N-Channel Logic Level Enhancement Mode Field Effect Transistor

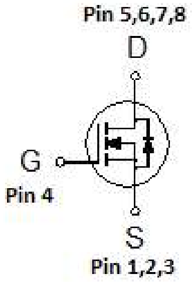
Product Summary:

BVDSS	30V
$R_{DSON\ (MAX.)}$ @V_{GS}=10V	20mΩ
$R_{DSON\ (MAX.)}$ @V_{GS}=4.5V	30mΩ
I_D@T_C=25°C	22A

Single N-Channel MOSFET

UIS, Rg 100% Tested

Pb-Free Lead Plating & Halogen Free



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_C = 25 °C	I_D	12	A
	T_A = 25 °C		9	
	T_C = 100 °C		9	
Pulsed Drain Current[1]		I_{DM}	88	
Avalanche Current		I_{AS}	10	
Avalanche Energy	L = 0.1mH, I_{AS}=10A, RG=25Ω	E_{AS}	5	mJ
Repetitive Avalanche Energy[2]	L = 0.05mH	E_{AR}	2.5	
Power Dissipation	T_C = 25 °C	P_D	20.8	W
	T_C = 100 °C		8.3	
Power Dissipation	T_A = 25 °C	P_D	2.5	W
	T_A = 100 °C		1	
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	$R_{\theta JC}$		6	°C / W
Junction-to-Ambient[3]	$R_{\theta JA}$		50	

[1] Pulse width limited by maximum junction temperature.

[2] Duty cycle ≤ 1%

[3] 50°C / W when mounted on a 1 in^2 pad of 2 oz copper.

ELECTRICAL CHARACTERISTICS (T_J = 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			25	
On-State Drain Current[1]	$I_{D(ON)}$	V_{DS} = 10V, V_{GS} = 10V	12			A
Drain-Source On-State Resistance[1]	$R_{DS(ON)}$	V_{GS} = 10V, I_D = 8A		15.5	20	mΩ
		V_{GS} = 4.5V, I_D = 6A		25	30	
Forward Transconductance[1]	g_{fs}	V_{DS} = 5V, I_D = 8A		16		S
DYNAMIC						
Input Capacitance	C_{iss}	V_{GS} = 0V, V_{DS} = 15V, f = 1MHz		520		pF
Output Capacitance	C_{oss}			88		
Reverse Transfer Capacitance	C_{rss}			62		
Gate Resistance	R_g	V_{GS} = 15mV, V_{DS} = 0V, f = 1MHz		2.0		Ω
Total Gate Charge[1,2]	Q_g(V_{GS}=10V)	V_{DS} = 15V, V_{GS} = 10V, I_D = 8A		11.5		nC
	Q_g(V_{GS}=4.5V)			5		
Gate-Source Charge[1,2]	Q_{gs}			1.6		
Gate-Drain Charge[1,2]	Q_{gd}			2.8		
Turn-On Delay Time[1,2]	$t_{d(on)}$	V_{DS} = 15V, I_D = 1A, V_{GS} = 10V, R_{GS} = 6Ω		9		nS
Rise Time[1,2]	t_r			12		
Turn-Off Delay Time[1,2]	$t_{d(off)}$			30		
Fall Time[1,2]	t_f			15		

SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS (T_C = 25 °C)

Continuous Current	I_S				22	A
Pulsed Current[3]	I_{SM}				88	
Forward Voltage[1]	V_{SD}	I_F = 8A, V_{GS} = 0V			1.2	V
Reverse Recovery Time	t_{rr}	I_F = I_S, dI_F/dt = 100A / µS		45		nS
Peak Reverse Recovery Current	$I_{RM(REC)}$			30		A
Reverse Recovery Charge	Q_{rr}			2		nC

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

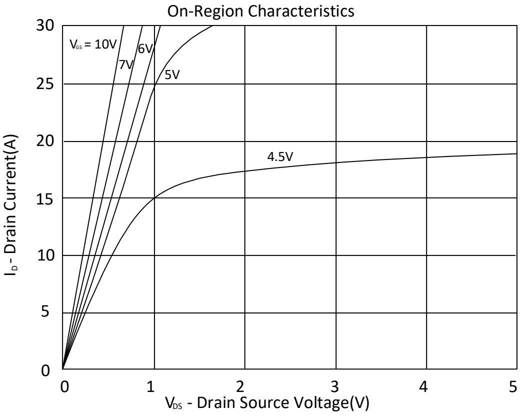
[2] Independent of operating temperature.

