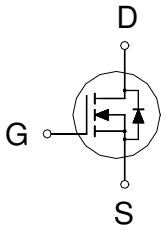
N-Channel Logic Level Enhancement Mode Field Effect Transistor

Product Summary:

BV_{DSS}	20V
$R_{DSON\ (MAX.)}$	20mΩ
I_D	6A



Pb-Free Lead Plating & Halogen Free

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	6	A
	T_A = 70 °C		4	
Pulsed Drain Current[1]		I_{DM}	24	
Power Dissipation	T_A = 25 °C	P_D	1.25	W
	T_A = 70 °C		0.8	
Operating Junction & Storage Temperature Range		T_j, T_{stg}	-55 to 150	°C

THERMAL RESISTANCE RATINGS

THERMAL RESISTANCE	SYMBOL	TYPICAL	MAXIMUM	UNIT
Junction-to-Ambient[3]	$R_{\theta JA}$		100	°C / W
Junction-to-Lead[4]	$R_{\theta JL}$		55	

[1]Pulse width limited by maximum junction temperature.

[2]Duty cycle ≤ 1%

[3]100°C / W when mounted on a 1 in^2 pad of 2 oz copper.

[4] $R_{\theta JA}$ is the sum of the thermal impedance from junction to lead $R_{\theta JL}$ and lead to ambient.

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	0.35	0.65	1.0	
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	6			A
Drain-Source On-State Resistance[1]	$R_{DS(ON)}$	V_{GS} = 4.5V, I_D = 6A		17	20	mΩ
		V_{GS} = 2.5V, I_D = 5A		20	25	
Forward Transconductance[1]	g_{fs}	V_{DS} = 5V, I_D = 6A		7		S
DYNAMIC						
Input Capacitance	C_{iss}	V_{GS} = 0V, V_{DS} = 10V, f = 1MHz		560		pF
Output Capacitance	C_{oss}			166		
Reverse Transfer Capacitance	C_{rss}			150		
Total Gate Charge[1,2]	Q_g	V_{DS} = 10V, V_{GS} = 4.5V, I_D = 6A		8.5		nC
Gate-Source Charge[1,2]	Q_{gs}			1.5		
Gate-Drain Charge[1,2]	Q_{gd}			3.5		
Turn-On Delay Time[1,2]	$t_{d(on)}$	V_{DS} = 10V, I_D = 1A, V_{GS} = 4.5V, R_{GS} = 6Ω		12		nS
Rise Time[1,2]	t_r			15		
Turn-Off Delay Time[1,2]	$t_{d(off)}$			30		
Fall Time[1,2]	t_f			15		
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS (T_C = 25 °C)						
Continuous Current	I_S				2	A
Pulsed Current[3]	I_{SM}				8	
Forward Voltage[1]	V_{SD}	I_F = I_S, V_{GS} = 0V			1.2	V

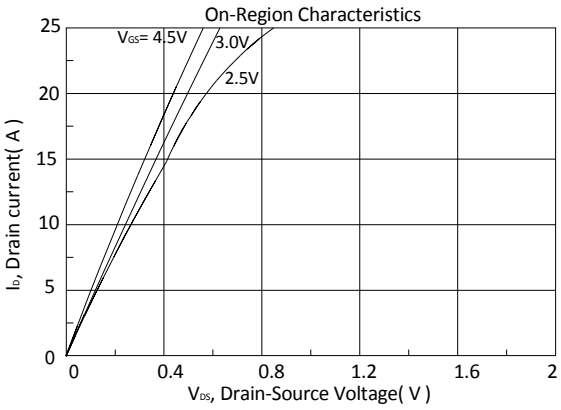
[1]Pulse test : Pulse Width ≤ 300 μsec, Duty Cycle ≤ 2%.

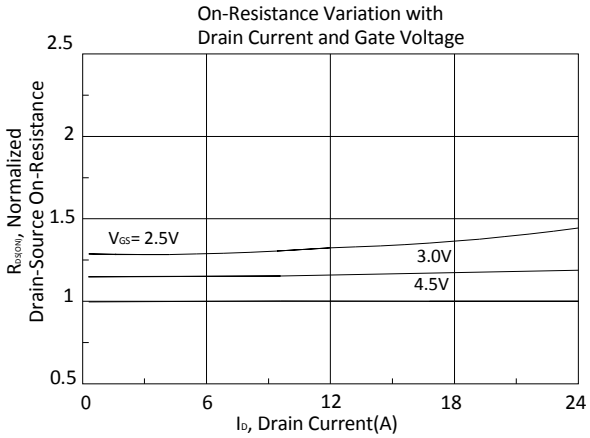
[2]Independent of operating temperature.

