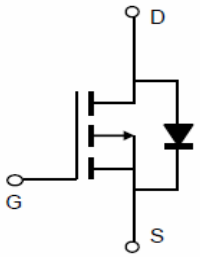
EFM045P04F

P-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
EFM045P04F	-40V	4.3mΩ	5.5mΩ	-80A



P-Channel MOSFET

• Description

- TheEFM045P04F is the high celldensity trenched
- P-chMOSFETs,which provide excellent RDSON
- and gate charge for most of the synchronous buck
- converter applications.
- The EFM045P04F 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.	EFM045P04F
Marking	045P04F ****
Packing Information	REEL TAPE
Basic ordering unit (pcs)	5000

•Absolute Maximum Ratings (T_C=25℃)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	-40	V
Gate-Source Voltage	V_{GS}	±20	V
Drain Current-Continuous	I_D	-80	A
Drain Current-Pulsed (Note 1)	I_{DM}	-320	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)	$R_{\theta JA}$	50	℃/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	-40	--	--	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=-40V 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	-1.7	-2.5	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=-10V I_D=-20A	--	4.3	5.3	mΩ
		V_{GS}=-4.5VI_D=-20A	--	5.5	6.9	mΩ
Forward Transconductance	g_{FS}	V_{DS}=-5V I_D=-20A	--	63	--	S
Gate Resistance	Rg	F=1.0MHz	--	2.2	--	Ω
Dynamic Characteristics (Note4)						
Input Capacitance	C_{lss}	V_{DS}=-20V V_{GS}=0V F=1.0MHz	--	6638	--	PF
Output Capacitance	C_{oss}		--	545	--	PF
Reverse Transfer Capacitance	C_{rss}		--	345	--	PF
Switching Characteristics (Note 4)						
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=-20V I_D=-20A V_{GS}=-10V R_G=3Ω,	--	16	--	nS
Turn-on Rise Time	t_r		--	17	--	nS
Turn-Off Delay Time	$t_{d(off)}$		--	68	--	nS
Turn-Off Fall Time	t_f		--	31	--	nS
Total Gate Charge	Q_g	V_{DS}=-20V I_D=-20A V_{GS}=-10V	--	118	--	nC
Gate-Source Charge	Q_{gs}		--	13	--	nC
Gate-Drain Charge	Q_{gd}		--	22	--	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		--	--	-80	A

Notes 1.Repetitive Rating: Pulse width limited by maximum junction temperature.
Notes 2.E_{AS} condition: T_J=25℃,V_{DD}=15V,V_G=-10V, Rg=25Ω, L=0.5mH.
Notes 3.Repetitive Rating: Pulse width limited by maximum junction temperature.

