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

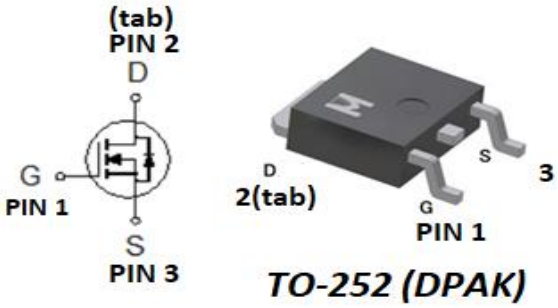
EMP29N04AS

Single N-Channel Logic Level Enhancement Mode Field Effect Transistor

▪Product Summary:

	N-CH
BVDSS	40V
$R_{DSON\ (MAX.)}$@V_{GS}=10V	3.6mΩ
$R_{DSON\ (MAX.)}$@V_{GS}=4.5V	4.8mΩ
I_D @T_C=25°C	83.0A
I_D @T_A=25°C	16.0A

▪ Pin Description:



TO-252 (DPAK)

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	83	A
	T_C = 100 °C		52	
Continuous Drain Current	T_A = 25 °C	I_D	16	
	T_A = 70 °C		13	
Pulsed Drain Current[1]		I_{DM}	196	
Avalanche Current		I_{AS}	56	
Avalanche Energy	L = 0.1mH	EAS	156.8	mJ
Repetitive Avalanche Energy[2]	L = 0.05mH	EAR	78.4	
Power Dissipation	T_C = 25 °C	P_D	41.7	W
	T_C = 100 °C		16.7	
Power Dissipation	T_A = 25 °C	P_D	1.7	W
	T_A = 70 °C		1.1	
Operating Junction & Storage Temperature Range		T_j, T_{stg}	-55 to 150	°C

▪ 100% UIS testing in condition of VD=20V, L=0.1mH, VG=10V, IL=44A, Rated VDS=40V N-CH

▪THERMAL RESISTANCE RATINGS

THERMAL RESISTANCE	SYMBOL	TYPICAL	MAXIMUM	UNIT
Junction-to-Case	$R_{\theta JC}$		3	°C/W
Junction-to-Ambient[3]	$R_{\theta JA}$		75	

[1]Pulse width limited by maximum junction temperature.
[2]Duty cycle < 1%
[3]75°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	1	2	3	
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} =28V, V_{GS} =0V, T_J = 125 °C			25	
On-State Drain Current[1]	$I_{D(ON)}$	V_{DS} = 10V, V_{GS} = 10V	83			A
Drain-Source On-State Resistance[1,4]	$R_{DS(ON)}$	V_{GS} = 10V, I_D = 25A		2.9	3.6	mΩ
		V_{GS} = 4.5V, I_D = 20A		3.6	4.8	
Forward Transconductance[1]	g_{fs}	V_{DS} = 5V, I_D = 20A		50		S
DYNAMIC						
Input Capacitance[5]	C_{iss}	V_{GS} = 0V, V_{DS} = 20V, f = 1MHz		2777		pF
Output Capacitance[5]	C_{oss}			574		
Reverse Transfer Capacitance[5]	C_{rss}			68		
Gate Resistance[4,5]	R_g	f = 1MHz		1.2		Ω
Total Gate Charge[1,2,5]	Q_g(V_{GS}=10V)	V_{DS} = 20V, V_{GS} = 10V, I_D = 25A		47.0		nC
	Q_g(V_{GS}=4.5V)			23.7		
Gate-Source Charge[1,2,5]	Q_{gs}			6.4		
Gate-Drain Charge[1,2,5]	Q_{gd}			9.2		
Turn-On Delay Time[1,2,5]	$t_{d(on)}$	V_{DS} = 20V, V_{GS} = 10V, I_D = 5A , Rg = 6Ω		10.1		nS
Rise Time[1,2,5]	t_r			12.6		
Turn-Off Delay Time[1,2,5]	$t_{d(off)}$			30.0		
Fall Time[1,2,5]	t_f			7.2		
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS						
Continuous Current	I_S				83	A
Pulsed Current[3]	I_{SM}				196	
Forward Voltage[1,4]	V_{SD}	I_F = 25A, V_{GS} = 0V			1.2	V
Reverse Recovery Time[5]	t_{rr}	I_F = 25A, dI_F/dt = 100A / uS		26.2		nS
Peak Reverse Recovery Current[5]	$I_{RM(REC)}$			0.55		A
Reverse Recovery Charge[5]	Q_{rr}			8.2		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.

