

N-Channel Logic Level Enhancement Mode Field Effect Transistor

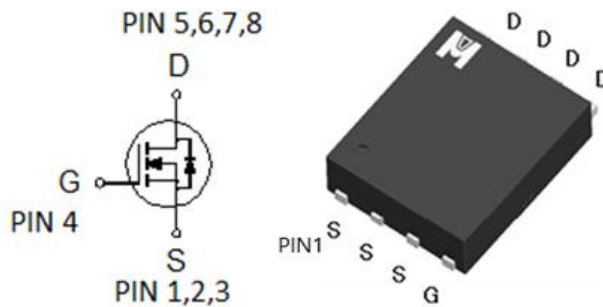
Product Summary:

BV_{DSS}	30V
$R_{DS(on)} (MAX.)$	$2.3m\Omega$
I_D	100A

N Channel MOSFET

UIS, Rg 100% Tested

RoHS & Halogen Free & TSCA Compliant



ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ C$ Unless Otherwise Noted)

PARAMETERS/TEST CONDITIONS		SYMBOL	LIMITS	UNIT
Gate-Source Voltage		V_{GS}	± 20	V
Continuous Drain Current ¹	$T_C = 25^\circ C$	I_D	100	A
	$T_C = 100^\circ C$		70	
Pulsed Drain Current ²		I_{DM}	400	
Avalanche Current		I_{AS}	65	
Avalanche Energy	$L = 0.1mH, I_D = 65A, R_G = 25\Omega$	E_{AS}	211	mJ
Repetitive Avalanche Energy ³	$L = 0.05mH$	E_{AR}	105	
Power Dissipation	$T_C = 25^\circ C$	P_D	50	W
	$T_C = 100^\circ C$		20	
Operating Junction & Storage Temperature Range		T_J, T_{stg}	-55 to 150	$^\circ C$

100% UIS testing in condition of $V_D = 25V, L = 0.1mH, V_G = 10V, I_L = 40A$, Rated $V_{DS} = 30V$ N-CH

THERMAL RESISTANCE RATINGS

THERMAL RESISTANCE	SYMBOL	TYPICAL	MAXIMUM	UNIT
Junction-to-Case	$R_{\theta JC}$		2.5	$^\circ C / W$
Junction-to-Ambient ⁴	$R_{\theta JA}$		50	

¹Pulse width limited by maximum junction temperature.

²Duty cycle $< 1\%$

³The 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 $T_A = 25^\circ C$.

⁴Guarantee by Engineering test

ELECTRICAL CHARACTERISTICS ($T_J = 25\text{ }^{\circ}\text{C}$, Unless Otherwise Noted)

PARAMETER	SYMBOL	TEST CONDITIONS	LIMITS			UNIT
			MIN	TYP	MAX	
STATIC						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 250\mu A$	30			V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	1	1.5	3	
Gate-Body Leakage	I_{GSS}	$V_{DS} = 0V, V_{GS} = \pm 20V$			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 24V, V_{GS} = 0V$			1	μA
		$V_{DS} = 20V, V_{GS} = 0V, T_J = 125\text{ }^{\circ}C$			25	
On-State Drain Current ¹	$I_{D(ON)}$	$V_{DS} = 10V, V_{GS} = 10V$	100			A
Drain-Source On-State Resistance ¹	$R_{DS(ON)}$	$V_{GS} = 10V, I_D = 25A$		2.0	2.3	m Ω
		$V_{GS} = 4.5V, I_D = 15A$		2.9	3.7	
Forward Transconductance ¹	g_{fs}	$V_{DS} = 5V, I_D = 25A$		70		S
DYNAMIC						
Input Capacitance	C_{iss}	$V_{GS} = 0V, V_{DS} = 15V, f = 1MHz$		3813		pF
Output Capacitance	C_{oss}			540		
Reverse Transfer Capacitance	C_{rss}			440		
Gate Resistance	R_g	$V_{GS} = 15mV, V_{DS} = 0V, f = 1MHz$		1.5		Ω
Total Gate Charge ^{1,2}	$Q_g(V_{GS}=10V)$	$V_{DS} = 15V, V_{GS} = 10V,$ $I_D = 25A$		59		nC
	$Q_g(V_{GS}=4.5V)$			28		
Gate-Source Charge ^{1,2}	Q_{gs}			13		
Gate-Drain Charge ^{1,2}	Q_{gd}			11		
Turn-On Delay Time ^{1,2}	$t_{d(on)}$	$V_{DS} = 15V,$ $I_D = 5A, V_{GS} = 10V, R_G = 3\Omega$		8.5		nS
Rise Time ^{1,2}	t_r			11.3		
Turn-Off Delay Time ^{1,2}	$t_{d(off)}$			55.1		
Fall Time ^{1,2}	t_f			28.3		
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS (T _c = 25 °C)						
Continuous Current ⁴	I_S				100	A
Pulsed Current ³	I_{SM}				400	
Forward Voltage ¹	V_{SD}	$I_F = 25A, V_{GS} = 0V$			1.2	V
Reverse Recovery Time	t_{rr}	$I_F = I_S, dI_F/dt = 100A / \mu S$		35		nS
Peak Reverse Recovery Current	$I_{RM(REC)}$			200		A
Reverse Recovery Charge	Q_{rr}			25		nC