• Typical Characteristics

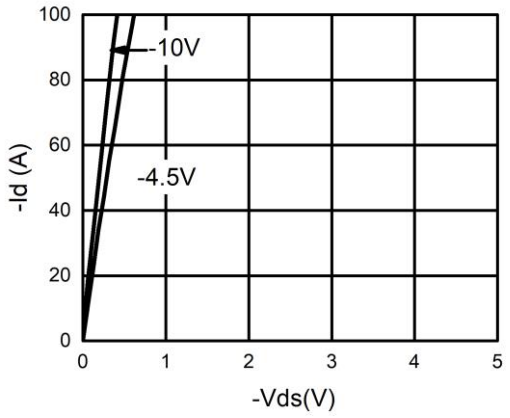


Figure 1. Output Characteristics

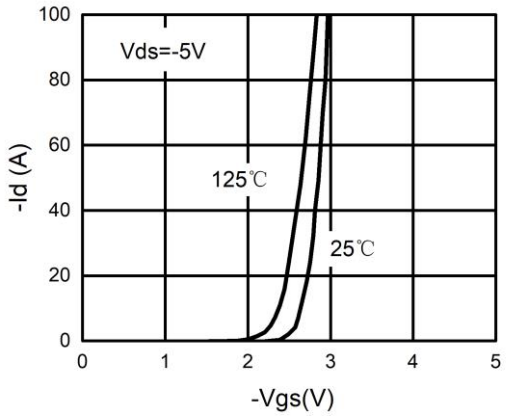


Figure 2. Transfer Characteristics

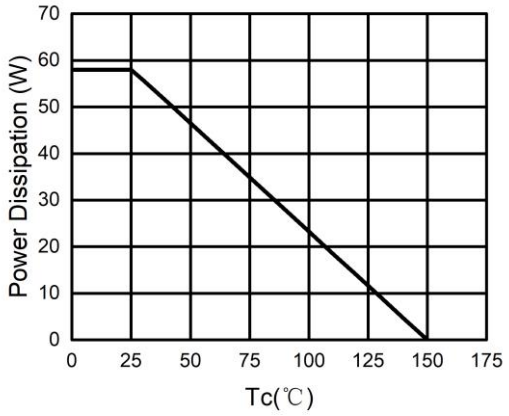


Figure 3. Power Dissipation

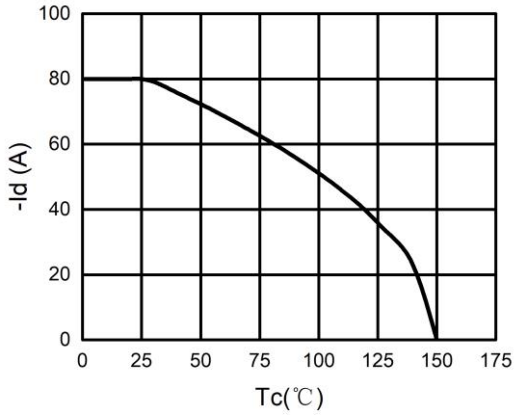


Figure 4. Drain Current

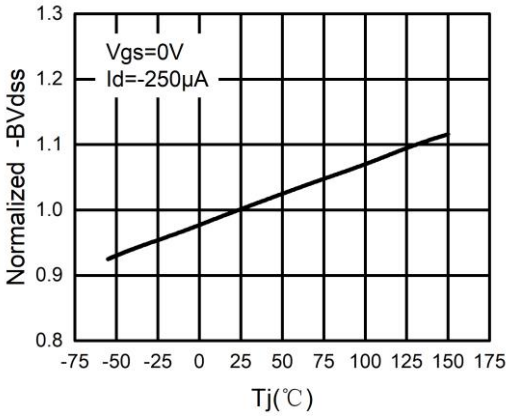


Figure 5. BV_{DSS} vs Junction Temperature

