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

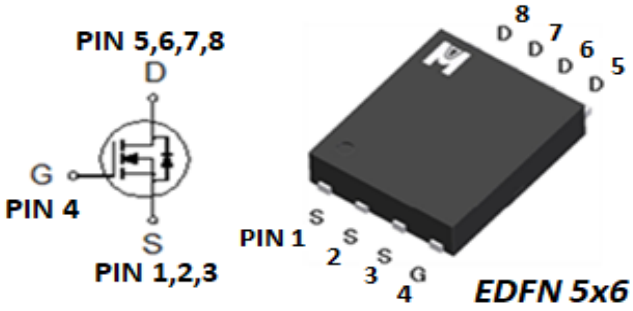
EMD04N04HS

Single N-Channel Logic Level Enhancement Mode Field Effect Transistor

▪Product Summary:

	N-CH
BVDSS	40V
$R_{DSON\ (MAX.)}$@V_{GS}=10V	4.0mΩ
$R_{DSON\ (MAX.)}$@V_{GS}=4.5V	6.5mΩ
I_D @T_C=25°C	140A
I_D @T_A=25°C	18A

▪ Pin Description:



Single N Channel MOSFET
UIS, Rg 100% Tested
Pb-Free Lead Plating & Halogen Free

▪ABSOLUTE MAXIMUM RATINGS (T_C = 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	140	A
	T_C = 100 °C		90	
Continuous Drain Current	T_A = 25 °C	I_D	18	
	T_A = 70 °C		15	
Pulsed Drain Current[1]		I_{DM}	400	
Avalanche Current		I_{AS}	55	
Avalanche Energy	L = 0.1mH	EAS	151	mJ
Repetitive Avalanche Energy[2]	L = 0.05mH	EAR	75.6	
Power Dissipation	T_C = 25 °C	P_D	147	W
	T_C = 100 °C		59	
Power Dissipation	T_A = 25 °C	P_D	2.5	W
	T_A = 70 °C		1.6	
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	$R_{\theta JC}$		0.85	°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.
[4]Guarantee by Engineering test

▪ **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 = 250uA	40			V
Gate Threshold Voltage[4]	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250uA	2	3	4	
Gate-Body Leakage[4]	I_{GSS}	V_{DS} = 0V, V_{GS} = ±20V			±100	nA
Zero Gate Voltage Drain Current[4]	I_{DSS}	V_{DS} = 32V, V_{GS} = 0V			1	uA
		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	140			A
Drain-Source On-State Resistance[1,4]	$R_{DS(ON)}$	V_{GS} = 10V, I_D = 30A		3.5	4	mΩ
		V_{GS} = 7V, I_D = 24A		5.2	6.5	
DYNAMIC						
Input Capacitance[5]	C_{iss}	V_{GS} = 0V, V_{DS} = 20V, f = 1MHz		1055		pF
Output Capacitance[5]	C_{oss}			821		
Reverse Transfer Capacitance[5]	C_{rss}			60		
Gate Resistance[4,5]	R_g	f = 1MHz		4.6		Ω
Total Gate Charge[1,2,5]	Q_g(V_{GS}=10V)	V_{DS} = 20V, V_{GS} = 10V, I_D = 24A		34.0		nC
	Q_g(V_{GS}=7V)			26.3		
Gate-Source Charge[1,2,5]	Q_{gs}			8.1		
Gate-Drain Charge[1,2,5]	Q_{gd}			5.1		
Turn-On Delay Time[1,2,5]	$t_{d(on)}$	V_{DS} = 20V, V_{GS} = 10V, I_D = 24A , Rg = 6Ω		6.1		nS
Rise Time[1,2,5]	t_r			13.7		
Turn-Off Delay Time[1,2,5]	$t_{d(off)}$			32.9		
Fall Time[1,2,5]	t_f			28.8		
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS						
Continuous Current	I_S				140	A
Pulsed Current[3]	I_{SM}				400	
Forward Voltage[1,4]	V_{SD}	I_F = I_S, V_{GS} = 0V			1.3	V
Reverse Recovery Time[5]	t_{rr}	I_F = I_S, dI_F/dt = 100A / uS		31.3		nS
Reverse Recovery Charge[5]	Q_{rr}			19.5		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.

