



N-Channel Logic Level Enhancement Mode Field Effect Transistor

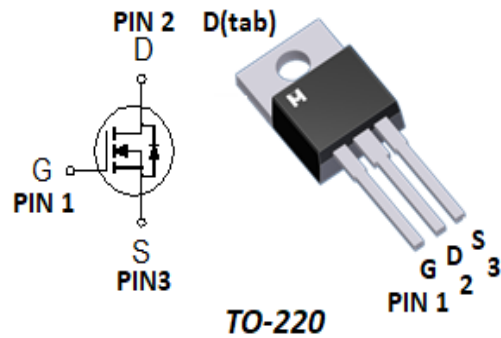
Product Summary:

BV _{DSS}	40V
R _{DS(on)} (MAX.)	2.9mΩ
I _D	172A

N Channel MOSFET

UIS, R_g 100% Tested

RoHS & Halogen Free & TSCA Compliant



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	172	A
	T _c = 100 °C		139	
Pulsed Drain Current ¹		I _{DM}	674	
Avalanche Current		I _{AS}	69	
Avalanche Energy	L = 0.1mH	E _{AS}	236	mJ
Repetitive Avalanche Energy ²	L = 0.05mH	E _{AR}	118	
Power Dissipation	T _c = 25 °C	P _D	227	W
	T _c = 100 °C		90	
Operating Junction & Storage Temperature Range		T _j , T _{stg}	-55 to 150	°C

100% UIS testing in condition of V_D=20V, L=0.1mH, V_G=10V, I_L=40A, Rated V_{DS}=40V N-CH

THERMAL RESISTANCE RATINGS

THERMAL RESISTANCE	SYMBOL	TYPICAL	MAXIMUM	UNIT
Junction-to-Case	R _{θJC}		0.55	°C / W
Junction-to-Ambient	R _{θJA}		62.5	

¹Pulse width limited by maximum junction temperature.

²Duty cycle ≤ 1%

³The value of R_{θJA} is measured with the device mounted on 1in² FR-4 board with 2oz. Copper, in a still air environment with T_A = 25°C.



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	40			V
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250μA	1	1.4	2	
Gate-Body Leakage	I _{GSS}	V _{DS} = 0V, V _{GS} = ±20V			±100	nA
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 32V, 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	172			A
Drain-Source On-State Resistance ¹	R _{DS(ON)}	V _{GS} = 10V, I _D = 20A		2.5	2.9	mΩ
		V _{GS} = 4.5V, I _D = 20A		3.2	4.0	
Forward Transconductance ¹	g _{fs}	V _{DS} = 5V, I _D = 20A		60		S
DYNAMIC						
Input Capacitance	C _{iss}	V _{GS} = 0V, V _{DS} = 20V, f = 1MHz		6923		pF
Output Capacitance	C _{oss}			1244		
Reverse Transfer Capacitance	C _{rss}			13		
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} = 20V, V _{GS} = 10V, I _D = 50A		82.9		nC
	Q _g (V _{GS} =4.5V)			34.3		
Gate-Source Charge ^{1,2}	Q _{gs}			27.2		
Gate-Drain Charge ^{1,2}	Q _{gd}			4.3		
Turn-On Delay Time ^{1,2}	t _{d(on)}	V _{DD} =20V, I _D =100A, R _g =6 ohm, V _{gs} =10V		15.5		nS
Rise Time ^{1,2}	t _r			123.5		
Turn-Off Delay Time ^{1,2}	t _{d(off)}			91.5		
Fall Time ^{1,2}	t _f			116		
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS (T _c = 25 °C)						
Continuous Current	I _S				221	A
Pulsed Current ³	I _{SM}				674	
Forward Voltage ¹	V _{SD}	I _F = 20A, V _{GS} = 0V			1.2	V
Reverse Recovery Time	t _{rr}	V _{DD} =40V, I _F =100A, di/dt (A/μS)=100, L=0.1mH, R _g =10 ohm		32.7		nS
Reverse Recovery Charge	Q _{rr}			19.3		nC

