杰力科技股份有限公司
Excelliance MOS Corporation

EMB20D03H

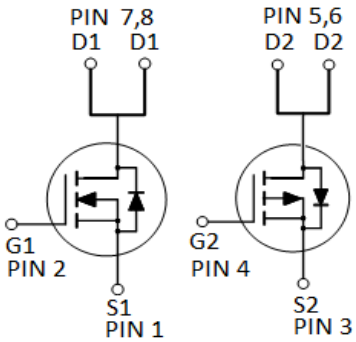
N-Channel + P-Channel Logic Level Enhancement Mode Field Effect Transistor

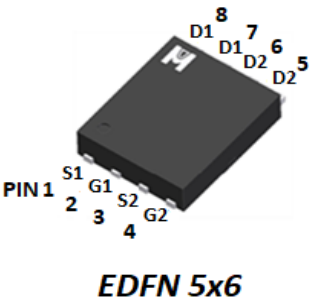
▪Product Summary:

	N-CH	P-CH
BV_{DSS}	30V	-30V
$R_{DSON\ (MAX.)}$@V_{GS}=10V	18mΩ	20mΩ
$R_{DSON\ (MAX.)}$@V_{GS}=4.5V	26mΩ	30mΩ
I_D @T_C=25°C	29A	-44A

N + P Channel MOSFET
UIS, Rg 100% Tested
RoHS & Halogen Free & TSCA Compliant

▪ Pin Description:





EDFN 5x6

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

PARAMETERS/TEST CONDITIONS		SYMBOL	LIMITS		UNIT
			N-CH	P-CH	
Gate-Source Voltage		V_{GS}	±20	±20	V
Continuous Drain Current	T_C = 25 °C	I_D	29	-44	A
	T_C = 100 °C		18	-28	
Continuous Drain Current	T_A = 25 °C	I_D	7	-8	
	T_A = 70 °C		6	-6	
Pulsed Drain Current[1]		I_{DM}	53	-59	
Avalanche Current		I_{AS}	31	-38	
Avalanche Energy	L = 0.1mH	EAS	48	72	mJ
Repetitive Avalanche Energy[2]	L = 0.05mH	EAR	24	36	
Power Dissipation	T_C = 25 °C	P_D	31	63	W
	T_C = 100 °C		13	25	
Power Dissipation	T_A = 25 °C	P_D	2.1	2.2	W
	T_A = 70 °C		1.4	1.4	
Operating Junction & Storage Temperature Range		T_j, T_{stg}	-55 to 150		°C

▪ 100% UIS testing in condition of VD=25V, L=0.1mH, VG=10V, IL= 19A,RG=25Ω,Rated VDS=30V N-CH

▪ 100% UIS testing in condition of VD=25V, L=0.1mH, VG=10V, IL= 23A,RG=25Ω, Rated VDS=30V P-CH

▪THERMAL RESISTANCE RATINGS

THERMAL RESISTANCE		SYMBOL	TYPICAL	MAXIMUM		UNIT
				N-CH	P-CH	
Junction-to-Case		$R_{\theta JC}$		4	2	°C/W
Junction-to-Ambient[3,4]	t≦10s	$R_{\theta JA}$		26	25	
	Steady-State	$R_{\theta JA}$		59	58	

[1]Pulse width limited by maximum junction temperature.

[2]Duty cycle < 1%

[3]The value of $R_{\theta JA}$ is measured with the device mounted on 1in^2 FR-4 board with 2oz. Copper, in a still air environment with T_A =25°C.

[4]Guarantee by Engineering test

▪ N-CH_ELECTRICAL CHARACTERISTICS (T_J = 25 °C, Unless Otherwise Noted)

PARAMETER	SYMBOL	TEST CONDITIONS	LIMITS			UNIT
			MIN	TYP	MAX	
STATIC						
Drain-Source Breakdown Voltage[4]	$V_{(BR)DSS}$	V_{GS} = 0V, I_D = 250μA	30			V
Gate Threshold Voltage[4]	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250μA	1.2	1.6	2.5	V
Gate-Body Leakage[4]	I_{GSS}	V_{DS} = 0V, V_{GS} = ±20V			±100	nA
Zero Gate Voltage Drain Current[4]	I_{DSS}	V_{DS} = 30V, V_{GS} = 0V			1	μA
		V_{DS} =30V, V_{GS} =0V, T_J = 125 °C			25	
On-State Drain Current[1]	$I_{D(ON)}$	V_{DS} = 10V, V_{GS} = 10V	29			A
Drain-Source On-State Resistance[1,4]	$R_{DS(ON)}$	V_{GS} = 10V, I_D = 20A		12	18	mΩ
		V_{GS} = 4.5V, I_D = 15A		17	26	
Forward Transconductance[1]	g_{fs}	V_{DS} = 5V, I_D = 12A		32		S
DYNAMIC						
Input Capacitance[5]	C_{iss}	V_{GS} = 0V, V_{DS} = 15V, f = 1MHz		730		pF
Output Capacitance[5]	C_{oss}			122		
Reverse Transfer Capacitance[5]	C_{rss}			105		
Gate Resistance[4,5]	R_g	f = 1MHz		1.4		Ω
Total Gate Charge[1,2,5]	Q_g(V_{GS}=10V)	V_{DS} = 15V, V_{GS} = 10V, I_D = 20A		17		nC
Total Gate Charge[1,2,5]	Q_g(V_{GS}=4.5V)			7.9		
Gate-Source Charge[1,2,5]	Q_{gs}			3.7		
Gate-Drain Charge[1,2,5]	Q_{gd}			4.7		
Turn-On Delay Time[1,2,5]	$t_{d(on)}$	V_{DS} = 15V, V_{GS} = 10V, I_D = 5A , Rg = 3Ω		6.4		nS
Rise Time[1,2,5]	t_r			12		
Turn-Off Delay Time[1,2,5]	$t_{d(off)}$			17		
Fall Time[1,2,5]	t_f			6.1		
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS						
Continuous Current	I_S				26	A
Pulsed Current[3]	I_{SM}				53	
Forward Voltage[1,4]	V_{SD}	I_F = 20A, V_{GS} = 0V			1.2	V
Reverse Recovery Time[5]	t_{rr}	I_F = 20A, dI_F/dt = 100A / μS		8.7		nS
Peak Reverse Recovery Current[5]	$I_{RM(REC)}$			0.7		A
Reverse Recovery Charge[5]	Q_{rr}			3.2		nC

