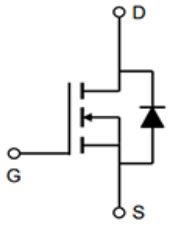
EFMICRO
Semiconductor Limited Company

EFM3N10

N-Channel Advanced Power MOSFET

• Product Summary

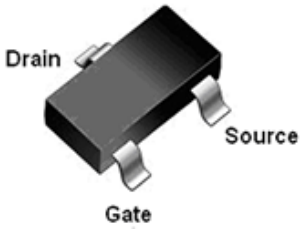
Part #	V_{DS}	$R_{DS(on).typ}$ ($@V_{GS}$=10V)	$R_{DS(on).typ}$ ($@V_{GS}$=4.5V)	I_D
EFM3N10	100V	190mΩ	200mΩ	3A



N-Channel MOSFET

• Features

- *Low $R_{DS(on)}$ @V_{GS}=10V*
- *4.5V Logic Level Control*
- *N Channel SOT23 Package*
- *Pb−Free, RoHS Compliant*



SOT-23

RoHS

HF

•Application

- Power switching application
- Hard switched and high frequency circuits
- Uninterruptible power supply

•Ordering Information:

Part NO.	EFM3N10
Marking	3N10
Packing Information	REEL TAPE
Basic ordering unit (pcs)	3000

•Absolute Maximum Ratings (T_C=25℃)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	100	V
Gate-Source Voltage	V_{GS}	±20	V
Drain Current-Continuous	I_D	3	A
Drain Current-Pulsed (Note 1)	I_{DM}	12	A
Maximum Power Dissipation	P_D	1.25	W
Operating Junction and Storage Temperature Range	T_J,T_{STG}	-55 To 150	℃

•Thermal Characteristic

Thermal Resistance,Junction-to-Ambient (Note 2)	$R_{\theta JA}$	100	℃/W

● Static Electrical Characteristics @ T_J = 25°C (unless otherwise stated)

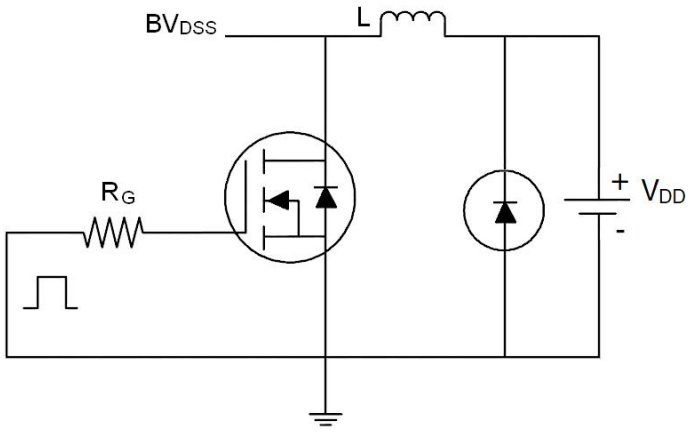
Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V I_D=250uA	100	--	--	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=100VV_{GS}=0V	--	--	1	μA
Gate-Body Leakage Current	I_{GSS}	V_{GS}=±20V V_{DS}=0V	--	--	±100	nA
On Characteristics (Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS} I_D=250uA	1.0	1.6	2.5	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=10V I_D=3A	--	190	220	mΩ
		V_{GS}=4.5V I_D=2A	--	200	240	mΩ
Dynamic Characteristics (Note4)						
Input Capacitance	C_{lss}	V_{DS}=50V V_{GS}=0V F=1.0MHz	--	360	--	PF
Output Capacitance	C_{oss}		--	25	--	PF
Reverse Transfer Capacitance	C_{rss}		--	13	--	PF
Forward Transconductance	g_{FS}	V_{DS}=5V,I_D=2A	1	--	--	S
Switching Characteristics (Note 4)						
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=50V R_L=25Ω V_{GS}=10V R_G=1Ω,	--	6	--	nS
Turn-on Rise Time	t_r		--	10	--	nS
Turn-Off Delay Time	$t_{d(off)}$		--	12	--	nS
Turn-Off Fall Time	t_f		--	8	--	nS
Total Gate Charge	Q_g	V_{DS}=50V I_D=2A V_{GS}=10V	--	12	--	nC
Gate-Source Charge	Q_{gs}		--	1.8	--	nC
Gate-Drain Charge	Q_{gd}		--	2.9	--	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage (Note 3)	V_{SD}	V_{GS}=0V I_S=2A	--	0.79	1.2	V
Diode Forward Current (Note 2)	I_S		--	--	2	A