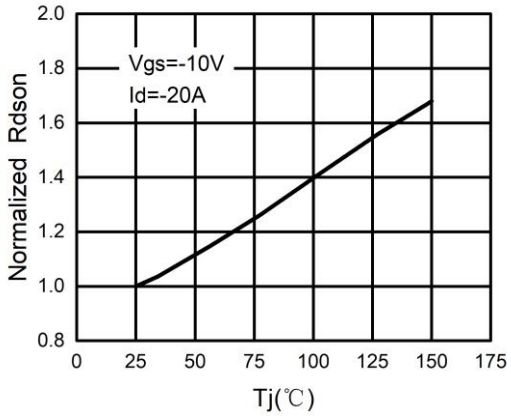


Figure 6. $R_{DS(ON)}$ vs Junction Temperature

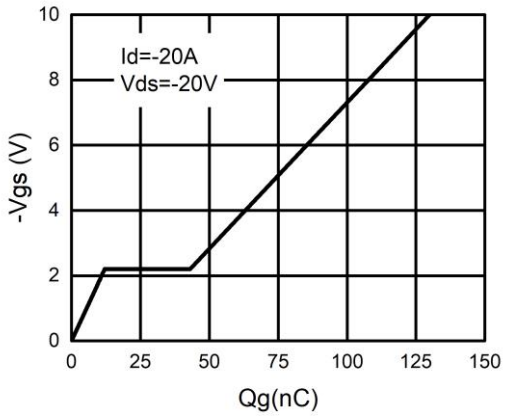


Figure 7. Gate Charge Waveforms

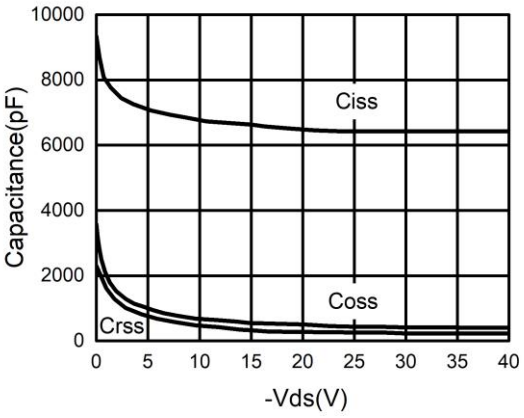


Figure 8. Capacitance

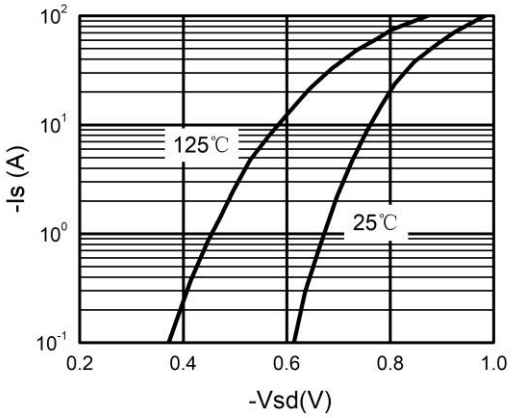


Figure 9. Body-Diode Characteristics

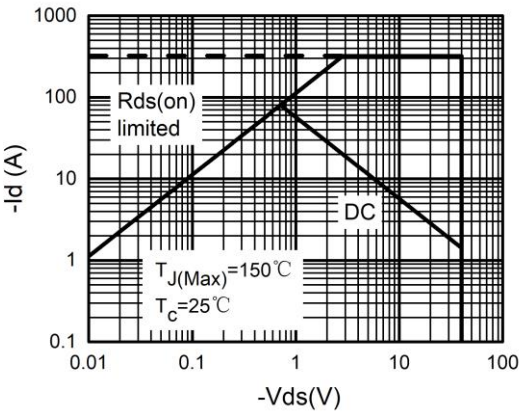
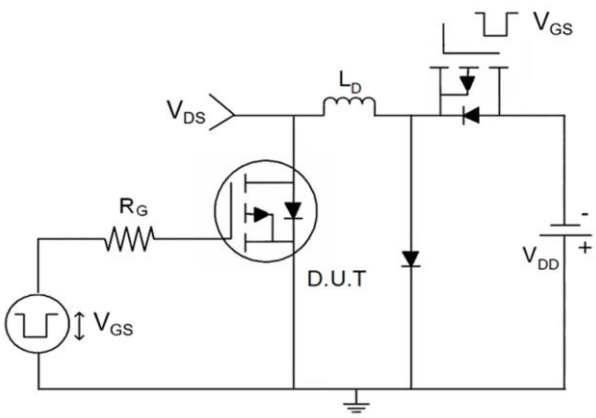
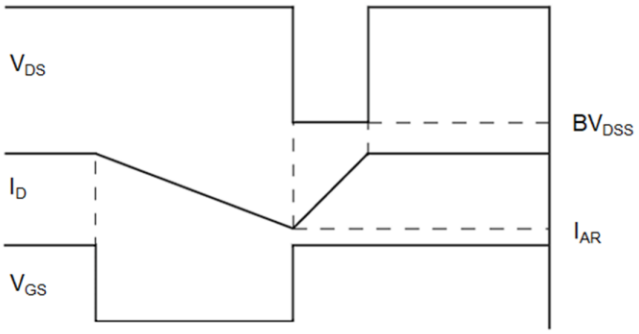