¹Pulse test : Pulse Width $\leq 300 \mu\text{sec}$, Duty Cycle $\leq 2\%$.

²Independent of operating temperature.

³Pulse width limited by maximum junction temperature.

⁴Package Limited.

Ordering & Marking Information:

Device Name: EMP21N03HR for EDFN 5 x 6



→ P21N03R: Device Name

→ ABCDEFGH: Date Code

A: Assembly House

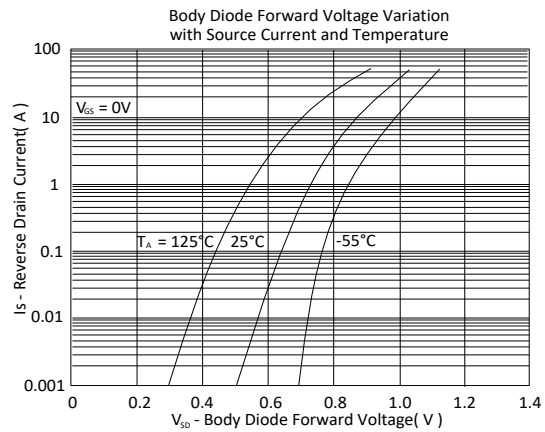
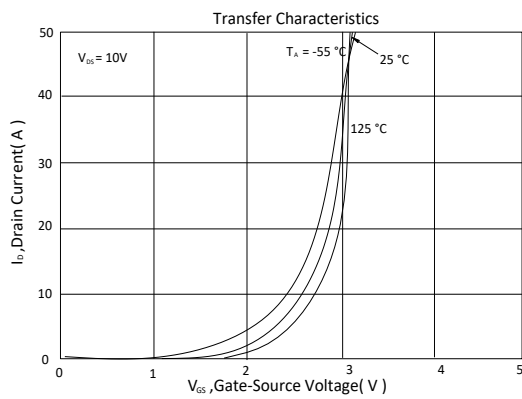
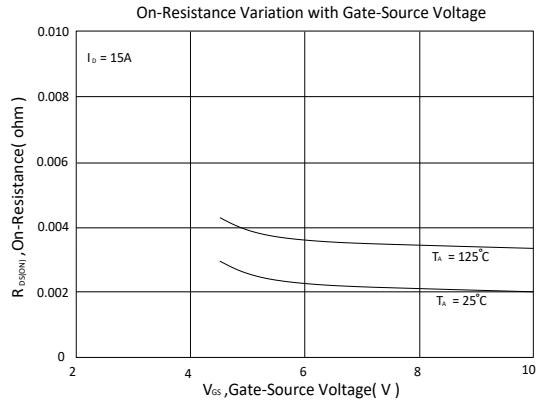
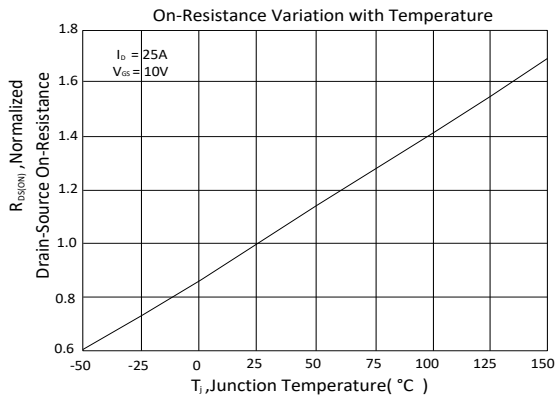
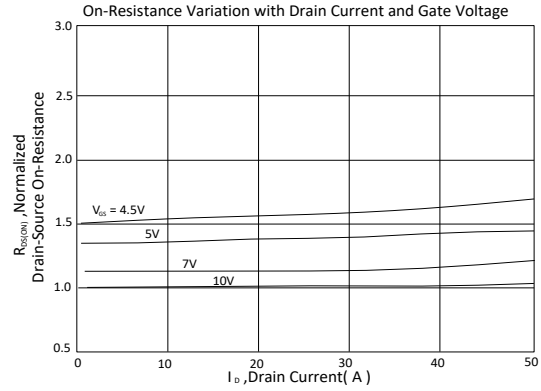
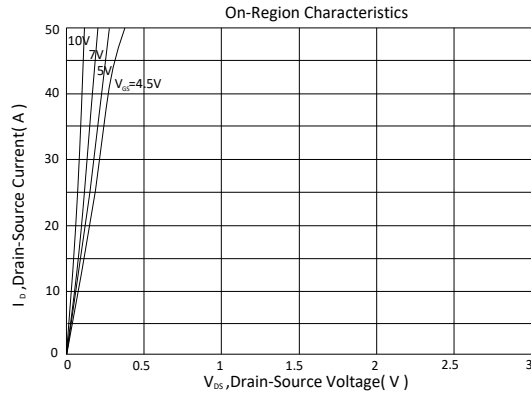
B: Year(A:2008 B:2009 C:2010....)

