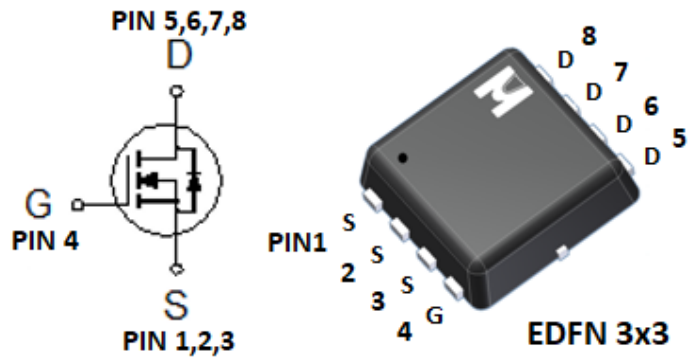


Single N-Channel Logic Level Enhancement Mode Field Effect Transistor

•Product Summary:

	N-CH
BVDSS	30V
$R_{DS(on)} (MAX.) @ V_{GS}=10V$	20.0mΩ
$R_{DS(on)} (MAX.) @ V_{GS}=4.5V$	30.0mΩ
$I_D @ T_C=25^{\circ}C$	22.0A
$I_D @ T_A=25^{\circ}C$	7.0A

• 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}	± 20	V
Continuous Drain Current	$T_C = 25^{\circ}C$	I_D	22	A
	$T_C = 100^{\circ}C$		22	
Continuous Drain Current	$T_A = 25^{\circ}C$	I_D	7	
	$T_A = 70^{\circ}C$		6	
Pulsed Drain Current ¹		I_{DM}	70	
Avalanche Current		I_{AS}	18	mJ
Avalanche Energy	$L = 0.1mH$	EAS	16.2	
Repetitive Avalanche Energy ²	$L = 0.05mH$	EAR	8.1	
Power Dissipation	$T_C = 25^{\circ}C$	P_D	62.5	W
	$T_C = 100^{\circ}C$		25	
Power Dissipation	$T_A = 25^{\circ}C$	P_D	2.1	W
	$T_A = 70^{\circ}C$		1.3	
Operating Junction & Storage Temperature Range		T_J, T_{stg}	-55 to 150	$^{\circ}C$

• 100% UIS testing in condition of $V_D=15V$, $L=0.1mH$, $V_G=10V$, $I_L=11A$, Rated $V_{DS}=30V$ N-CH

•THERMAL RESISTANCE RATINGS

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

¹Pulse width limited by maximum junction temperature.

²Duty cycle $< 1\%$

³60 $^{\circ}C$ / W when mounted on a 1 in² pad of 2 oz copper.

⁴Guarantee by Engineering test

▪ ELECTRICAL CHARACTERISTICS ($T_J = 25\text{ }^{\circ}\text{C}$, Unless Otherwise Noted)

PARAMETER	SYMBOL	TEST CONDITIONS	LIMITS			UNIT
			MIN	TYP	MAX	
STATIC						
Drain-Source Breakdown Voltage ⁴	V _{(BR)DSS}	VGS = 0V, ID = 250uA	30			V
Gate Threshold Voltage ⁴	VGS(th)	VDS = VGS, ID = 250uA	1.2	1.5	2.5	
Gate-Body Leakage ⁴	IGSS	VDS = 0V, VGS = ±20V			±100	nA
Zero Gate Voltage Drain Current ⁴	IDSS	VDS = 30V, VGS = 0V			1	uA
		VDS = 30V, VGS = 0V, TJ = 125 °C			25	
On-State Drain Current ¹	ID(ON)	VDS = 10V, VGS = 10V	22			A
Drain-Source On-State Resistance ^{1,4}	RDS(ON)	VGS = 10V, ID = 8A		15.5	20	mΩ
		VGS = 4.5V, ID = 6A		25	30	
Forward Transconductance ¹	gfs	VDS = 5V, ID = 8A		16		S
DYNAMIC						
Input Capacitance ⁵	Ciss	VGS = 0V, VDS = 15V, f = 1MHz		553		pF
Output Capacitance ⁵	Coss			84		
Reverse Transfer Capacitance ⁵	Crss			73		
Gate Resistance ^{4,5}	Rg	f = 1MHz		0.7		Ω
Total Gate Charge ^{1,2,5}	Qg(VGS=10V)	VDS = 15V, VGS = 10V, ID = 8A		11.2		nC
	Qg(VGS=4.5V)			6.0		
Gate-Source Charge ^{1,2,5}	Qgs			1.3		
Gate-Drain Charge ^{1,2,5}	Qgd			2.8		
Turn-On Delay Time ^{1,2,5}	td(on)	VDS = 15V, VGS = 10V, ID = 5A , Rg = 6Ω		5.4		nS
Rise Time ^{1,2,5}	tr			10.5		
Turn-Off Delay Time ^{1,2,5}	td(off)			15.2		
Fall Time ^{1,2,5}	tf			12.8		
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS						
Continuous Current	IS				22	A
Pulsed Current ³	ISM				70	
Forward Voltage ^{1,4}	VSD	IF = IS, VGS = 0V			1.3	V
Reverse Recovery Time ⁵	trr	IF = 20A, dIF/dt = 400A / uS		6.9		nS
Peak Reverse Recovery Current ⁵	IRM(REC)			2.22		A
Reverse Recovery Charge ⁵	Qrr			7.8		nC

