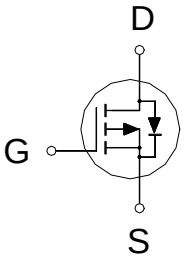
杰力科技股份有限公司
Excelliance MOS Corporation

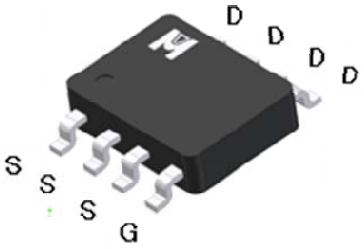
EMB50P03G

P-Channel Logic Level Enhancement Mode Field Effect Transistor

Product Summary:

BV_{DSS}	-30V
$R_{DSON\ (MAX.)}$	60mΩ
I_D	-6A





Pb-Free Lead Plating & Halogen Free

GP
GREEN PRODUCT

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	-6	A
	T_A = 100 °C		-5	
Pulsed Drain Current[1]		I_{DM}	-24	
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	$R_{\theta JC}$		25	°C / W
Junction-to-Ambient[3]	$R_{\theta JA}$		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_A = 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			-10	
On-State Drain Current[1]	$I_{D(ON)}$	V_{DS} = -5V, V_{GS} = -10V	-6			A
Drain-Source On-State Resistance[1]	$R_{DS(ON)}$	V_{GS} = -10V, I_D = -6A		48	60	mΩ
		V_{GS} = -4.5V, I_D = -5A		60	80	
Forward Transconductance[1]	g_{fs}	V_{DS} = -5V, I_D = -6A		16		S
DYNAMIC						
Input Capacitance	C_{iss}	V_{GS} = 0V, V_{DS} = -15V, f = 1MHz		520		pF
Output Capacitance	C_{oss}			82		
Reverse Transfer Capacitance	C_{rss}			61		
Total Gate Charge[1,2]	Q_g	V_{DS} = -15V, V_{GS} = 10V, I_D = -6A		8.6		nC
Gate-Source Charge[1,2]	Q_{gs}			1.4		
Gate-Drain Charge[1,2]	Q_{gd}			1.8		
Turn-On Delay Time[1,2]	$t_{d(on)}$	V_{DS} = -15V, I_D = -1A, V_{GS} = -10V, R_{GS} = 6Ω		5.5		nS
Rise Time[1,2]	t_r			10		
Turn-Off Delay Time[1,2]	$t_{d(off)}$			18		
Fall Time[1,2]	t_f			15		
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS (T_C = 25 °C)						
Continuous Current	I_S				-2.3	A
Pulsed Current[3]	I_{SM}				-9.2	
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		15		nS
Reverse Recovery Charge	Q_{rr}			8		nC

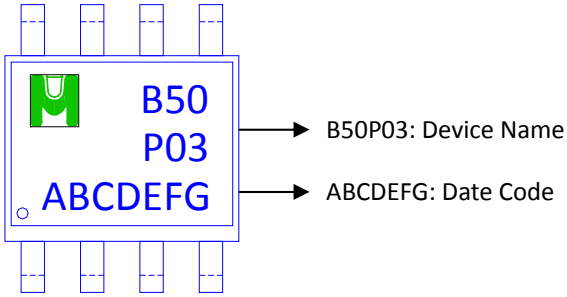
[1]Pulse test : Pulse Width ≤ 300 μsec, Duty Cycle ≤ 2%.

[2]Independent of operating temperature.

