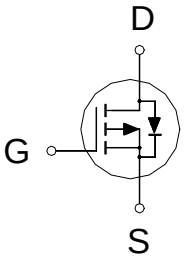
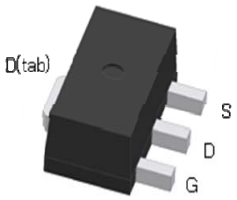
P-Channel Logic Level Enhancement Mode Field Effect Transistor

Product Summary:

BV_{DSS}	-30V
$R_{DSON\ (MAX.)}$	20mΩ
I_D	-8A





Pb-Free Lead Plating & Halogen Free

GP
GREEN PRODUCT

ABSOLUTE MAXIMUM RATINGS (T_C = 25 °C Unless Otherwise Noted)

PARAMETERS/TEST CONDITIONS		SYMBOL	LIMITS	UNIT
Gate-Source Voltage		V_{GS}	±25	V
Continuous Drain Current	T_C = 25 °C	I_D	-8	A
	T_C = 100 °C		-6	
Pulsed Drain Current[1]		I_{DM}	-32	
Power Dissipation	T_A = 25 °C	P_D	1.47	W
	T_A = 100 °C		0.58	
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	$R_{\theta JC}$		18	°C / W
Junction-to-Ambient[3]	$R_{\theta JA}$		85	

[1]Pulse width limited by maximum junction temperature.

[2]Duty cycle ≤ 1%

[3]85°C / W when mounted on a 1 in^2 pad of 2 oz copper.

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	-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
		V_{DS} = 0V, V_{GS} = ±25V			±500	
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	-18			A
Drain-Source On-State Resistance[1]	$R_{DS(ON)}$	V_{GS} = -10V, I_D = -8A		17.5	20	mΩ
		V_{GS} = -4.5V, I_D = -5A		26	35	
Forward Transconductance[1]	g_{fs}	V_{DS} = -5V, I_D = -8A		24		S
DYNAMIC						
Input Capacitance	C_{iss}	V_{GS} = 0V, V_{DS} = -15V, f = 1MHz		1407		pF
Output Capacitance	C_{oss}			208		
Reverse Transfer Capacitance	C_{rss}			164		
Gate Resistance	R_g	V_{GS} = 15mV, V_{DS} = 0V, f = 1MHz		4.7		Ω
Total Gate Charge[1,2]	Q_g(V_{GS}=10V)	V_{DS} = -15V, V_{GS} = -10V, I_D = -8A		20.3		nC
	Q_g(V_{GS}=4.5V)			9.8		
Gate-Source Charge[1,2]	Q_{gs}			3.2		
Gate-Drain Charge[1,2]	Q_{gd}			4.9		
Turn-On Delay Time[1,2]	$t_{d(on)}$	V_{DS} = -15V, I_D = -1A, V_{GS} = -10V, R_{GS} = 2.7Ω		10		nS
Rise Time[1,2]	t_r			8		
Turn-Off Delay Time[1,2]	$t_{d(off)}$			25		
Fall Time[1,2]	t_f			6		
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS (T_C = 25 °C)						
Continuous Current	I_S				-3.5	A
Pulsed Current[3]	I_{SM}				-14	
Forward Voltage[1]	V_{SD}	I_F = I_S A, V_{GS} = 0V			-1.2	V
Reverse Recovery Time	t_{rr}	I_F = I_S, dI_F/dt = 100A / μS		32		nS
Reverse Recovery Charge	Q_{rr}			26		nC

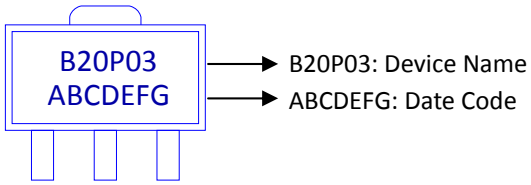
[1]Pulse test : Pulse Width ≤ 300 μsec, Duty Cycle ≤ 2%.

[2]Independent of operating temperature.

