelliance MOS Corporation

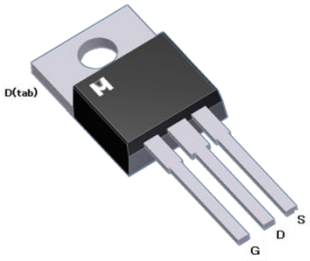
EMB04N06E

N-Channel Logic Level Enhancement Mode Field Effect Transistor

Product Summary:

BV_{DSS}	60V
$R_{DSON\ (MAX.)}$	4mΩ
I_D	165A





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	165	A
	T_C = 100 °C		104	
Pulsed Drain Current[1,3]		I_{DM}	540	
Avalanche Current		I_{AS}	65	
Avalanche Energy	L = 0.1mH, I_{AS}=65A, RG=25Ω	E_{AS}	211	mJ
Repetitive Avalanche Energy[2]	L = 0.05mH	E_{AR}	105	
Power Dissipation	T_C = 25 °C	P_D	192	W
	T_C = 100 °C		76	
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=40A, Rated V_{DS}=60V N-CH

THERMAL RESISTANCE RATINGS

THERMAL RESISTANCE	SYMBOL	TYPICAL	MAXIMUM	UNIT
Junction-to-Case	$R_{\theta JC}$		0.65	°C / W
Junction-to-Ambient	$R_{\theta JA}$		62.5	

[1]Pulse width limited by maximum junction temperature.

[2]Duty cycle ≤ 1%

[3]Pulsed drain current rating is package limited.

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	60			V
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250μA	1.0	1.8	2.5	
Gate-Body Leakage	I_{GSS}	V_{DS} = 0V, V_{GS} = ±20V			±100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 48V, V_{GS} = 0V			1	μA
		V_{DS} = 40V, V_{GS} = 0V, T_J = 125 °C			25	
On-State Drain Current[1]	$I_{D(ON)}$	V_{DS} = 5V, V_{GS} = 10V	165			A
Drain-Source On-State Resistance[1]	$R_{DS(ON)}$	V_{GS} = 10V, I_D = 20A		3.3	4.0	mΩ
		V_{GS} = 4.5V, I_D = 20A		4.4	5.5	
Forward Transconductance[1]	g_{fs}	V_{DS} = 5V, I_D = 20A		58		S
DYNAMIC						
Input Capacitance	C_{iss}	V_{GS} = 0V, V_{DS} = 30V, f = 1MHz		3250		pF
Output Capacitance	C_{oss}			1200		
Reverse Transfer Capacitance	C_{rss}			50		
Gate Resistance	R_g	V_{GS} = 15mV, V_{DS} = 0V, f = 1MHz		1.6		Ω
Total Gate Charge[1,2]	Q_g	V_{DS} = 30V, V_{GS} = 10V, I_D = 20A		49		nC
Gate-Source Charge[1,2]	Q_{gs}			8		
Gate-Drain Charge[1,2]	Q_{gd}			9		
Turn-On Delay Time[1,2]	$t_{d(on)}$	V_{DS} = 30V, I_D = 20A, V_{GS} = 10V, R_{GS} = 6Ω		12		nS
Rise Time[1,2]	t_r			10		
Turn-Off Delay Time[1,2]	$t_{d(off)}$			55		
Fall Time[1,2]	t_f			15		
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS (T_C = 25 °C)						
Continuous Current	I_S				165	A
Pulsed Current[3]	I_{SM}				540	
Forward Voltage[1]	V_{SD}	I_F = 20A, V_{GS} = 0V			1.2	V
Reverse Recovery Time	t_{rr}	I_F = 20A, dI_F/dt = 300A / μS		50		nS
Reverse Recovery Charge	Q_{rr}			120		nC

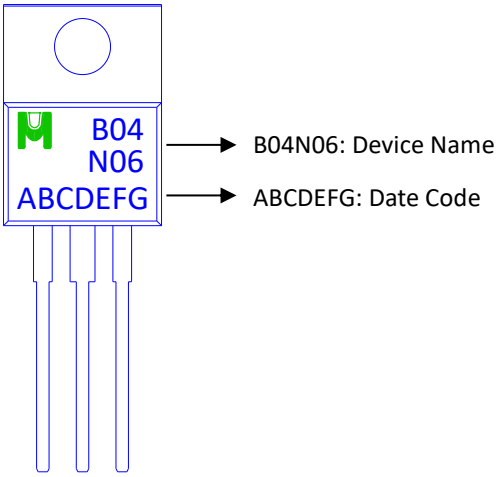
[1]Pulse test : Pulse Width ≤ 300 μsec, Duty Cycle ≤ 2%.

