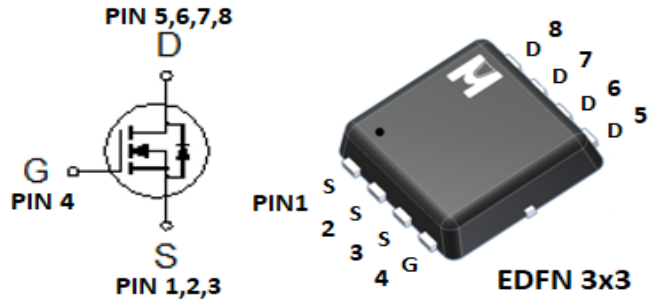


Single N-Channel Logic Level Enhancement Mode Field Effect Transistor

•Product Summary:

	N-CH
BVDSS	30V
$R_{DS(on) (MAX.)}@V_{GS}=10V$	20.0m $\Omega$
$R_{DS(on) (MAX.)}@V_{GS}=4.5V$	30.0m $\Omega$
$I_D @T_C=25^\circ C$	22.0A
$I_D @T_A=25^\circ C$	8.0A

• Pin Description:



Single N Channel MOSFET

UIS, Rg 100% Tested

Pb-Free Lead Plating & Halogen Free

•ABSOLUTE MAXIMUM RATINGS ( $T_C = 25^\circ C$  Unless Otherwise Noted)



PARAMETERS/TEST CONDITIONS	SYMBOL	LIMITS	UNIT
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Continuous Drain Current	$I_D$	$T_C = 25^\circ C$	22
		$T_C = 100^\circ C$	14
Continuous Drain Current	$I_D$	$T_A = 25^\circ C$	8.5
		$T_A = 70^\circ C$	7
Pulsed Drain Current <sup>1</sup>	$I_{DM}$	75	A
Avalanche Current	$I_{AS}$	19	
Avalanche Energy	$E_{AS}$	309	
Repetitive Avalanche Energy <sup>2</sup>	$E_{AR}$	154	
Power Dissipation	$P_D$	$T_C = 25^\circ C$	62.5
		$T_C = 100^\circ C$	25
Power Dissipation	$P_D$	$T_A = 25^\circ C$	8
		$T_A = 70^\circ C$	6
Operating Junction & Storage Temperature Range	$T_j, T_{stg}$	-55 to 150	$^\circ C$

•THERMAL RESISTANCE RATINGS

THERMAL RESISTANCE	SYMBOL	TYPICAL	MAXIMUM	UNIT
Junction-to-Case	$R_{\theta JC}$		2	$^\circ C/W$
Junction-to-Ambient <sup>3</sup>	$R_{\theta JA}$		60	

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

<sup>2</sup>Duty cycle < 1%

<sup>3</sup>60 $^\circ C$  / W when mounted on a 1 in<sup>2</sup> pad of 2 oz copper.

<sup>4</sup>Guarantee by Engineering test

**▪ CH-1\_ELECTRICAL CHARACTERISTICS (T<sub>j</sub> = 25 °C, Unless Otherwise Noted)**

PARAMETER	SYMBOL	TEST CONDITIONS	LIMITS			UNIT
			MIN	TYP	MAX	
<b>STATIC</b>						
Drain-Source Breakdown Voltage <sup>4</sup>	V <sub>(BR)DSS</sub>	V <sub>GS</sub> = 0V, I <sub>D</sub> = 250uA	30			V
Gate Threshold Voltage <sup>4</sup>	V <sub>GS(th)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250uA	1.2	1.6	2.5	
Gate-Body Leakage <sup>4</sup>	I <sub>GSS</sub>	V <sub>DS</sub> = 0V, V <sub>GS</sub> = ±20V			±100	nA
Zero Gate Voltage Drain Current <sup>4</sup>	I <sub>DSS</sub>	V <sub>DS</sub> = 24V, V <sub>GS</sub> = 0V			1	uA
		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	22			A
Drain-Source On-State Resistance <sup>1,4</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	
<b>DYNAMIC</b>						
Input Capacitance <sup>5</sup>	C <sub>iss</sub>	V <sub>GS</sub> = 0V, V <sub>DS</sub> = 15V, f = 1MHz		520		pF
Output Capacitance <sup>5</sup>	C <sub>oss</sub>			88		
Reverse Transfer Capacitance <sup>5</sup>	C <sub>rss</sub>			62		
Gate Resistance <sup>4,5</sup>	R <sub>g</sub>	f = 1MHz		2		Ω
Total Gate Charge <sup>1,2,5</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>1,2,5</sup>	Q <sub>gs</sub>			1.6		
Gate-Drain Charge <sup>1,2,5</sup>	Q <sub>gd</sub>			2.8		
Turn-On Delay Time <sup>1,2,5</sup>	t <sub>d(on)</sub>	V <sub>DS</sub> = 15V, V <sub>GS</sub> = 10V, I <sub>D</sub> = 1A, R <sub>g</sub> = 6Ω		5		nS
Rise Time <sup>1,2,5</sup>	t <sub>r</sub>			3		
Turn-Off Delay Time <sup>1,2,5</sup>	t <sub>d(off)</sub>			15		
Fall Time <sup>1,2,5</sup>	t <sub>f</sub>			11		
<b>SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS</b>						
Continuous Current	I <sub>S</sub>				22	A
Pulsed Current <sup>3</sup>	I <sub>SM</sub>				75	
Forward Voltage <sup>1,4</sup>	V <sub>SD</sub>	I <sub>F</sub> = I <sub>S</sub> , V <sub>GS</sub> = 0V			1.2	V
Reverse Recovery Time <sup>5</sup>	t <sub>rr</sub>	IF=20A, dIF/dt = 400A / mS		8.2		nS
Reverse Recovery Charge <sup>5</sup>	Q <sub>rr</sub>				10.5	