Notes:

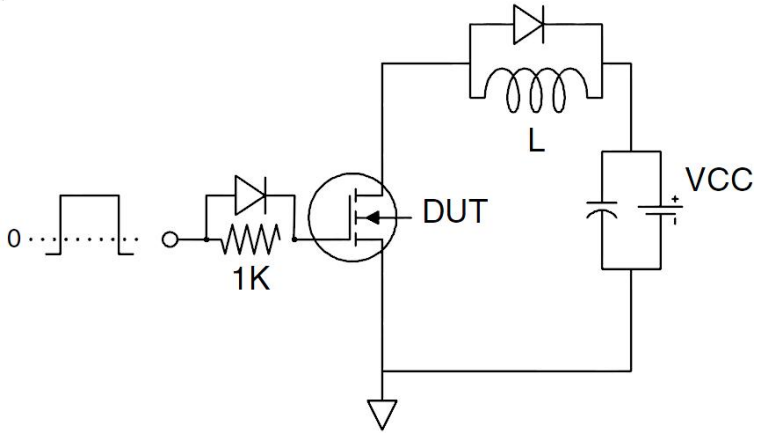
1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, t ≤ 10 sec.
3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
4. Guaranteed by design, not subject to production
5.EAS condition : Tj=25℃,V_{DD}=50V,V_G=10V,L=0.5mH,Rg=25Ω