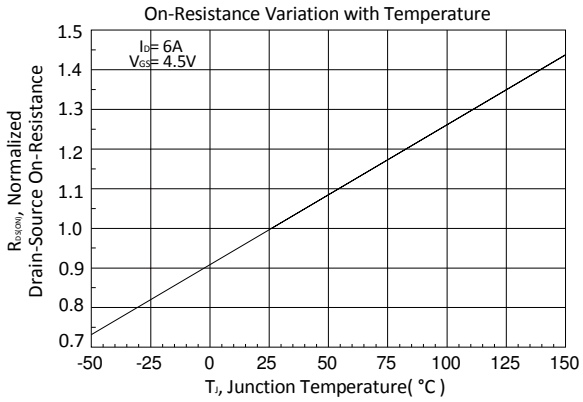
[3]Pulse width limited by maximum junction temperature.

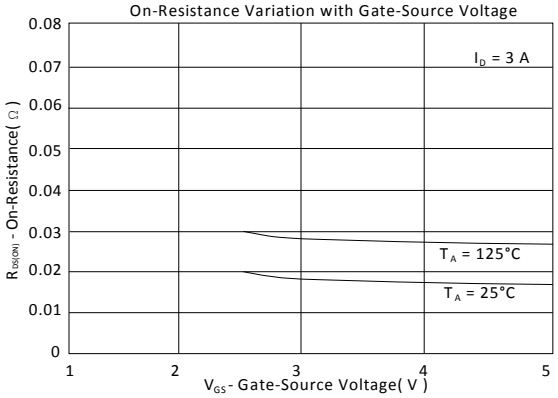
EMC will review datasheet by quarter, and update new version.

