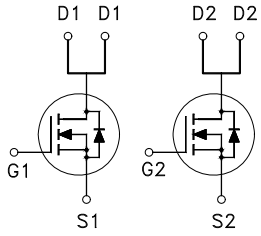
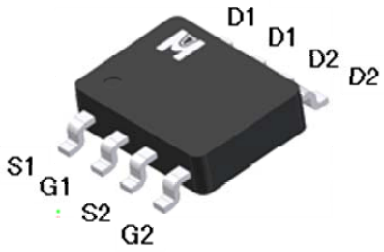
N-Channel Logic Level Enhancement Mode Field Effect Transistor

Product Summary:

BV_{DSS}	100V
$R_{DSON\ (MAX.)}$	500mΩ
I_D	1.5A





UIS 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_A = 25 °C	I_D	1.5	A
	T_A = 100 °C		0.9	
Pulsed Drain Current[1]		I_{DM}	6	
Power Dissipation	T_A = 25 °C	P_D	2	W
	T_A = 100 °C		0.8	
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	$R_{\theta JC}$		25	°C / W
Junction-to-Ambient[3]	$R_{\theta JA}$		62.5	

[1]Pulse width limited by maximum junction temperature.

[2]Duty cycle ≤ 1%

[3]62.5°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	100			V
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250μA	1	2	3	
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} = 5V, V_{GS} = 10V	1.5			A
Drain-Source On-State Resistance[1]	$R_{DS(ON)}$	V_{GS} = 10V, I_D = 1.5A		450	500	mΩ
		V_{GS} = 5V, I_D = 0.5A		485	570	
Forward Transconductance[1]	g_{fs}	V_{DS} = 5V, I_D = 1.5A		2		S
DYNAMIC						
Input Capacitance	C_{iss}	V_{GS} = 0V, V_{DS} = 50V, f = 1MHz		328		pF
Output Capacitance	C_{oss}			35		
Reverse Transfer Capacitance	C_{rss}			21		
Total Gate Charge[1,2]	Q_g	V_{DS} = 15V, V_{GS} = 10V, I_D = 1.5A		7.6		nC
Gate-Source Charge[1,2]	Q_{gs}			1.1		
Gate-Drain Charge[1,2]	Q_{gd}			2.7		
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			15		
Turn-Off Delay Time[1,2]	$t_{d(off)}$			25		
Fall Time[1,2]	t_f			20		
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS (T_C = 25 °C)						
Continuous Current	I_S				1.5	A
Pulsed Current[3]	I_{SM}				6	
Forward Voltage[1]	V_{SD}	I_F = I_S, V_{GS} = 0V			1.2	V
Reverse Recovery Time	t_{rr}			30		nS
Reverse Recovery Charge	Q_{rr}			60		nC

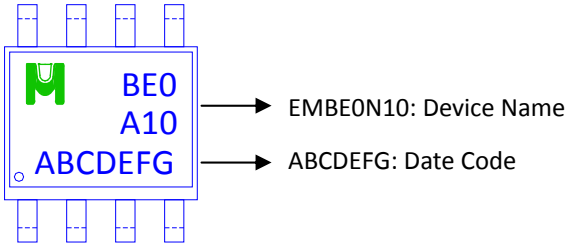
[1]Pulse test : Pulse Width ≤ 300 μsec, Duty Cycle ≤ 2%.

[2]Independent of operating temperature.

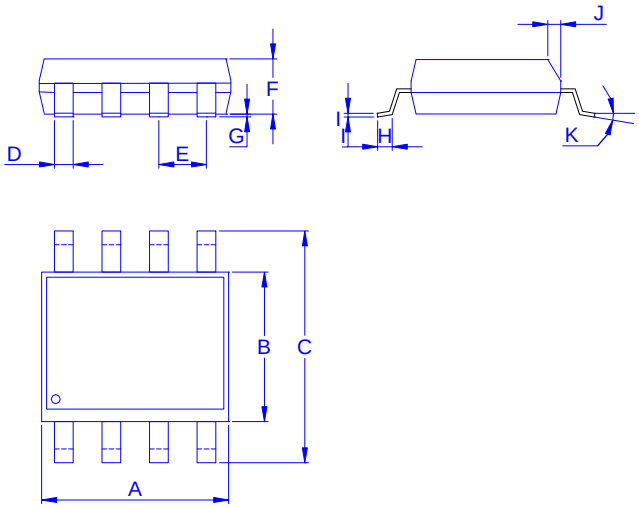
[3]Pulse width limited by maximum junction temperature.