¹Pulse test : Pulse Width $\leq 300\text{ }\mu s$, Duty Cycle $\leq 2\%$.

²Independent of operating temperature.

³Pulse width limited by maximum junction temperature.

⁴Guarantee by FT test Item

⁵Guarantee by Engineering test

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



▪ TYPICAL CHARACTERISTICS

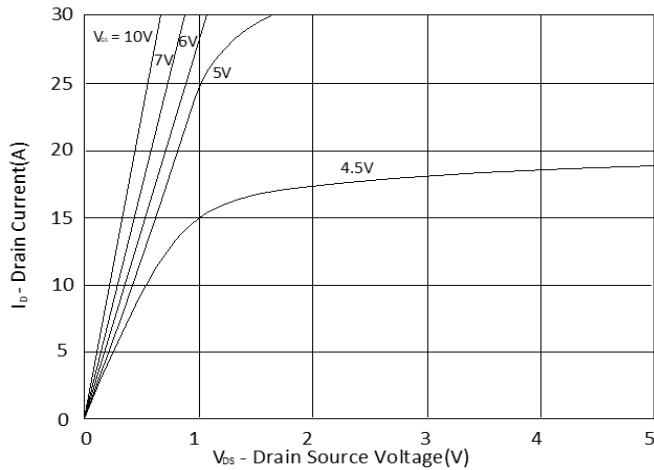


Fig.1 Typical Output Characteristics

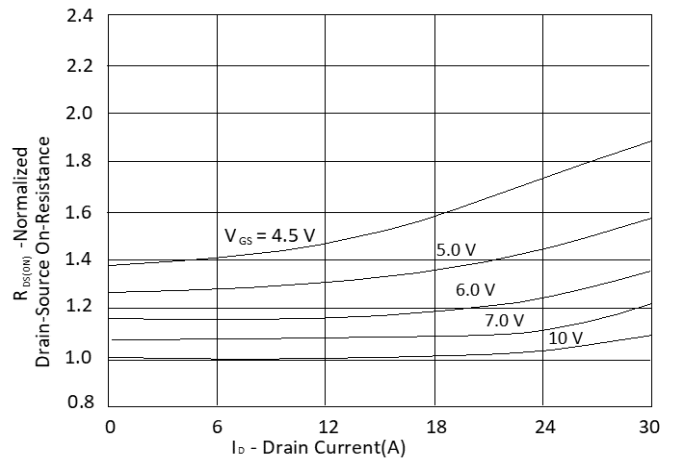