[1]Pulse test : Pulse Width ≦ 300 usec, Duty Cycle ≦ 2%.

[2]Independent of operating temperature.

[3]Pulse width limited by maximum junction temperature.

[4]Guarantee by FT test Item

[5]Guarantee by Engineering test

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

▪ **N-CH_TYPICAL CHARACTERISTICS**

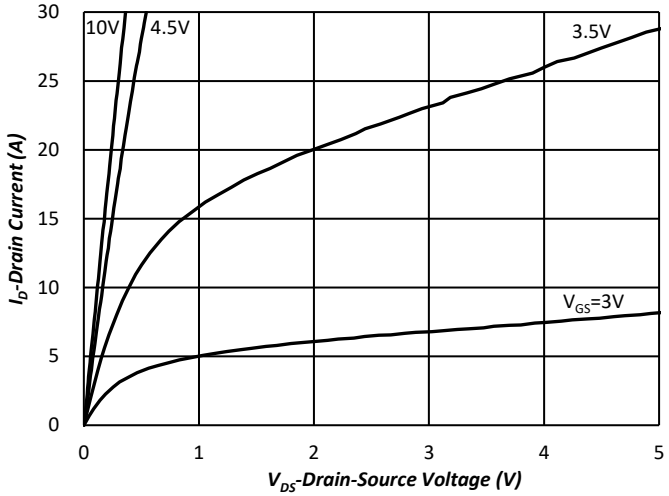


Fig.1 Typical Output Characteristics

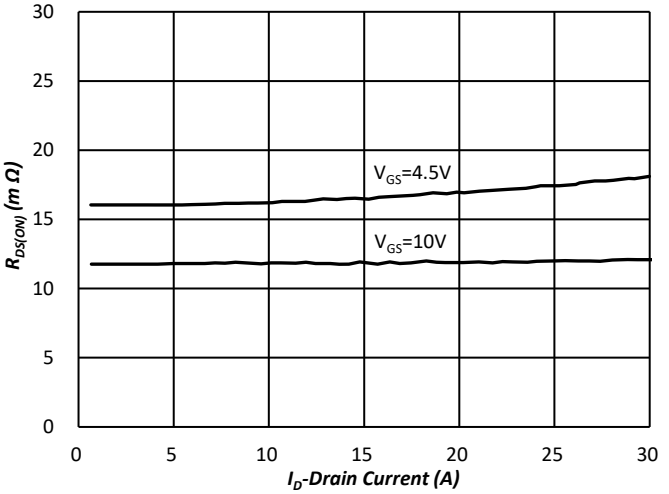


