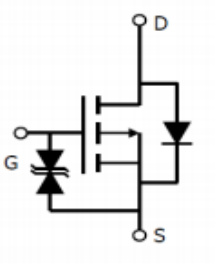
EFMICRO
Semiconductor Limited Company

EFM3415A

P-Channel Advanced Power MOSFET

• Product Summary

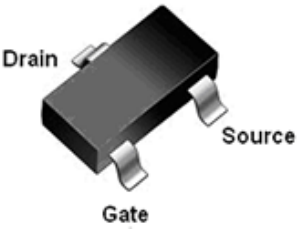
Part #	V_{DS}	$R_{DS(on).typ}$ ($@V_{GS}$=4.5V)	$R_{DS(on).typ}$ ($@V_{GS}$=2.5V)	I_D
EFM3415A	-20V	35mΩ	45mΩ	-4.2A



P-Channel MOSFET

• Features

- *Low $R_{DS(on)}$ @V_{GS}=-4.5V*
- *-2.5V Logic Level Control*
- *P Channel SOT23-3L Package*
- *Pb−Free, RoHS Compliant*
- *HMB ESD Protection 4KV*



SOT23-3L

RoHS

HF

•Application

- High-side Load Switch
- *Switching Circuits*
- *High Speed line Driver*
- Power Management Functions

•Ordering Information:

Part NO.	EFM3415A
Marking	AF****
Packing Information	REEL TAPE
Basic ordering unit (pcs)	3000

•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	-4.2	A
Drain Current-Pulsed (Note 1)	I_{DM}	-30	A
Maximum Power Dissipation	P_D	1.5	W
Operating Junction and Storage Temperature Range	T_J,T_{STG}	-55 To 150	℃

•Thermal Characteristic

Thermal Resistance,Junction-to-Ambient (Note 2)	$R_{\theta JA}$	80	℃/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	uA
Gate-Body Leakage Current	I_{GSS}	V_{GS}=±12V V_{DS}=0V	--	--	±10	uA
On Characteristics (Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS} I_D=-250uA	-0.4	-0.7	-1.2	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=-4.5V I_D=-4.2A	--	35	45	mΩ
		V_{GS}=-2.5V I_D=-3A	--	45	55	mΩ
Dynamic Characteristics (Note4)						
Input Capacitance	C_{lss}	V_{DS}=-10V V_{GS}=0V F=1.0MHz	--	675	--	PF
Output Capacitance	C_{oss}		--	120	--	PF
Reverse Transfer Capacitance	C_{rss}		--	85	--	PF
Switching Characteristics (Note 4)						
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=-10V I_D=-2A V_{GS}=-4.5V R_G=3.3Ω,	--	15	--	nS
Turn-on Rise Time	t_r		--	11	--	nS
Turn-Off Delay Time	$t_{d(off)}$		--	22	--	nS
Turn-Off Fall Time	t_f		--	35	--	nS
Total Gate Charge	Q_g	V_{DS}=-10V I_D=-4A V_{GS}=-4.5V	--	14.2	--	nC
Gate-Source Charge	Q_{gs}		--	3.2	--	nC
Gate-Drain Charge	Q_{gd}		--	5.8	--	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage (Note 3)	V_{SD}	V_{GS}=0V I_S=-2A	--	-0.83	-1.2	V
Diode Forward Current (Note 2)	I_S		--	--	-2	A

Notes:

① Pulse width limited by maximum allowable junction temperature

②Pulse test ; Pulse width≤300μs, duty cycle≤2%.