▪TYPICAL CHARACTERISTICS

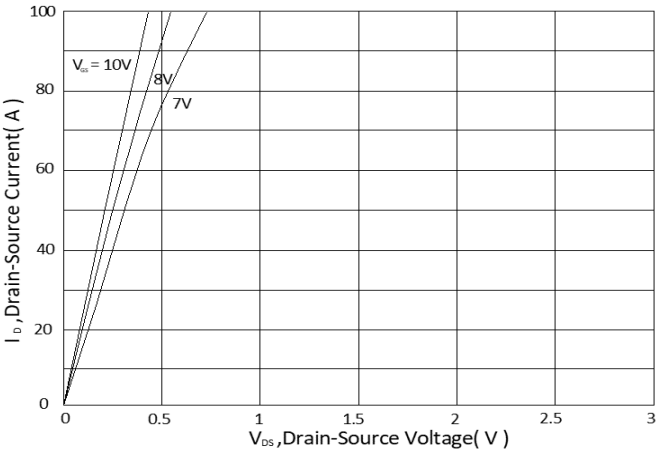


Fig.1 Typical Output Characteristics

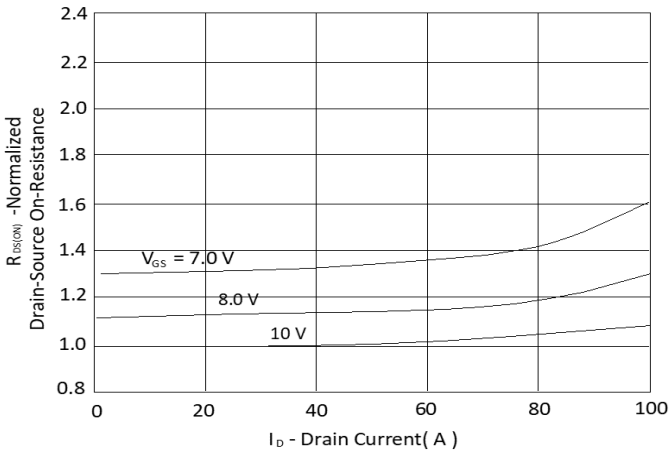


Fig.2 On-Resistance Variation with Drain Current and Gate Voltage

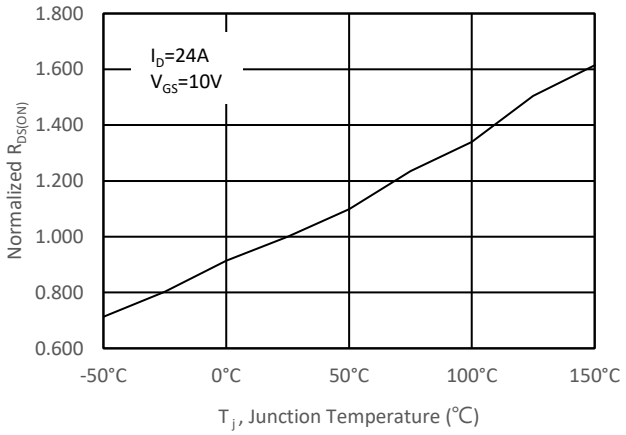


Fig.3 Normalized On-Resistance v.s. Junction Temperature

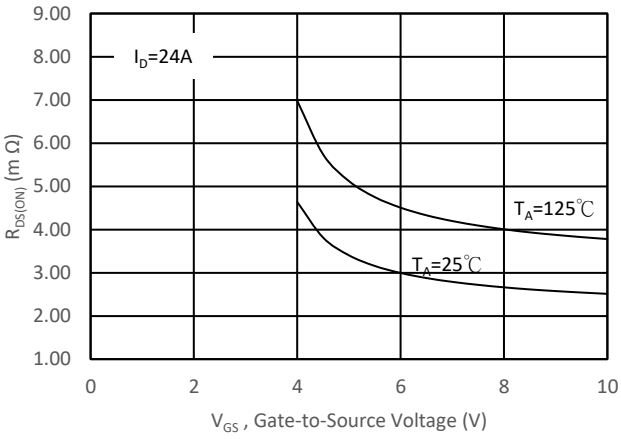