Fig.2 On-Resistance Variation with Drain Current and Gate Voltage

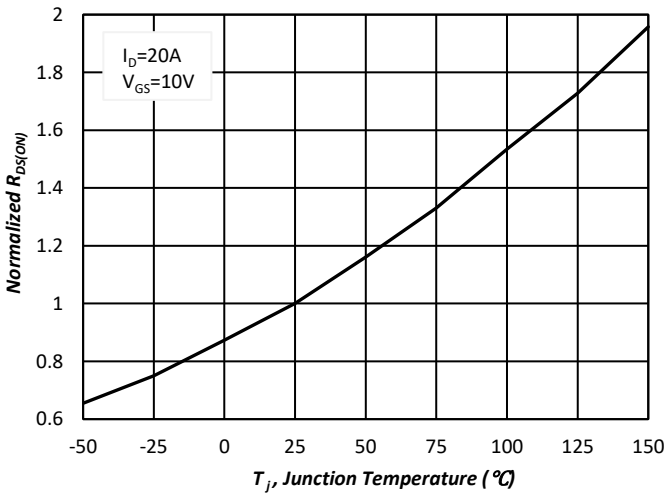


Fig.3 Normalized On-Resistance v.s. Junction Temperature

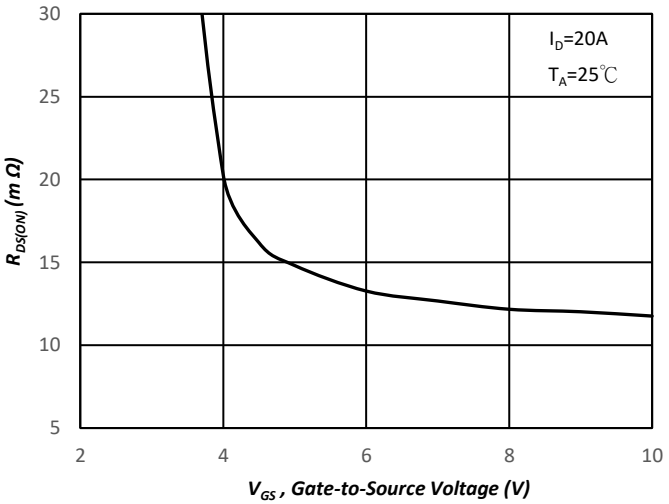


Fig.4 On-Resistance v.s. Gate Voltage

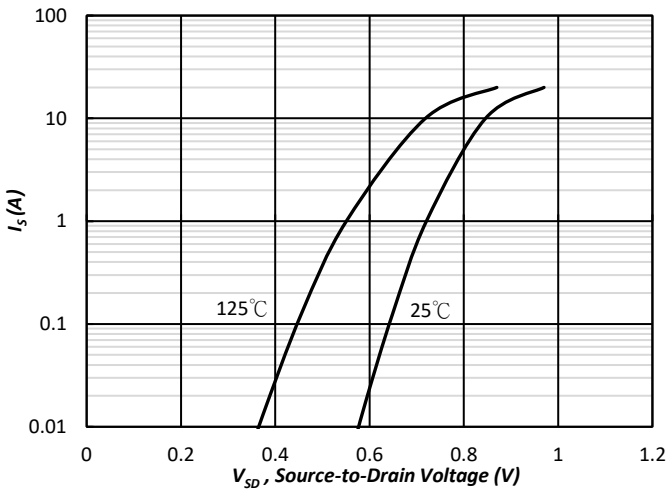


Fig.5 Forward Characteristic of Reverse Diode

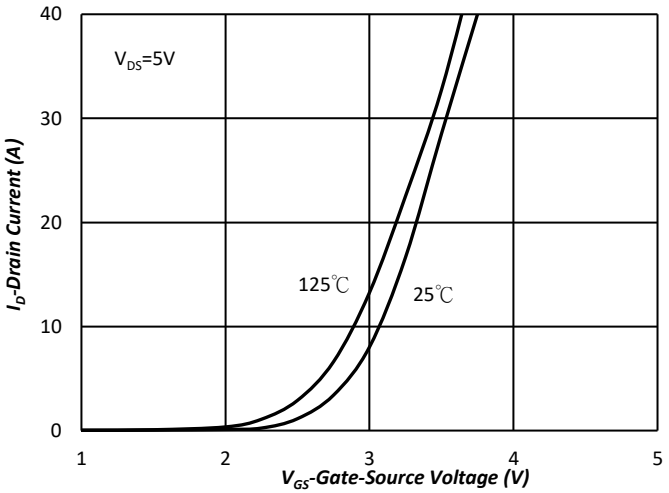


Fig.6 Transfer Characteristics

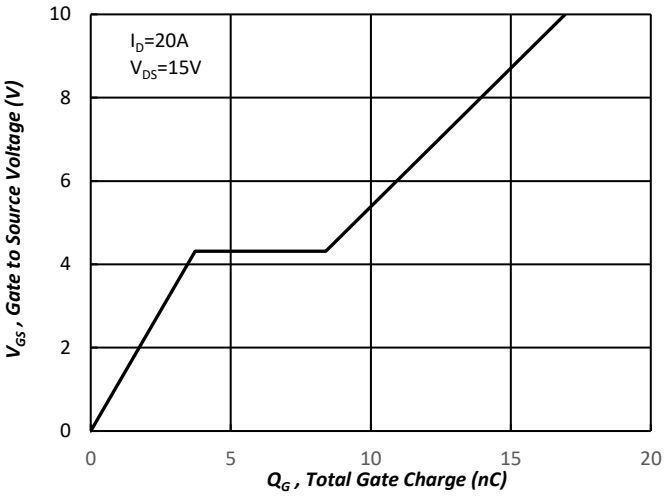