• Typical Characteristics

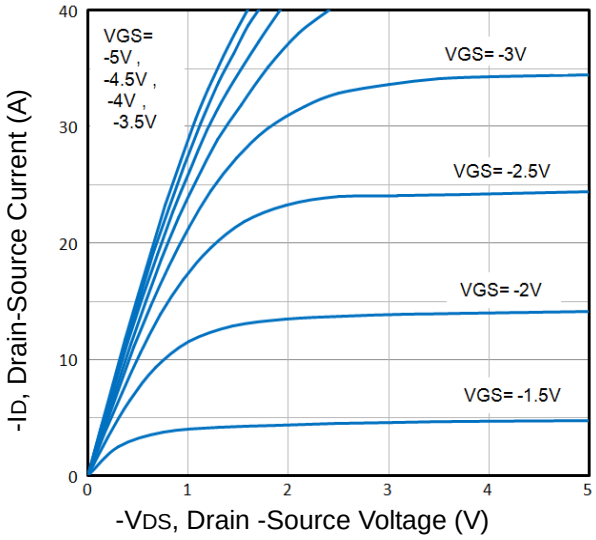


Fig1. Typical Output Characteristics

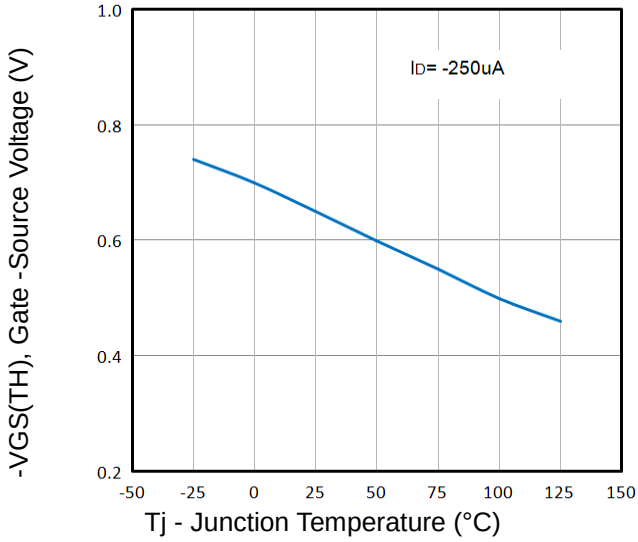


Fig2. Normalized Threshold Voltage Vs. Temperature

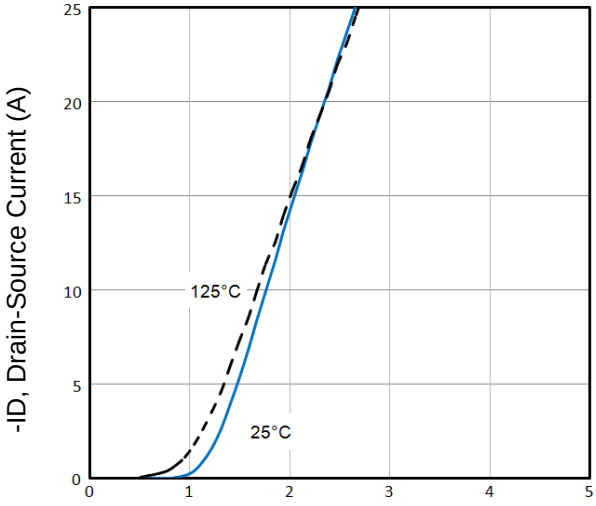


Fig3. Typical Transfer Characteristics

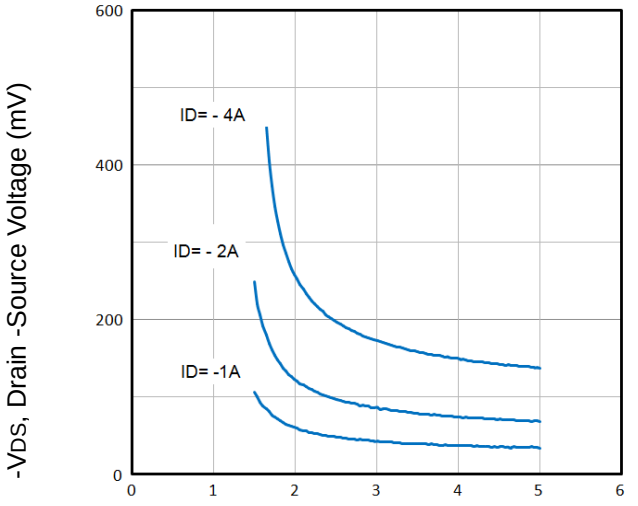