Fig.4 On-Resistance v.s. Gate Voltage

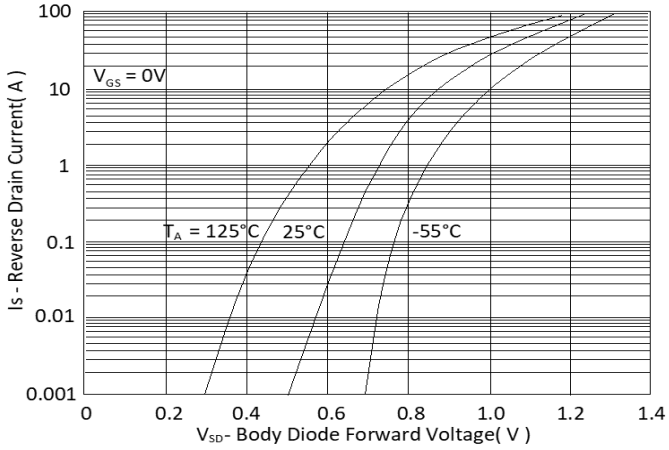


Fig.5 Forward Characteristic of Reverse Diode

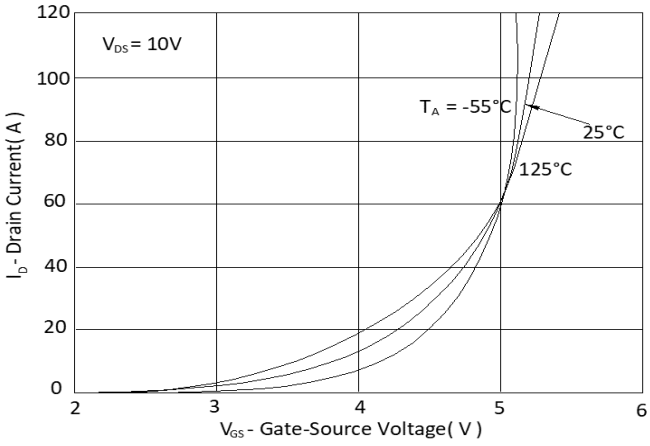


Fig.6 Transfer Characteristics

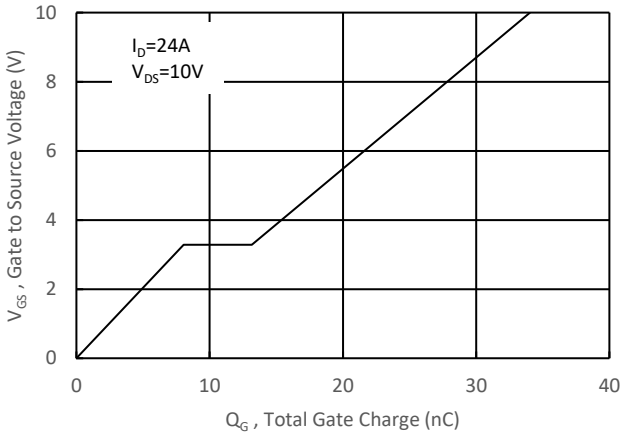


Fig.7 Gate Charge Characteristics

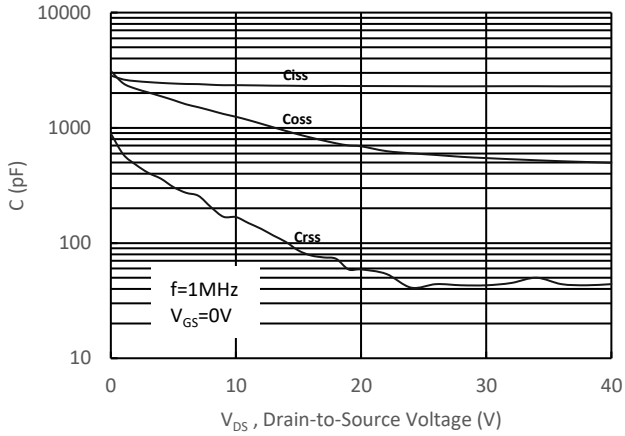


Fig.8 Typical Capacitance Characteristics