▪TYPICAL CHARACTERISTICS

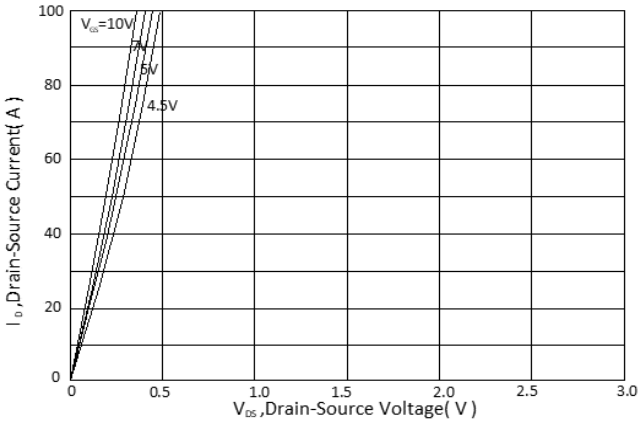


Fig.1 Typical Output Characteristics

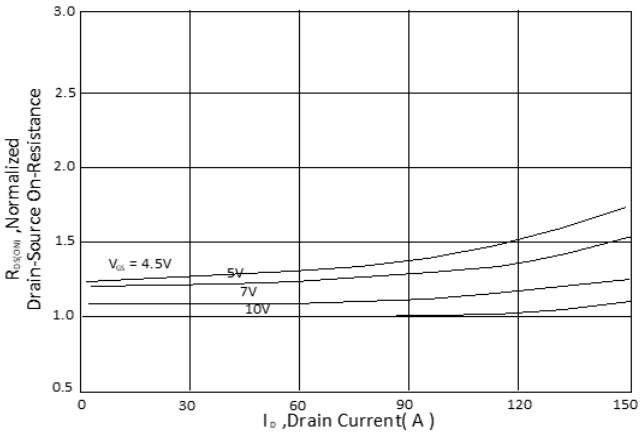


Fig.2 On-Resistance Variation with Drain Current and Gate Voltage

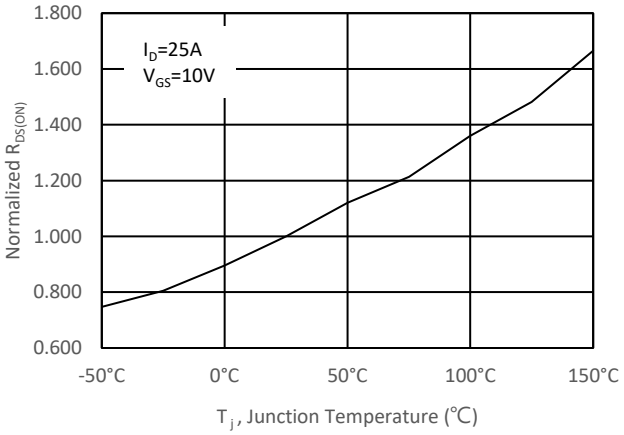


Fig.3 Normalized On-Resistance v.s. Junction Temperature

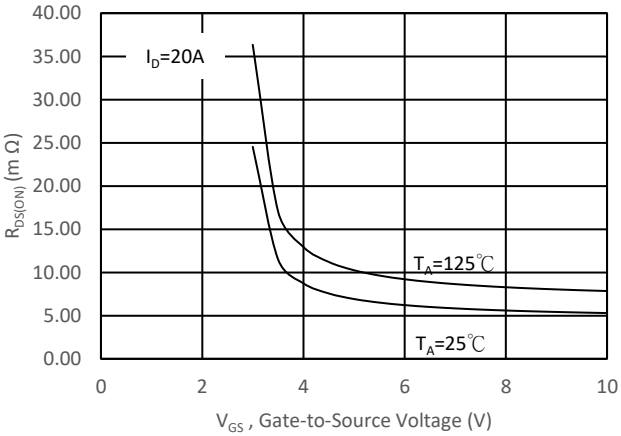


Fig.4 On-Resistance v.s. Gate Voltage