Fig.7 Gate Charge Characteristics

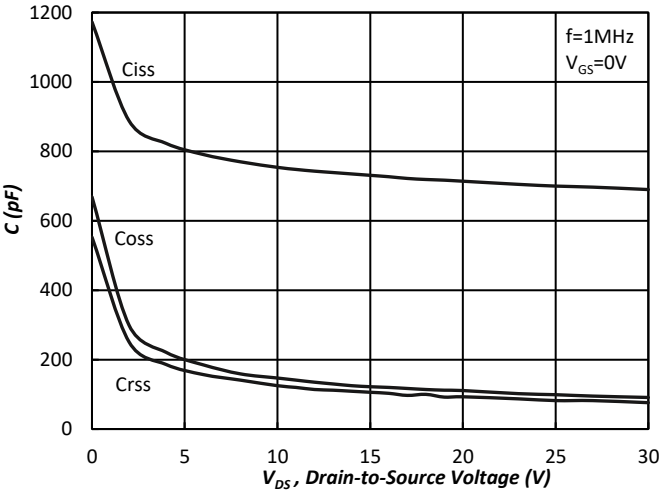


Fig.8 Typical Capacitance Characteristics

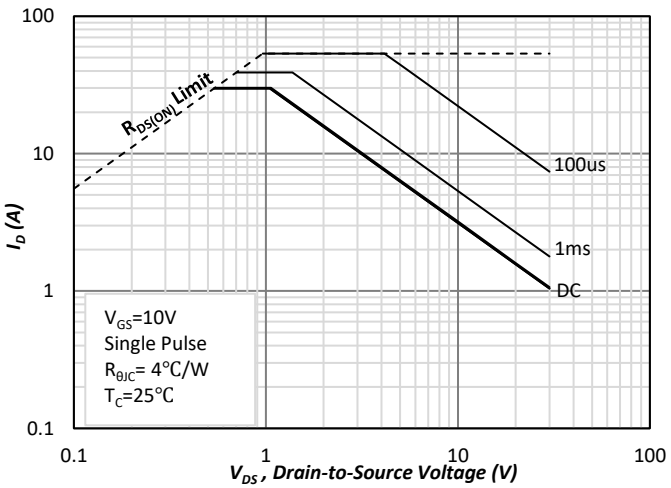


Fig 9. Maximum Safe Operating Area

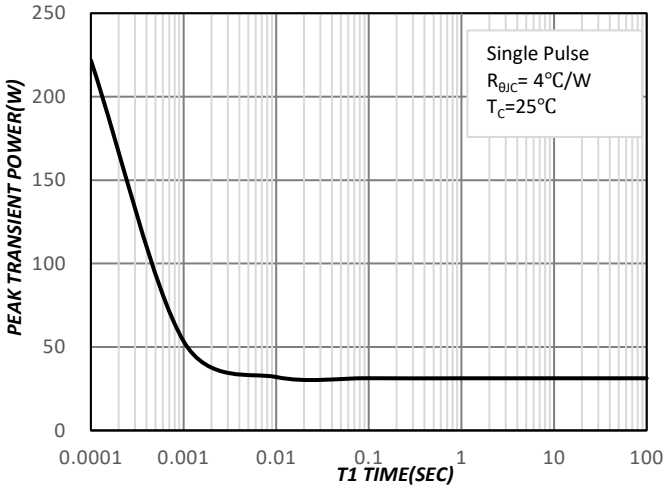


Fig 10. Single Pulse Maximum Power Dissipation

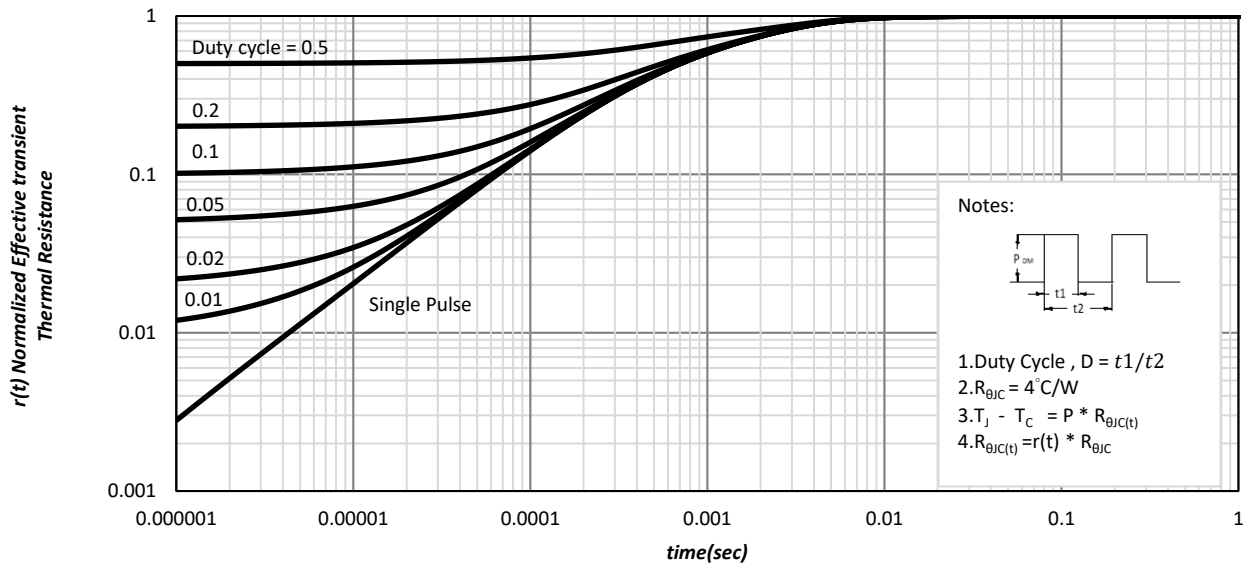


Fig 11. Effective Transient Thermal Impedance

▪ P-CH_ELECTRICAL CHARACTERISTICS (T_J = 25 °C, Unless Otherwise Noted)