Fig4. Drain -Source Voltage vs Gate -Source Voltage

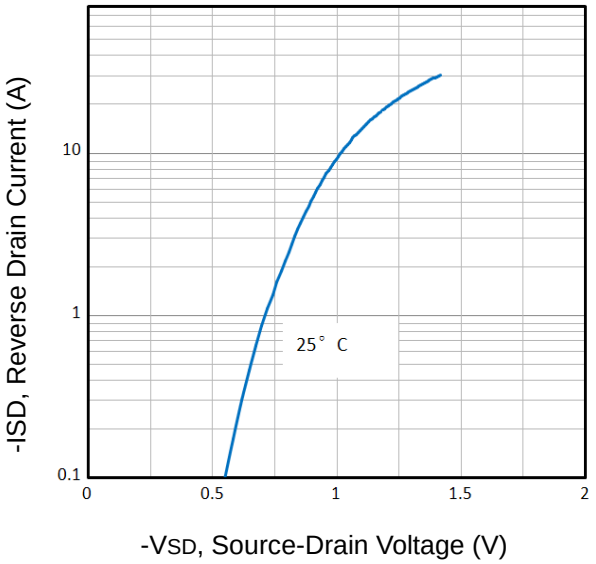


Fig5. Typical Source-Drain Diode Forward Voltage

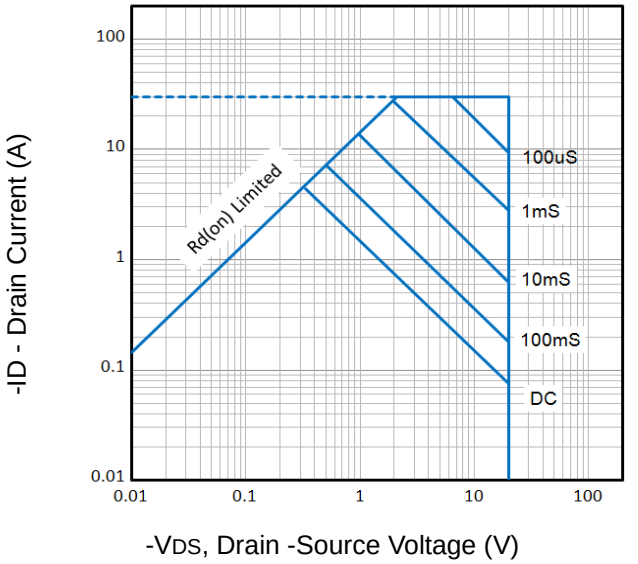


Fig6. Maximum Safe Operating Area

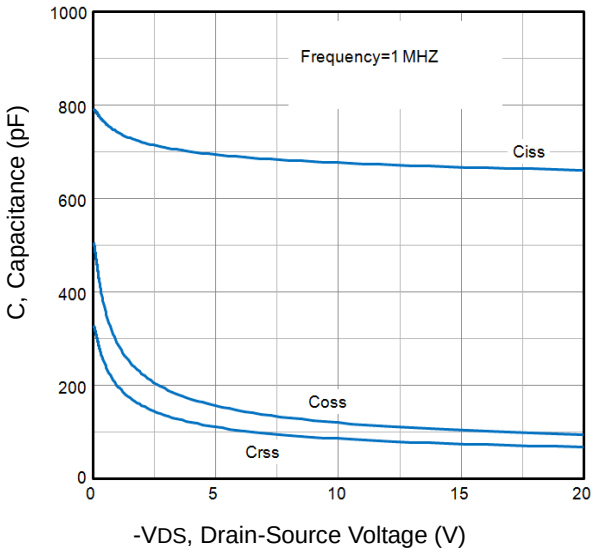


Fig7. Typical Capacitance Vs. Drain-Source Voltage