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

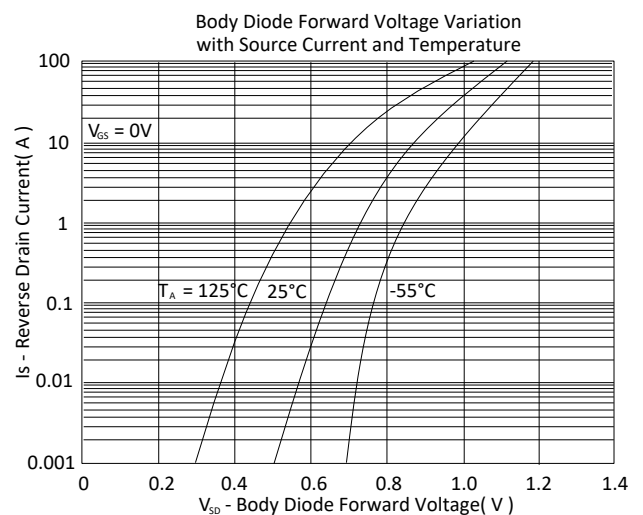
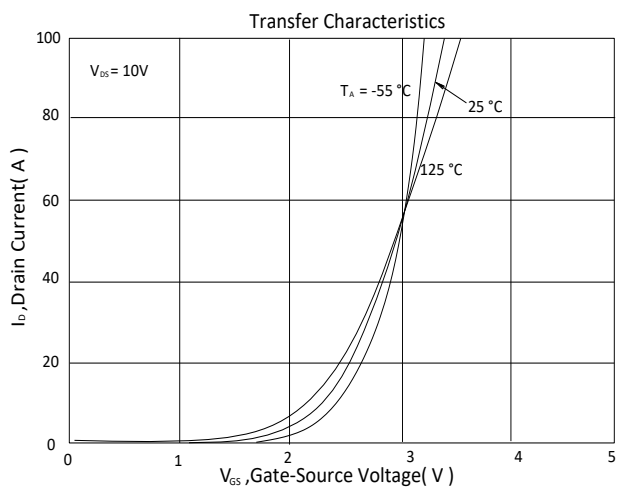
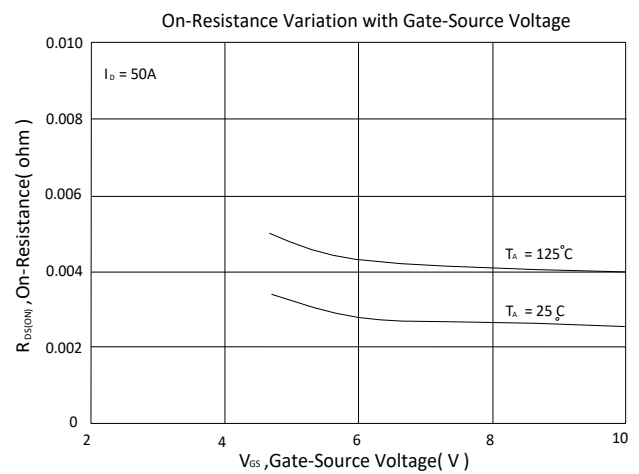
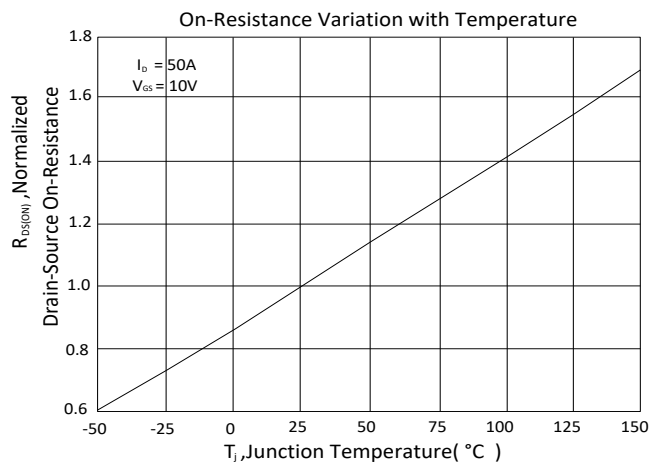
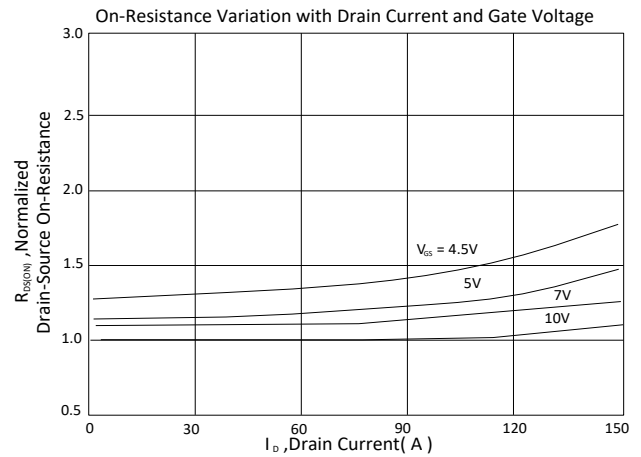
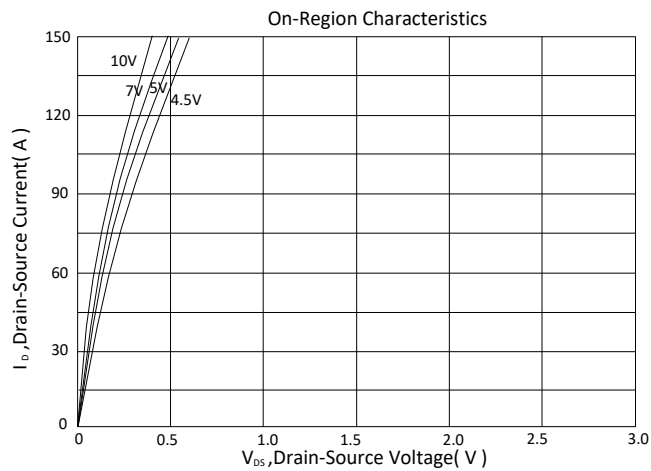
²Independent of operating temperature.