[2]Independent of operating temperature.

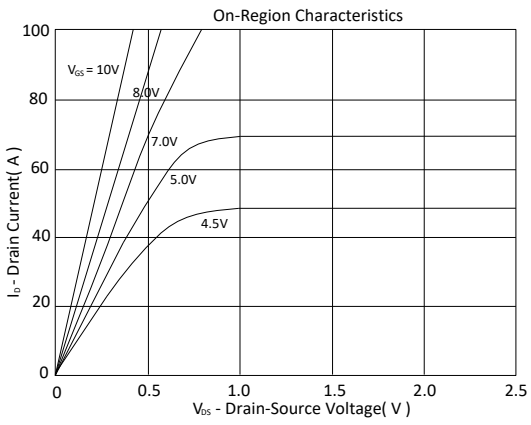
[3]Pulse width limited by maximum junction temperature.

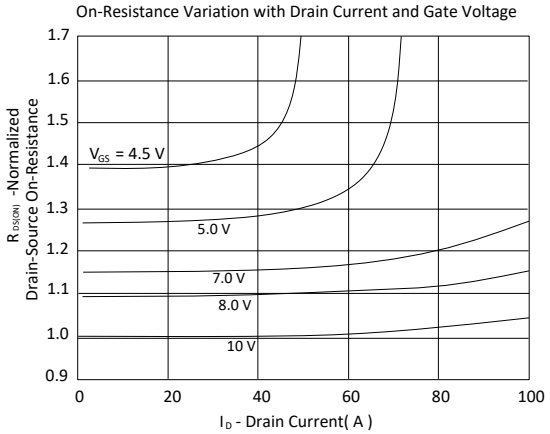
Ordering & Marking Information:

