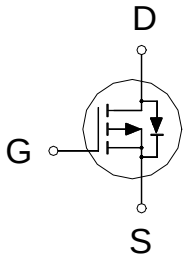
杰力科技股份有限公司
Excelliance MOS Corporation

EMFA0P02VAT

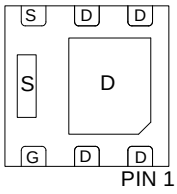
P-Channel Logic Level Enhancement Mode Field Effect Transistor

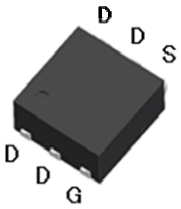
Product Summary:

BV_{DSS}	-20V
$R_{DSON\ (MAX.)}$	100mΩ
I_D	-3.4A



Bottom View





Pb-Free Lead Plating & Halogen Free

GP
GREEN PRODUCT

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

PARAMETERS/TEST CONDITIONS		SYMBOL	LIMITS	UNIT
Gate-Source Voltage		V_{GS}	±12	V
Continuous Drain Current	T_A = 25 °C	I_D	-3.4	A
	T_A = 70 °C		-2.4	
Pulsed Drain Current[1]		I_{DM}	-13.6	
Power Dissipation	T_A = 25 °C	P_D	2.08	W
	T_A = 70 °C		1.33	
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	$R_{\theta JC}$		20	°C / W
Junction-to-Ambient[3]	$R_{\theta JA}$		60	

[1]Pulse width limited by maximum junction temperature.

[2]Duty cycle ≤ 1%

[3]60°C / W when mounted on a 1 in^2 pad of 2 oz copper.

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	-20			V
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = -250μA	-0.3	-0.75	-1.2	
Gate-Body Leakage	I_{GSS}	V_{DS} = 0V, V_{GS} = ±12V			±100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = -16V, V_{GS} = 0V			-1	μA
		V_{DS} = -16V, V_{GS} = 0V, T_J = 125 °C			-10	
On-State Drain Current[1]	$I_{D(ON)}$	V_{DS} = -5V, V_{GS} = -4.5V	-3.4			A
Drain-Source On-State Resistance[1]	$R_{DS(ON)}$	V_{GS} = -4.5V, I_D = -3.4A		83	100	mΩ
		V_{GS} = -2.5V, I_D = -2.5A		110	135	
Forward Transconductance[1]	g_{fs}	V_{DS} = -5V, I_D = -3A		4.5		S
DYNAMIC						
Input Capacitance	C_{iss}	V_{GS} = 0V, V_{DS} = -10V, f = 1MHz		450		pF
Output Capacitance	C_{oss}			58		
Reverse Transfer Capacitance	C_{rss}			41		
Total Gate Charge[1,2]	Q_g	V_{DS} = -10V, V_{GS} = -4.5V, I_D = -3A		5.4		nC
Gate-Source Charge[1,2]	Q_{gs}			1.0		
Gate-Drain Charge[1,2]	Q_{gd}			1.3		
Turn-On Delay Time[1,2]	$t_{d(on)}$	V_{DS} = -10V, I_D = -1A, V_{GS} = -4.5V, R_{GS} = 6Ω		10		nS
Rise Time[1,2]	t_r			20		
Turn-Off Delay Time[1,2]	$t_{d(off)}$			15		
Fall Time[1,2]	t_f			12		
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS (T_C = 25 °C)						
Continuous Current	I_S				-3.4	A
Pulsed Current[3]	I_{SM}				-13.6	
Forward Voltage[1]	V_{SD}	I_F = I_S, V_{GS} = 0V			-1.2	V

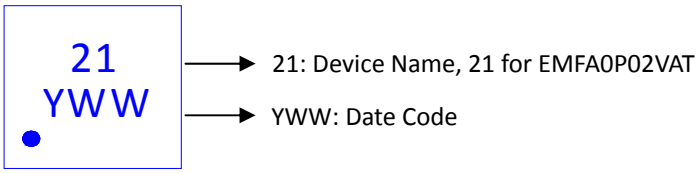
[1]Pulse test : Pulse Width ≤ 300 μsec, Duty Cycle ≤ 2%.

[2]Independent of operating temperature.