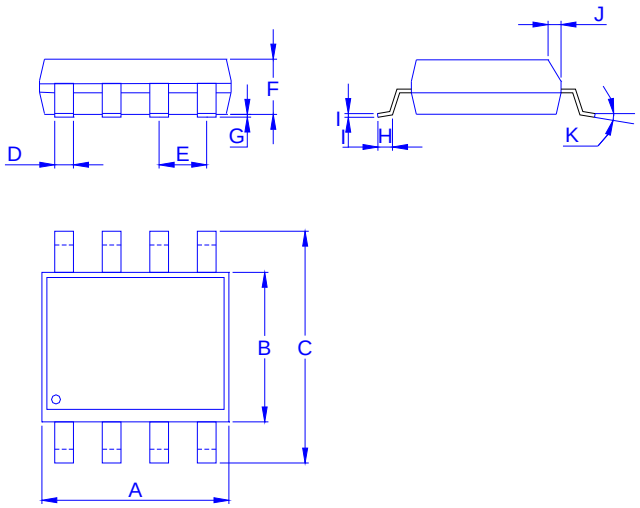
[3]Pulse width limited by maximum junction temperature.

Ordering & Marking Information:

Device Name: EMB50P03G for SOP-8



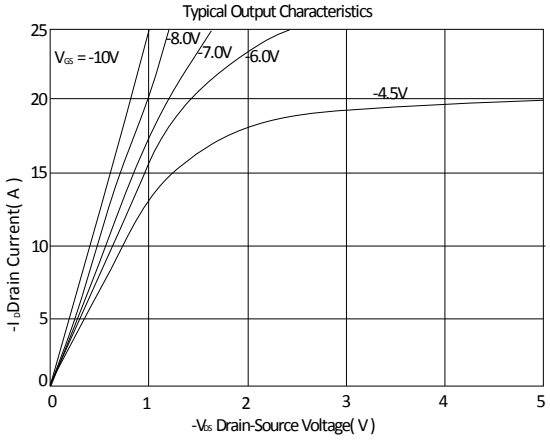
Outline Drawing



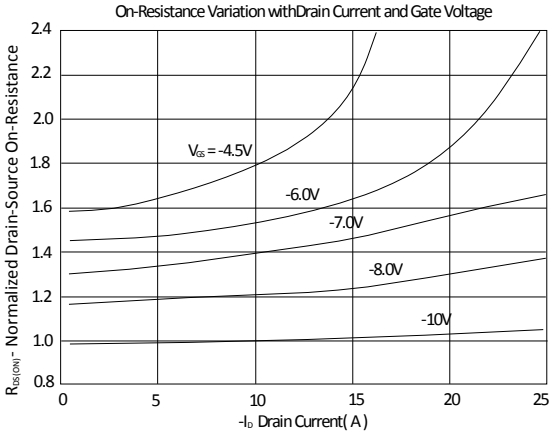
Dimension in mm

Dimension	A	B	C	D	E	F	G	H	I	J	K
Min.	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°

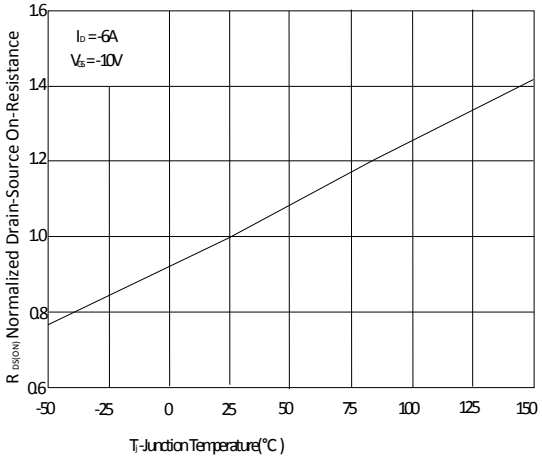
Typical Output Characteristics



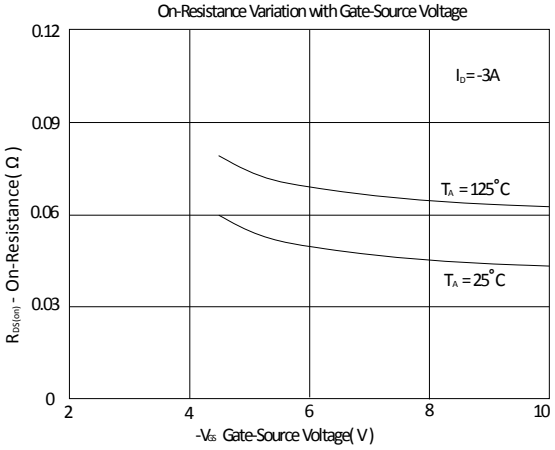
On-Resistance Variation withDrain Current and Gate Voltage