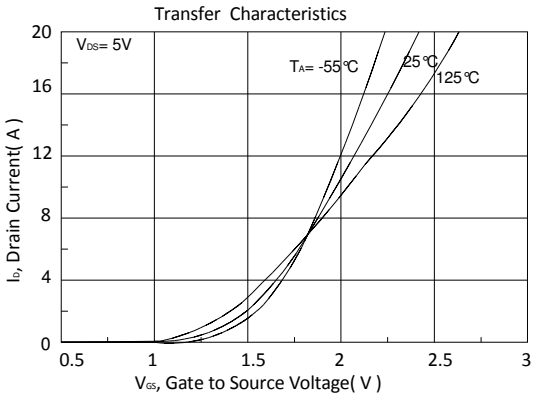
TYPICAL CHARACTERISTICS

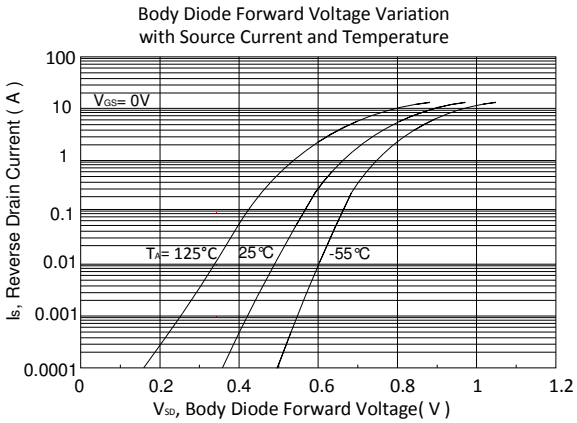


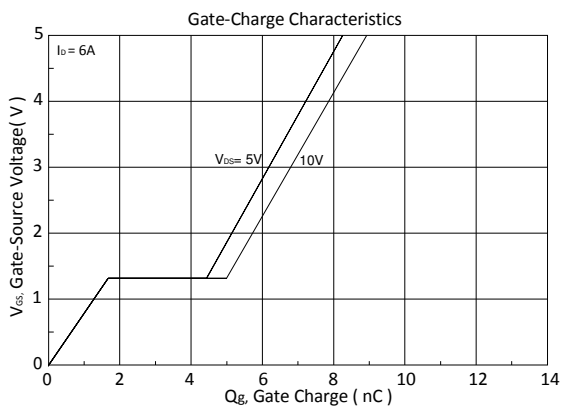


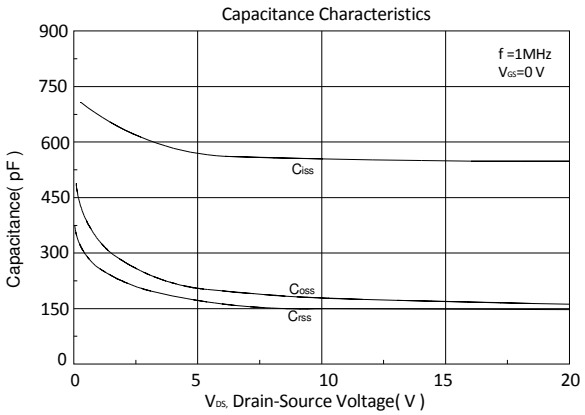


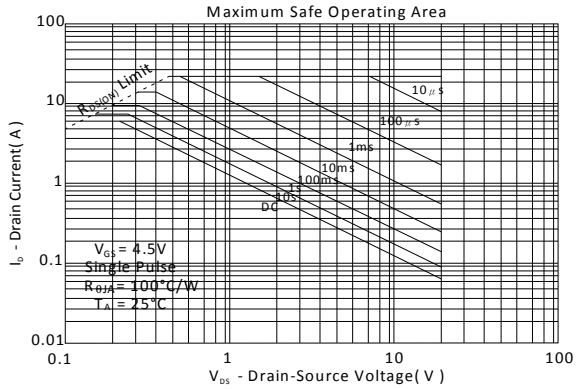


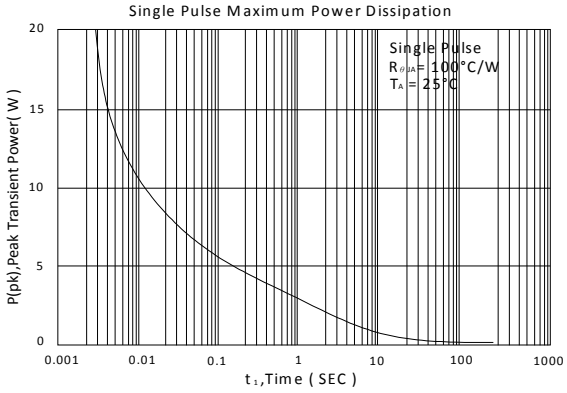


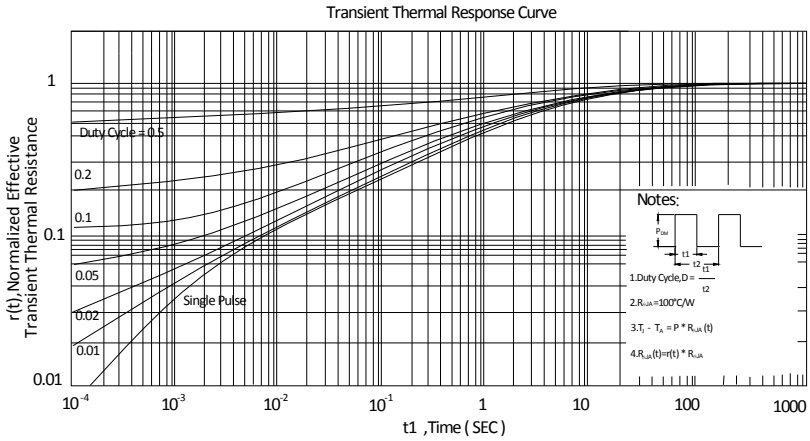



Gate-Charge Characteristics
I_D = 6A
V_DS= 5V
10V
V_GS, Gate-Source Voltage(V)
Qg, Gate Charge (nC)


Capacitance Characteristics
f =1MHz
V_GS=0 V
Ciss
Coss
Crss
Capacitance(pF)
V_DS, Drain-Source Voltage(V)

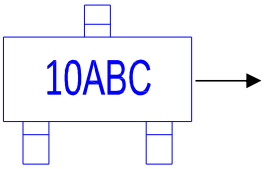

Maximum Safe Operating Area
R_DS(on) Limit
10μs
100μs
1ms
10ms
100ms
1s
DC
V_GS = 4.5V
Single Pulse
R_θJA= 100°C/W
T_A = 25°C
I_D - Drain Current(A)
V_DS - Drain-Source Voltage(V)


Single Pulse Maximum Power Dissipation
Single Pulse
R_θJA= 100°C/W
T_A = 25°C
P(pk),Peak Transient Power(W)
t 1 ,Time (SEC)


Transient Thermal Response Curve
Duty Cycle = 0.5
0.2
0.1
0.05
0.02
0.01
Single Pulse
Notes:
1.Duty Cycle,D = t1/t2
2.R_θJA=100°C/W
3.T_J - T_A = P * R_θJA (t)
4.R_θJA(t)=r(t) * R_θJA
r(t),Normalized Effective Transient Thermal Resistance
t1 ,Time (SEC)

Ordering & Marking Information:

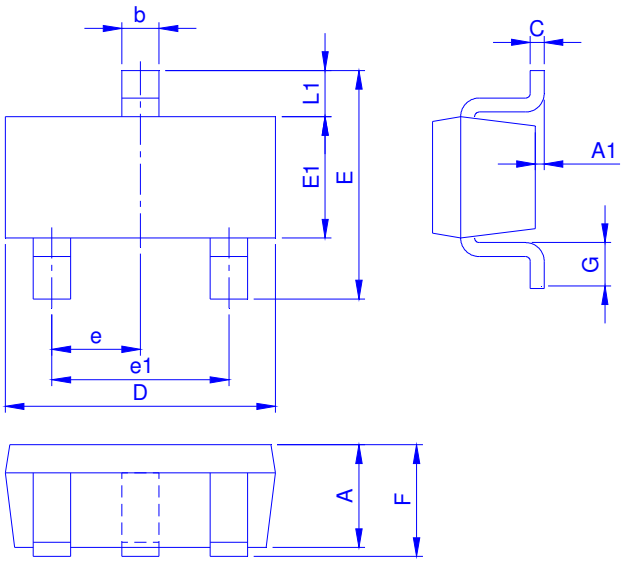
Device Name: EMF20N02J for SOT23-3



10: Device Code, 10 for EMF20N02J

ABC: Date Code

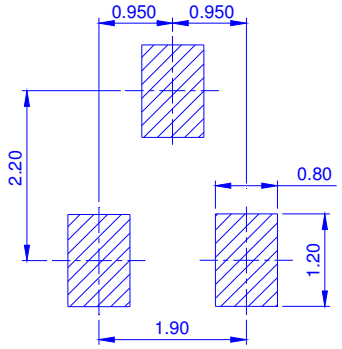
Outline Drawing



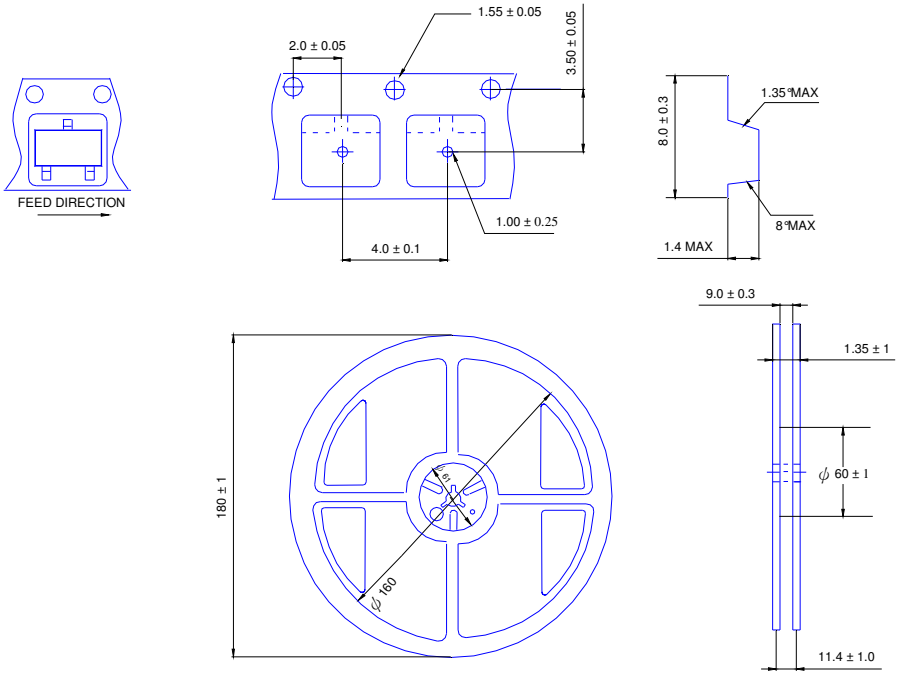
Dimension in mm

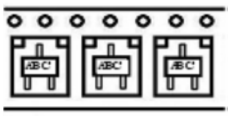
Dimension	A	A1	b	C	D	E	E1	e	e1	F	G	L1
Min.	0.70	-	0.30	0.080	2.80	2.10	1.20	0.90	1.80	0.80	0.30	0.54
Typ.	0.95	-	0.40	0.127	2.90	2.50	1.30	0.95	1.90	0.95	0.40	0.57
Max.	1.20	0.15	0.50	0.202	3.10	3.00	1.80	1.00	2.00	1.25	0.60	0.70

Footprint



◆ Tape&Reel Information:3000pcs/Reel



產品別	SOT23-3
Reel 尺寸	7”
編帶方式	FEED DIRECTION 
前空格	50
後空格	50
裝箱數	
滿捲數量	3K
捲/內盒比	5：1
內盒滿箱數	15K
內/外箱比	12：1
外箱滿箱數	180K