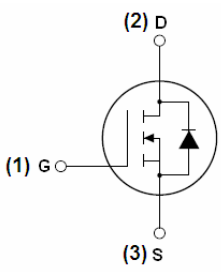
EFM048N02F

N-Channel Advanced MOSFET

• Product Summary

Part #	V_{DS}	$R_{DS(on).typ}$ ($@V_{GS}$=4.5V)	$R_{DS(on).typ}$ ($@V_{GS}$=2.5V)	I_D
EFM048N02F	20V	4.8mΩ	6.2mΩ	60A



N-Channel MOSFET

• Description

- The EFM048N02F is the high cell density trenched
- N-ch MOSFETs which provide excellent
- RDSON and gate cherge for most of the
- synchronous buck converter applications.
- The EFM048N02F meet the RoHS and Green
- Prod uct requirement, 100 % EAS guaranteed
- with full function reliability approved.

DFN5*6-8L

•Application

- Super Low Gate Charge 100% EAS Guaranteed
- Green Device Available Excellent CdV/dt effect decline
- Advanced high cell density Trench technology

•Ordering Information:

Part NO.	EFM048N02F
Marking	048N02F ****
Packing Information	REEL TAPE
Basic ordering unit (pcs)	5000

•Absolute Maximum Ratings (T_C=25℃)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	20	V
Gate-Source Voltage	V_{GS}	±12	V
Drain Current-Continuous	I_D	60	A
Drain Current-Pulsed (Note 1)	I_{DM}	210	A
Maximum Power Dissipation	P_D	60	W
Operating Junction and Storage Temperature Range	T_J,T_{STG}	-55 To 150	℃

•Thermal Characteristic

Thermal Resistance,Junction-to-Ambient (Note 2)	$R_{\theta JC}$	2.1	℃/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	20	--	--	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=20V V_{GS}=0V	--	--	1	nA
Gate-Body Leakage Current	I_{GSS}	V_{GS}=±12V V_{DS}=0V	--	--	±200	nA
On Characteristics (Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS} I_D=250uA	0.5	0.7	1.0	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=4.5V I_D=20A	--	4.8	6	mΩ
		V_{GS}=2.5V I_D=15A	--	6.2	9	mΩ
Forward Transconductance	g_{FS}	V_{DS}=10V I_D=20A	15	--	--	S
Gate Resistance	Rg	F=1.0MHz	--	25	--	Ω
Dynamic Characteristics (Note4)						
Input Capacitance	C_{lss}	V_{DS}=10V V_{GS}=0V F=1.0MHz	--	2800	--	PF
Output Capacitance	C_{oss}		--	368	--	PF
Reverse Transfer Capacitance	C_{rss}		--	341	--	PF
Switching Characteristics (Note 4)						
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=10V I_D=2A V_{GS}=4.5V R_G=3Ω,	--	6.4	--	nS
Turn-on Rise Time	t_r		--	17.2	--	nS
Turn-Off Delay Time	$t_{d(off)}$		--	29.6	--	nS
Turn-Off Fall Time	t_f		--	16.8	--	nS
Total Gate Charge	Q_g	V_{DS}=10V I_D=20A V_{GS}=4.5V	--	35	--	nC
Gate-Source Charge	Q_{gs}		--	3	--	nC
Gate-Drain Charge	Q_{gd}		--	10	--	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage (Note 3)	V_{SD}	V_{GS}=0V I_S=20A	--	--	1.2	V
Diode Forward Current (Note 2)	I_S		--	--	60	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. E_{AS} condition : Tj=25℃,V_{DD}=10V,V_G=10V,L=0.5mH,Rg=25Ω,