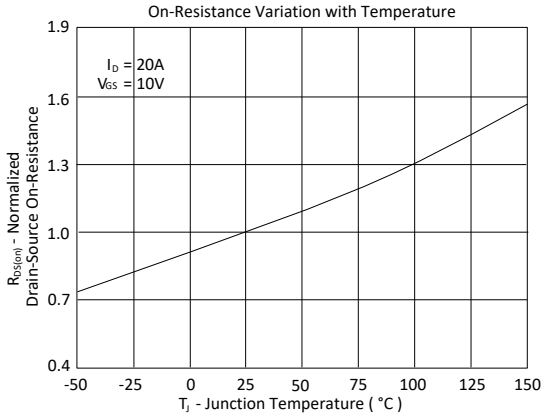
Device Name: EMB04N06E for TO-220

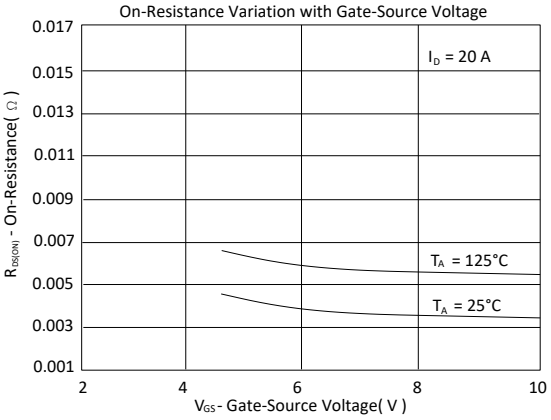


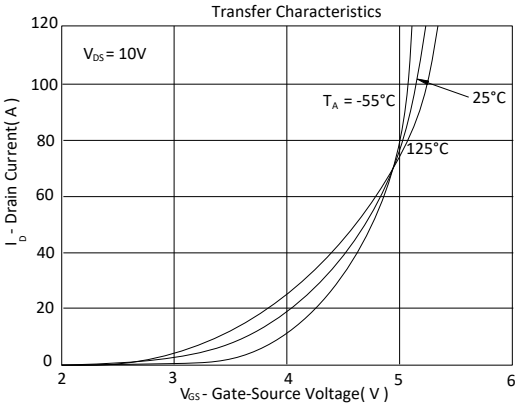
TYPICAL CHARACTERISTICS

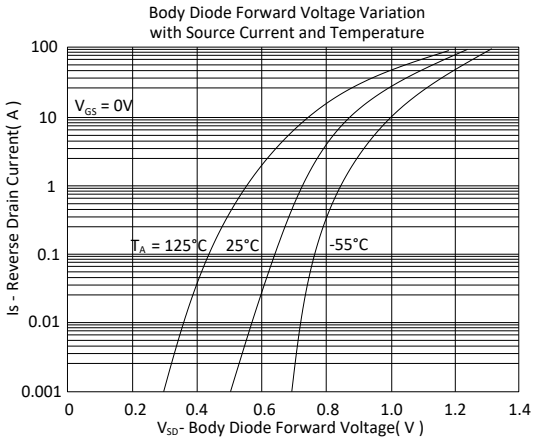


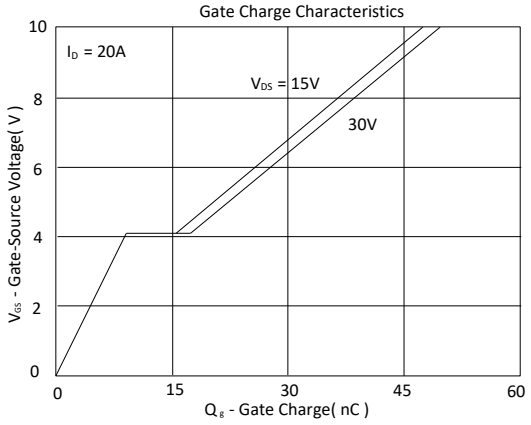


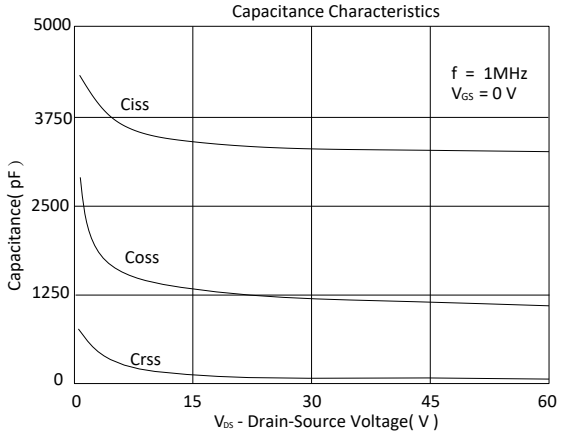


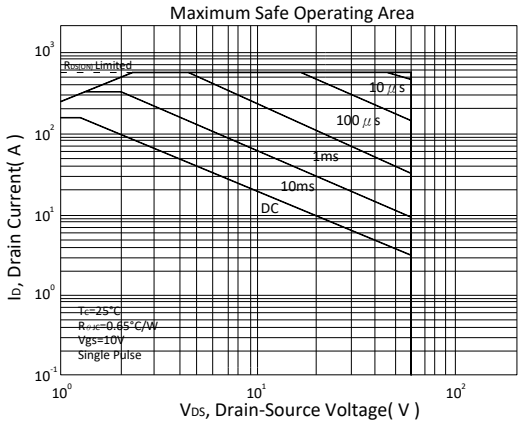


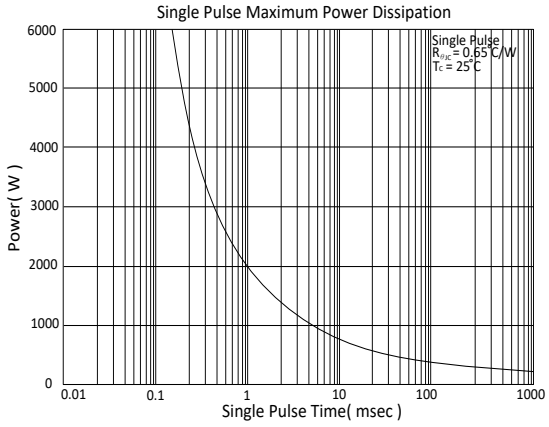


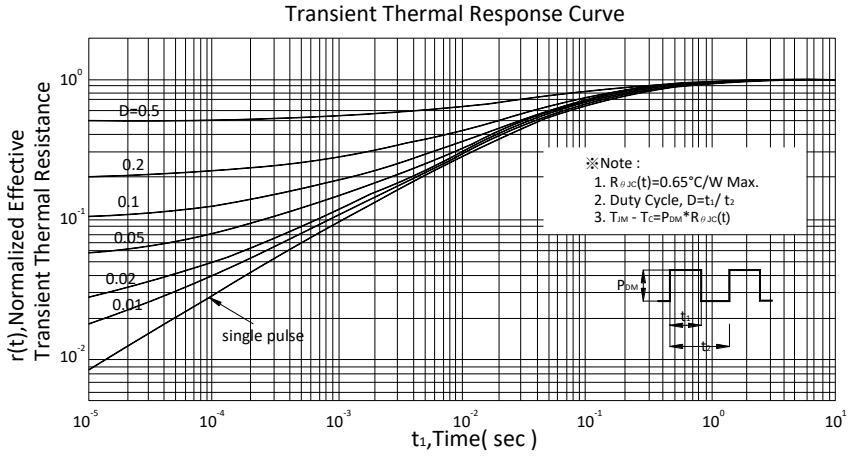



Gate Charge Characteristics
I_D = 20A
V_{DS} = 15V
30V
V_{GS} - Gate-Source Voltage(V)
Q_g - Gate Charge(nC)

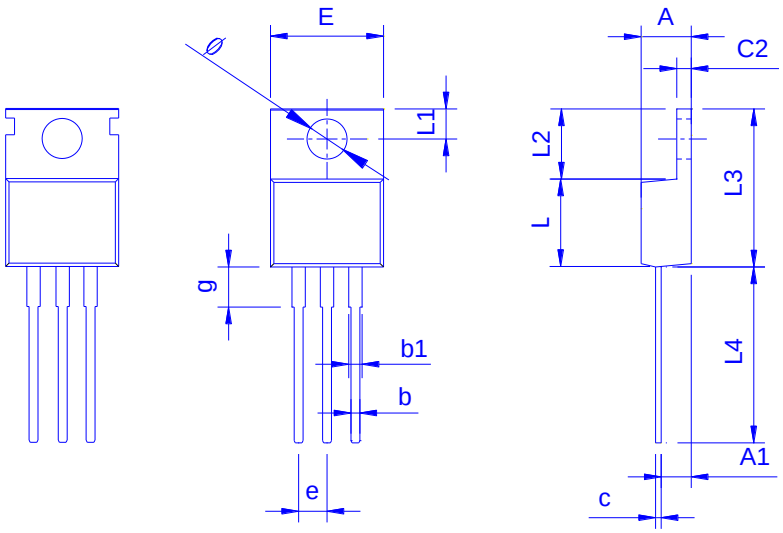

Capacitance Characteristics
f = 1MHz
V_{GS} = 0 V
Ciss
Coss
Crss
Capacitance(pF)
V_{DS} - Drain-Source Voltage(V)


Maximum Safe Operating Area
$R_{DS(ON)}$ Limited
10 μs
100 μs
1ms
10ms
DC
T_C=25°C