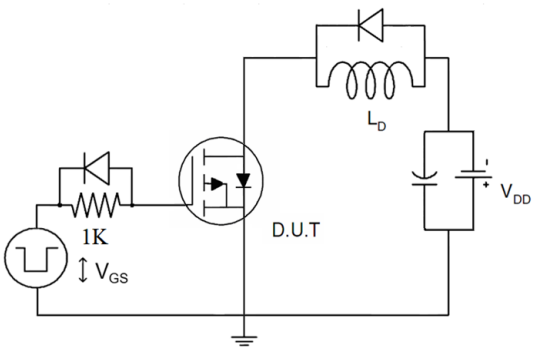
Figure 10. Maximum Safe Operating Area

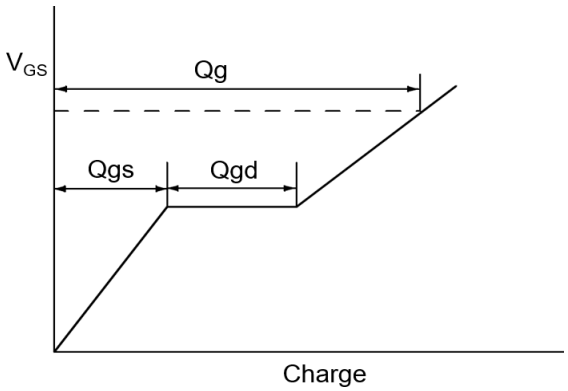
1) E_{AS} Test Circuits



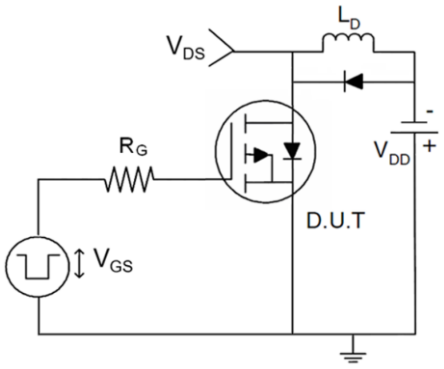


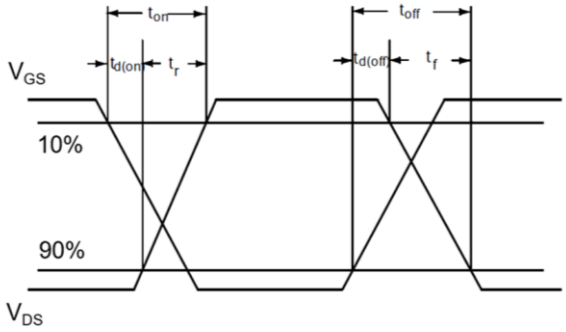
2) Gate Charge Test Circuit



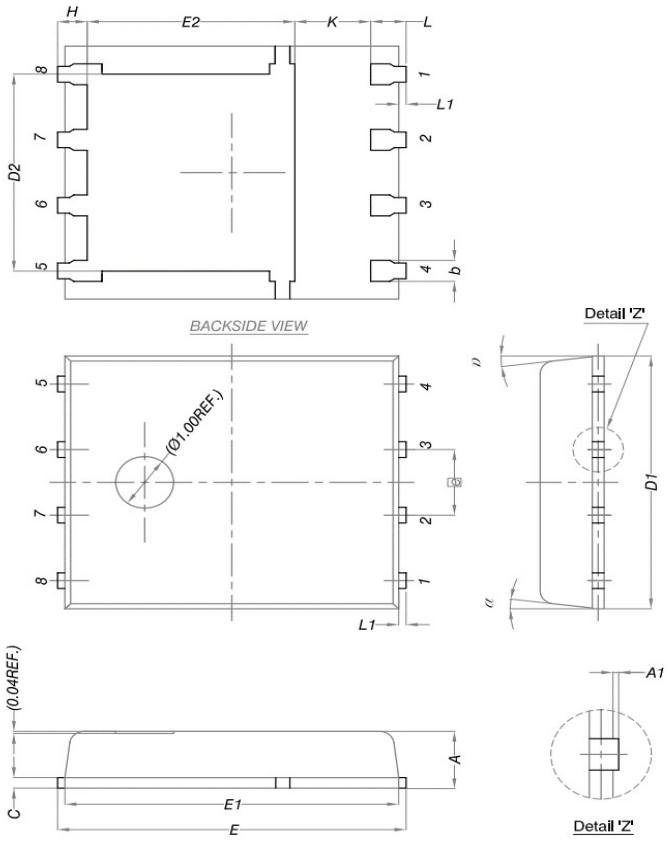


3) Switch Time Test Circuit





●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°