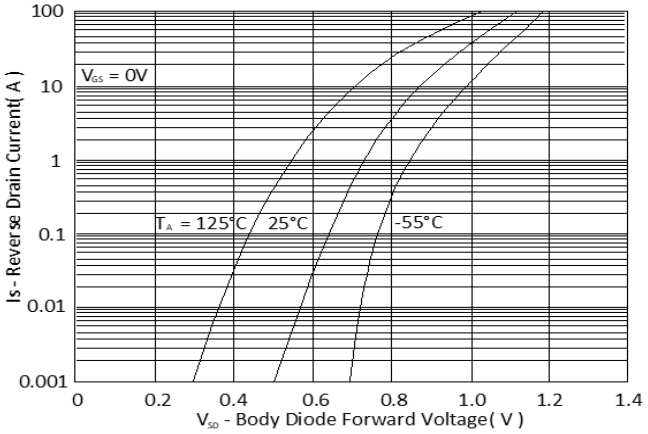


Fig.5 Forward Characteristic of Reverse Diode

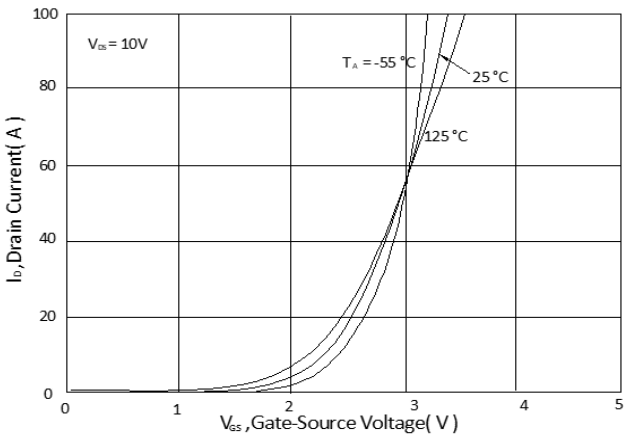


Fig.6 Transfer Characteristics

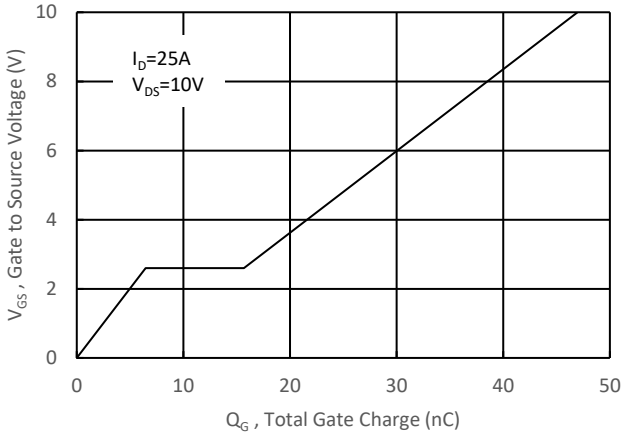


Fig.7 Gate Charge Characteristics

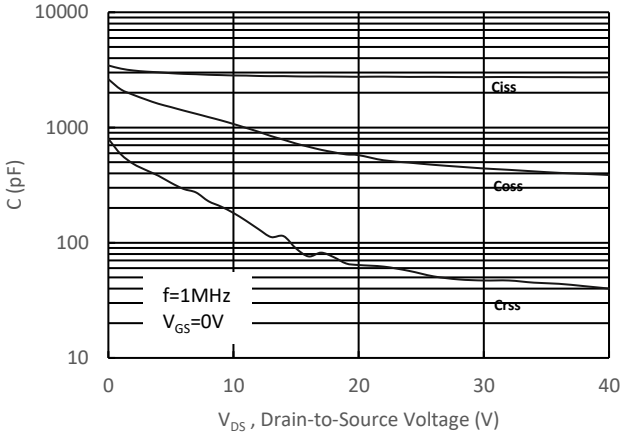


Fig.8 Typical Capacitance Characteristics

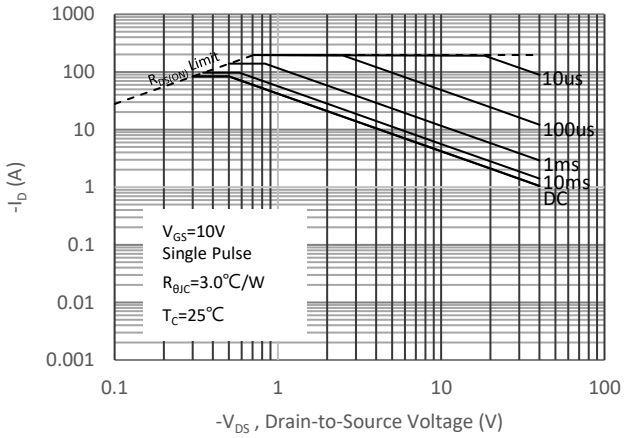


Fig 9. Maximum Safe Operating Area