<sup>1</sup>Pulse test : Pulse Width ≤ 300 usec, Duty Cycle ≤ 2%.

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

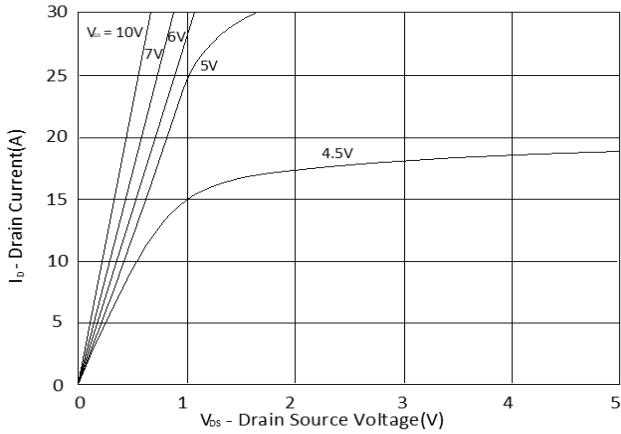
<sup>3</sup>Pulse width limited by maximum junction temperature.

<sup>4</sup>Guarantee by FT test Item

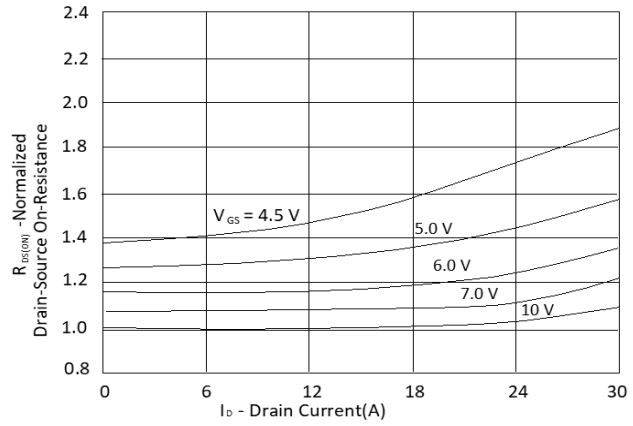
<sup>5</sup>Guarantee by Engineering test

