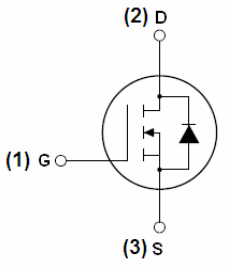
EFM060N03M

N-Channel Advanced MOSFET

• Product Summary

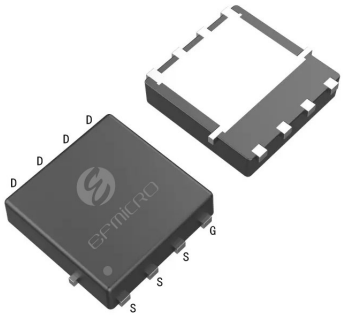
Part #	V_{DS}	$R_{DS(on).typ}$ ($@V_{GS}$=10V)	$R_{DS(on).typ}$ ($@V_{GS}$=4.5V)	I_D
EFM060N03M	30V	6mΩ	9mΩ	60A



N-Channel MOSFET

• Description

- The EFM060N03M 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 EFM060N03M meet the RoHS and Green
- Prod uct requirement, 100 % EAS guaranteed
- with full function reliability approved.



DFN3*3-8L

•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.	EFM060N03M
Marking	060N03M ******
Packing Information	REEL TAPE
Basic ordering unit (pcs)	5000

•Absolute Maximum Ratings (T_C=25℃)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	30	V
Gate-Source Voltage	V_{GS}	±20	V
Drain Current-Continuous	I_D	60	A
Drain Current-Pulsed (Note 1)	I_{DM}	120	A
Maximum Power Dissipation	P_D	58	W
Operating Junction and Storage Temperature Range	T_J,T_{STG}	-55 To 150	℃

•Thermal Characteristic

Thermal Resistance,Junction-to-Ambient (Note 2)	$R_{\theta JC}$	2.5	℃/W

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

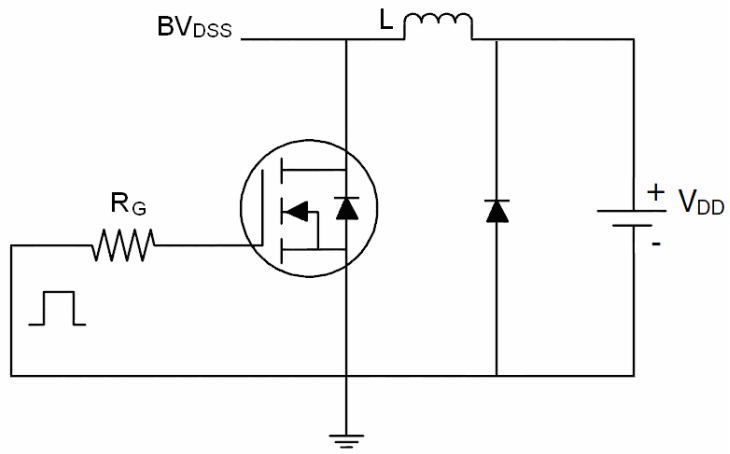
Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V I_D=250uA	30	--	--	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=30V V_{GS}=0V	--	--	1	nA
Gate-Body Leakage Current	I_{GSS}	V_{GS}=±20V V_{DS}=0V	--	--	±100	nA
On Characteristics (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=20A	--	6	7.5	mΩ
		V_{GS}=4.5V I_D=20A	--	9	11	mΩ
Forward Transconductance	g_{FS}	V_{DS}=5V I_D=20A	--	20	--	S
Dynamic Characteristics (Note4)						
Input Capacitance	C_{lss}	V_{DS}=15V V_{GS}=0V F=1.0MHz	--	1150	--	PF
Output Capacitance	C_{oss}		--	380	--	PF
Reverse Transfer Capacitance	C_{rss}		--	260	--	PF
Switching Characteristics (Note 4)						
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=15V I_D=20A V_{GS}=10V R_G=1.8Ω,	--	10	--	nS
Turn-on Rise Time	t_r		--	8	--	nS
Turn-Off Delay Time	$t_{d(off)}$		--	25	--	nS
Turn-Off Fall Time	t_f		--	5	--	nS
Total Gate Charge	Q_g	V_{DS}=15V I_D=20A V_{GS}=10V	--	32	--	nC
Gate-Source Charge	Q_{gs}		--	4.9	--	nC
Gate-Drain Charge	Q_{gd}		--	6.9	--	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage (Note 3)	V_{SD}	V_{GS}=0V I_S=20A	--	0.85	1.2	V
Diode Forward Current (Note 2)	I_S		--	--	50	A