[3] Pulse width limited by maximum junction temperature.

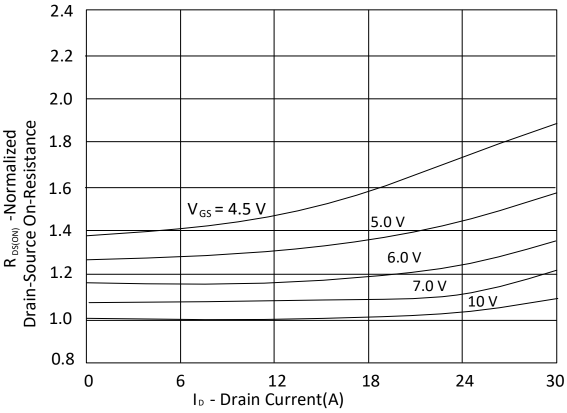
EMC will review datasheet by quarter, and update new version.

TYPICAL CHARACTERISTICS

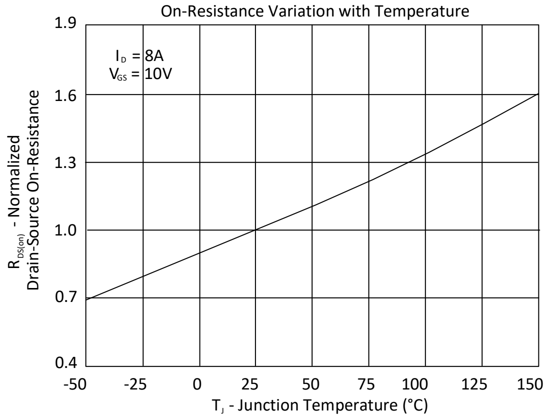
On-Region Characteristics



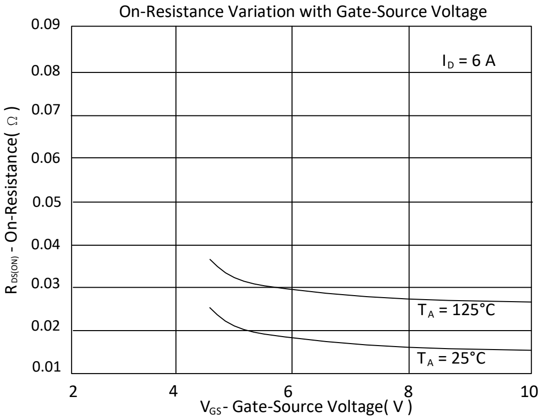
On-Resistance Variation with Drain Current and Gate Voltage



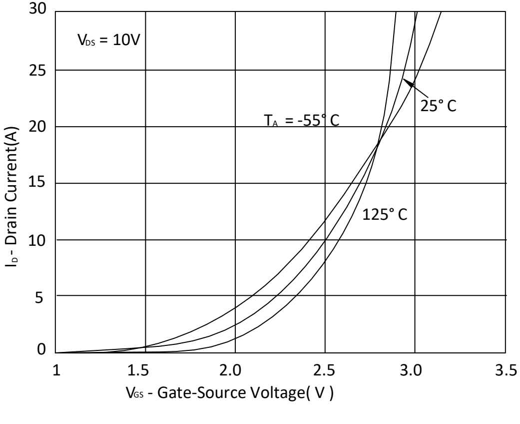
On-Resistance Variation with Temperature



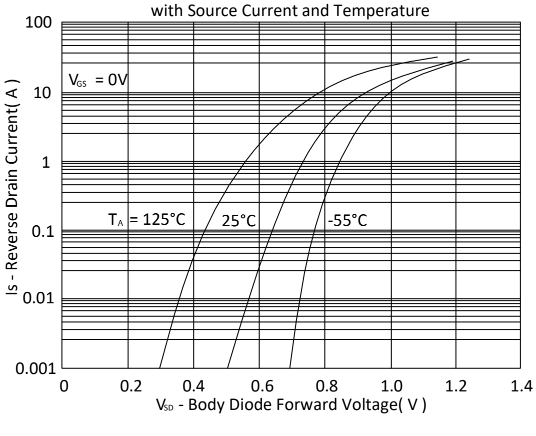
On-Resistance Variation with Gate-Source Voltage

