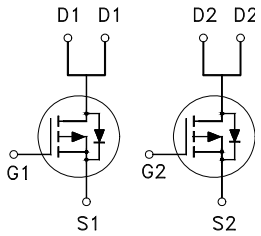
Dual P-Channel Logic Level Enhancement Mode Field Effect Transistor

Product Summary:

BV_{DSS}	-30V
$R_{DSON\ (MAX.)}$	50mΩ
I_D	-5.5A



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	-5.5	A
	T_A = 100 °C		-4.2	
Pulsed Drain Current[1]		I_{DM}	-22	
Power Dissipation	T_A = 25 °C	P_D	2	W
	T_A = 100 °C		1.08	
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_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	-5.5			A
Drain-Source On-State Resistance[1]	$R_{DS(ON)}$	V_{GS} = -10V, I_D = -5A		40	50	mΩ
		V_{GS} = -5V, I_D = -4A		65	80	
Forward Transconductance[1]	g_{fs}	V_{DS} = -5V, I_D = -5A		16		S
DYNAMIC						
Input Capacitance	C_{iss}	V_{GS} = 0V, V_{DS} = -15V, f = 1MHz		820		pF
Output Capacitance	C_{oss}			122		
Reverse Transfer Capacitance	C_{rss}			97		
Total Gate Charge[1,2]	Q_g	V_{DS} = -15V, V_{GS} = 10V, I_D = -5A		9		nC
Gate-Source Charge[1,2]	Q_{gs}			2.2		
Gate-Drain Charge[1,2]	Q_{gd}			2.5		
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

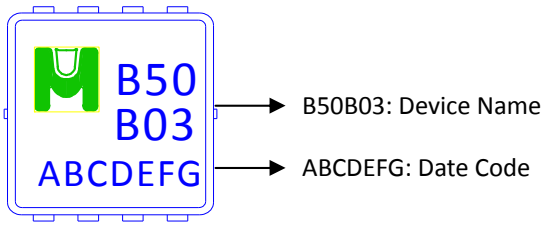
[1]Pulse test : Pulse Width ≤ 300 μsec, Duty Cycle ≤ 2%.

[2]Independent of operating temperature.

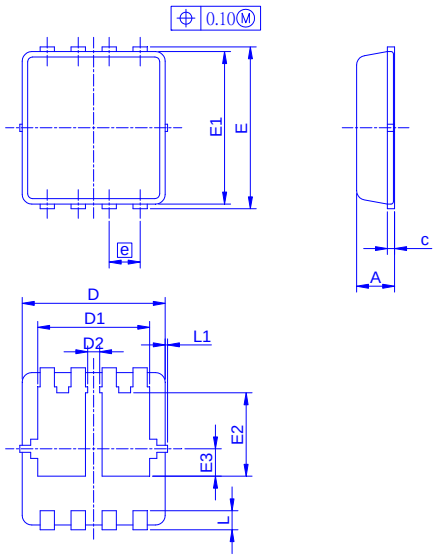
[3]Pulse width limited by maximum junction temperature.

Ordering & Marking Information:

Device Name: EMB50B03V for EDFN 3 x 3



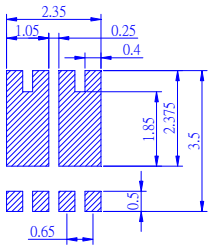
Outline Drawing

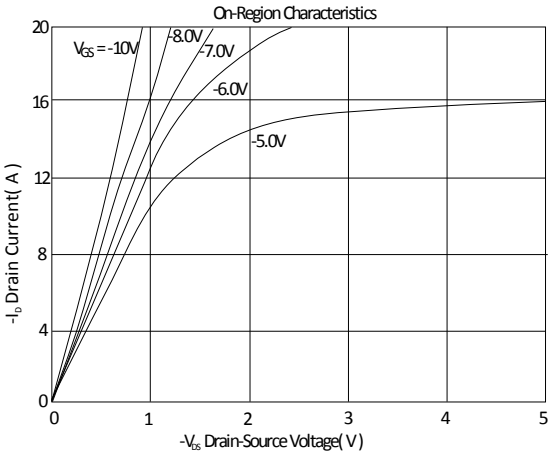


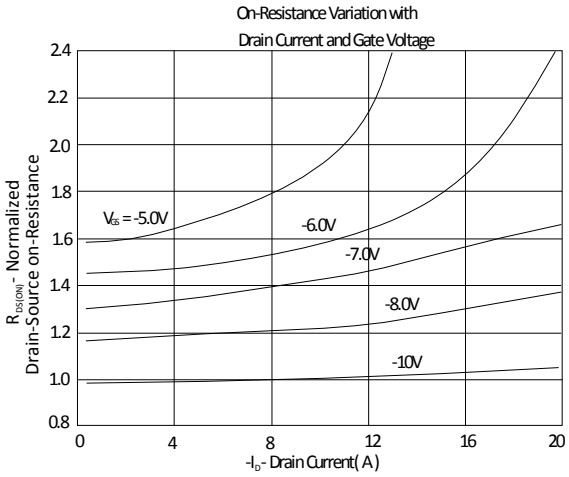
Dimension in mm

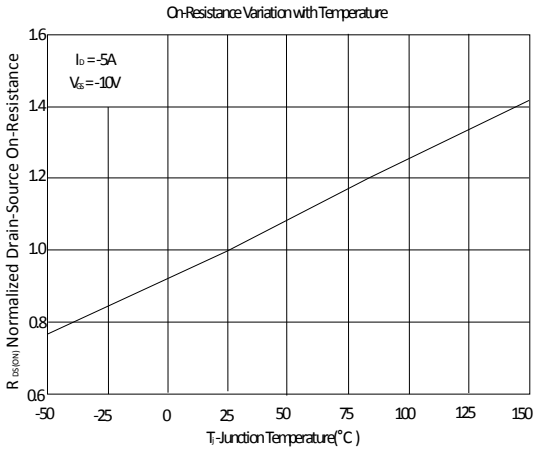
Dimension	A	A1	b	c	D	D1	D2	E	E1	E2	E3	e	L	L1	θ1
Min.	0.70	0	0.24	0.10	2.95	2.25		3.15	2.95	1.65			0.30	0	0°
Typ.	0.80		0.30	0.152	3.00	2.35	0.225	3.20	3.00	1.75	0.575	0.65	0.40		10°
Max.	0.90	0.05	0.35	0.25	3.05	2.45		3.25	3.05	1.85			0.50	0.10	12°

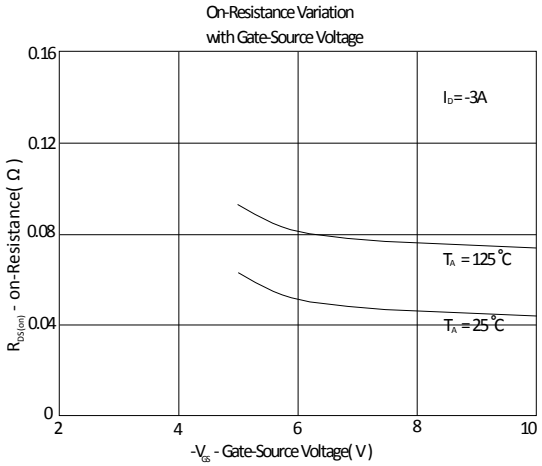
Recommended minimum pads

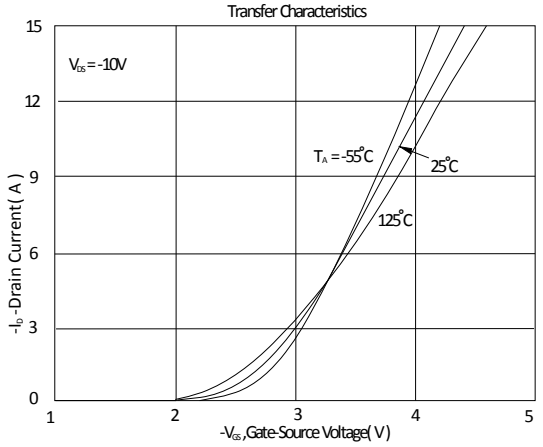


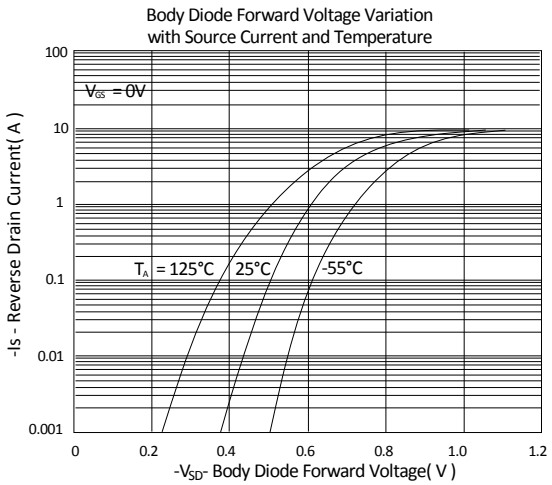

On-Region Characteristics
V_{GS} = -10V
-8.0V
-7.0V
-6.0V
-5.0V
$-I_D$ Drain Current(A)
$-V_{DS}$ Drain-Source Voltage(V)