PARAMETER	SYMBOL	TEST CONDITIONS	LIMITS			UNIT
			MIN	TYP	MAX	
STATIC						
Drain-Source Breakdown Voltage[4]	$V_{(BR)DSS}$	V_{GS} = 0V, I_D = -250μA	-30			V
Gate Threshold Voltage[4]	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = -250μA	-1.2	-1.6	-2.5	V
Gate-Body Leakage[4]	I_{GSS}	V_{DS} = 0V, V_{GS} = ±20V			±100	nA
Zero Gate Voltage Drain Current[4]	I_{DSS}	V_{DS} = -30V, V_{GS} = 0V			1	μA
		V_{DS} =-30V, V_{GS} =0V, T_J = 125 °C			25	
On-State Drain Current[1]	$I_{D(ON)}$	V_{DS} = -5V, V_{GS} = -10V	-44			A
Drain-Source On-State Resistance[1,4]	$R_{DS(ON)}$	V_{GS} = -10V, I_D = -15A		12	20	mΩ
		V_{GS} = -4.5V, I_D = -10A		19	30	
Forward Transconductance[1]	g_{fs}	V_{DS} = -5V, I_D = -10A		23		S
DYNAMIC						
Input Capacitance[5]	C_{iss}	V_{GS} = 0V, V_{DS} = -15V, f = 1MHz		1255		pF
Output Capacitance[5]	C_{oss}			215		
Reverse Transfer Capacitance[5]	C_{rss}			175		
Gate Resistance[4,5]	R_g	f = 1MHz		5.6		Ω
Total Gate Charge[1,2,5]	Q_g(V_{GS}=10V)	V_{DS} = -15V, V_{GS} = -10V, I_D = -15A		25		nC
Total Gate Charge[1,2,5]	Q_g(V_{GS}=4.5V)			12		
Gate-Source Charge[1,2,5]	Q_{gs}			4.8		
Gate-Drain Charge[1,2,5]	Q_{gd}			5.3		
Turn-On Delay Time[1,2,5]	$t_{d(on)}$	V_{DS} = -15V, V_{GS} = -10V, I_D = -5A , Rg = 3Ω		6.5		nS
Rise Time[1,2,5]	t_r			13		
Turn-Off Delay Time[1,2,5]	$t_{d(off)}$			40		
Fall Time[1,2,5]	t_f			36		
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS						
Continuous Current	I_S				-44	A
Pulsed Current[3]	I_{SM}				-59	
Forward Voltage[1,4]	V_{SD}	I_F = -15A, V_{GS} = 0V			-1.2	V
Reverse Recovery Time[5]	t_{rr}	I_F =-15A, dI_F/dt = 100A / μS		9.3		nS
Peak Reverse Recovery Current[5]	$I_{RM(REC)}$			0.5		A
Reverse Recovery Charge[5]	Q_{rr}			2.8		nC

[1]Pulse test : Pulse Width ≦ 300 usec, Duty Cycle ≦ 2%.

[2]Independent of operating temperature.

[3]Pulse width limited by maximum junction temperature.

[4]Guarantee by FT test Item

[5]Guarantee by Engineering test

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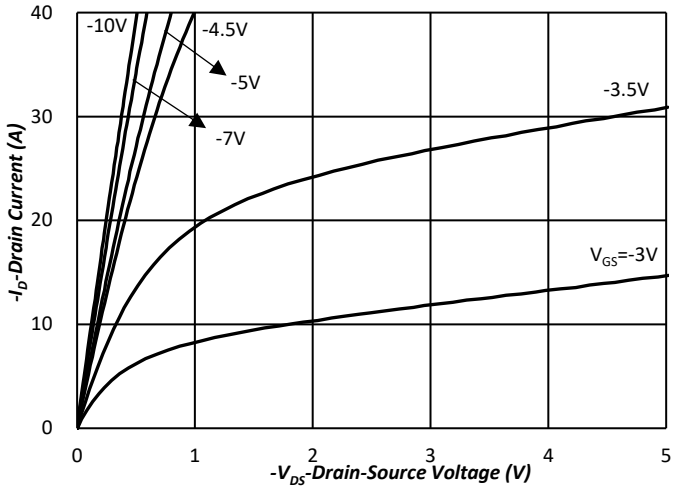


