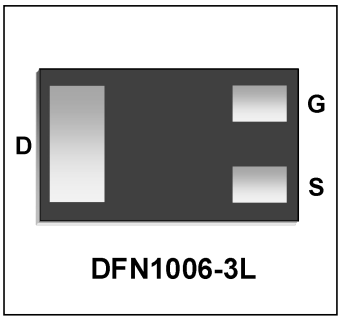
ETEK Microelectronics

EM03N09FX

N-Channel Trench MOSFET

Features

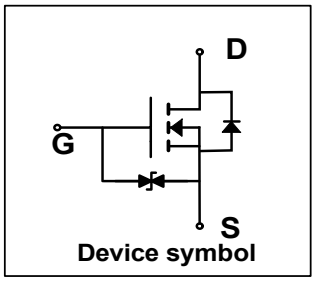


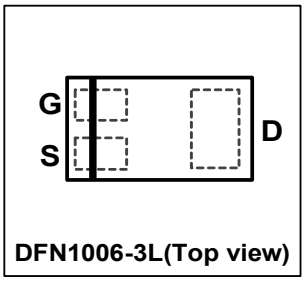
- V_{DS}= 30 V, I_D = 0.93 A
  $R_{DS(on)}$ < 0.50 Ω @ V_{GS} = 4.5 V
  $R_{DS(on)}$ < 0.60 Ω @ V_{GS} = 2.5 V
- Very Fast Switching
- Trench MOSFET Technology
- Low Threshold Voltage
- Pb Free Device
- ESD Protected
- MSL1

Mechanical Characteristics

- DFN1006-3L Package
- Marking : Making Code
- RoHS Compliant

Schematic & PIN Configuration





Absolute Maximum Rating

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	30	V
Continuous Drain Current [1]	I_D	930	mA
Gate-Source Voltage	V_{GS}	±12	V
Power Dissipation [1]	P_D	715	mW
Pulsed Drain Current (tp = 10 μs)	I_{DM}	3.7	A
Operating Junction and Storage Temperature Range	T_J , T_{STG}	-55 to +150	°C
Junction−to−Ambient − Steady State[1]	$R_{\theta JA}$	305	°C/W

Electrical Characteristics (T_{amb}=25°C unless otherwise noted)

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0 V, I_D= 250μA	30	-	-	V
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=250μA	0.5	1.0	1.5	V
Drain Cut-off Current	I_{DSS}	V_{DS}=30 V, V_{GS}=0 V	-	-	1	μA
Gate leakage Current	I_{GSS}	V_{GS}=±10 V, V_{DS}=0 V	-	-	±10	μA
Drain-Source on-state Resistance[2]	$R_{DS(on)}$	V_{GS}=4.5 V, I_D=0.6A	-	0.32	0.50	Ω
		V_{GS}=2.5 V, I_D=0.3A	-	0.41	0.60	
Dynamic characteristics						
Input Capacitance	C_{iss}	V_{DS}= 25 V, V_{GS}= 0 V, f = 1 MHz	-	37	-	pF
Output Capacitance	C_{oss}		-	8.6	-	
Reverse Transfer Capacitance	C_{rss}		-	5.4	-	
Switching Characteristics						
Total Gate Charge	Q_g	V_{DS}= 15 V, V_{GS}= 4.5 V, I_D = 1.0 A	-	0.65	-	nC
Gate-Source Charge	Q_{gs}		-	0.14	-	
Gate-Drain Charge	Q_{gd}		-	0.18	-	
Turn-on Delay Time	$t_{d(on)}$	V_{DS} = 15V, V_{GEN}=4.5V, R_G = 6Ω, R_L = 15Ω	-	6.5	-	ns
Rise Time	t_r		-	9.5	-	
Turn-off Delay Time	$t_{d(off)}$		-	14	-	
Fall Time	t_f		-	5.5	-	
Drain-Source Body Diode Characteristics						
Diode Forward Voltage[2]	V_{SD}	I_S = 0.6A, V_{GS} = 0V	-	-	1.2	V

Note:

1: Surface−mounted on FR4 board using 1 in sq pad size (Cu area = 1.127 in sq [1 oz] including traces)

2: Pulse Test: Pulse Width ≤300μs, Duty Cycle ≤2%.