• Typical Characteristics

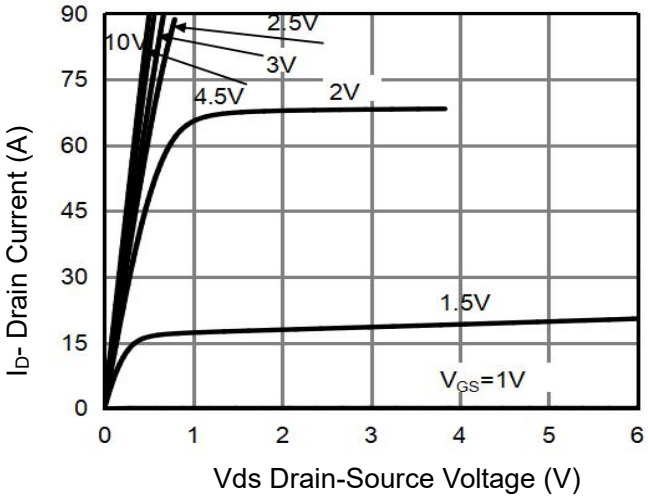


Figure 1 Output Characteristics

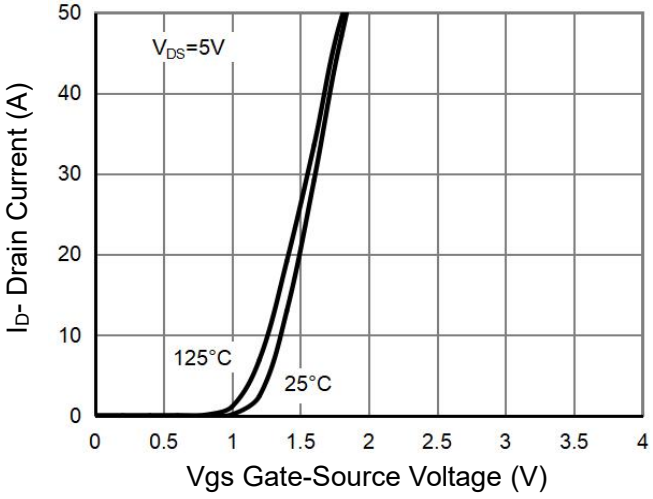


Figure 2 Transfer Characteristics

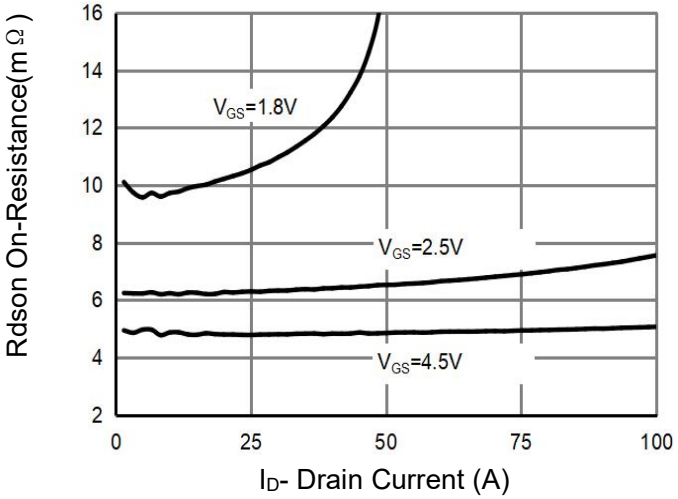


Figure 3 Rdson- Drain Current

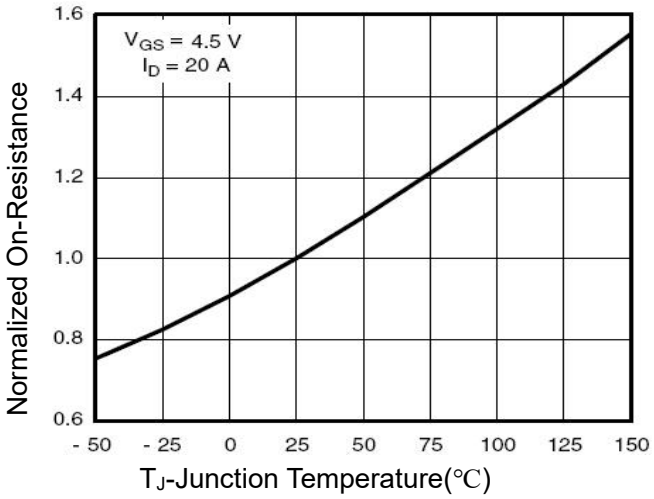