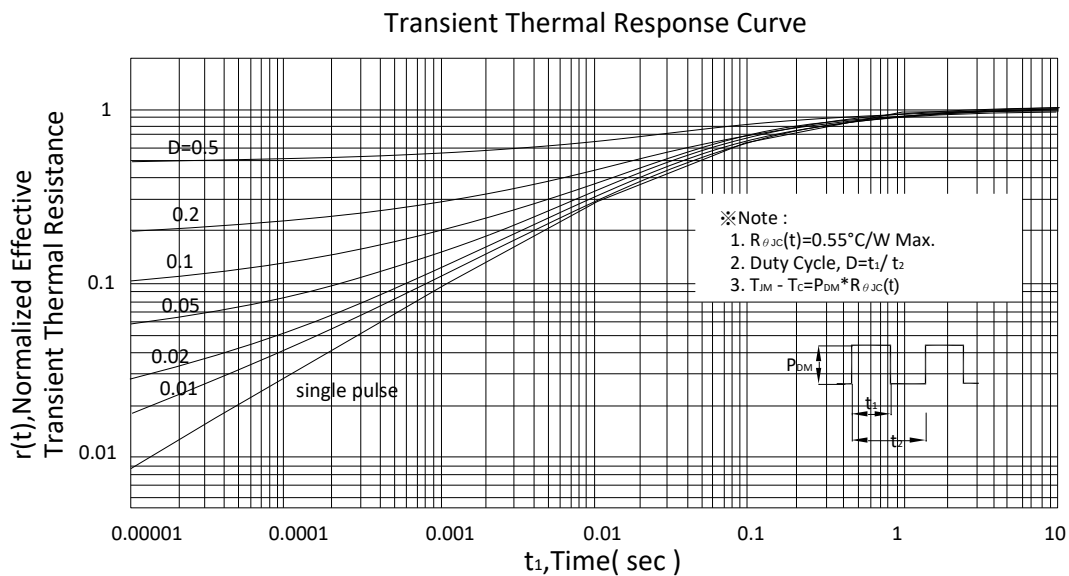
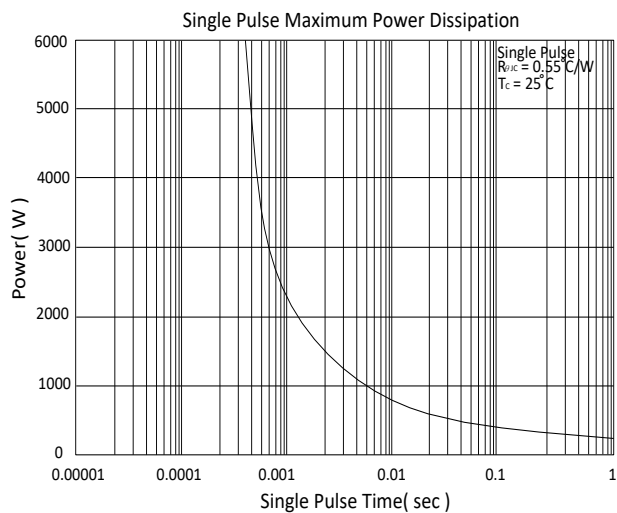
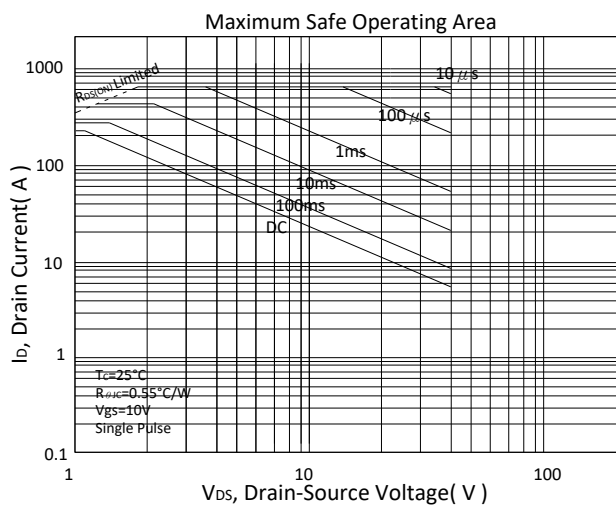
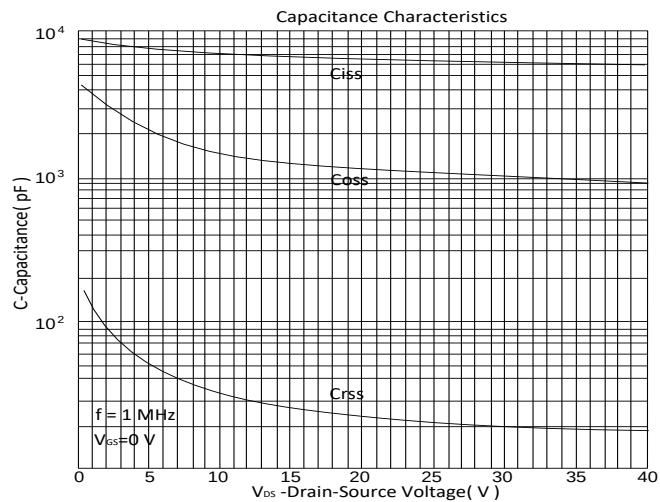
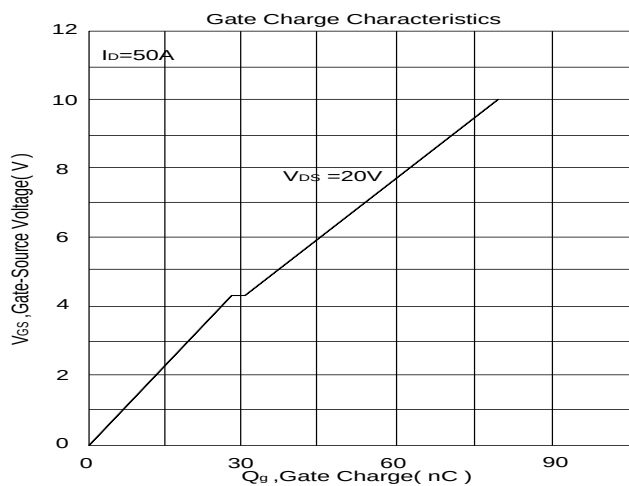
³Pulse width limited by maximum junction temperature.