$R_{θJC}$=0.65°C/W
Vgs=10V
Single Pulse
I_D, Drain Current(A)
V_{DS}, Drain-Source Voltage(V)


Single Pulse Maximum Power Dissipation
Single Pulse
$R_{θJC}$ = 0.65°C/W
T_C = 25°C
Power(W)
Single Pulse Time(msec)


Transient Thermal Response Curve
D=0.5
0.2
0.1
0.05
0.02
0.01
single pulse
※Note :
1. $R_{θJC}$(t)=0.65°C/W Max.
2. Duty Cycle, D=t_1/ t_2
3. T_{JM} - T_C=P_{DM}*$R_{θJC}$(t)
P_{DM}
t_1
t_2
r(t),Normalized Effective Transient Thermal Resistance
t_1,Time(sec)

Outline Drawing



Dimension in mm

Dimension	A	A1	b	b1	c	c2	E	L	L1	L2	L3	L4	ø	e	g
Min.	4.07	2.04	0.60	1.15	0.31	1.11	9.90	8.30	2.50	6.00	14.30	12.70	3.40	2.04	2.85
Typ.	4.44	2.40	0.80	1.27	-	1.27	10.16	-	2.74	6.30	15.00	13.40	3.84	2.54	3.71
Max.	4.82	3.00	1.00	1.75	0.65	1.41	11.50	9.75	3.25	6.80	16.90	14.50	4.00	3.04	4.10