Fig.2 On-Resistance Variation with Drain Current and Gate Voltage

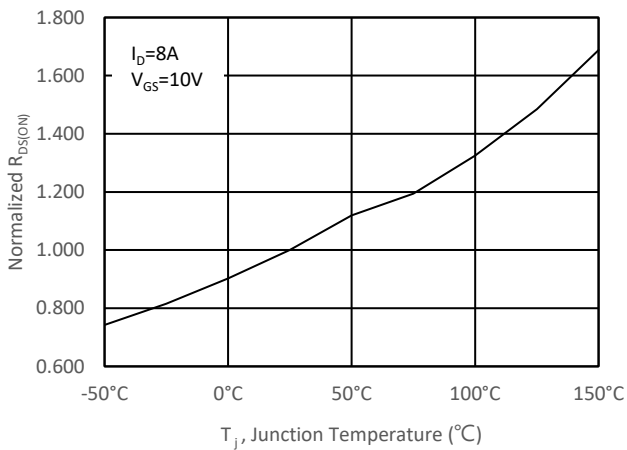


Fig.3 Normalized On-Resistance v.s. Junction Temperature

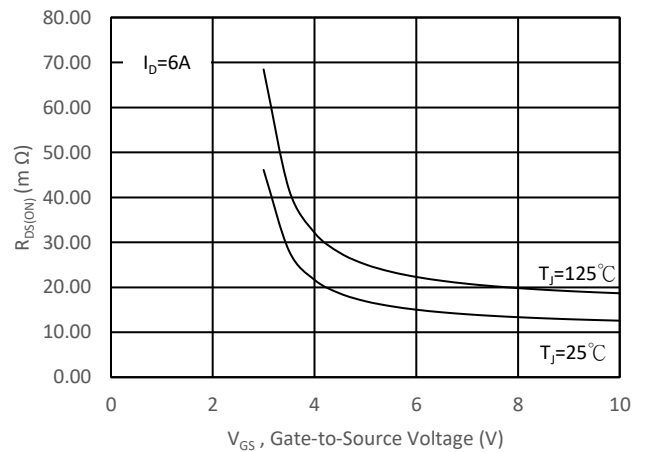


Fig.4 On-Resistance v.s. Gate Voltage

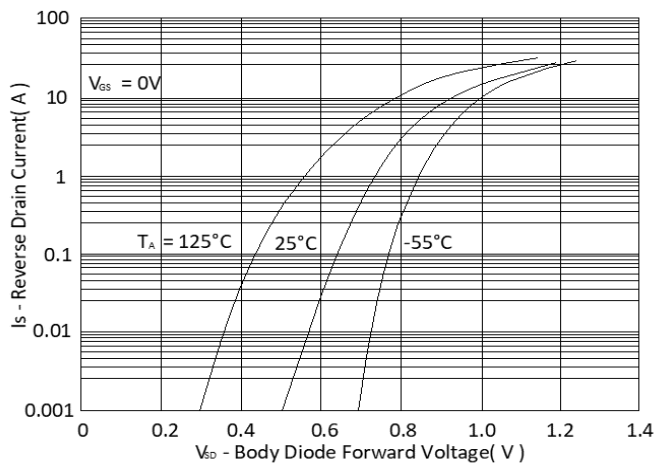


Fig.5 Forward Characteristic of Reverse Diode

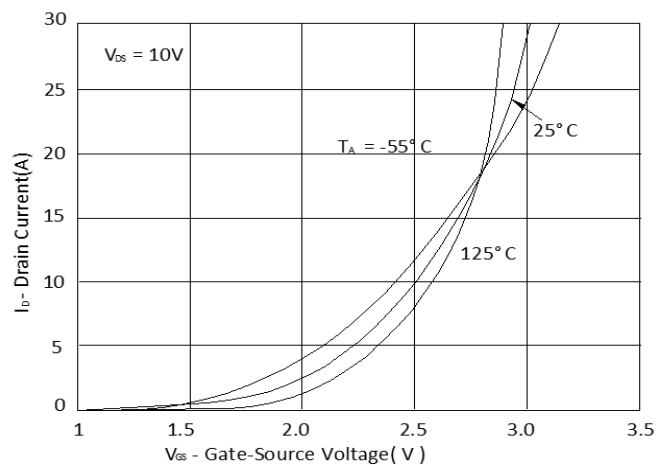


Fig.6 Transfer Characteristics