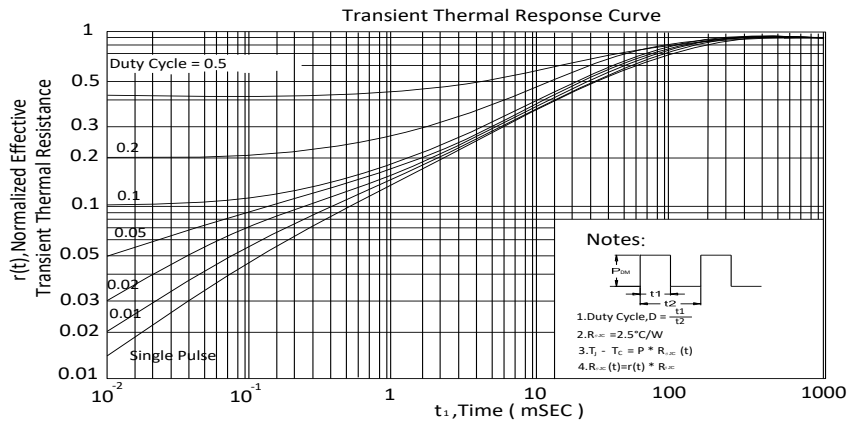
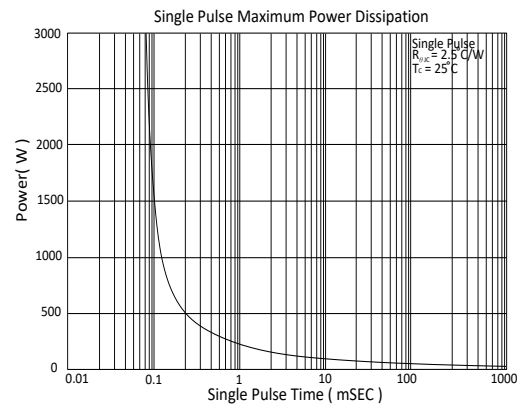
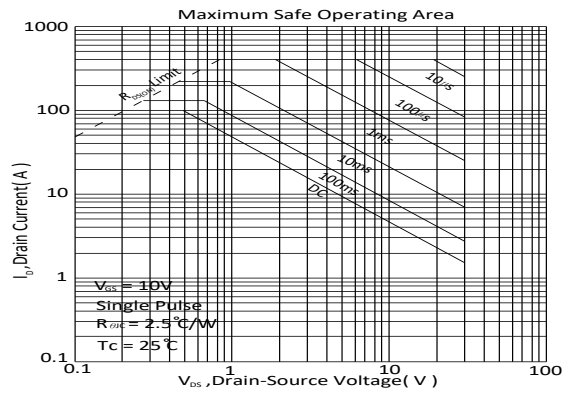
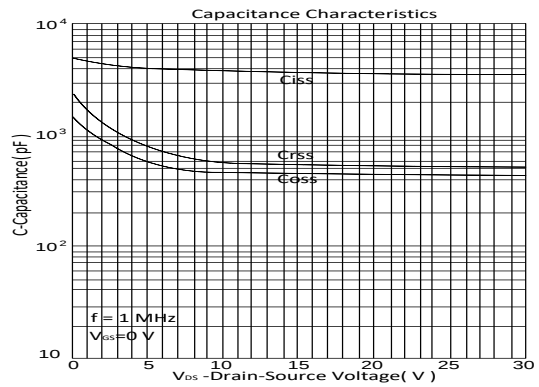
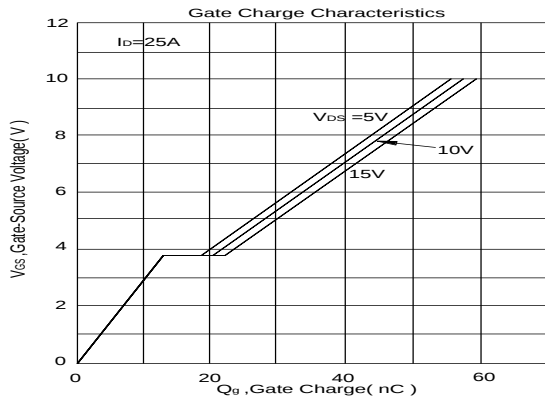
C: Month(A:01 B:02 C:03 D:04 E:05 F:06 G:07 H:08 I:09 J:10 K:11 L:12)

DEFG: Serial No.