• Test Circuit

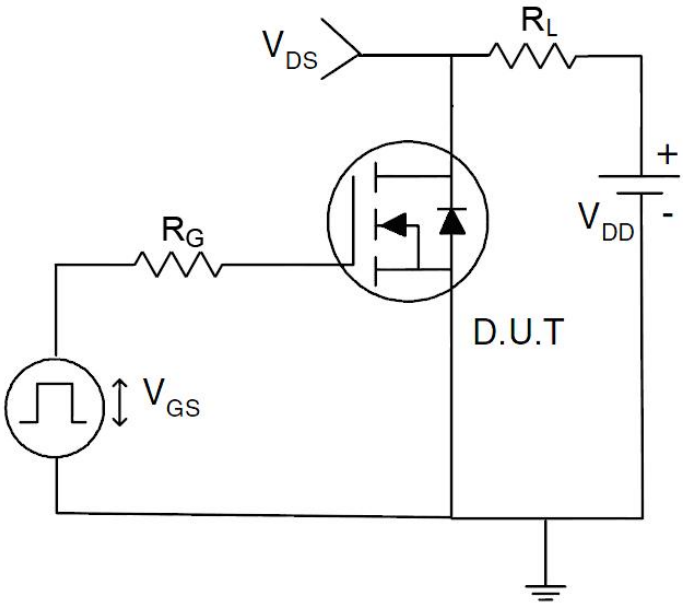
1）E_{AS} test circuit



2）Gate charge test circuit



3）Switch Time Test Circuit



• Typical Characteristics

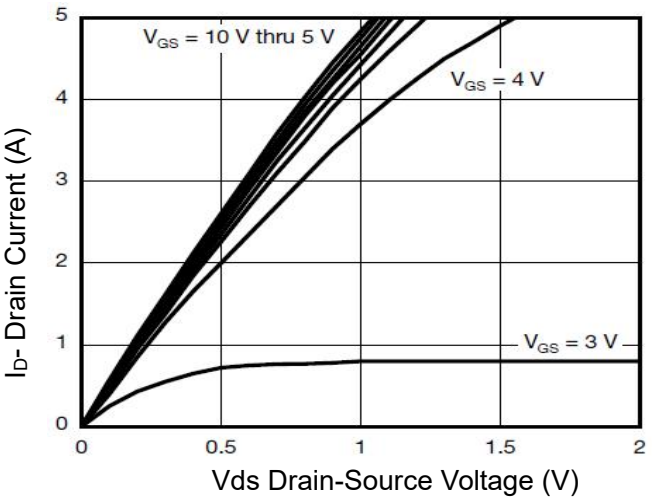


Figure 1 Output Characteristics

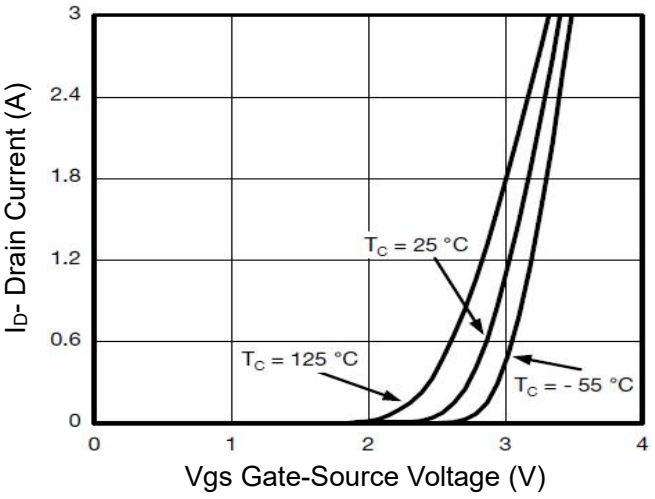


Figure 2 Transfer Characteristics

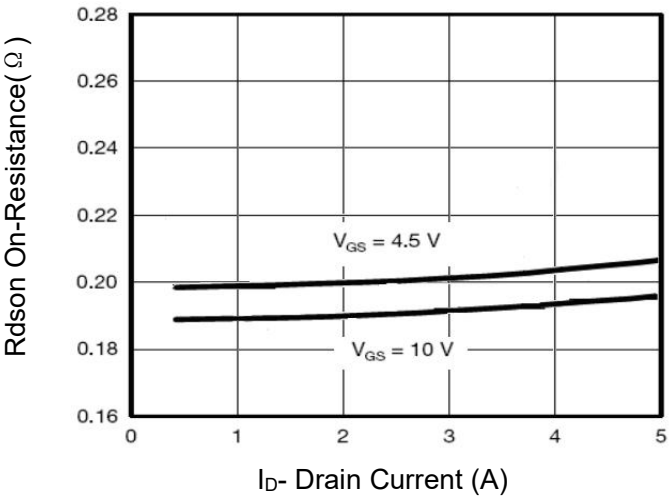


Figure 3 Rdson- Drain Current

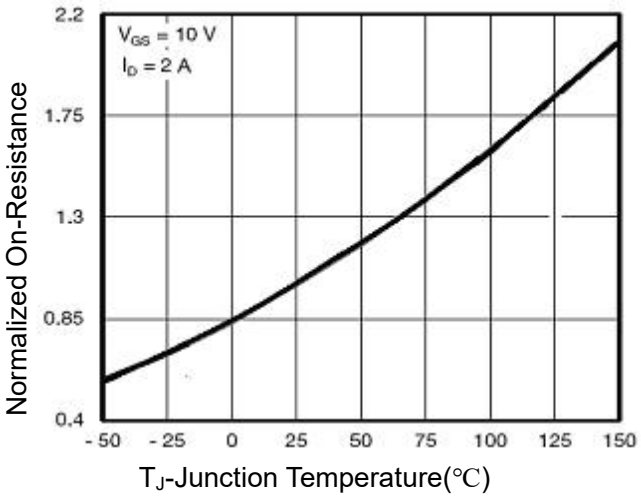


Figure 4 Rdson-JunctionTemperature

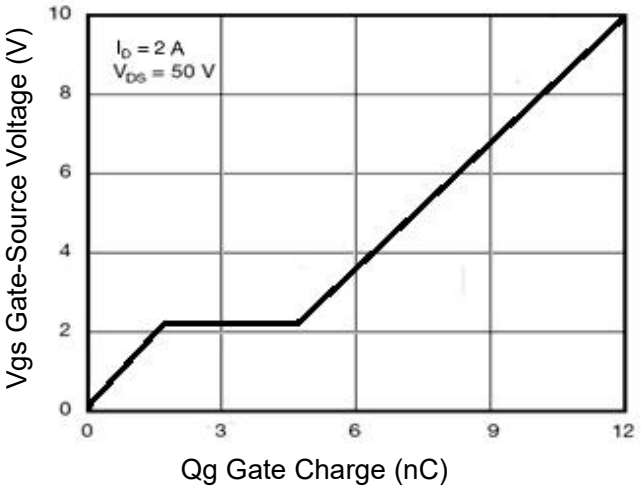


Figure 5 Gate Charge

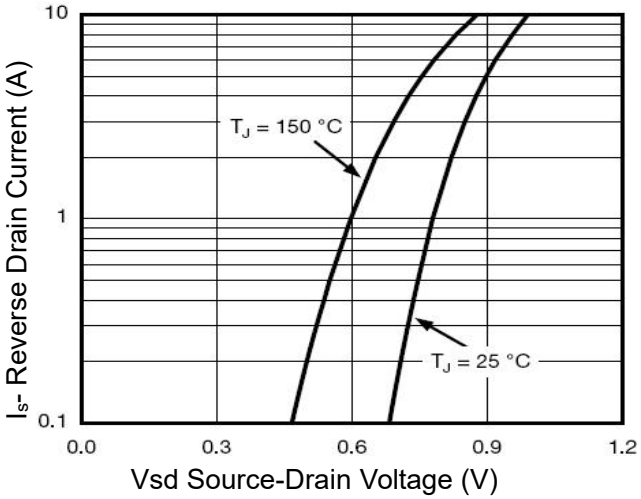


