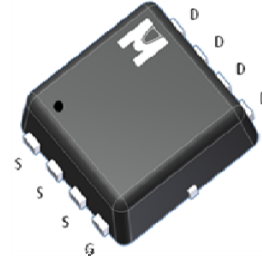


N-Channel Logic Level Enhancement Mode Field Effect Transistor

Product Summary:

BV <sub>DSS</sub>	30V
R <sub>DS(on)</sub> (MAX.)	20mΩ
I <sub>D</sub>	12A



UIS, R<sub>g</sub> 100% Tested

Pb-Free Lead Plating & Halogen Free



ABSOLUTE MAXIMUM RATINGS (T<sub>C</sub> = 25 °C Unless Otherwise Noted)

PARAMETERS/TEST CONDITIONS		SYMBOL	LIMITS	UNIT
Gate-Source Voltage		V <sub>GS</sub>	±20	V
Continuous Drain Current	T <sub>C</sub> = 25 °C	I <sub>D</sub>	12	A
	T <sub>C</sub> = 100 °C		9	
Pulsed Drain Current <sup>1</sup>		I <sub>DM</sub>	48	
Avalanche Current		I <sub>AS</sub>	8	
Avalanche Energy	L = 0.1mH, I <sub>D</sub> =8A, R <sub>G</sub> =25Ω	E <sub>AS</sub>	3.2	mJ
Repetitive Avalanche Energy <sup>2</sup>	L = 0.05mH	E <sub>AR</sub>	1.6	
Power Dissipation	T <sub>C</sub> = 25 °C	P <sub>D</sub>	21	W
	T <sub>C</sub> = 100 °C		8.3	
Power Dissipation	T <sub>A</sub> = 25 °C	P <sub>D</sub>	2.5	W
	T <sub>A</sub> = 100 °C		1	
Operating Junction & Storage Temperature Range		T <sub>J</sub> , T <sub>stg</sub>	-55 to 150	°C

THERMAL RESISTANCE RATINGS

THERMAL RESISTANCE	SYMBOL	TYPICAL	MAXIMUM	UNIT
Junction-to-Case	R <sub>θJC</sub>		6	°C / W
Junction-to-Ambient <sup>3</sup>	R <sub>θJA</sub>		50	

<sup>1</sup>Pulse width limited by maximum junction temperature.

<sup>2</sup>Duty cycle ≤ 1%

<sup>3</sup>50°C / W when mounted on a 1 in<sup>2</sup> pad of 2 oz copper.