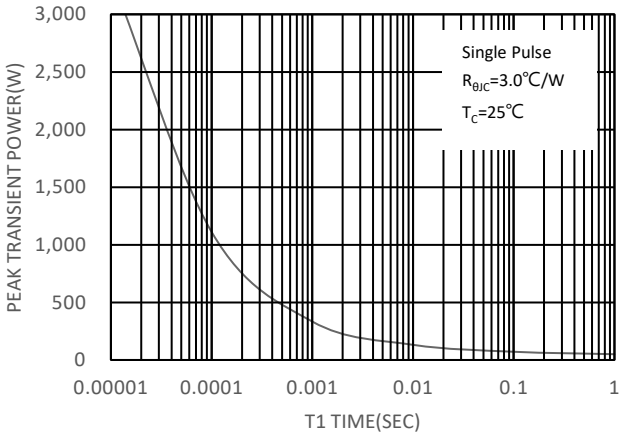


Fig 10. Single Pulse Maximum Power Dissipation

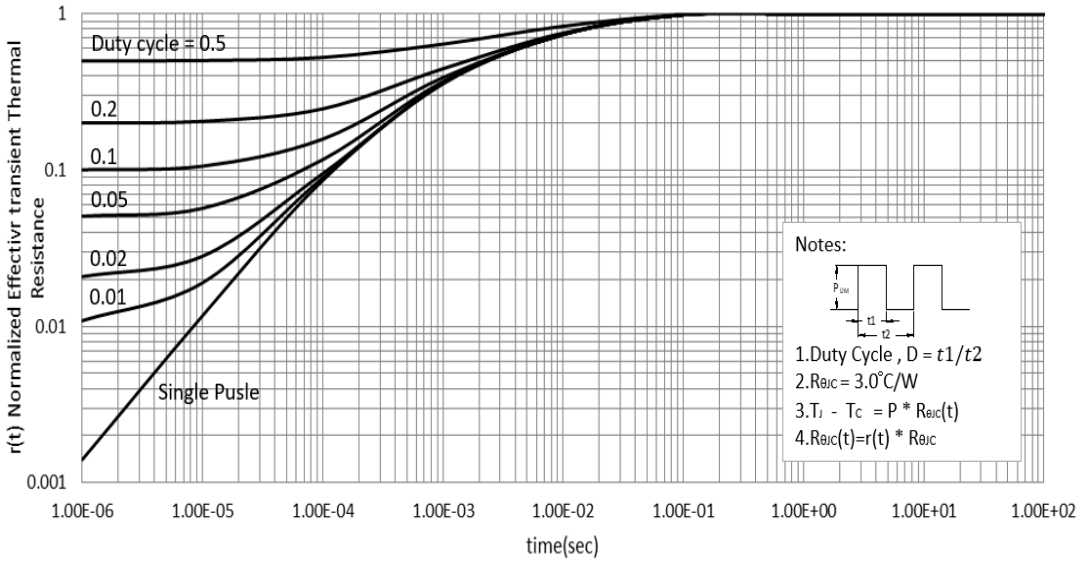
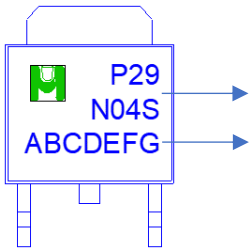


Fig 11. Effective Transient Thermal Impedance

Ordering & Marking Information:

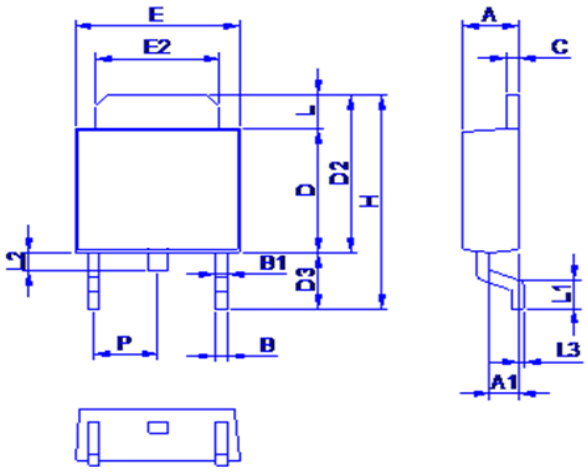
Device Name: EMP29N04AS for TO-252 [DPAK]



P29N04S: 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.