Notes:

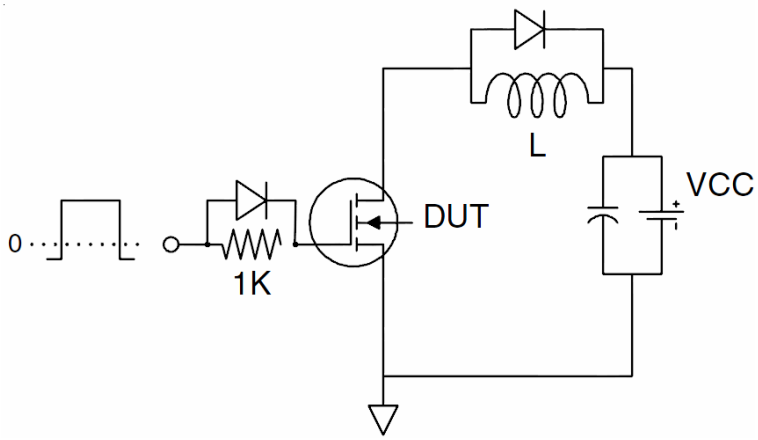
1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, t ≤ 10 sec.
3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
4. Guaranteed by design, not subject to production
5. EAS condition：Tj=25℃, V_{DD}=15V,V_G=10V,L=0.5mH, Rg=25Ω

• Typical Characteristics

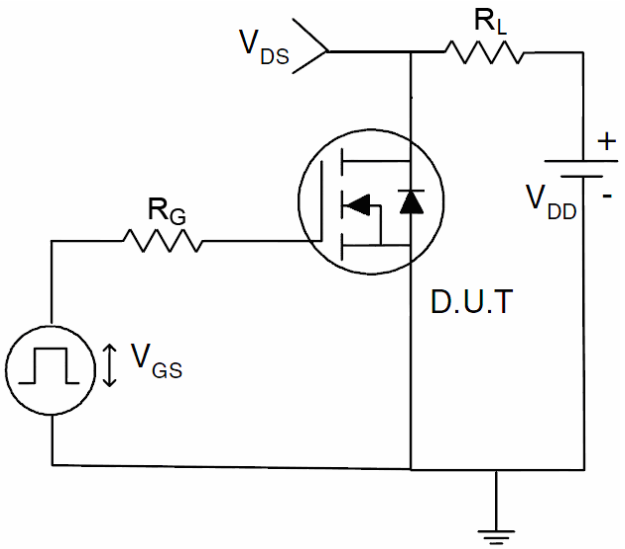
1）E_{AS} test Circuits



2）Gate charge test Circuit:



3）Switch Time Test Circuit：



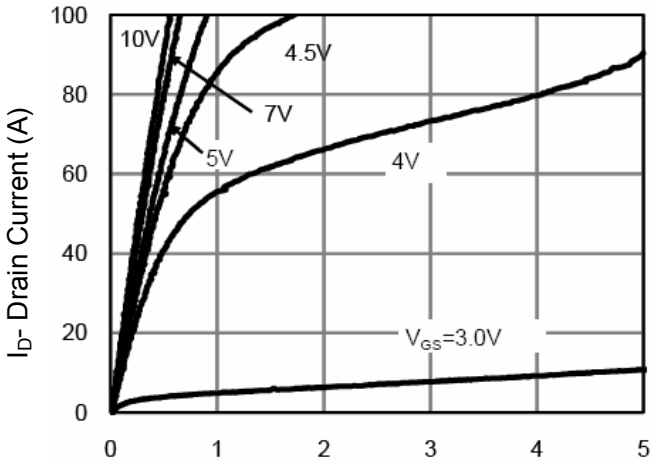


Figure 1 Output Characteristics

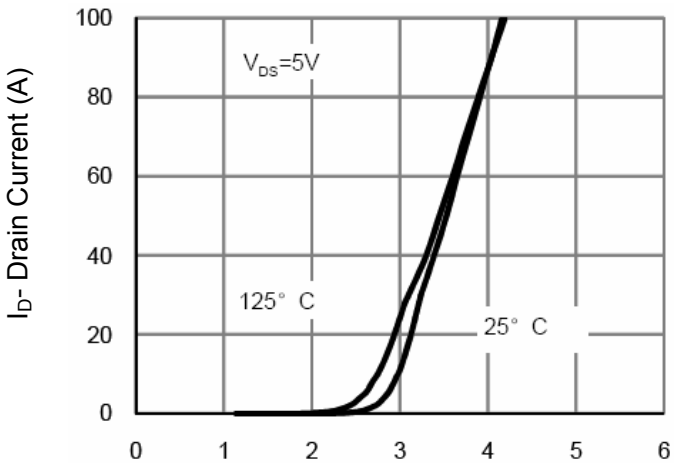


Figure 2 Transfer Characteristics

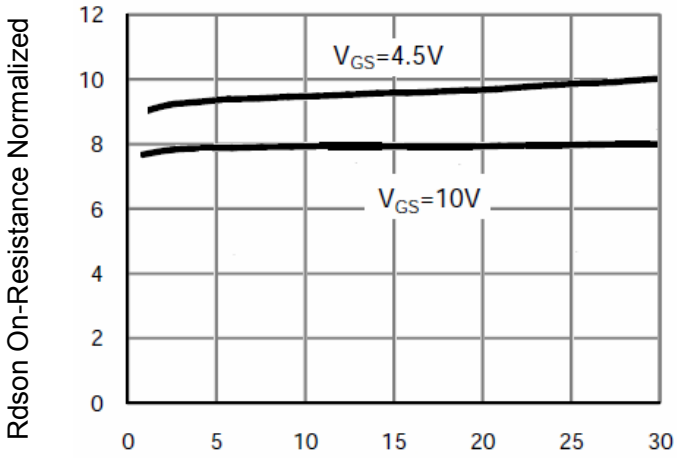


Figure 3 Rdson- Drain Current