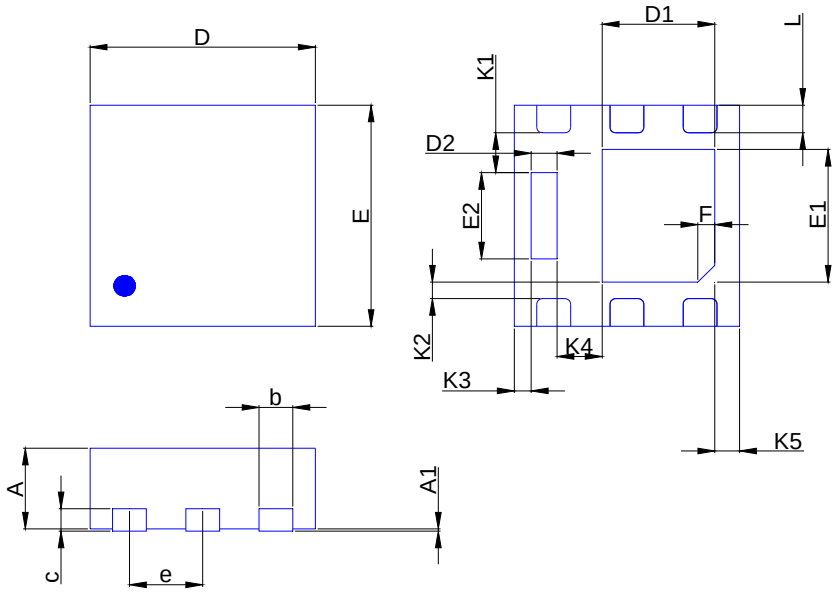
[3]Pulse width limited by maximum junction temperature.

Ordering & Marking Information:

Device Name: EMFA0P02VAT for EDFN 2 x 2



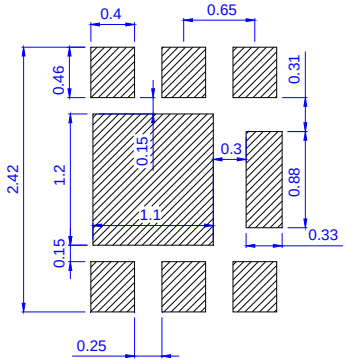
Outline Drawing



Dimension in mm

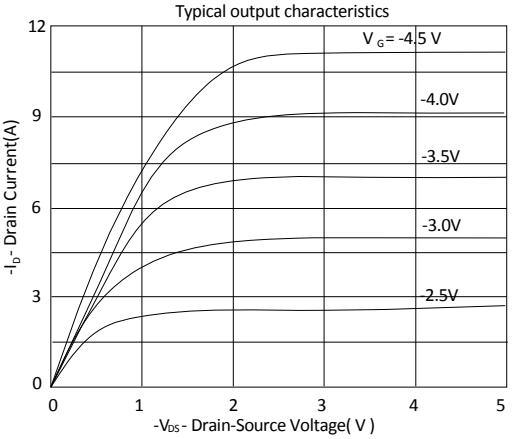
Dimension	A	A1	b	c	D	D1	D2	E	E1	E2	e	F	f	K1	K2	L	K3	K4	K5
Min.	0.50	0.00	0.25		1.9	1.0	0.13	1.9	1.1	0.65				0.306	0.10	0.2	0.10	0.27	0.17
Typ.		0.02	0.30	0.1	2.0	1.1	0.25	2.0	1.2	0.75	0.65	0.15	45°	0.356	0.15	0.25	0.15		0.22
Max.	0.65	0.05	0.35		2.1	1.2	0.35	2.1	1.3	0.88				0.406	0.20	0.3	0.20		0.27