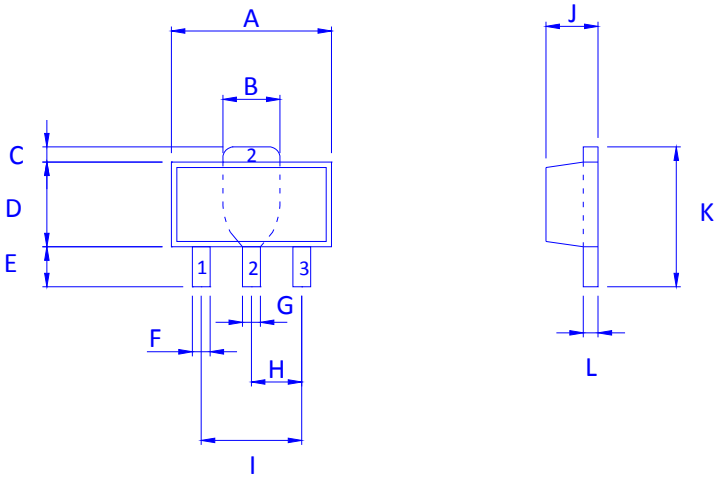
[3]Pulse width limited by maximum junction temperature.

Ordering & Marking Information:

Device Name: EMB20P03P for SOT-89



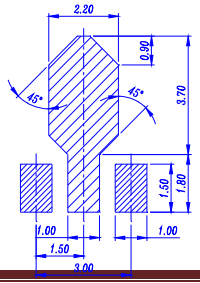
Outline Drawing

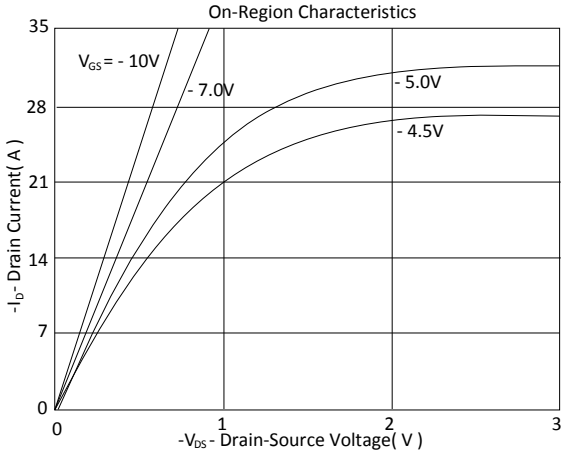


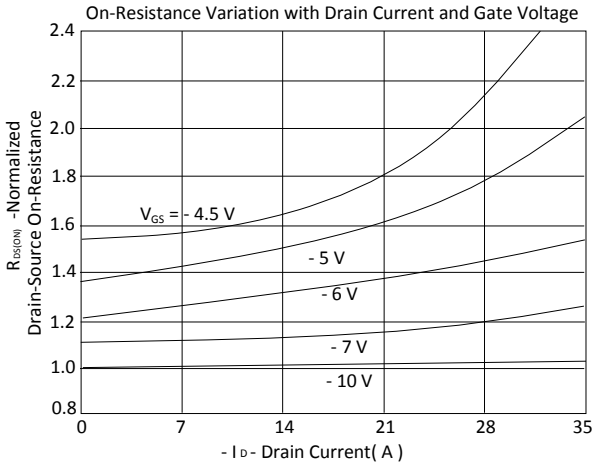
Dimension in mm

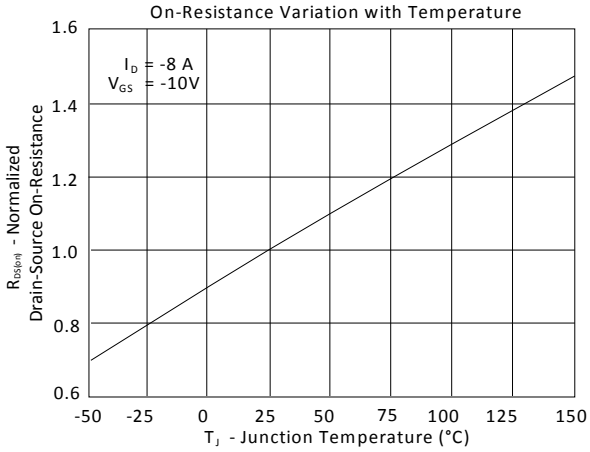
Dimension	A	B	C	D	E	F	G	H	I	J	K	L
in.	4.30	1.60	0.40	2.40	0.80	0.40	0.40	1.40	2.80	1.30	3.80	0.30
Typ.												
Max.	4.70	1.80	0.60	2.60	1.40	0.50	0.60	1.60	3.20	1.70	4.60	0.50