**EMC will review datasheet by quarter, and update new version.**

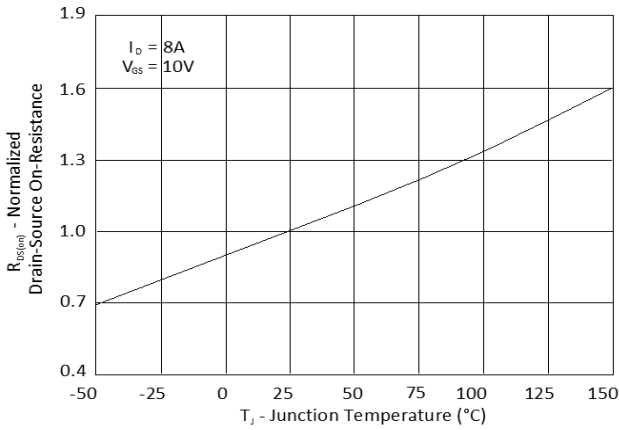
▪ TYPICAL CHARACTERISTICS



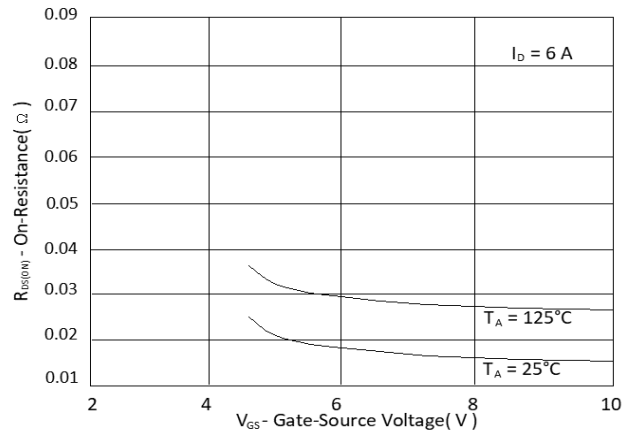
**Fig.1 Typical Output Characteristics**



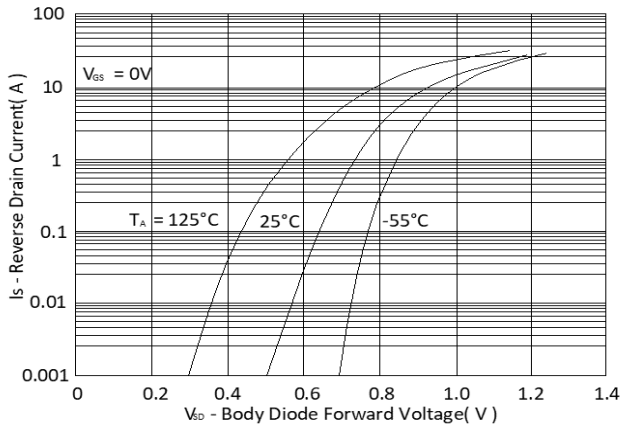
**Fig.2 On-Resistance Variation with Drain Current and Gate Voltage**



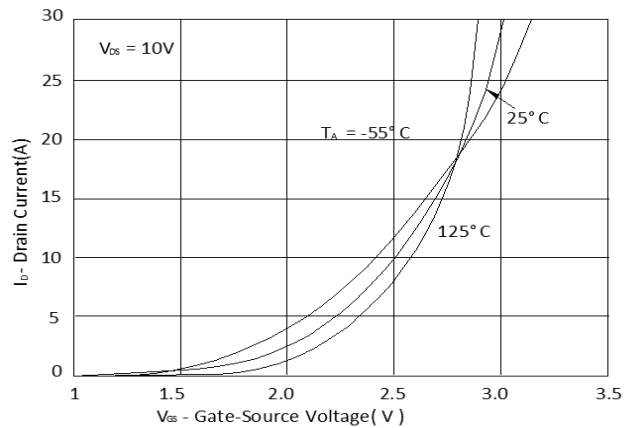
**Fig.3 Normalized On-Resistance v.s. Junction Temperature**



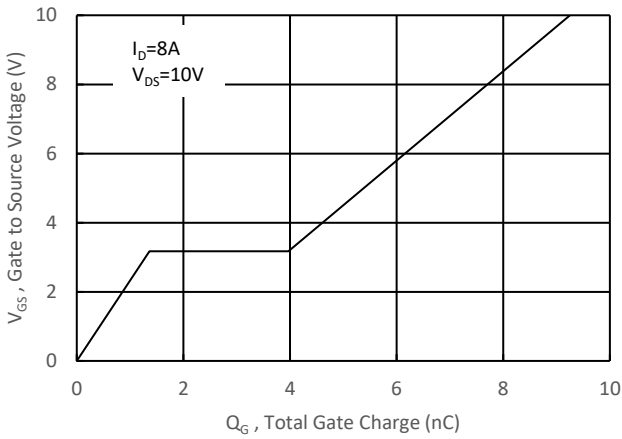
**Fig.4 On-Resistance v.s. Gate Voltage**