Recommended minimum pads

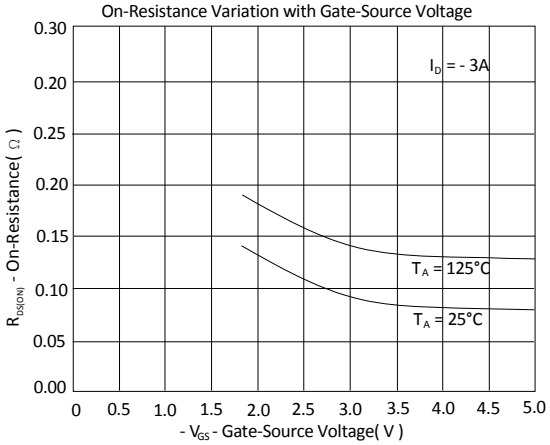


TYPICAL CHARACTERISTICS

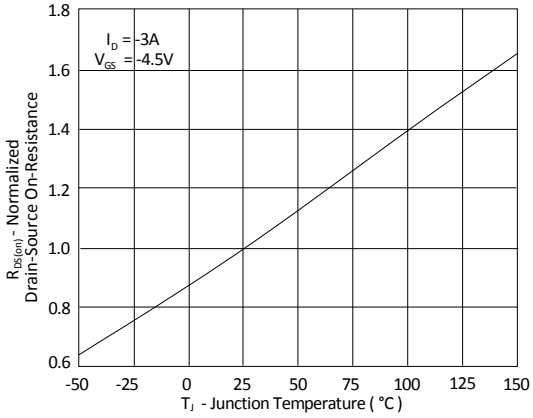
Typical output characteristics



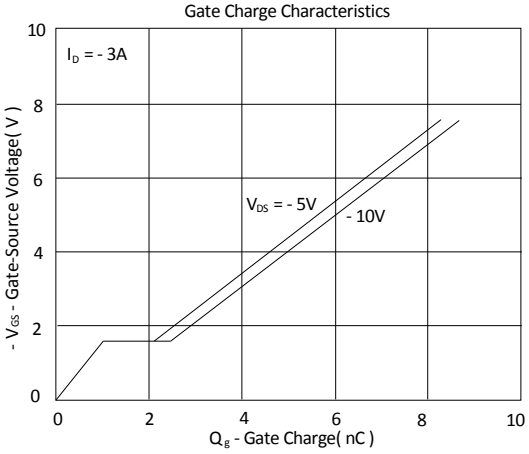
On-Resistance Variation with Gate-Source Voltage



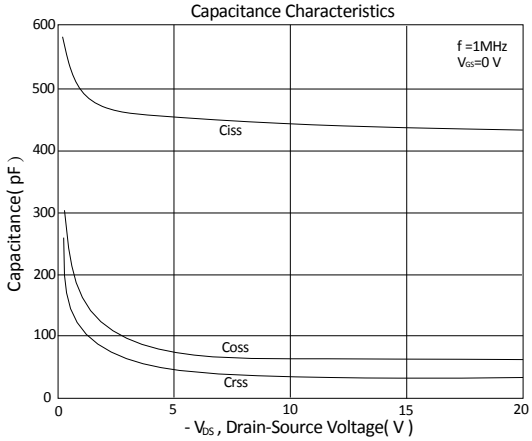
Normalized on-Resistance v.s. Junction Temperature