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

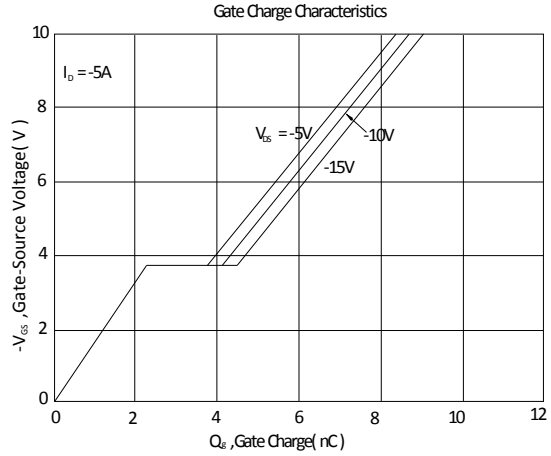

On-Resistance Variation with Temperature
I_D = -5A
V_{GS} = -10V
$R_{DS(ON)}$ Normalized Drain-Source On-Resistance
T_J-Junction Temperature(°C)


On-Resistance Variation
with Gate-Source Voltage
I_D = -3A
T_A = 125°C
T_A = 25°C
$R_{DS(on)}$ - on-Resistance(Ω)
$-V_{GS}$ - Gate-Source Voltage(V)

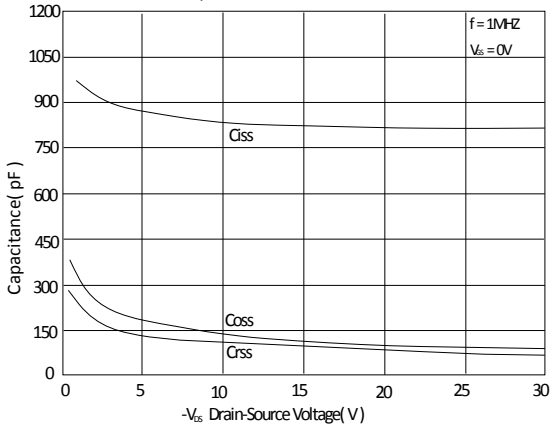

Transfer Characteristics
V_{DS} = -10V
T_A = -55°C
25°C
125°C
$-I_D$ -Drain Current(A)
$-V_{GS}$,Gate-Source Voltage(V)


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)

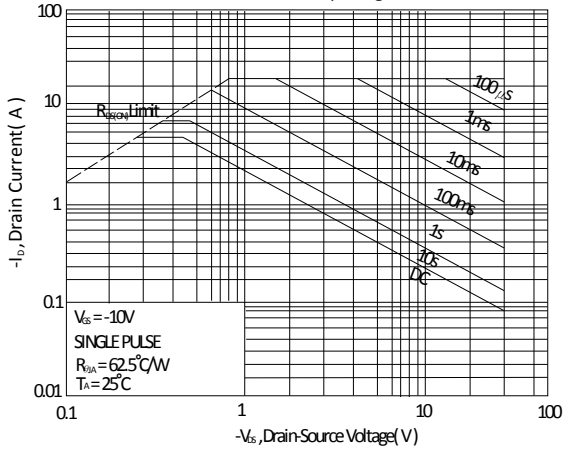
Gate Charge Characteristics



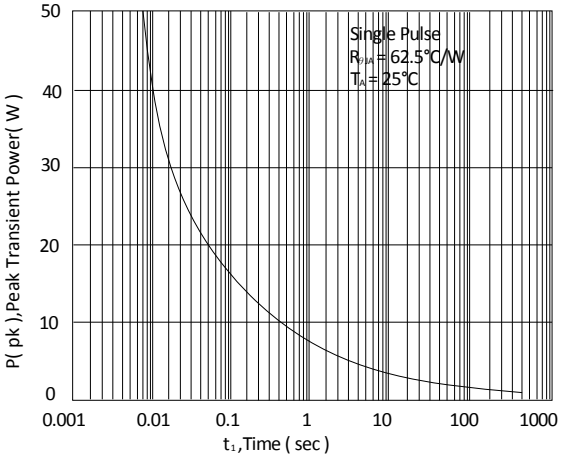
Capacitance Characteristics



Maximum Safe Operating Area



Single Pulse Maximum Power Dissipation



Transient Thermal Response Curve