Figure 4 Rdson-JunctionTemperature

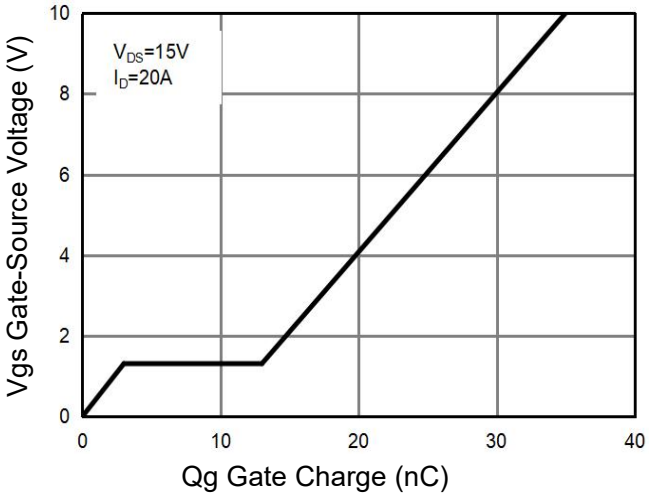


Figure 5 Gate Charge

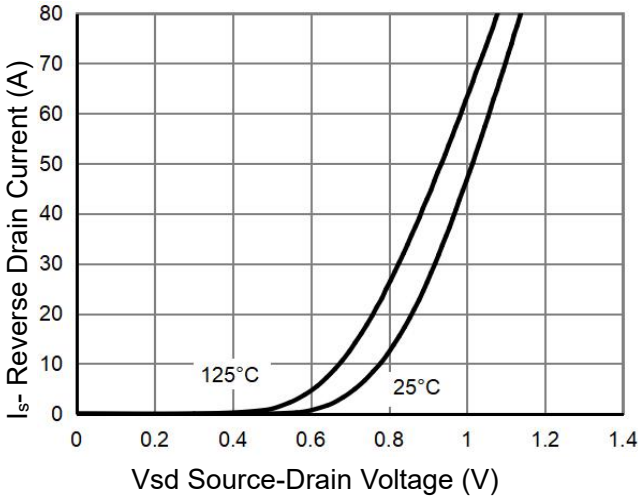


Figure 6 Source- Drain Diode Forward

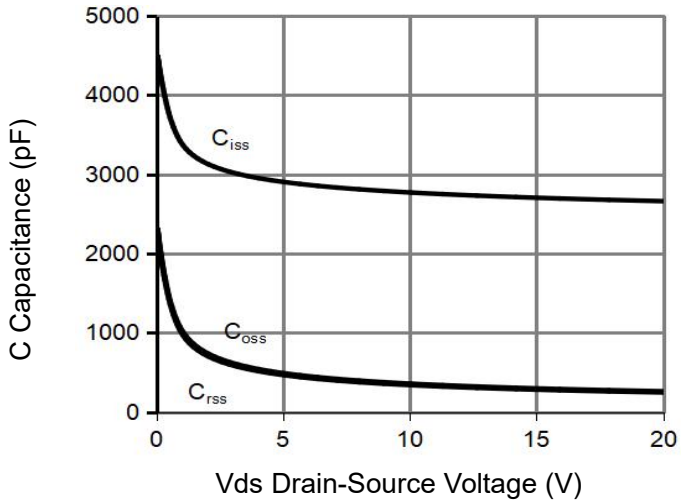


Figure 7 Capacitance vs Vds

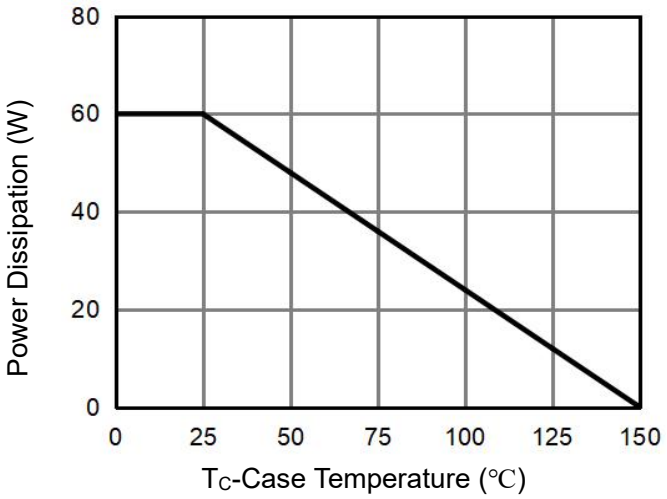


Figure 9 Power De-rating