Figure 6 Source- Drain Diode Forward

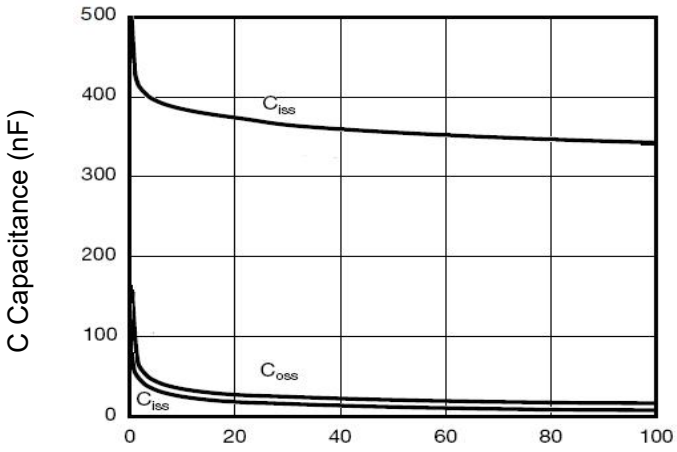


Figure 7 Capacitance vs Vds

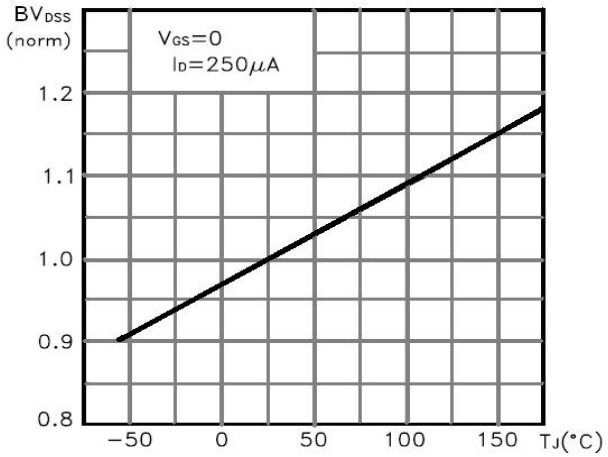


Figure 9 BV_{DSS} vs Junction Temperature

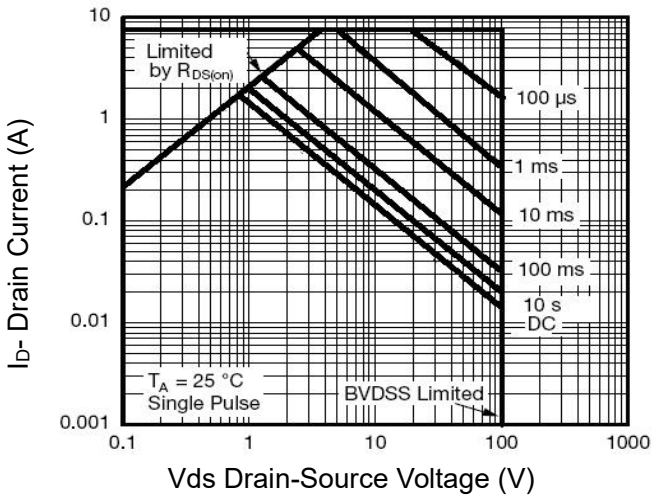


Figure 8 Safe Operation Area

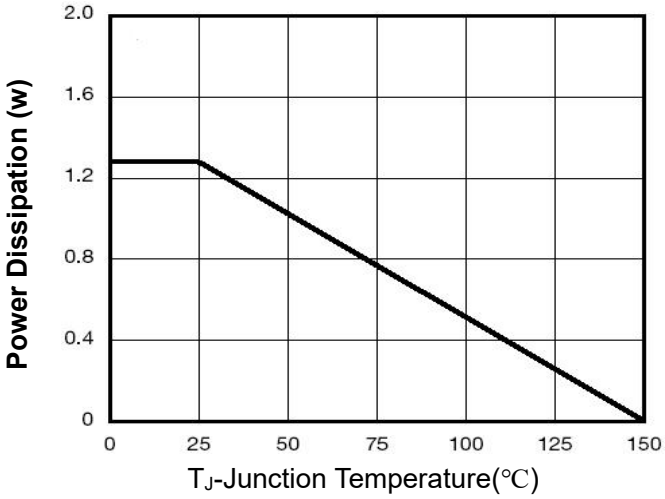


Figure 10 Power De-rati

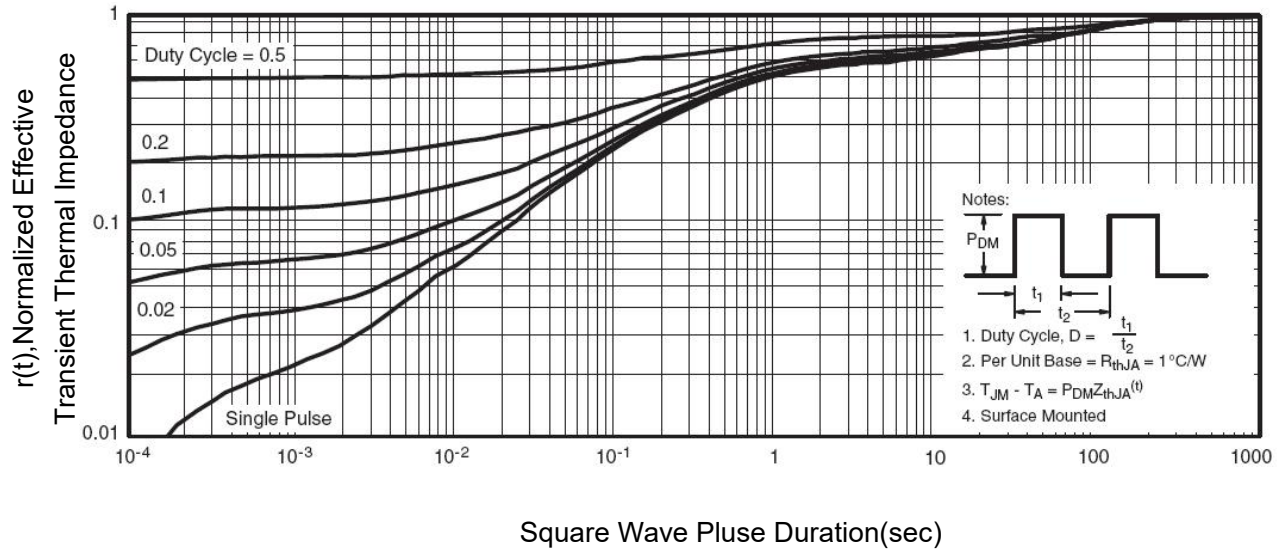
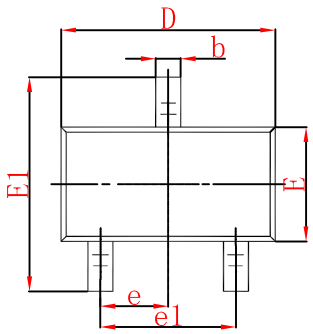
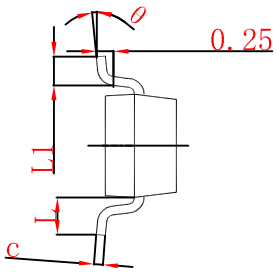
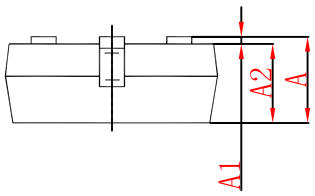


Figure 11 Normalized Maximum Transient Thermal Impedance

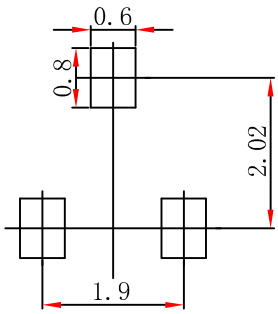
SOT-23 Package Outline Dimensions







Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.900	1.150	0.035	0.045
A1	0.000	0.100	0.000	0.004
A2	0.900	1.050	0.035	0.041
b	0.300	0.500	0.012	0.020
c	0.080	0.150	0.003	0.006
D	2.800	3.000	0.110	0.118
E	1.200	1.400	0.047	0.055
E1	2.250	2.550	0.089	0.100
e	0.950 TYP		0.037 TYP	
e1	1.800	2.000	0.071	0.079
L	0.550 REF		0.022 REF	
L1	0.300	0.500	0.012	0.020
θ	0°	8°	0°	8°



Note:
1.Controlling dimension:in millimeters.
2.General tolerance:± 0.05mm.
3.The pad layout is for reference purposes only.