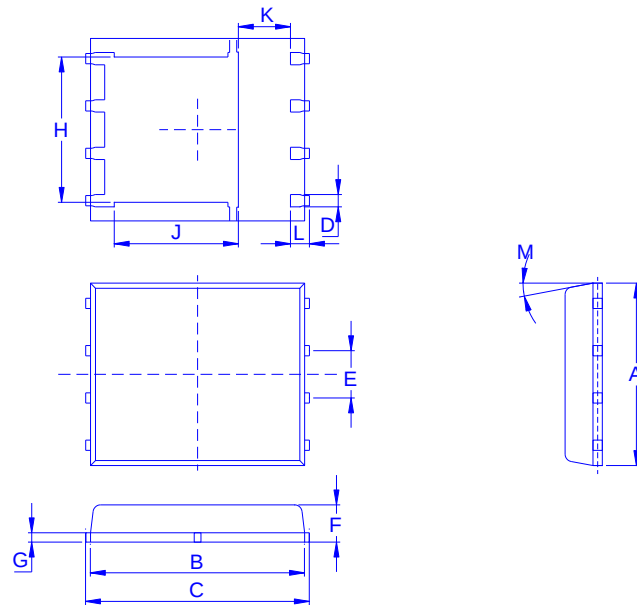
TYPICAL CHARACTERISTICS







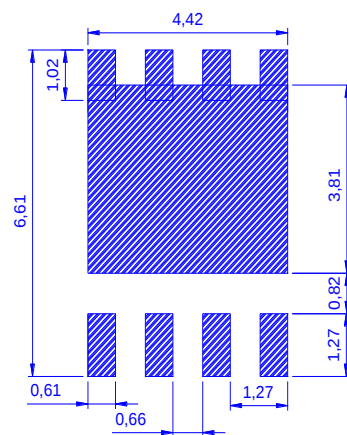
Outline Drawing



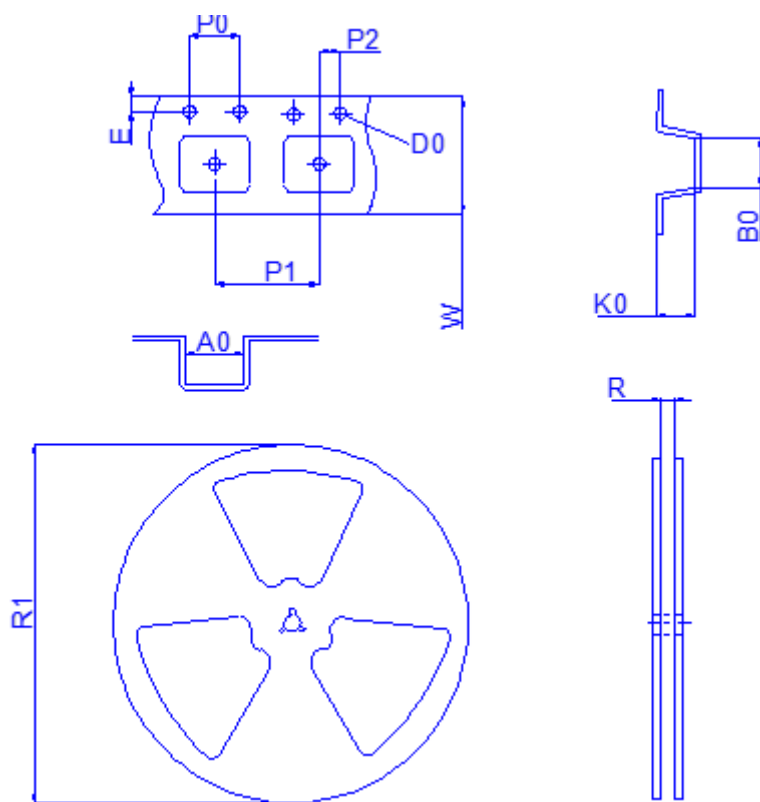
Dimension in mm

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

Recommended minimum pads



Tape&Reel Information:2500pcs/Reel



Package	EDFN5X6
Reel	13"
Device orientation	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	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