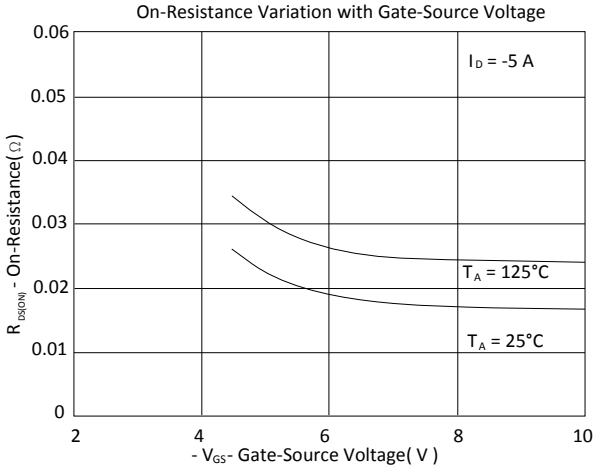
Footprint

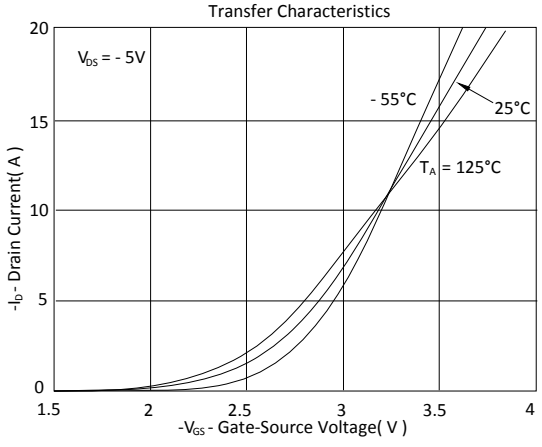


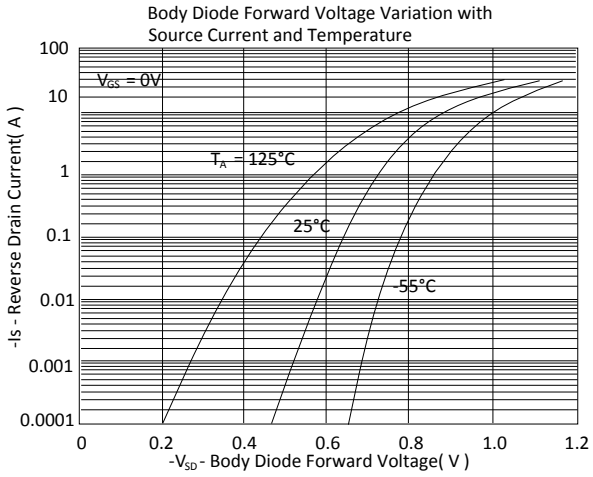

On-Region Characteristics
V_GS = - 10V
- 7.0V
- 5.0V
- 4.5V
-I_D - Drain Current(A)
-V_DS - Drain-Source Voltage(V)


On-Resistance Variation with Drain Current and Gate Voltage
R_DS(ON) -Normalized
Drain-Source On-Resistance
V_GS = - 4.5 V
- 5 V
- 6 V
- 7 V
- 10 V
- I_D - Drain Current(A)