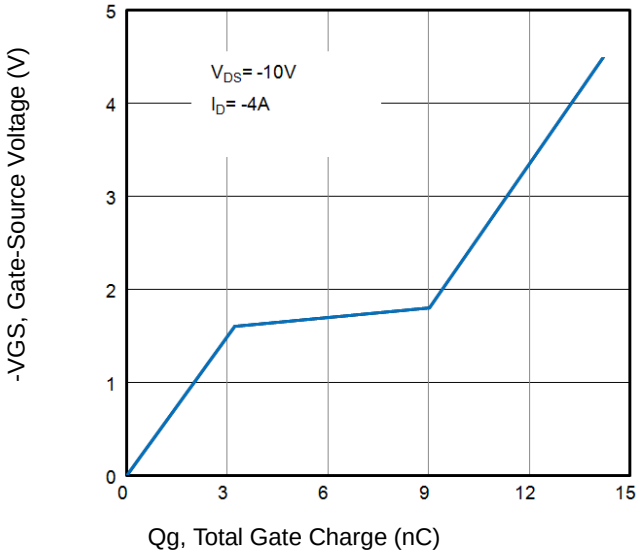


Fig8. Typical Gate Charge Vs. Gate-Source Voltage

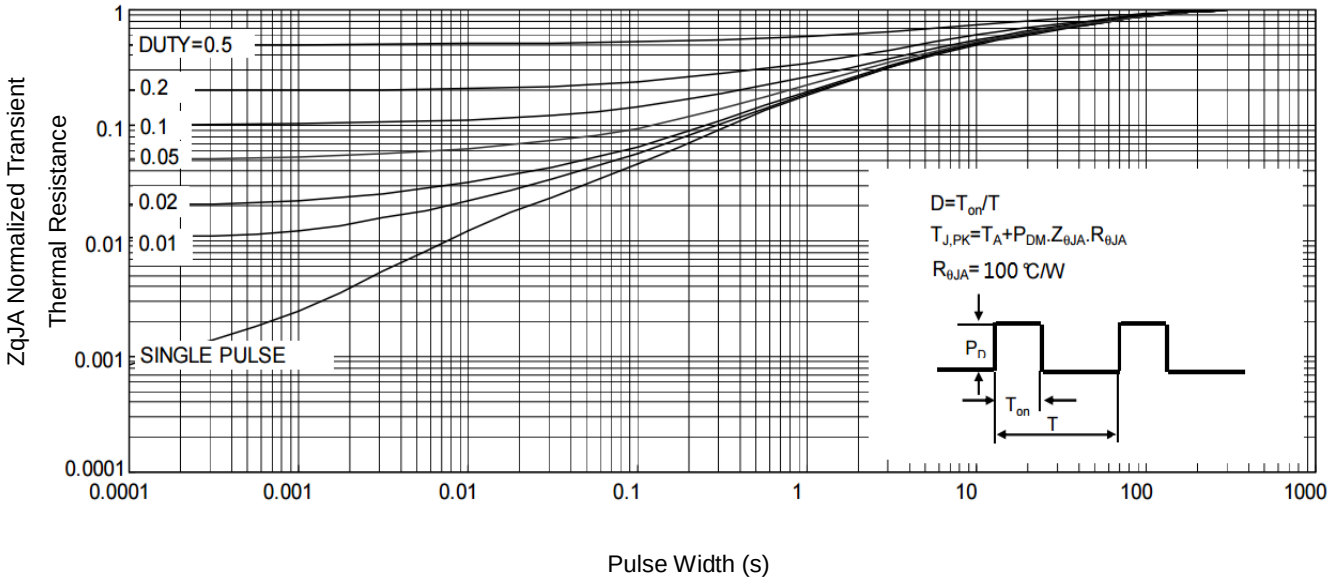


Fig9. Normalized Maximum Transient Thermal Impedance

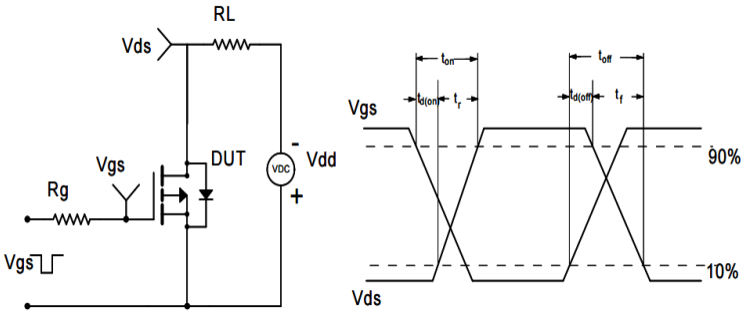
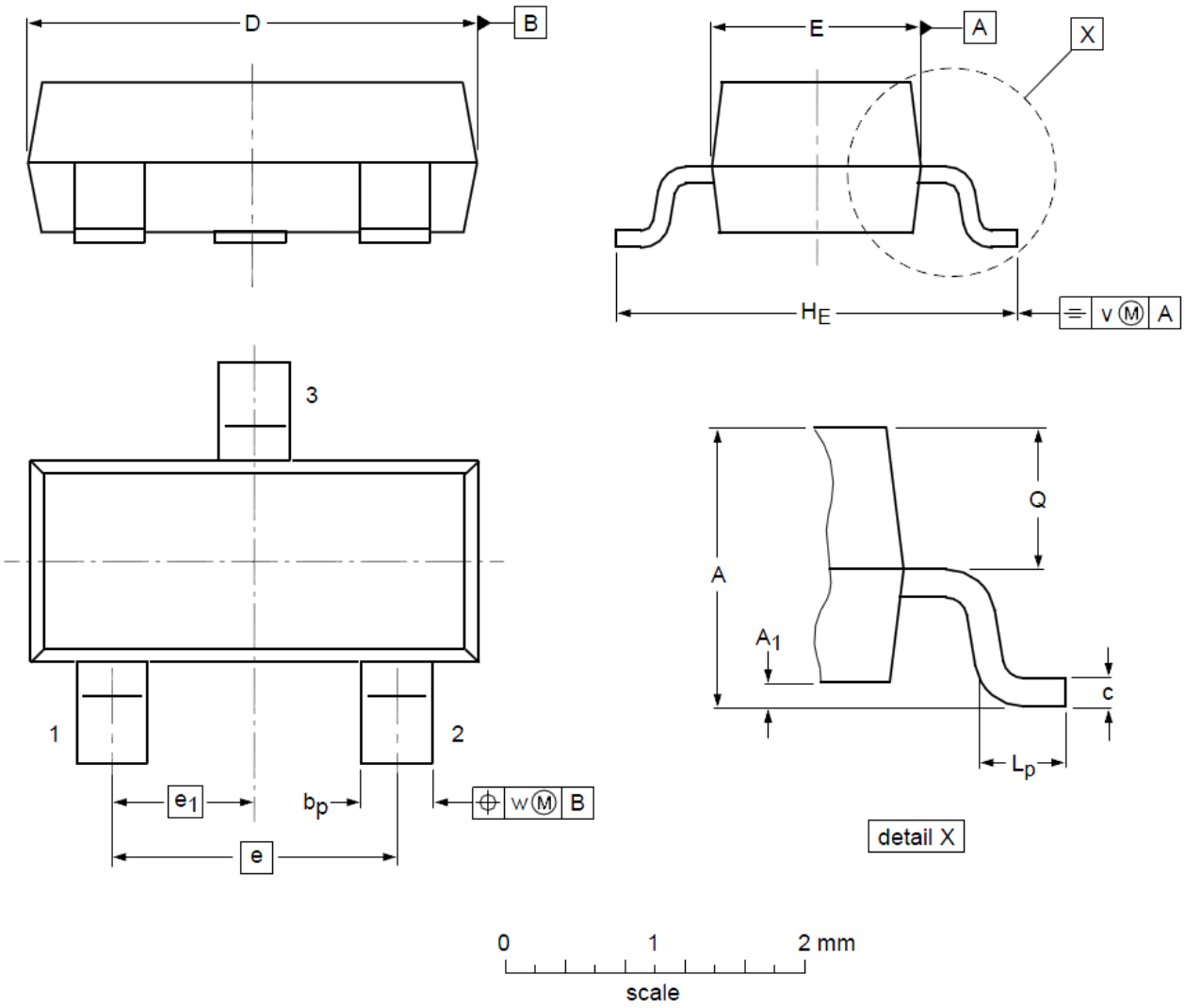


Fig10. Switching Time Test Circuit and waveforms

SOT23-3L Package Outline Dimensions



DIMENSIONS (unit : mm)

Symbol	Min	Typ	Max	Symbol	Min	Typ	Max
A	1.00	1.17	1.30	**A_1**	0.01	0.05	0.10
b_p	0.35	0.39	0.50	**c**	0.10	0.20	0.26
D	2.70	2.90	3.10	**E**	1.30	1.58	1.70
e	--	1.90	--	**e_1**	--	0.95	--
H_E	2.50	2.78	3.00	**L_p**	0.20	0.32	0.60
Q	0.23	0.27	0.33	**v**	--	0.20	--
w	--	0.20	--				