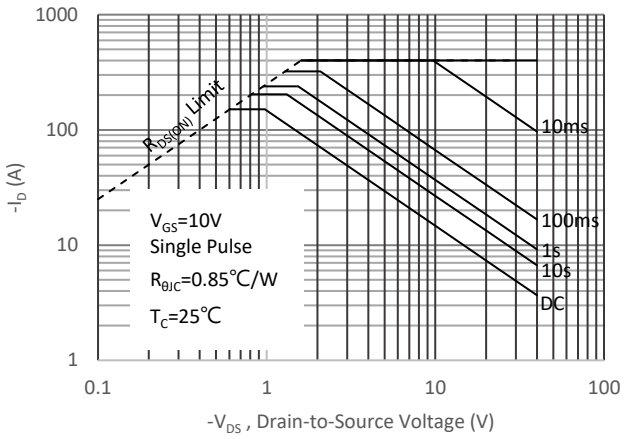


Fig 9. Maximum Safe Operating Area

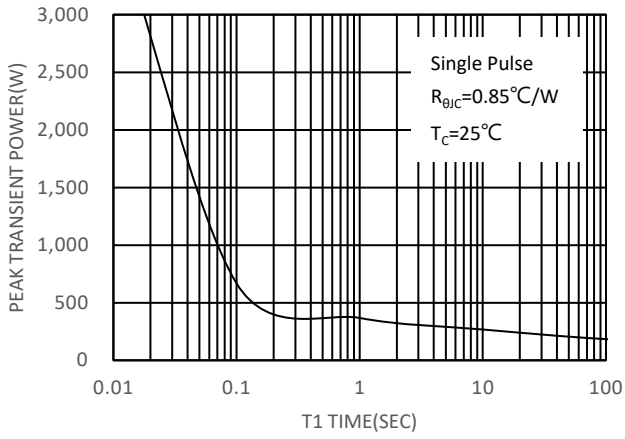


Fig 10. Single Pulse Maximum Power Dissipation

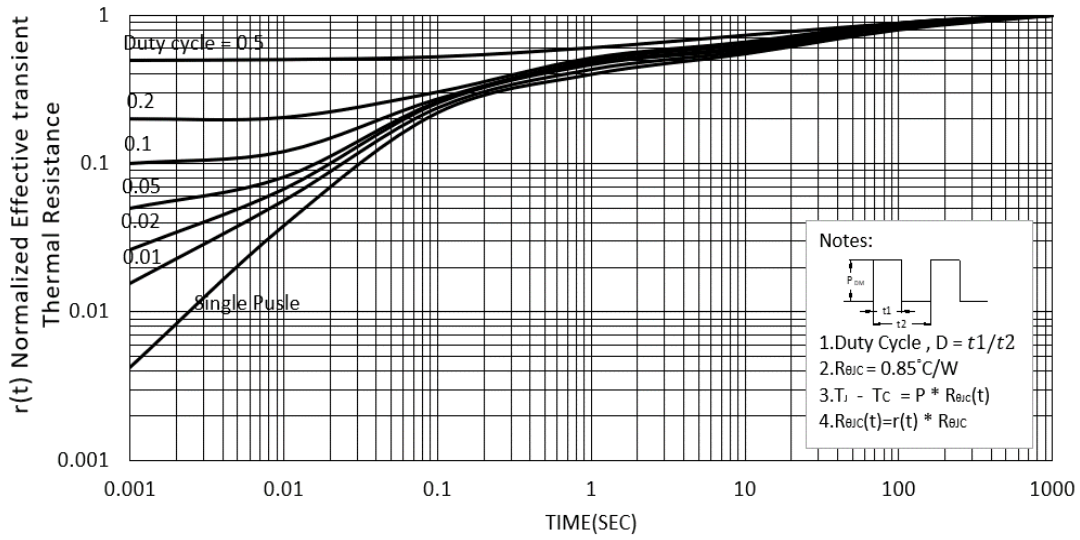
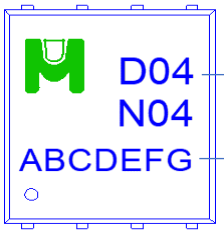


Fig 11. Effective Transient Thermal Impedance

Ordering & Marking Information:

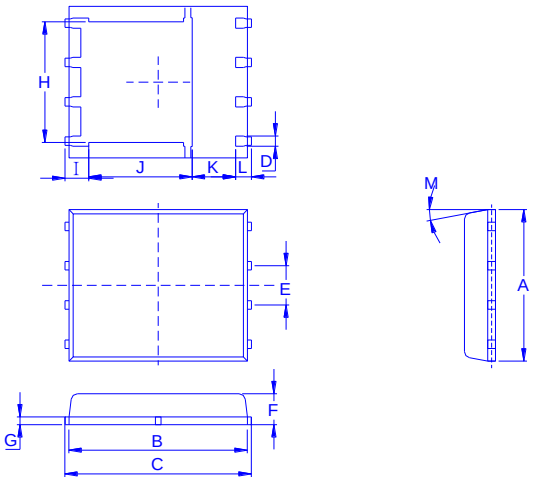
Device Name: EMD04N04HS for EDFN 5x6



D04N04: Device Name

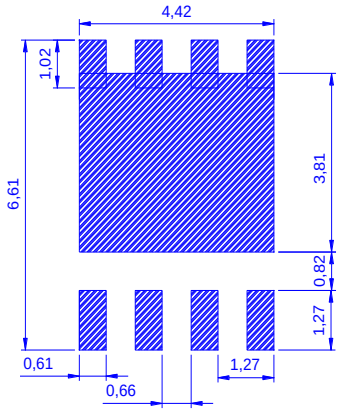
ABCDEFG: Date Code
A: Assembly House
B: Year(A:2008 B:2009 C:2010….)
C: Month(A:01 B:02 C:03 D:04 E:05 F:06 G:07 H:08 I:09 J:10 K:11 L:12)
DEFG: Serial No.

Outline Drawing

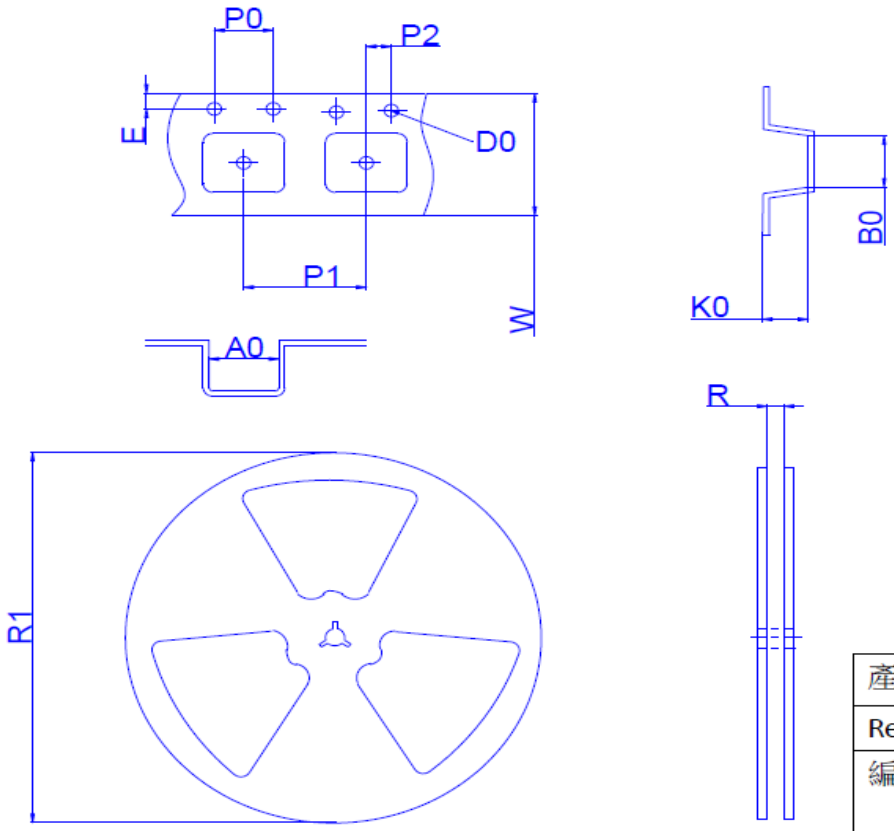


Dimension	A	B	C	D	E	F	G	H	I	J	K	L	M
Min.	4.8	5.55	5.9	0.3	1.17	0.85	0.15	3.61	0.38	3.18	1	0.38	0°
Typ.	4.9	5.7	6	0.4	1.27	0.95	0.2	3.87	0.4	3.44	1.2	0.4	
Max.	5.4	5.85	6.15	0.51	1.37	1.17	0.34	4.31	0.71	3.78	1.39	0.71	12°

Footprint



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



產品別	EDFN 5*6
Reel 尺寸	13"
編帶方式	FEED DIRECTION

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	4.0	8.0	2.0	12.0	17.0	330.0
±	0.2	0.2	0.1	0.1	0.6	0.1	0.1	0.1	0.3	2.0	2.0