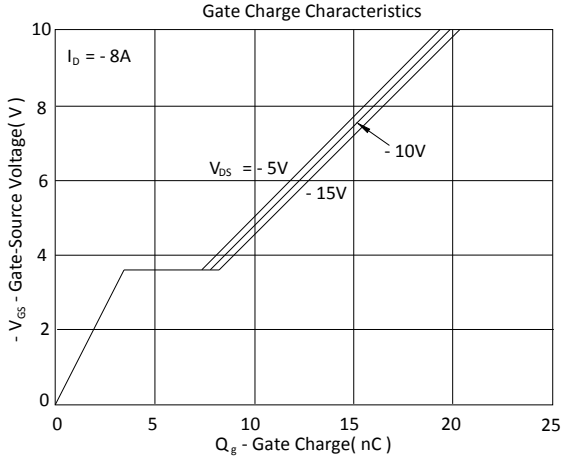

On-Resistance Variation with Temperature
I_D = -8 A
V_GS = -10V
R_DS(on) - Normalized
Drain-Source On-Resistance
T_J - Junction Temperature (°C)


On-Resistance Variation with Gate-Source Voltage
I_D = -5 A
T_A = 125°C
T_A = 25°C
R_DS(ON) - On-Resistance(Ω)
- V_GS - Gate-Source Voltage(V)

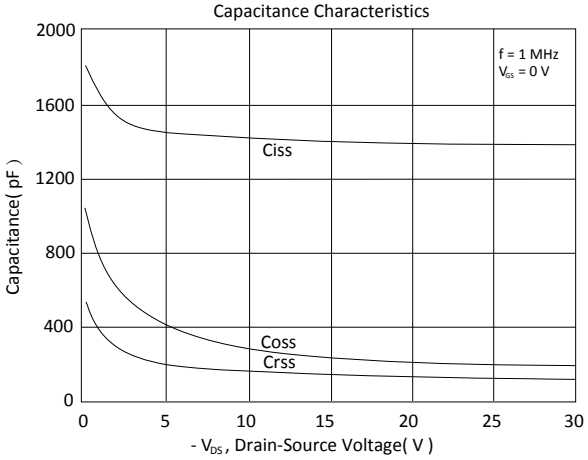

Transfer Characteristics
V_DS = - 5V
- 55°C
25°C
T_A = 125°C
-I_D - Drain Current(A)
-V_GS - Gate-Source Voltage(V)


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)

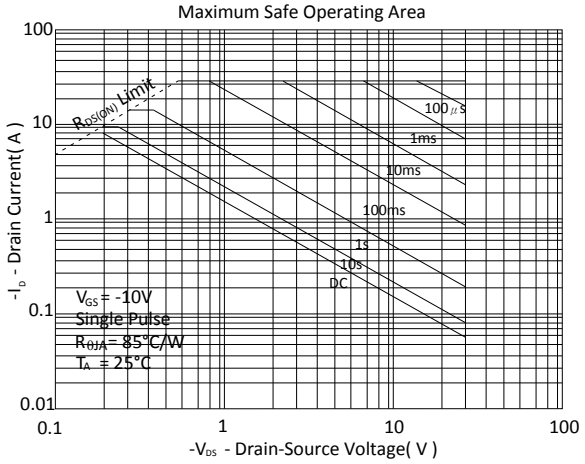
Gate Charge Characteristics



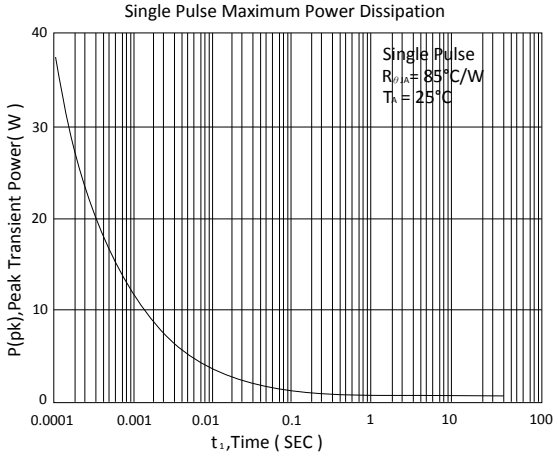
Capacitance Characteristics



Maximum Safe Operating Area



Single Pulse Maximum Power Dissipation



Transient Thermal Response Curve