Fig.1 Typical Output Characteristics

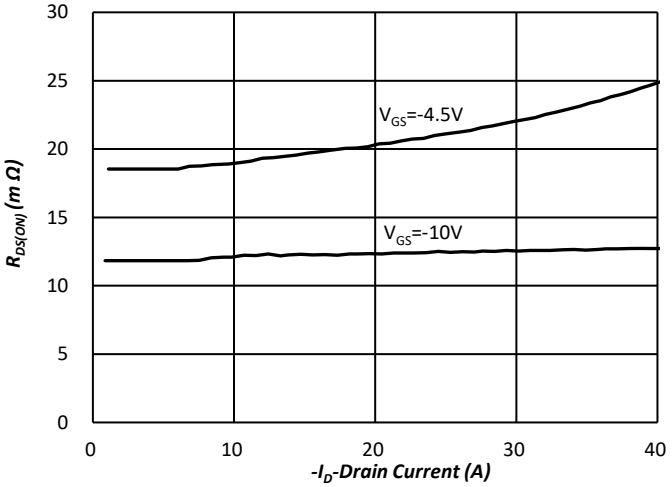


Fig.2 On-Resistance Variation with Drain Current and Gate Voltage

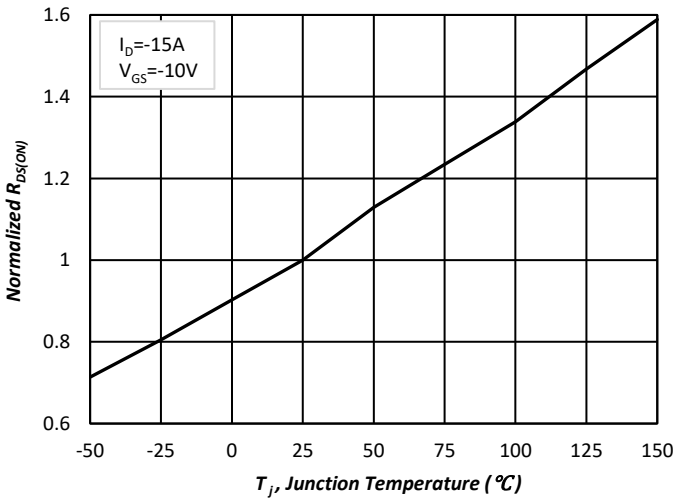
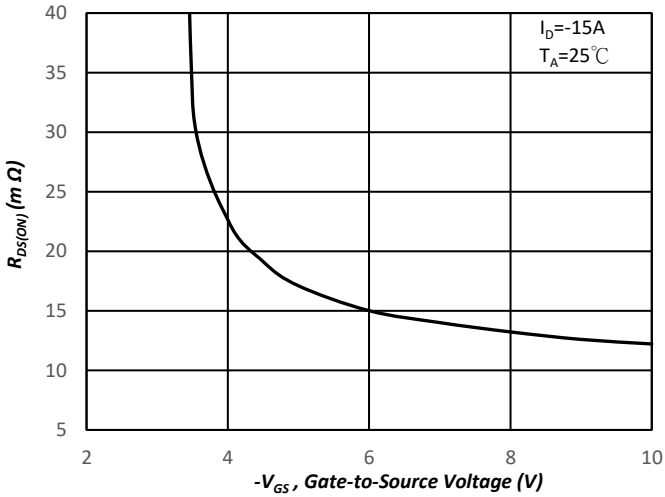


Fig.3 Normalized On-Resistance v.s. Junction Temperature



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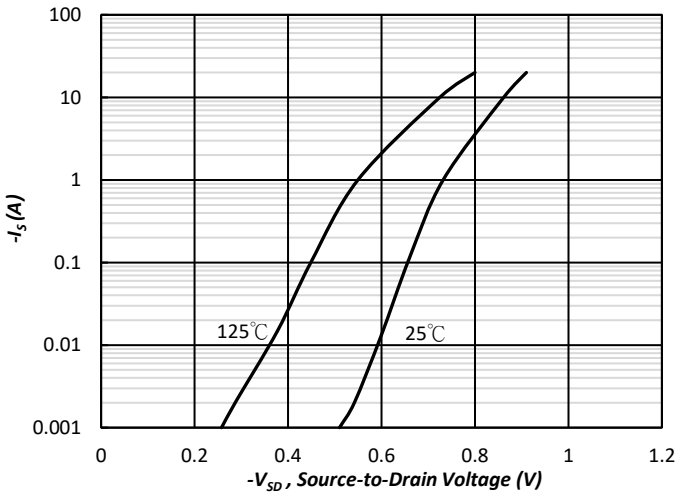

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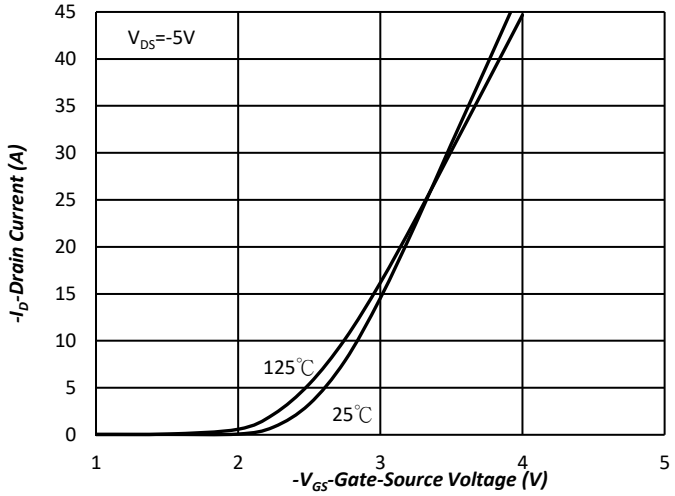