Typical Characteristics

Figure 1. Output Characteristics

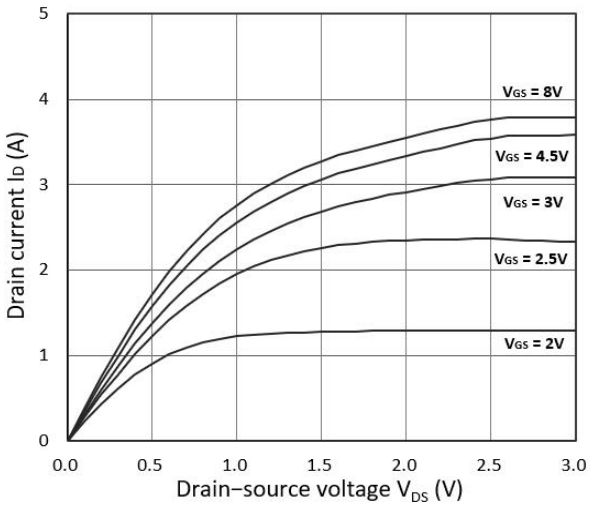


Figure 2. Transfer Characteristics

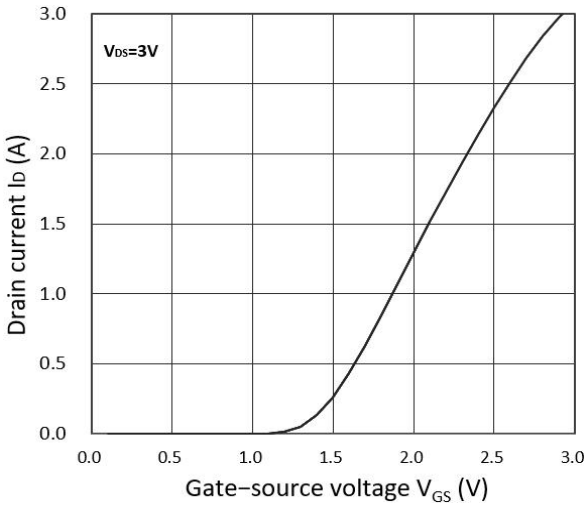


Figure 3. $R_{DS(on)}$ vs. I_D

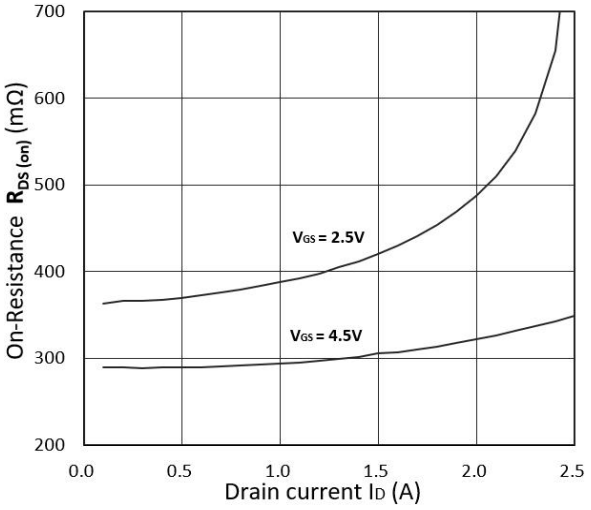


Figure 4. $R_{DS(on)}$ vs. V_{GS}

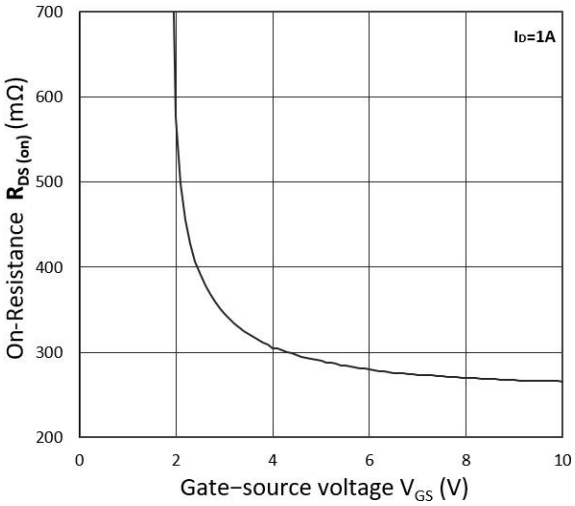


Figure 5. I_S vs. V_{SD}

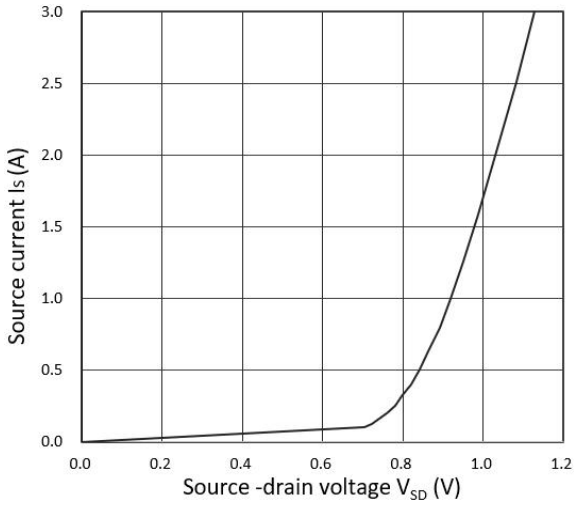
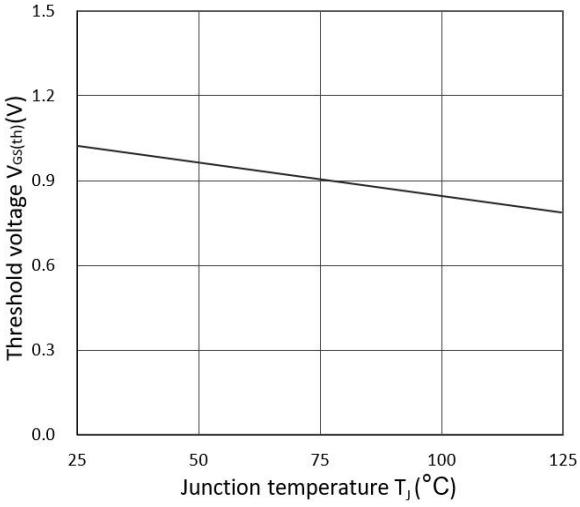
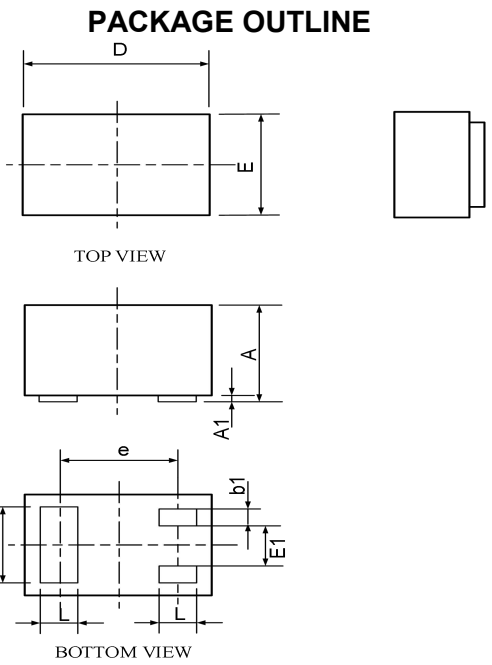


Figure 6. $V_{GS(th)}$ vs.T_J



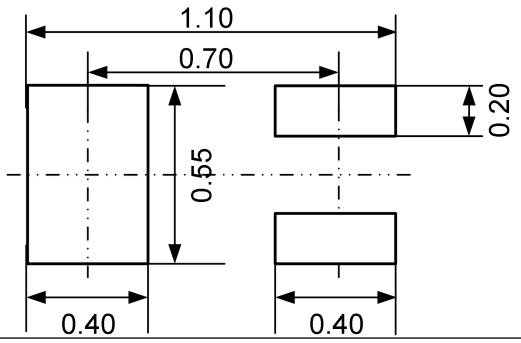
Outline Drawing – DFN1006-3L



DFN1006-3L

SYMBOL	MILLIMETER		
	MIN.	TYP.	MAX.
A	0.45	0.50	0.55
A1	0.00	-	0.05
b	0.40	0.50	0.60
b1	0.10	0.15	0.20
D	0.95	1.00	1.05
e	0.65BSC		
E	0.55	0.60	0.65
E1	0.19BSC		
L	0.20	0.25	0.30

Land Pattern



Marking Codes

Part Number	EM03N09FX
Marking Code	N5

Package Information

Qty：10k/Reel

Revision History

No.	Version	Date	Revision Item	Request	Function and characteristic checking	Package dimension checking	Typos checking
1	1.0	2018-05-24	Released Version	Qi Shu Kun	Yin Peng	Ge Zheng Bing	Liu Jia Ying