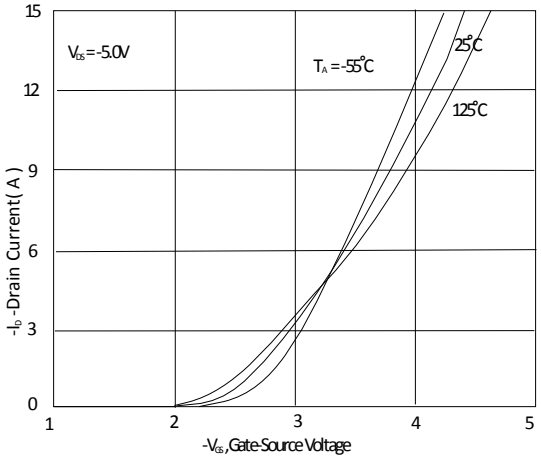
On-Resistance Variation with Temperature



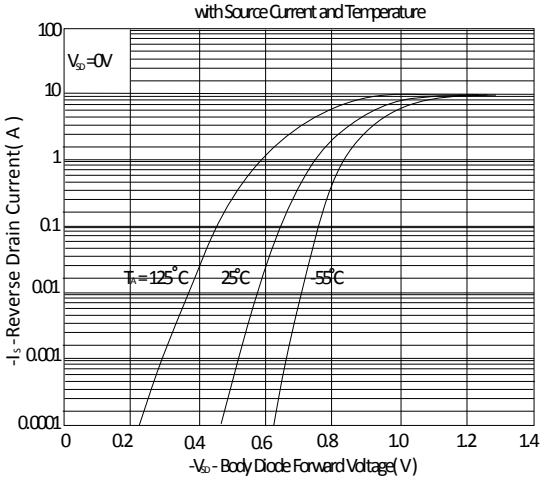
On-Resistance Variation with Gate-Source Voltage