Fig.6 Transfer Characteristics

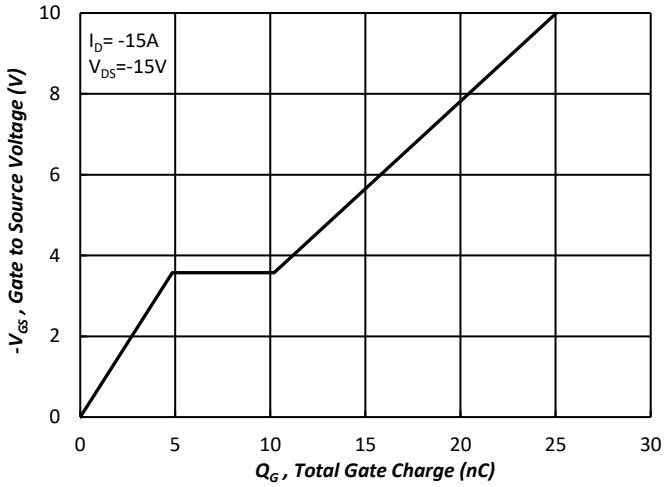


Fig.7 Gate Charge Characteristics

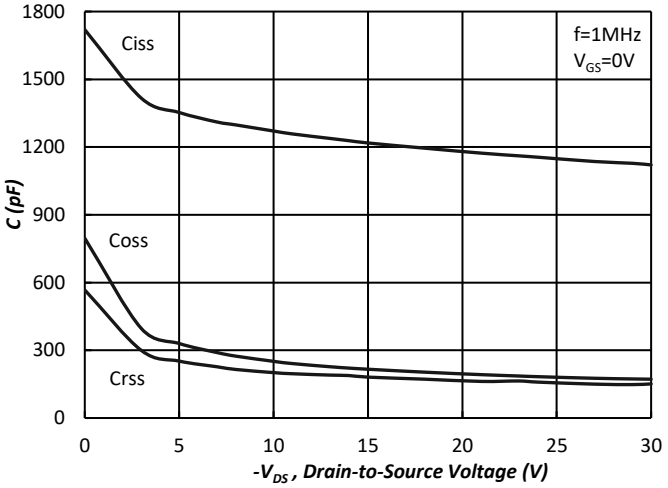


Fig.8 Typical Capacitance Characteristics

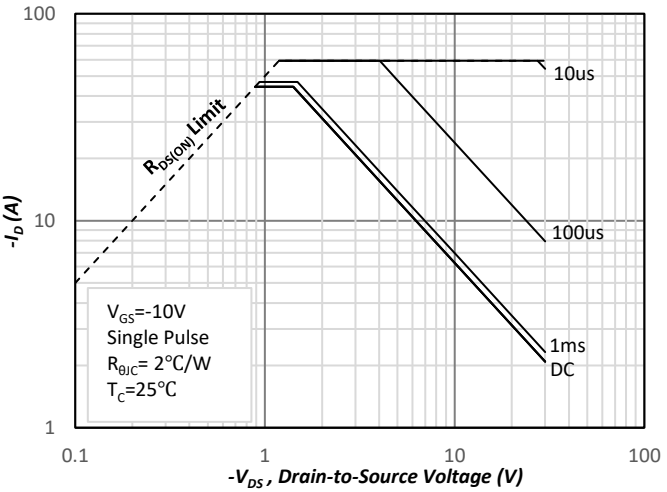


Fig 9. Maximum Safe Operating Area

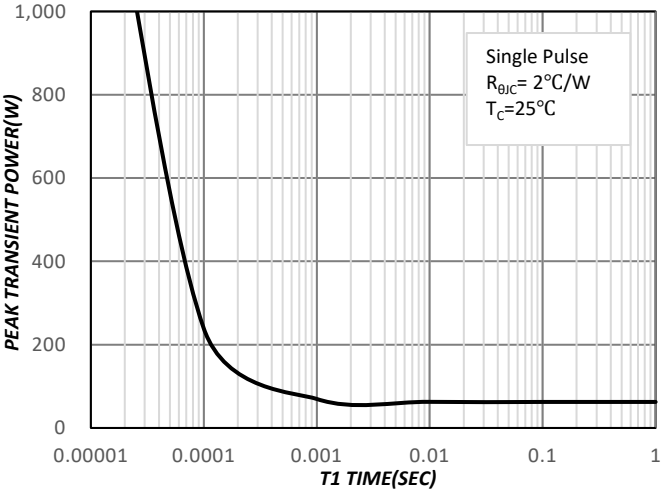


Fig 10. Single Pulse Maximum Power Dissipation

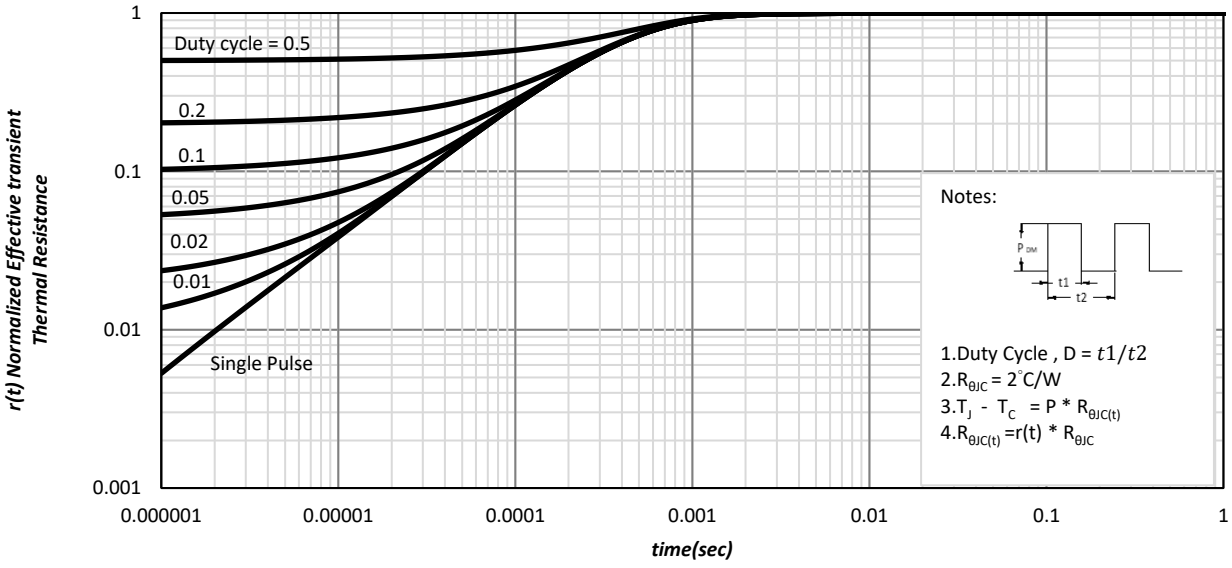
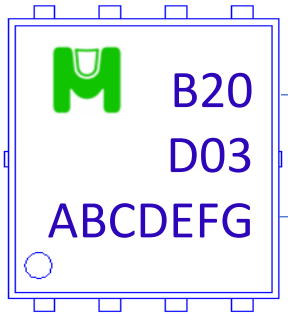