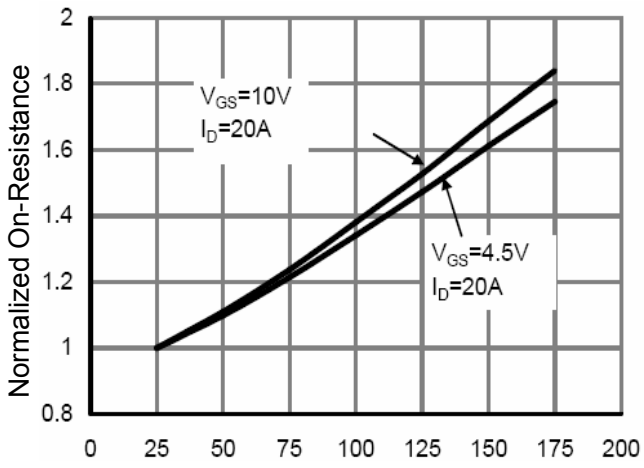


Figure 4 Rdson-JunctionTemperature

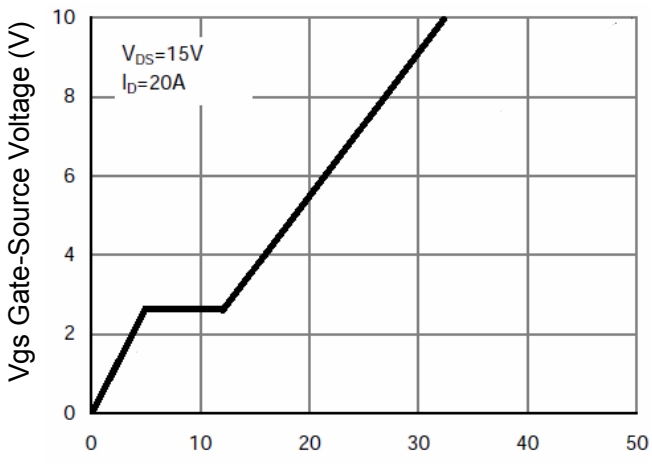


Figure 5 Gate Charge

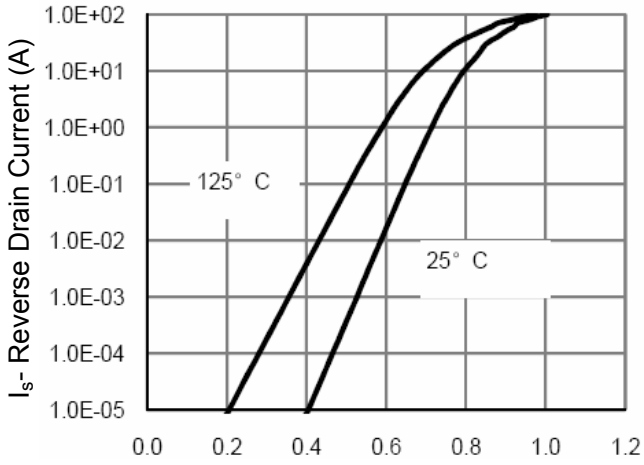


Figure 6 Source- Drain Diode Forward

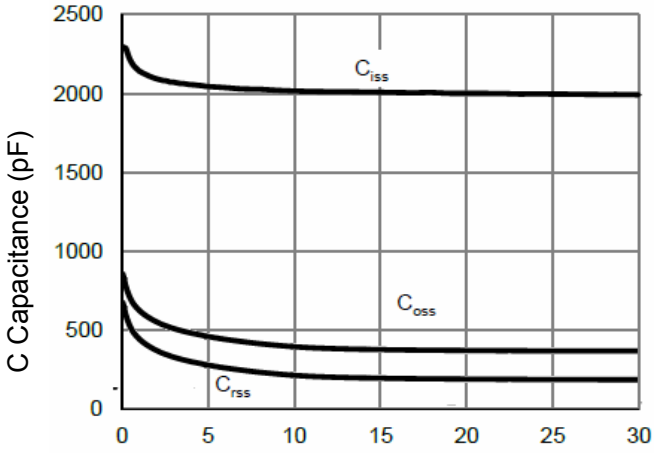


Figure 7 Capacitance vs Vds