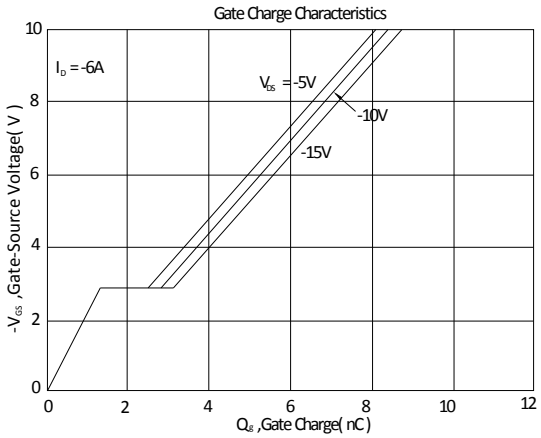


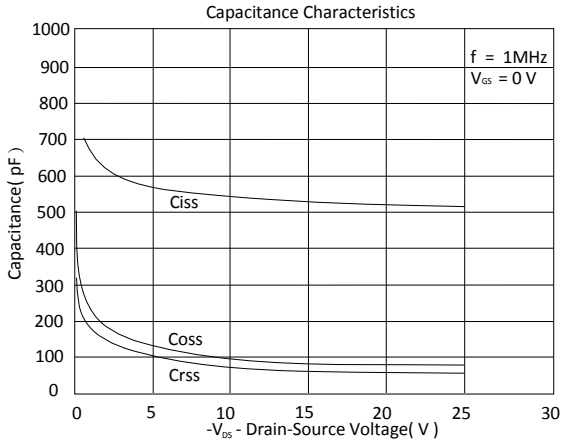
Transfer Characteristics

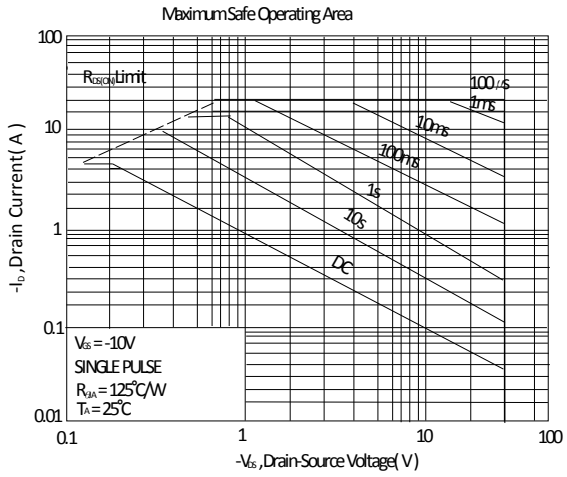


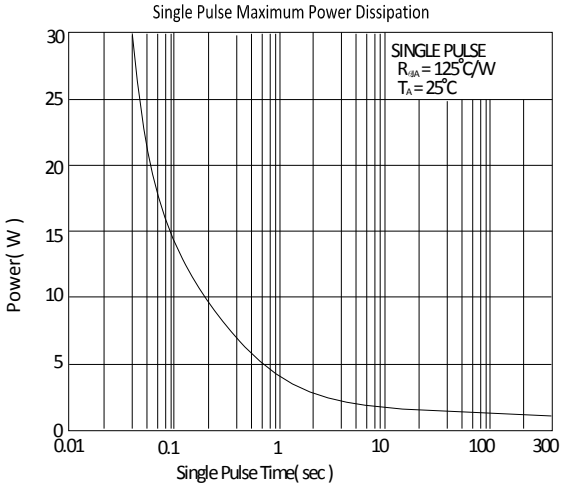
Body Diode Forward Voltage Variation with Source Current and Temperature

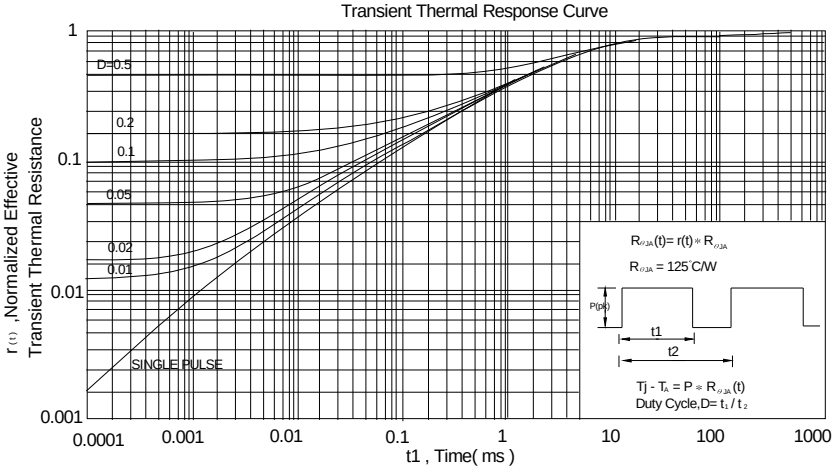



Gate Charge Characteristics
I_D = -6A
V_DS = -5V
-10V
-15V
-V_GS ,Gate-Source Voltage(V)
Q_g ,Gate Charge(nC)


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
100μs
1ms
10ms
100ms
1s
10s
DC
V_GS = -10V
SINGLE PULSE
R_θJA = 125°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 = 125°C/W
T_A = 25°C
Power(W)
Single Pulse Time(sec)


Transient Thermal Response Curve
D=0.5
0.2
0.1
0.05
0.02
0.01
SINGLE PULSE
R_θJA(t)= r(t) * R_θJA
R_θJA = 125°C/W
P(pk)
t1
t2
Tj - T_A = P * R_θJA(t)
Duty Cycle,D= t1 / t2
r(t) ,Normalized Effective Transient Thermal Resistance
t1 , Time(ms)