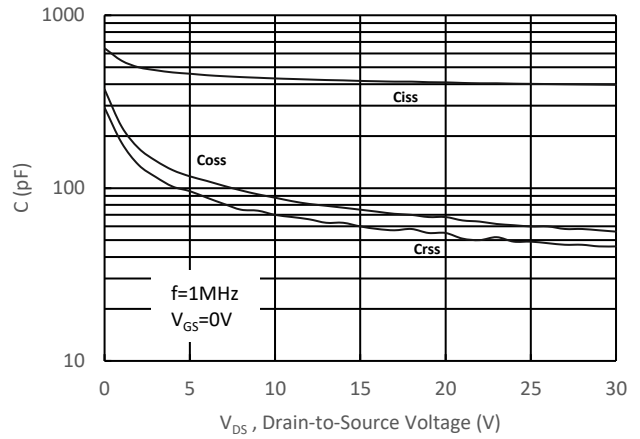
**Fig.5 Forward Characteristic of Reverse Diode**



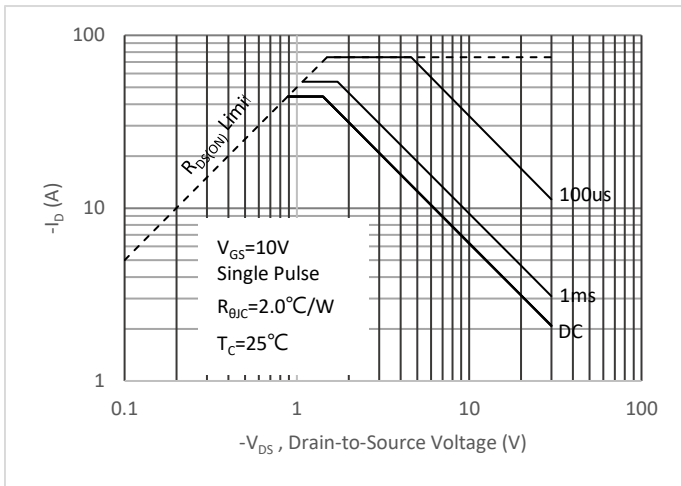
**Fig.6 Transfer Characteristics**



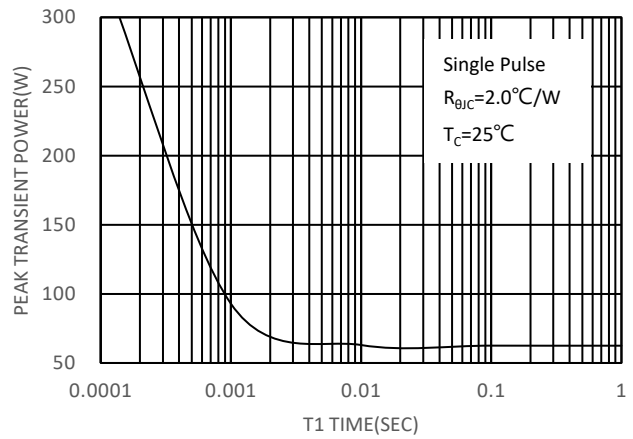
**Fig.7 Gate Charge Characteristics**



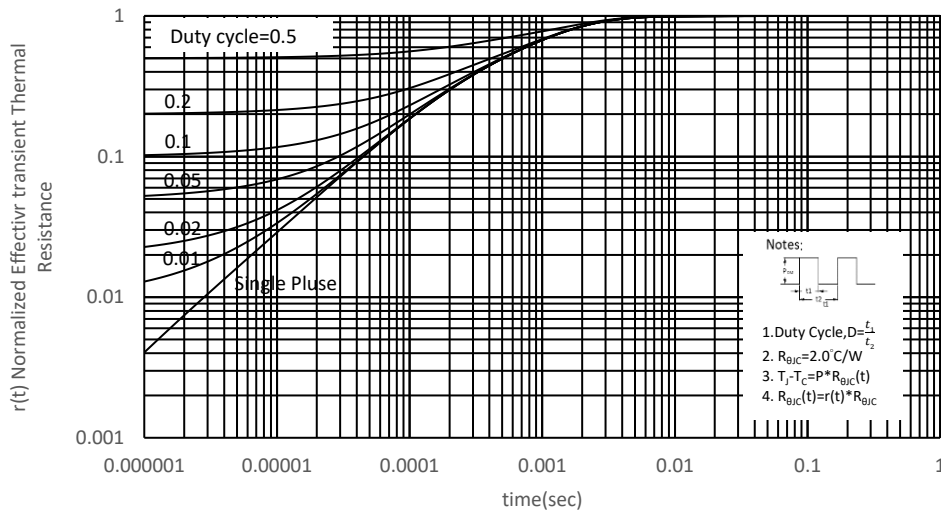
**Fig.8 Typical Capacitance Characteristics**