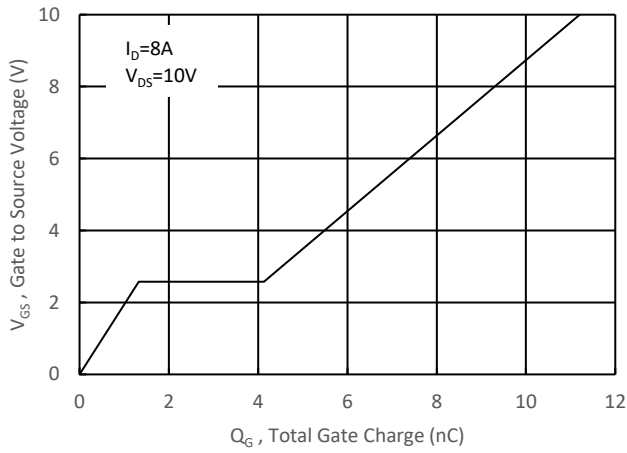


Fig.7 Gate Charge Characteristics

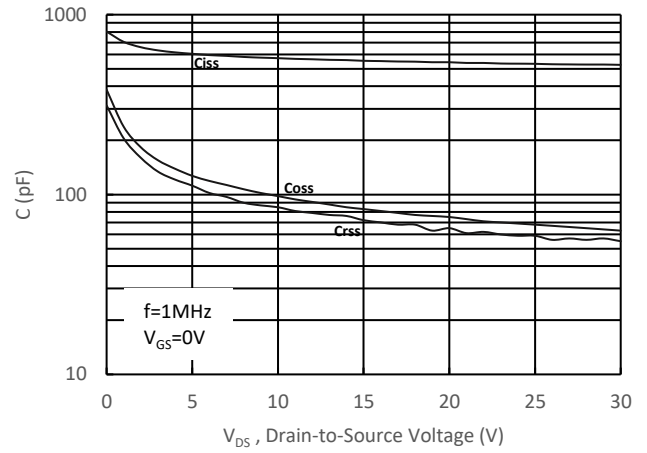


Fig.8 Typical Capacitance Characteristics

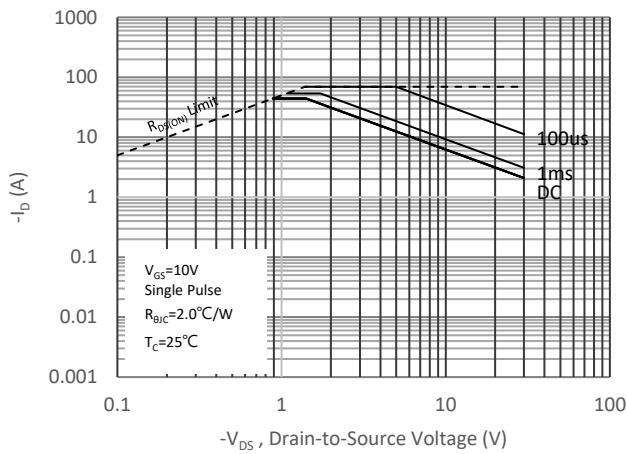


Fig.9. Maximum Safe Operating Area

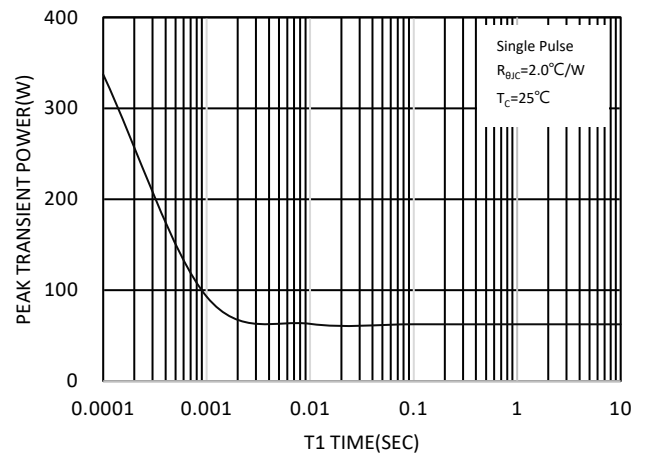


Fig.10. Single Pulse Maximum Power Dissipation

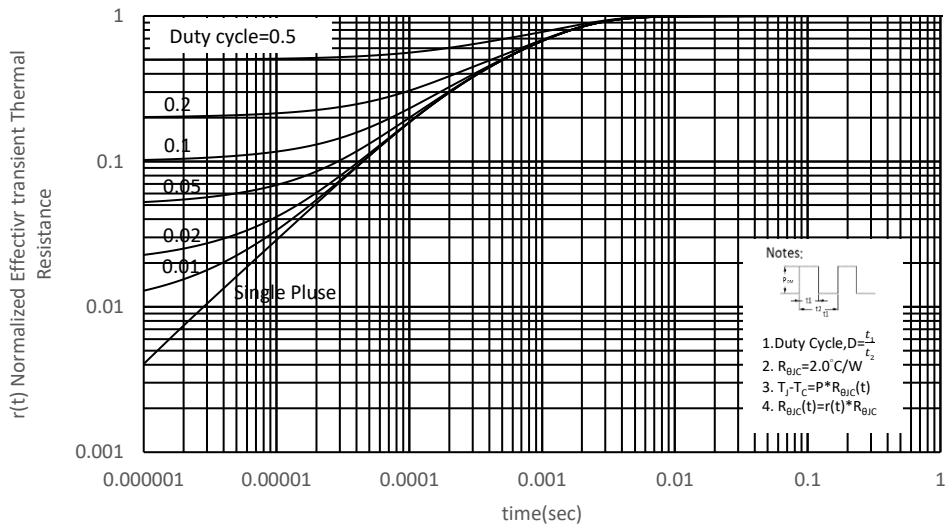


Fig.11. Effective Transient Thermal Impedance

Ordering & Marking Information:

Device Name: EMB20N03VZ for EDFN 3x3



B20N03: Device Name

ABCDEFG: Date Code

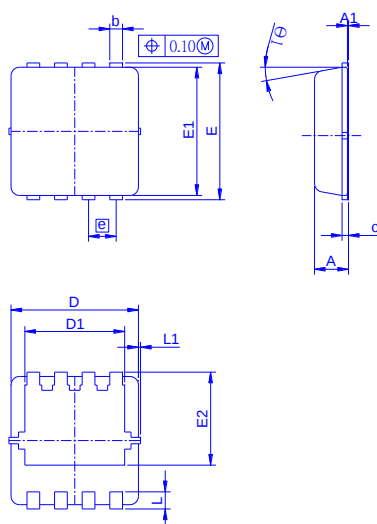
A: Assembly House

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)

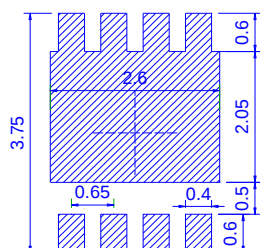
DEFG: Serial No.

Outline Drawing

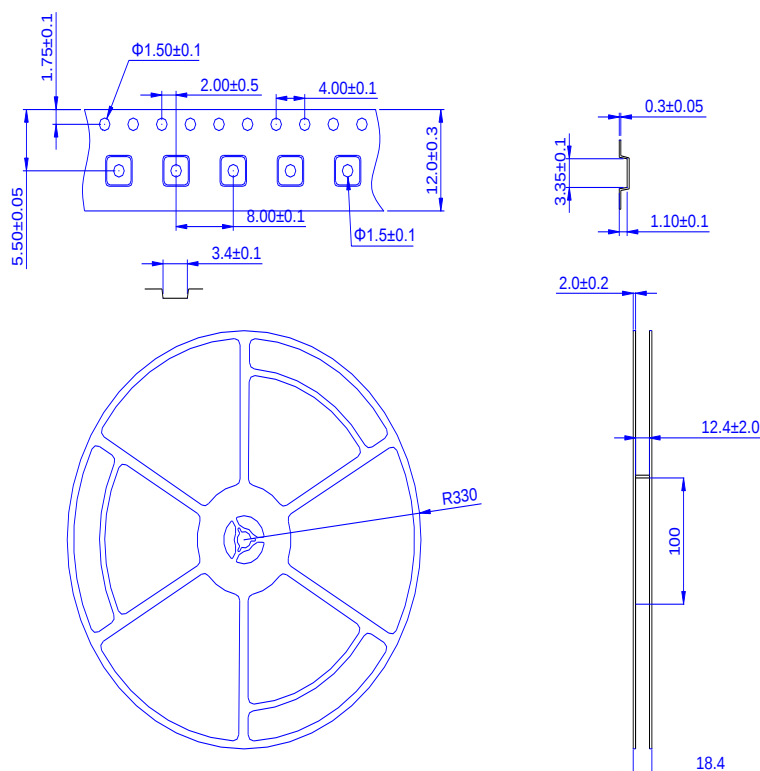


Dimension	A	A1	b	c	D	D1	E	E1	E2	e	L	L1	θ1
Min.	0.65	0	0.2	0.1	2.9	2.15	3.1	2.9	1.53	0.55	0.25	-	0°
Typ.	0.75	-	0.3	0.15	3	2.45	3.2	3	1.97	0.65	0.4	0.075	10°
Max.	0.9	0.05	0.4	0.25	3.3	2.74	3.5	3.3	2.59	0.75	0.6	0.15	14°

Footprint



◆ Tape&Reel Information:5000pcs/Reel(Dimension in millimeter)



產品別	EDFN 3x3
Reel尺寸	13"
編帶方式	FEED DIRECTION
前空格	50
後空格	50
裝箱數	
滿捲數量	5K
捲/內盒比	01:01
內盒滿箱數	5K
內/外箱比	10:01
外箱滿箱數	50K



★Datasheet Latest version specification :

	Revision History	Prepared	Approved	Date
A.0	Initial Datasheet	Johnson	Sam	2020/4/20