Ordering & Marking Information:

Device Name: EMBE0A10G for SOP-8

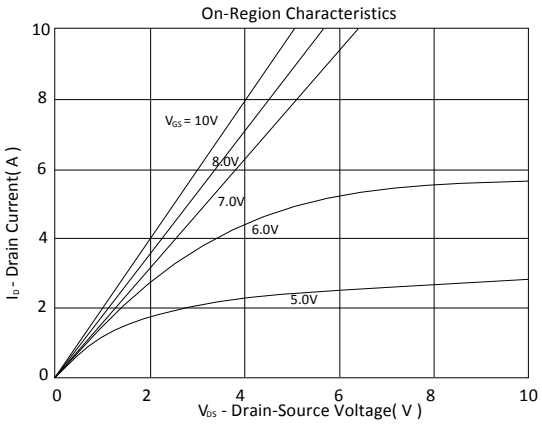


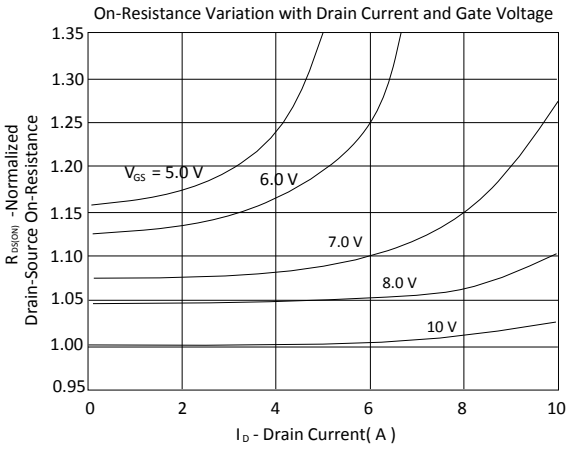
Outline Drawing

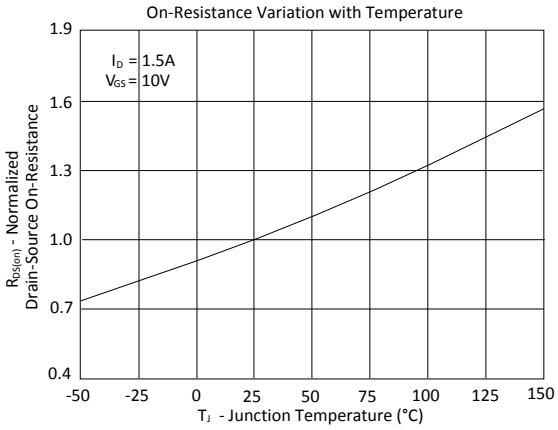


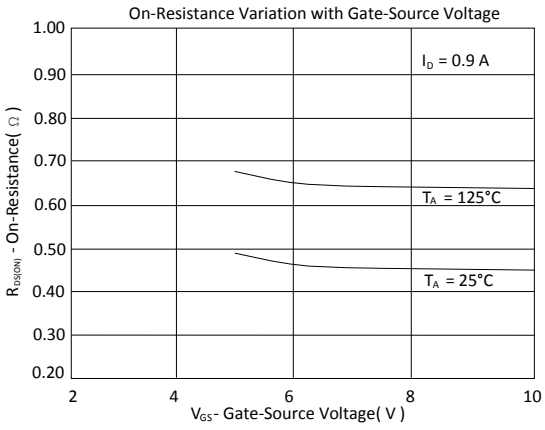
Dimension in mm

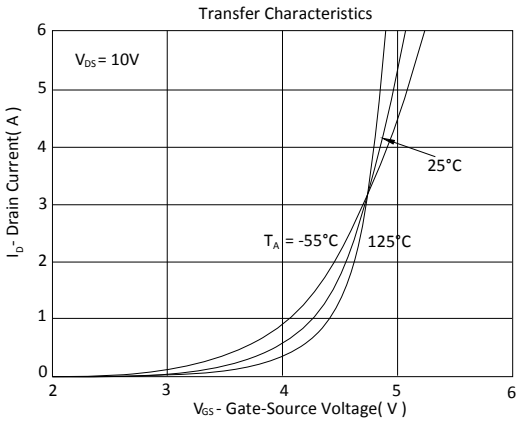
Dimension	A	B	C	D	E	F	G	H	I	J	K
in.	4.70	3.70	5.80	0.33		1.20	0.08	0.40	0.19	0.25	0°
Typ.					1.27						
Max.	5.10	4.10	6.20	0.51		1.62	0.28	0.83	0.26	0.50	8°

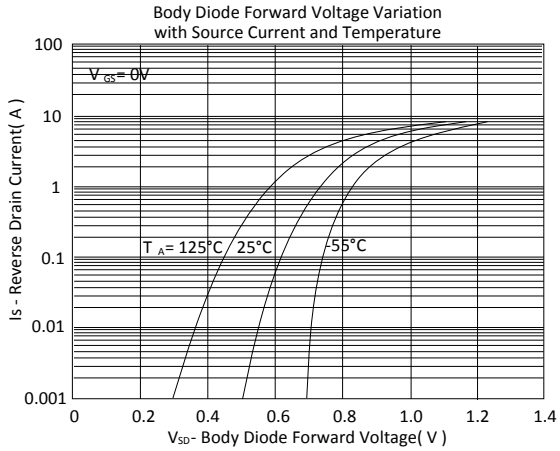