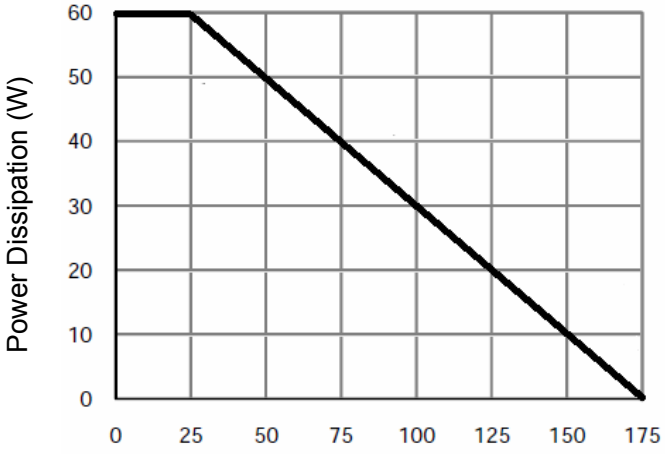


Figure 9 Power De-rating

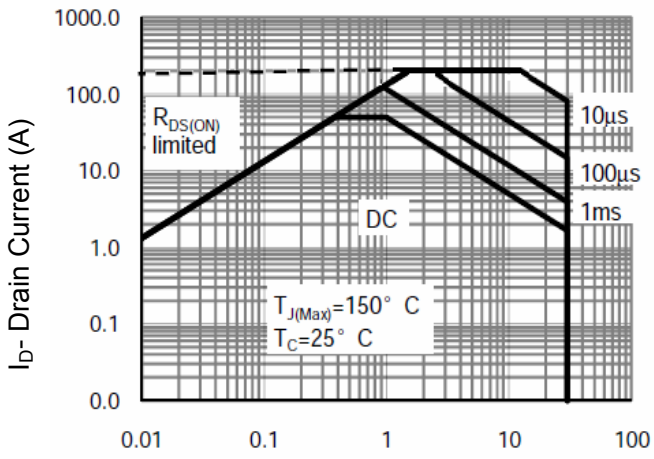


Figure 8 Safe Operation Area

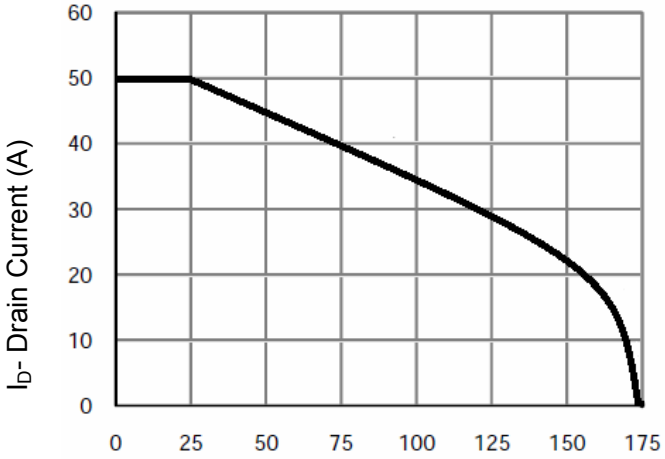
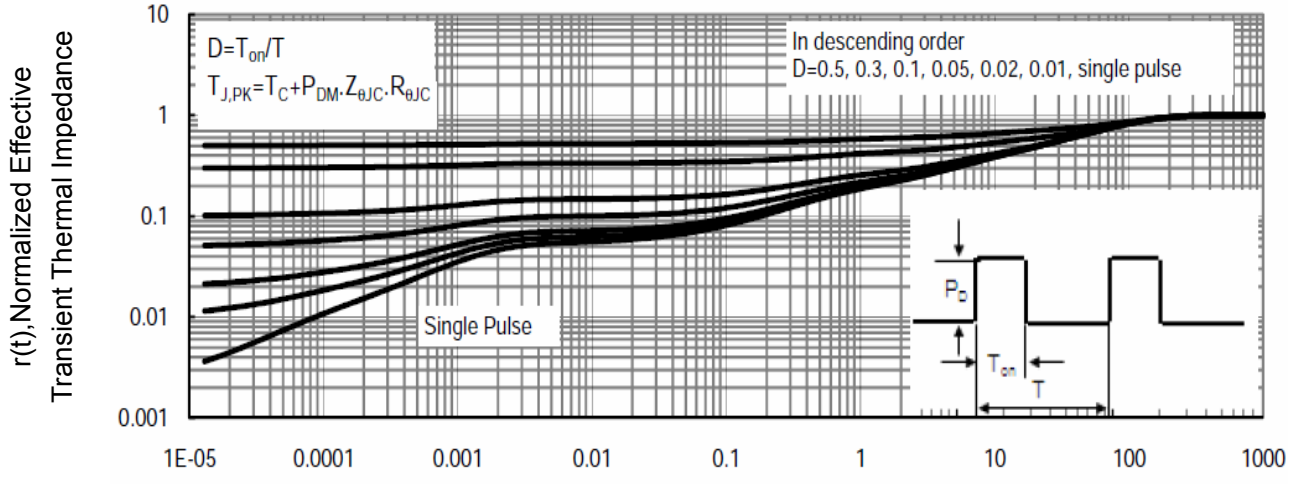
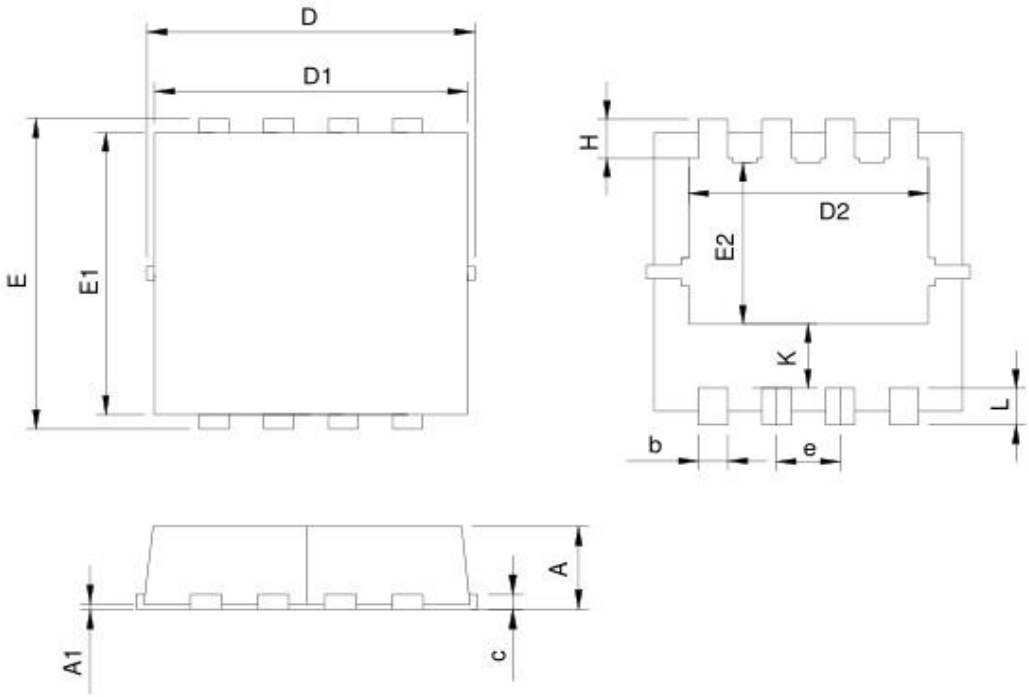