**ELECTRICAL CHARACTERISTICS (T<sub>c</sub> = 25 °C, Unless Otherwise Noted)**

PARAMETER	SYMBOL	TEST CONDITIONS	LIMITS			UNIT
			MIN	TYP	MAX	
<b>STATIC</b>						
Drain-Source Breakdown Voltage	V <sub>(BR)DSS</sub>	V <sub>GS</sub> = 0V, I <sub>D</sub> = 250μA	30			V
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA	1	1.5	3	
Gate-Body Leakage	I <sub>GSS</sub>	V <sub>DS</sub> = 0V, V <sub>GS</sub> = ±20V			±100	nA
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> = 24V, V <sub>GS</sub> = 0V			1	μA
		V <sub>DS</sub> = 20V, V <sub>GS</sub> = 0V, T <sub>J</sub> = 125 °C			25	
On-State Drain Current <sup>1</sup>	I <sub>D(ON)</sub>	V <sub>DS</sub> = 10V, V <sub>GS</sub> = 10V	12			A
Drain-Source On-State Resistance <sup>1</sup>	R <sub>DS(ON)</sub>	V <sub>GS</sub> = 10V, I <sub>D</sub> = 8A		15.5	20	mΩ
		V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 6A		25	30	
Forward Transconductance <sup>1</sup>	g <sub>fs</sub>	V <sub>DS</sub> = 5V, I <sub>D</sub> = 8A		16		S
<b>DYNAMIC</b>						
Input Capacitance	C <sub>iss</sub>	V <sub>GS</sub> = 0V, V <sub>DS</sub> = 15V, f = 1MHz		520		pF
Output Capacitance	C <sub>oss</sub>			88		
Reverse Transfer Capacitance	C <sub>rss</sub>			62		
Gate Resistance	R <sub>g</sub>	V <sub>GS</sub> = 15mV, V <sub>DS</sub> = 0V, f = 1MHz		2.0		Ω
Total Gate Charge <sup>1,2</sup>	Q <sub>g</sub> (V <sub>GS</sub> =10V)	V <sub>DS</sub> = 15V, V <sub>GS</sub> = 10V, I <sub>D</sub> = 8A		11.5		nC
	Q <sub>g</sub> (V <sub>GS</sub> =4.5V)			5		
Gate-Source Charge <sup>1,2</sup>	Q <sub>gs</sub>			1.6		
Gate-Drain Charge <sup>1,2</sup>	Q <sub>gd</sub>			2.8		
Turn-On Delay Time <sup>1,2</sup>	t <sub>d(on)</sub>		V <sub>DS</sub> = 15V, I <sub>D</sub> = 1A, V <sub>GS</sub> = 10V, R <sub>GS</sub> = 6Ω		9	
Rise Time <sup>1,2</sup>	t <sub>r</sub>			12		
Turn-Off Delay Time <sup>1,2</sup>	t <sub>d(off)</sub>			30		
Fall Time <sup>1,2</sup>	t <sub>f</sub>			15		
<b>SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS (T<sub>c</sub> = 25 °C)</b>						
Continuous Current	I <sub>S</sub>				2.3	A
Pulsed Current <sup>3</sup>	I <sub>SM</sub>				9.2	
Forward Voltage <sup>1</sup>	V <sub>SD</sub>	I <sub>F</sub> = I <sub>S</sub> , V <sub>GS</sub> = 0V			1.2	V
Reverse Recovery Time	t <sub>rr</sub>	I <sub>F</sub> = I <sub>S</sub> , dI <sub>F</sub> /dt = 100A / μS		45		nS
Peak Reverse Recovery Current	I <sub>RM(REC)</sub>			30		A
Reverse Recovery Charge	Q <sub>rr</sub>			2		nC

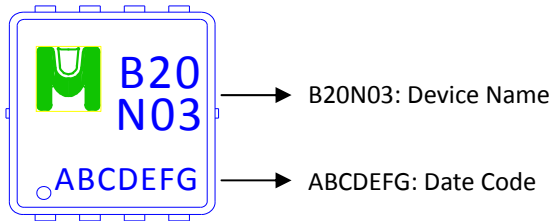
<sup>1</sup>Pulse test : Pulse Width  $\leq 300 \mu\text{sec}$ , Duty Cycle  $\leq 2\%$ .

<sup>2</sup>Independent of operating temperature.

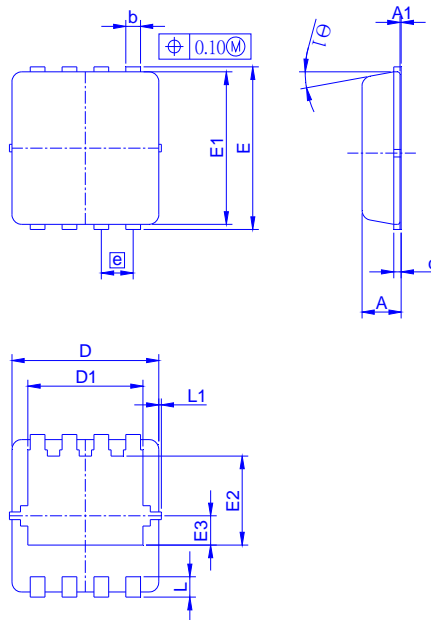
<sup>3</sup>Pulse width limited by maximum junction temperature.

Ordering & Marking Information:

Device Name: EMB20N03V for EDFN 3 x 3



Outline Drawing



Dimension in mm

Dimension	A	A1	b	c	D	D1	E	E1	E2	E3	e	L	L1	$\Theta 1$
Min.	0.70	0	0.24	0.10	2.95	2.25	3.15	2.95	1.65			0.30		0°
Typ.	0.80		0.30	0.152	3.00	2.35	3.20	3.00	1.75	0.575	0.65	0.40	0.13	10°
Max.	0.90	0.05	0.37	0.25	3.15	2.45	3.40	3.15	1.96			0.50		12°

Recommended minimum pads