Fig 11. Effective Transient Thermal Impedance

Ordering & Marking Information:

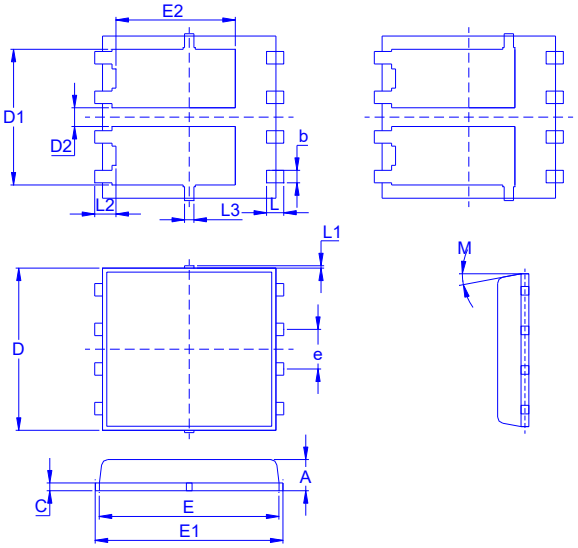
Device Name: EMB20D03H for EDFN 5x6



B20D03: Device Name

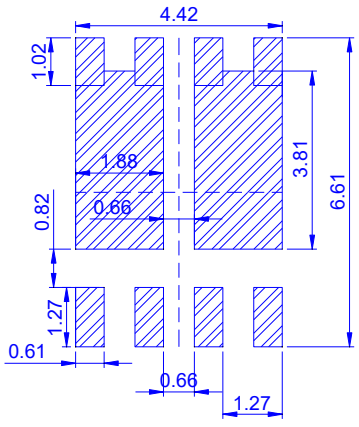
ABCDEFG: Date Code
A: Assembly House
B: Year(A:2008 B:2009 C:2010….)
C: Month(A:01 B:02 C:03 D:04 E:05 F:06 G:07 H:08 I:09 J:10 K:11 L:12)
DEFG: Serial No.

Outline Drawing

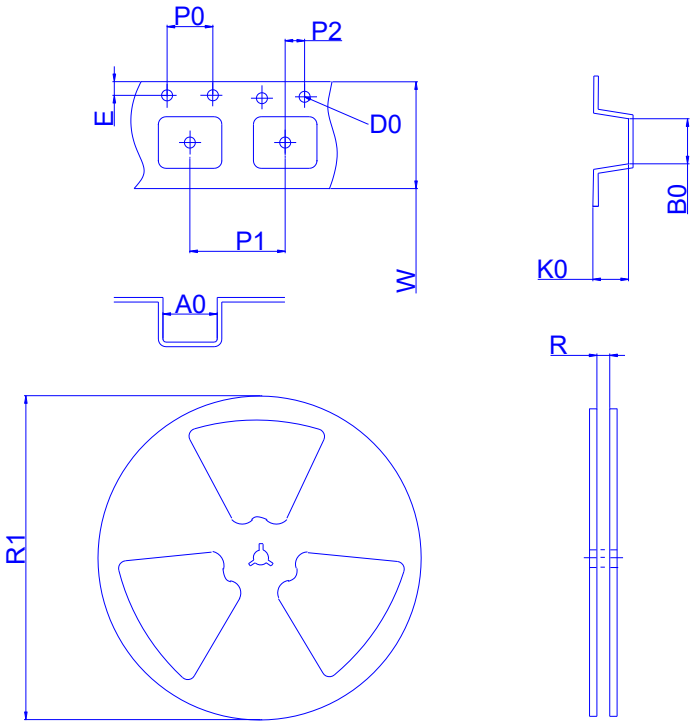


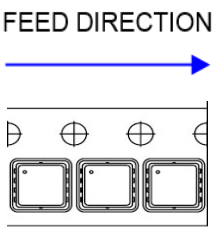
Dimension	A	b	c	D	D1	D2	E	E1	E2	e	L	L1	L2	M
Min.	0.85	0.30	0.15	4.80	3.41	0.47	5.65	5.95	3.30		0.38	-	0.38	0°
Typ.	1.01	0.40	0.20	5.00	4.01	0.67	5.75	6.05	3.43	1.27	0.55	0.09	0.48	
Max.	1.17	0.50	0.25	5.20	4.61	0.87	5.85	6.15	3.58		0.71	0.18	0.58	12°

Footprint



◆ **Tape&Reel Information:2500pcs/Reel**



Package	EDFN5X6
Reel	13”
Device orientation	

Dimension in mm

Dimension	Carrier tape									Reel	
	A0	B0	D0	E	K0	P0	P1	P2	W	R	R1
Typ.	6.4	5.3	1.5	1.8	1.6	4	8	2	12	12.4	330
±	0.2	0.2	0.1	0.1	0.6	0.1	0.1	0.1	0.3	2	2