Figure10 ID Current- Junction Temperature



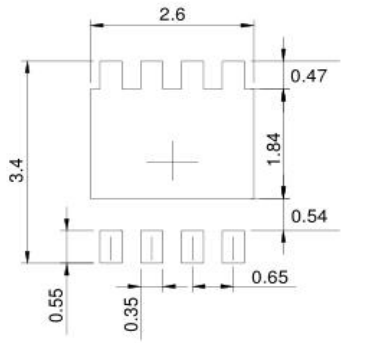
Normalized Maximum Transient Thermal Impedance

●DFN3*3 Package Outline



SYMBOL	DFN3.3x3.3-8			
	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	0.70	1.00	0.028	0.039
A1	0.00	0.05	0.000	0.002
b	0.25	0.35	0.010	0.014
c	0.14	0.20	0.006	0.008
D	3.10	3.50	0.122	0.138
D1	3.05	3.25	0.120	0.128
D2	2.35	2.55	0.093	0.100
E	3.10	3.50	0.122	0.138
E1	2.90	3.10	0.114	0.122
E2	1.64	1.84	0.065	0.072
e	0.65 BSC		0.026 BSC	
H	0.32	0.52	0.013	0.020
K	0.59	0.79	0.023	0.031
L	0.25	0.55	0.010	0.022

RECOMMENDED LAND PATTERN



UNIT: mm