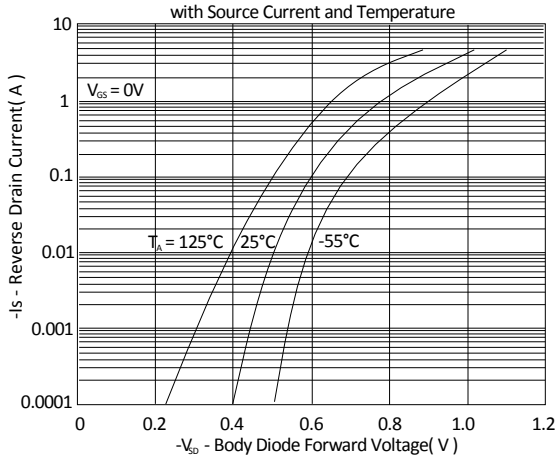
Gate Charge Characteristics

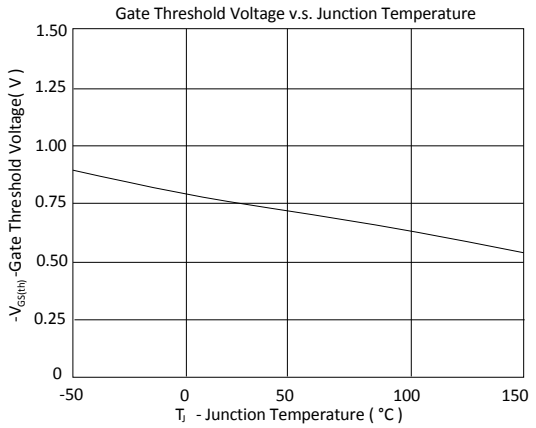


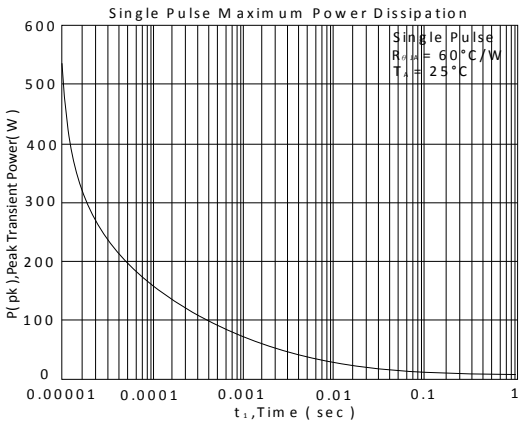
Capacitance Characteristics

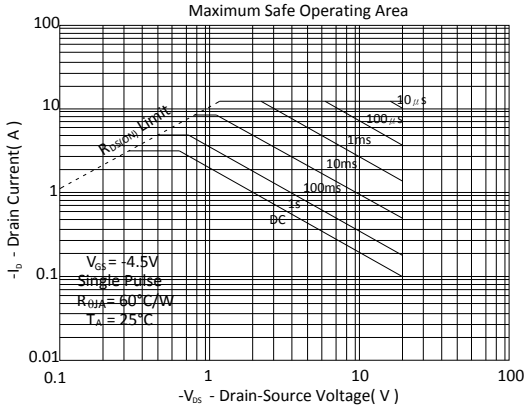


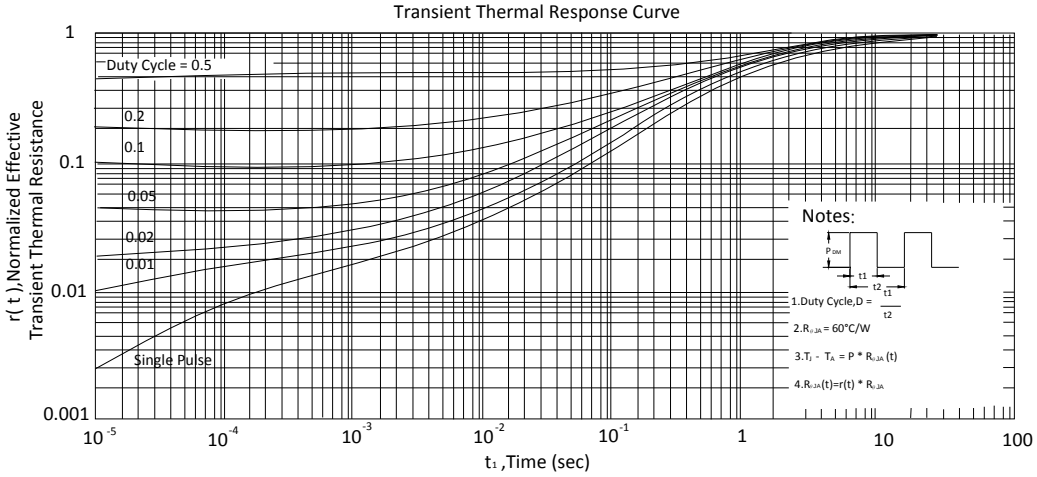
Body Diode Forward Voltage Variation
with Source Current and Temperature




Gate Threshold Voltage v.s. Junction Temperature
-VGS(th) -Gate Threshold Voltage(V)
1.50
1.25
1.00
0.75
0.50
0.25
0
-50
0
50
100
150
TJ - Junction Temperature (°C)


Single Pulse Maximum Power Dissipation
Single Pulse
RθJA = 60°C/W
TA = 25°C
P(pk),Peak Transient Power(W)
600
500
400
300
200
100
0
0.00001
0.0001
0.001
0.01
0.1
1
t1 ,Time (sec)


Maximum Safe Operating Area
-ID - Drain Current(A)
100
10
1
0.1
0.01
0.1
1
10
100
-VDS - Drain-Source Voltage(V)
RDS(ON) Limit
10μs
100μs
1ms
10ms
100ms
1s
DC
VGS = -4.5V
Single Pulse
RθJA = 60°C/W
TA = 25°C


Transient Thermal Response Curve
r(t),Normalized Effective Transient Thermal Resistance
1
0.1
0.01
0.001
Duty Cycle = 0.5
0.2
0.1
0.05
0.02
0.01
Single Pulse
Notes:
1.Duty Cycle,D = t1/t2
2.RθJA = 60°C/W
3.TJ - TA = P * RθJA (t)
4.RθJA(t)=r(t) * RθJA
10-5
10-4
10-3
10-2
10-1
1
10
100
t1 ,Time (sec)