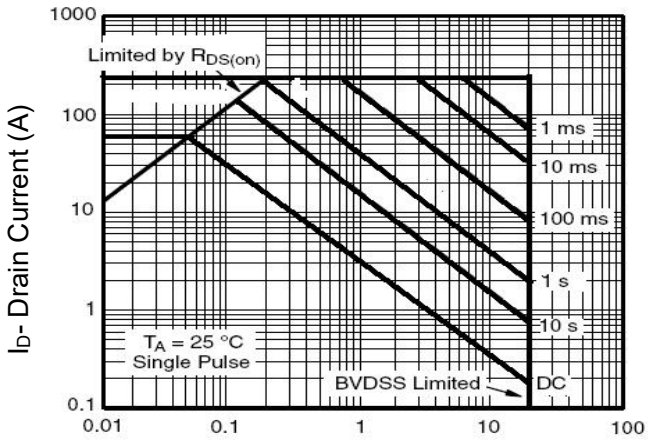


Figure 8 Safe Operation Area

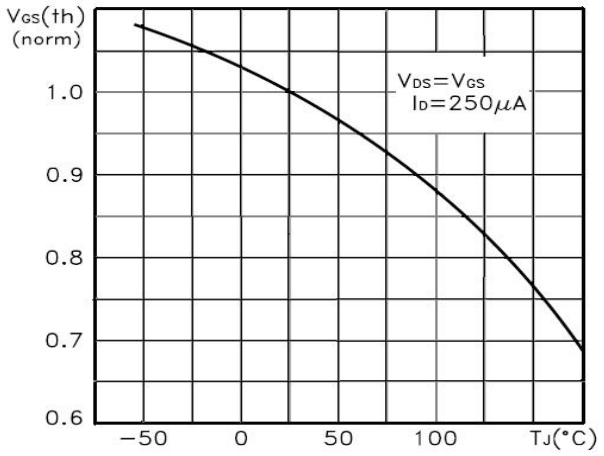


Figure 10 $V_{GS(th)}$ vs Junction Temperature

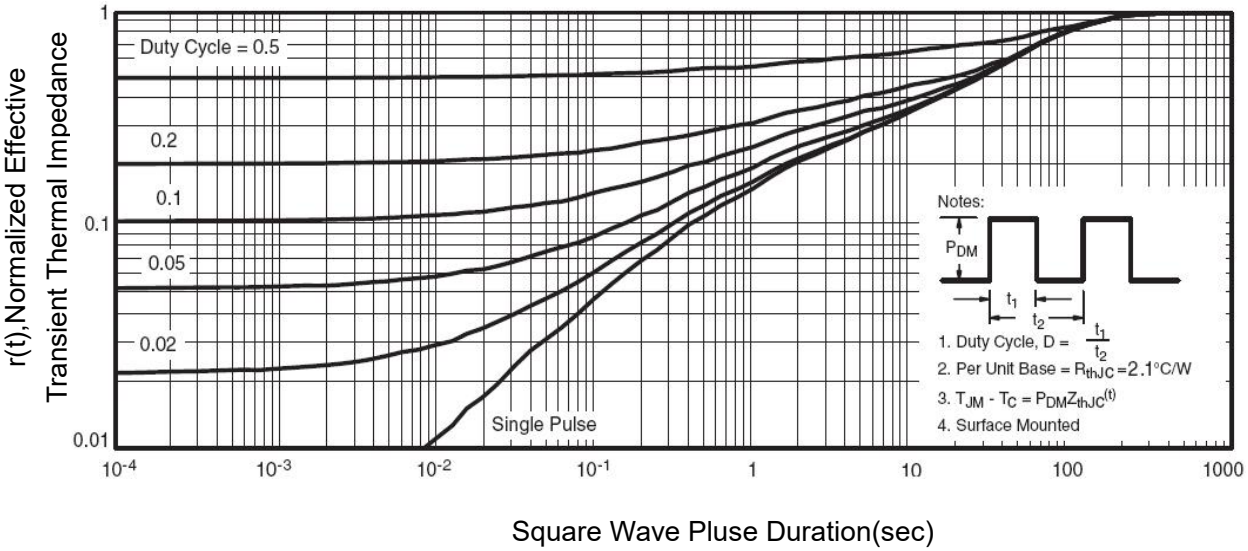
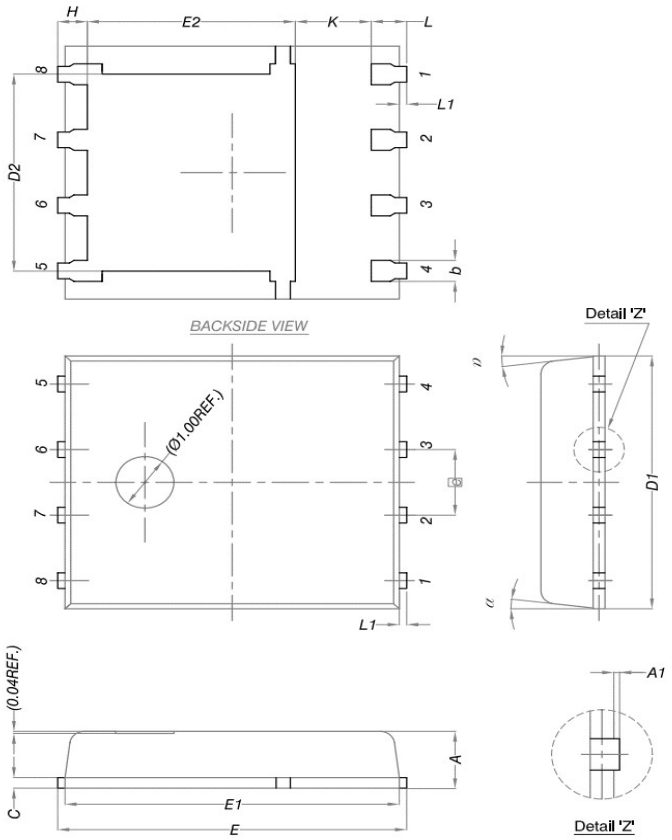


Figure 11 Normalized Maximum Transient Thermal Impedance

●DFN5*6 Package Outline



DIM.	MILLIMETERS		
	MIN.	NOM.	MAX.
A	0.90	1.00	1.10
A1	0	-	0.05
b	0.33	0.41	0.51
C	0.20	0.25	0.30
D1	4.80	4.90	5.00
D2	3.61	3.81	3.96
E	5.90	6.00	6.10
E1	5.70	5.75	5.80
E2	3.38	3.58	3.78
e	1.27 BSC		
H	0.41	0.51	0.61
K	1.10	-	-
L	0.51	0.61	0.71
L1	0.06	0.13	0.20
α	0°	-	12°