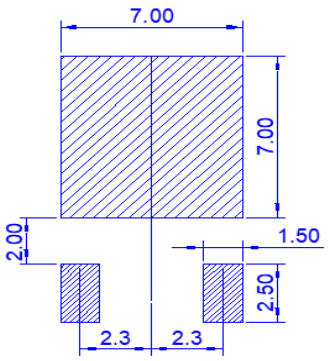
Outline Drawing



Dimension	A	A1	B	B1	C	D	D2	D3	E	E2	H	L	L1
Min.	2.1	0.95	0.62	0.65	0.45	5.96	6.8	2.6	6.3	4.9	9.3	0.8	1.2
Typ.	2.25	1.125	0.76	0.9	0.67	6.1	7.15	2.8	6.5	5.2	9.9	1.1	1.65
Max.	2.4	1.3	0.9	1.15	0.89	6.24	7.5	3	6.7	5.5	10.5	1.4	2.1

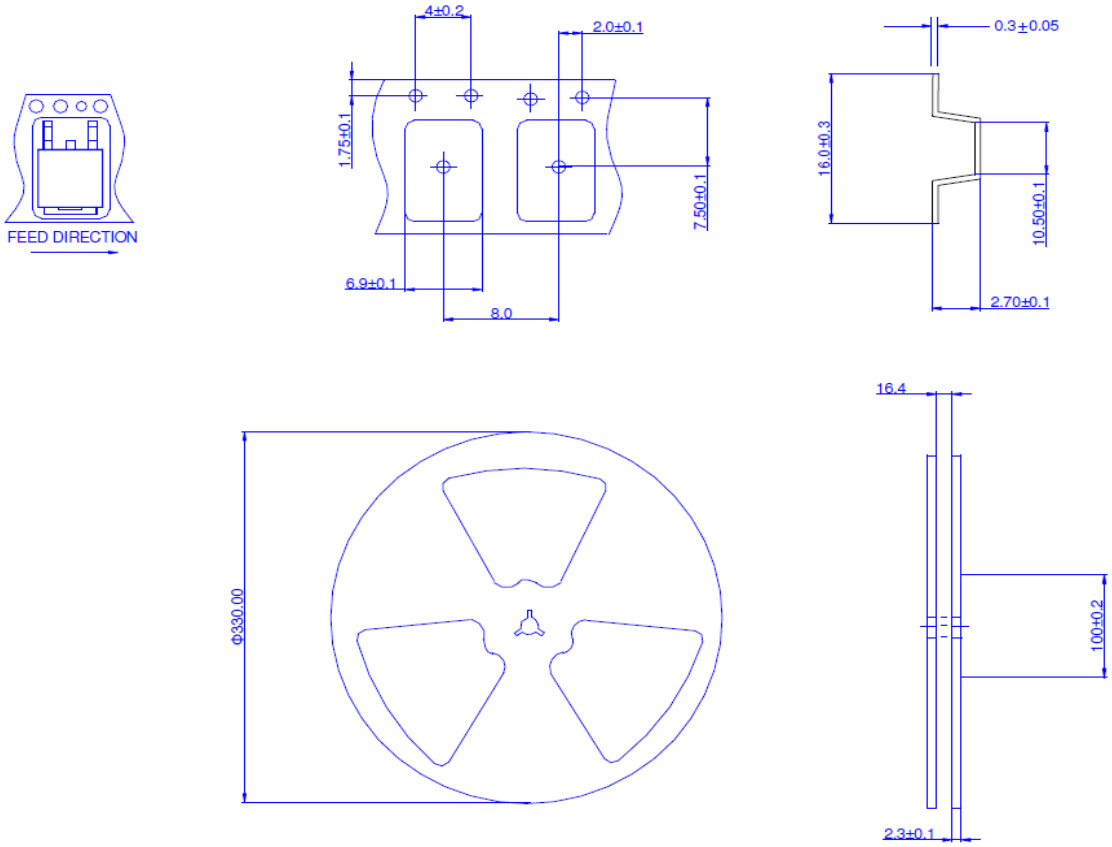
Dimension	L2	L3	P
Min.	0.5	0	2.1
Typ.	0.8	0.1	2.25
Max.	1.1	0.2	2.4

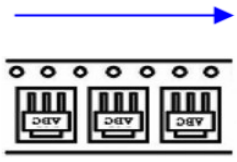
Footprint



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

(Dimension in millimeter)



產品別	TO252-2
Reel 尺寸	13”
編帶方式	FEED DIRECTION 
前空格	35
後空格	35
裝箱數	
滿捲數量	2.5K
捲/內盒比	1：1
內盒滿箱數	2.5K
內/外箱比	10：1
外箱滿箱數	25K

★Datasheet Latest version specification :

	Revision History	Prepared	Approved	Date
A.0	Initial Datasheet	Jannie	Andy	2019/9/9
A.1	Update electrical specifications	Johnson	Sam	2020/7/20