On-Region Characteristics
V_{GS} = 10V
8.0V
7.0V
6.0V
5.0V
I_D - Drain Current(A)
V_{DS} - Drain-Source Voltage(V)

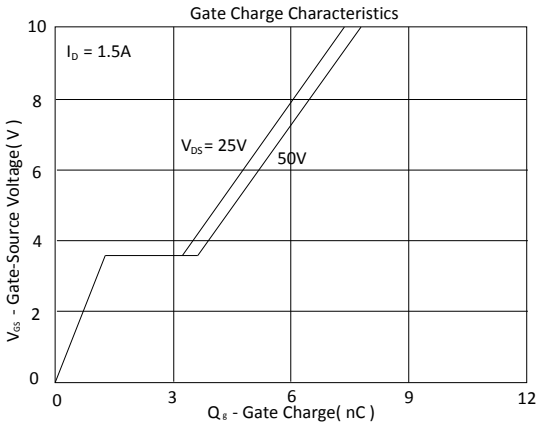

On-Resistance Variation with Drain Current and Gate Voltage
V_{GS} = 5.0 V
6.0 V
7.0 V
8.0 V
10 V
$R_{DS(ON)}$ -Normalized
Drain-Source On-Resistance
I_D - Drain Current(A)

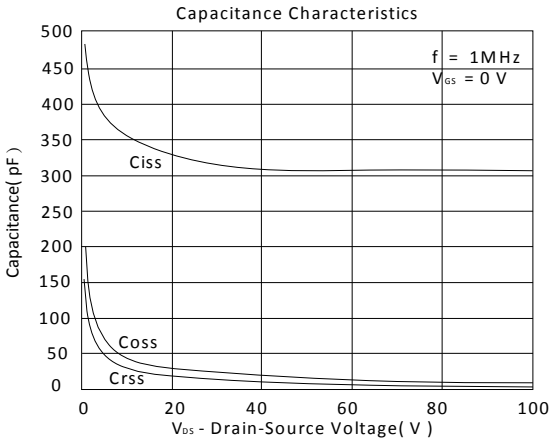

On-Resistance Variation with Temperature
I_D = 1.5A
V_{GS} = 10V
$R_{DS(on)}$ - Normalized
Drain-Source On-Resistance
T_J - Junction Temperature (°C)