**Fig 9. Maximum Safe Operating Area**



**Fig 10. Single Pulse Maximum Power Dissipation**



**Fig 11. Effective Transient Thermal Impedance**

Ordering & Marking Information:

Device Name: EMB20N03V for EDFN 3x3



B20N03: Device Name

ABCDEFG: Date Code

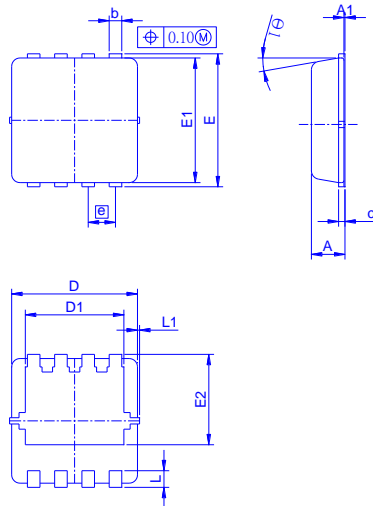
A: Assembly House

B: Year(A:2008 B:2009 C:2010....)

C: Month(A:01 B:02 C:03 D:04 E:05 F:06 G:07 H:08 I:09 J:10 K:11 L:12)

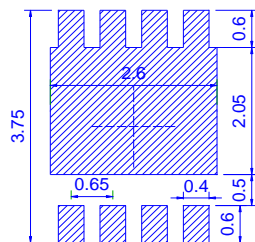
DEFG: Serial No.

Outline Drawing

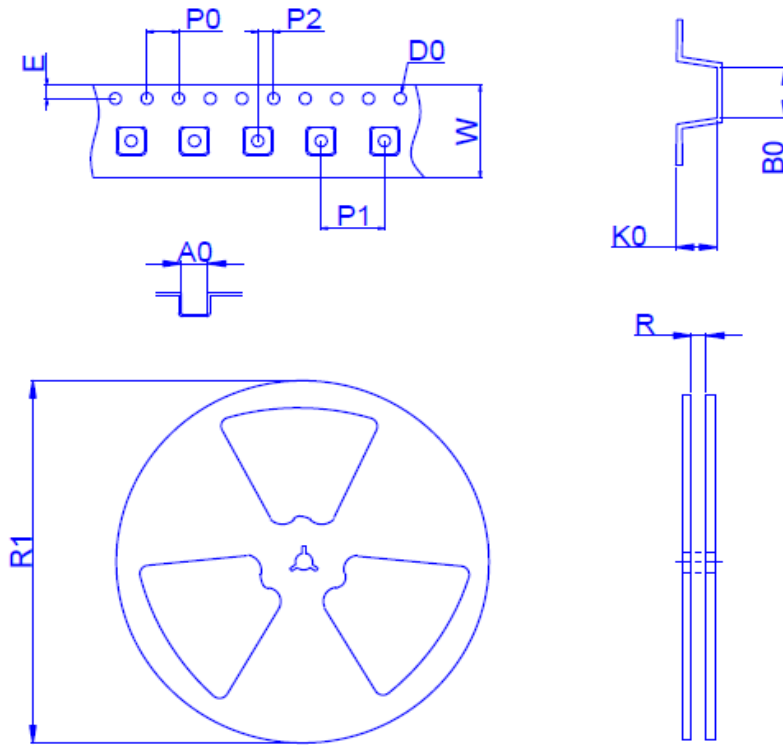


Dimension	A	A1	b	c	D	D1	E	E1	E2	e	L	L1	$\theta 1$
Min.	0.65	0	0.2	0.1	2.9	2.15	3.1	2.9	1.53	0.55	0.25	-	0°
Typ.	0.75	-	0.3	0.15	3	2.45	3.2	3	1.97	0.65	0.4	0.075	10°
Max.	0.9	0.05	0.4	0.25	3.3	2.74	3.5	3.3	2.59	0.75	0.6	0.15	14°

Footprint



◆ Tape&Reel Information:5000pcs/Reel



產品別	EDFN3X3
Reel 尺寸	13"
編帶方式	<p>FEED DIRECTION</p>

Dimension in mm

Dimension	Carrier tape									Reel	
	A0	B0	D0	E	K0	P0	P1	P2	W	R	R1
Typ.	3.6	3.5	1.55	1.7	1.2	4	8	2	12	14	330
±	0.3	0.3	0.2	0.2	0.2	0.1	0.1	0.1	1	2	2