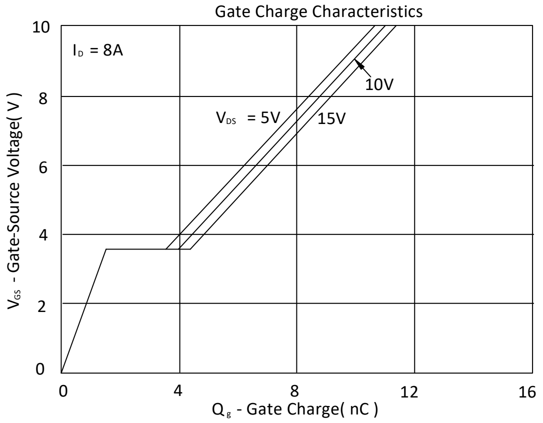


Transfer Characteristics

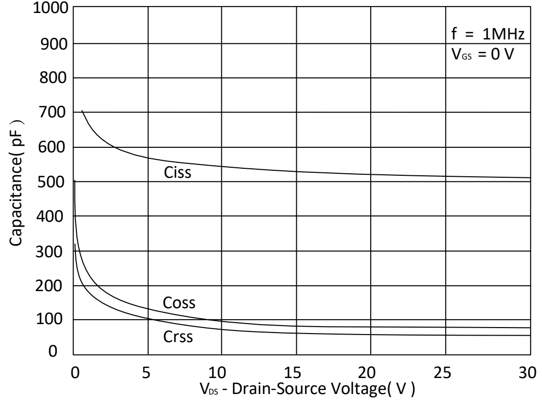


Body Diode Forward Voltage Variation
with Source Current and Temperature

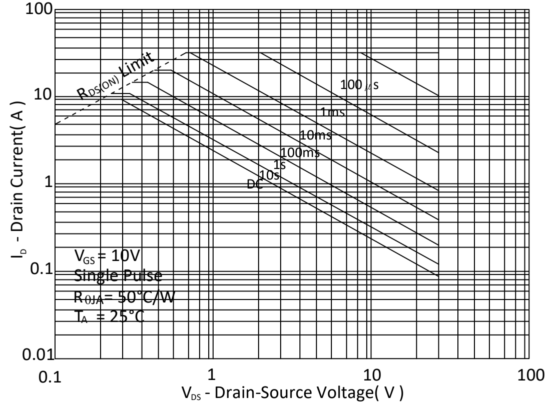




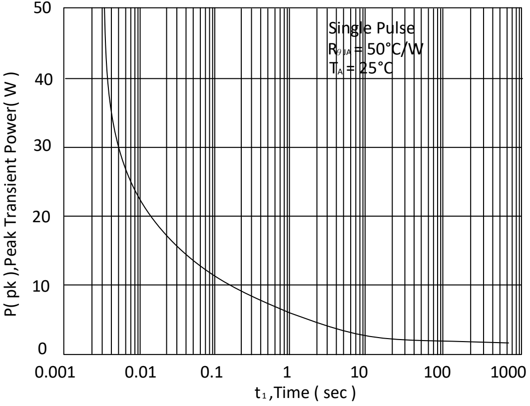
Gate Charge Characteristics



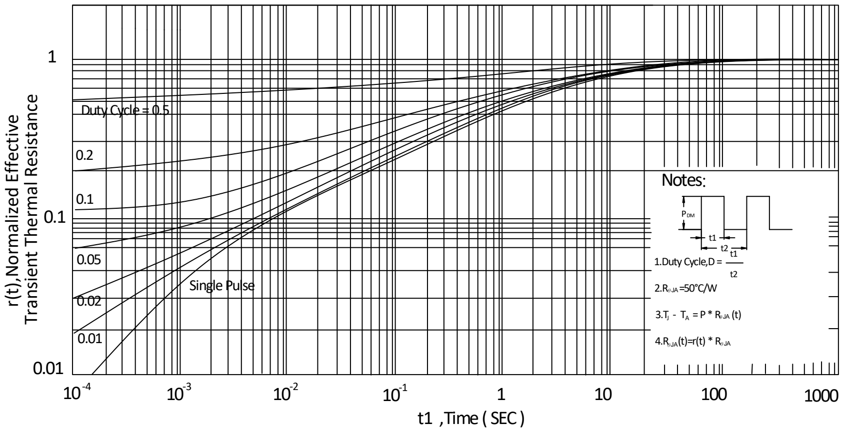
Capacitance Characteristics



Maximum Safe Operating Area



Single Pulse Maximum Power Dissipation



Transient Thermal Response Curve

Ordering & Marking Information:

Device Name: EMB20N03VL for EDFN3X3

B20N03: Device Name

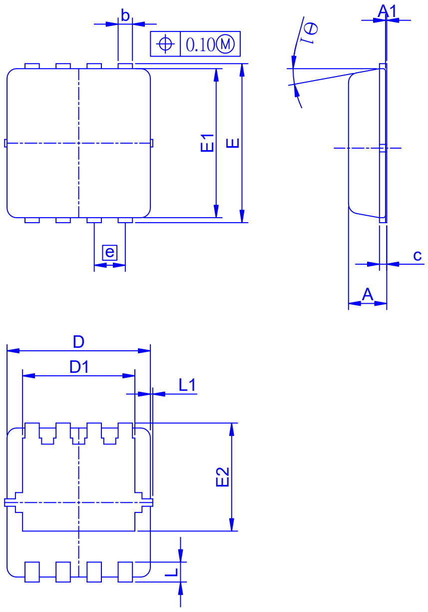
ABCDEFG: Date Code

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)

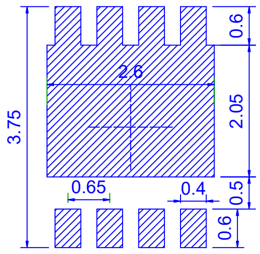
Outline Drawing



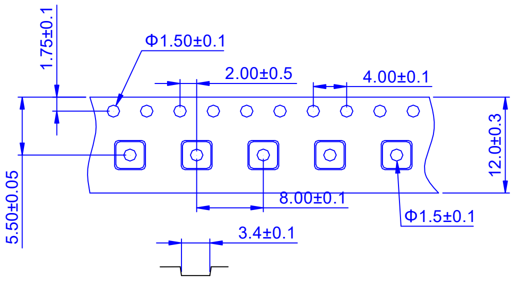
Dimension in mm

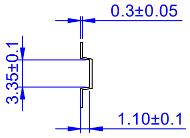
Dimension	A	A1	b	c	D	D1	E	E1	E2	e	L	L1	Θ1
Min.	0.65	0	0.20	0.10	2.90	2.15	3.10	2.90	1.53	0.55	0.25	-	0°
Typ.	0.75	-	0.30	0.15	3.00	2.45	3.20	3.00	1.97	0.65	0.40	0.075	10°
Max.	0.90	0.05	0.40	0.25	3.30	2.74	3.50	3.30	2.59	0.75	0.60	0.150	14°

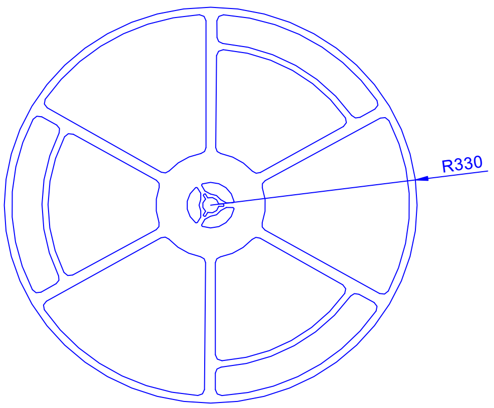
Recommended minimum pads

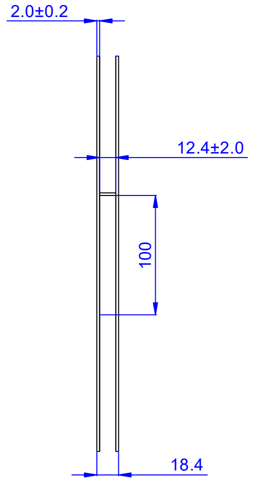


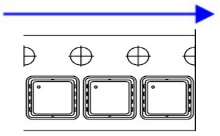
Tape&Reel Information: 5000pcs/Reel









產品別	EDFN3X3
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	1 : 1
內盒滿箱數	5K
內/外箱比	10 : 1
外箱滿箱數	50K