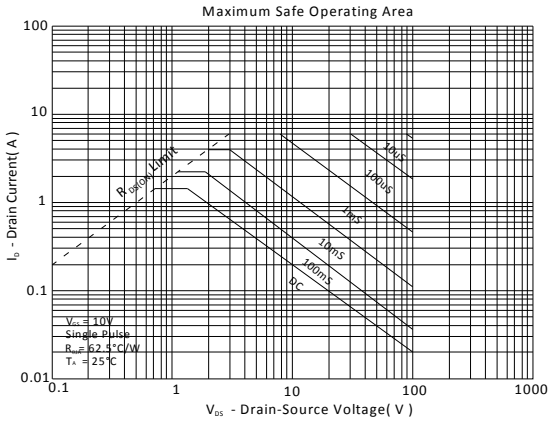

On-Resistance Variation with Gate-Source Voltage
I_D = 0.9 A
T_A = 125°C
T_A = 25°C
$R_{DS(ON)}$ - On-Resistance(Ω)
V_{GS}- Gate-Source Voltage(V)

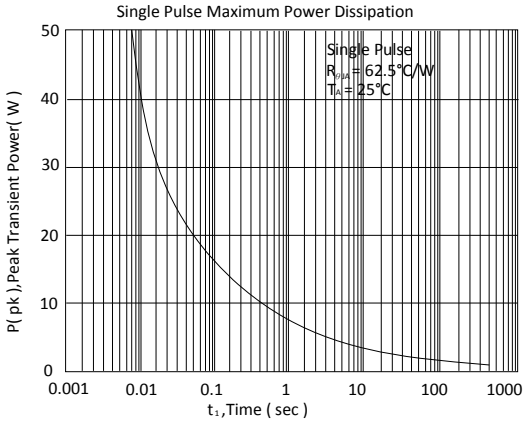

Transfer Characteristics
V_{DS} = 10V
25°C
T_A = -55°C
125°C
I_D- Drain Current(A)
V_{GS}- Gate-Source Voltage(V)

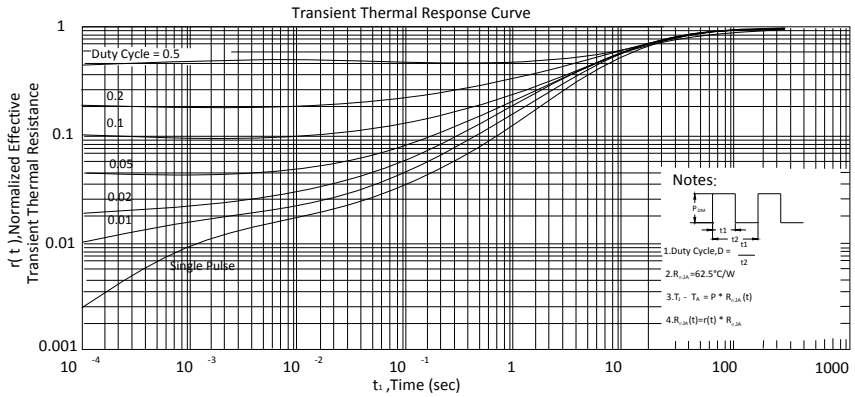

Body Diode Forward Voltage Variation
with Source Current and Temperature
V_{GS}= 0V
T_A= 125°C
25°C
-55°C
Is - Reverse Drain Current(A)
V_{SD}- Body Diode Forward Voltage(V)


Gate Charge Characteristics
I_D = 1.5A
V_{DS}= 25V
50V
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
$R_{\theta JA}$=62.5°C/W
T_A = 25°C
I_D - Drain Current(A)
V_{DS} - Drain-Source Voltage(V)


Single Pulse Maximum Power Dissipation
Single Pulse
$R_{\theta JA}$=62.5°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.$R_{\theta JA}$=62.5°C/W
3.T_J - T_A = P * $R_{\theta JA}$(t)
4.$R_{\theta JA}$(t)=r(t) * $R_{\theta JA}$
r(t),Normalized Effective Transient Thermal Resistance
t_1 ,Time (sec)