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



TYPICAL CHARACTERISTICS

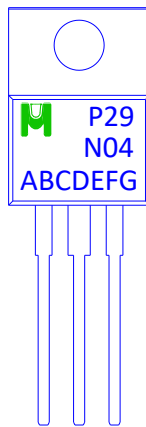






Ordering & Marking Information:

Device Name: EMP29N04E for TO-220



P29N04: Device Name

ABCDEFG: Date Code

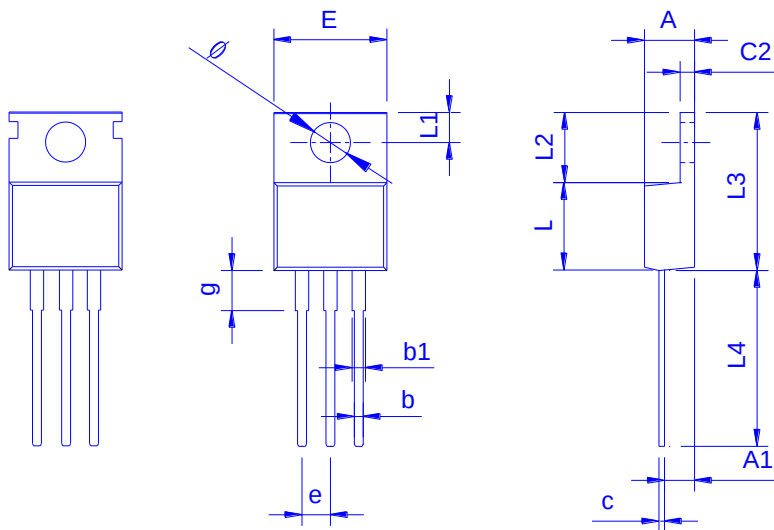
A: Assembly House

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 in mm

Dimension	A	A1	b	b1	c	c2	E	L	L1	L2	L3	L4	Ø	e	g
Min.	4.240	2.250	0.700	1.170	0.310	1.150	9.910	8.500	2.590	6.100	14.700	12.700	3.400	2.440	2.850
Typ.	4.440	2.400	0.800	1.550	0.500	1.270	10.160	8.920	2.800	6.300	15.370	13.720	3.840	2.540	3.800
Max.	4.700	2.820	0.910	1.750	0.650	1.400	10.360	9.750	3.250	6.800	16.900	13.970	3.935	2.640	4.000



- ◆ Tube Information: 50pcs/Tube (1000pcs/Box)

