

Product Summary

Part #	V_{DS}	$R_{DS(on).typ}$ (@ $V_{GS}=4.5V$)	$R_{DS(on).typ}$ (@ $V_{GS}=2.5V$)	I_D
EFM3400ARL	20V	28m Ω	35m Ω	3.6A

Features

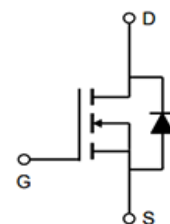
- Low $R_{DS(on)}$ @ $V_{GS}=4.5V$
- 2.5V Logic Level Control
- N Channel SOT23-3L Package
- Pb-Free, RoHS Compliant

Application

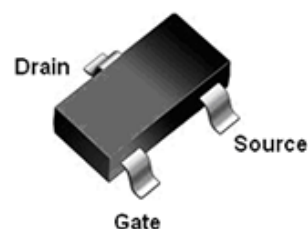
- Load Switch
- DC/DC Converter
- Switching Circuits
- LED Driver

Ordering Information:

Part NO.	EFM3400ARL
Marking	A09T
Packing Information	REEL TAPE
Basic ordering unit (pcs)	3000



N-Channel MOSFET



SOT23-3L



Absolute Maximum Ratings ($T_C=25^{\circ}C$)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	20	V
Gate-Source Voltage	V_{GS}	± 12	V
Drain Current-Continuous	I_D	3.6	A
Drain Current-Pulsed ^(Note 1)	I_{DM}	18	A
Maximum Power Dissipation	P_D	1.2	W
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 To 150	$^{\circ}C$

Thermal Characteristic

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

• Static Electrical Characteristics @ $T_J = 25^\circ\text{C}$ (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	--	--	±100	nA
On Characteristics ^(Note 3)						
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} I _D =250uA	0.4	0.6	1.0	V
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =4.5V I _D =3.6A	--	28	35	mΩ
		V _{GS} =2.5V I _D =3A	--	35	45	mΩ
Dynamic Characteristics ^(Note4)						
Input Capacitance	C _{ISS}	V _{DS} =10V V _{GS} =0V F=1.0MHz	--	280	--	PF
Output Capacitance	C _{OSS}		--	46	--	PF
Reverse Transfer Capacitance	C _{RSS}		--	42	--	PF
Switching Characteristics ^(Note 4)						
Turn-on Delay Time	t _{d(on)}	V _{DD} =10V I _D =4A V _{GS} =4.5V R _G =3.3Ω,	--	11	--	nS
Turn-on Rise Time	t _r		--	35	--	nS
Turn-Off Delay Time	t _{d(off)}		--	25	--	nS
Turn-Off Fall Time	t _f		--	32	--	nS
Total Gate Charge	Q _g	V _{DS} =10V I _D =3A V _{GS} =4.5V	--	4.7	--	nC
Gate-Source Charge	Q _{gs}		--	0.6	--	nC
Gate-Drain Charge	Q _{gd}		--	1.7	--	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage ^(Note 3)	V _{SD}	V _{GS} =0V I _S =2A	--	0.74	1.2	V
Diode Forward Current ^(Note 2)	I _S		--	--	1.8	A

Notes:

- ① Pulse width limited by maximum allowable junction temperature
 ② Pulse test ; Pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.

• Typical Characteristics

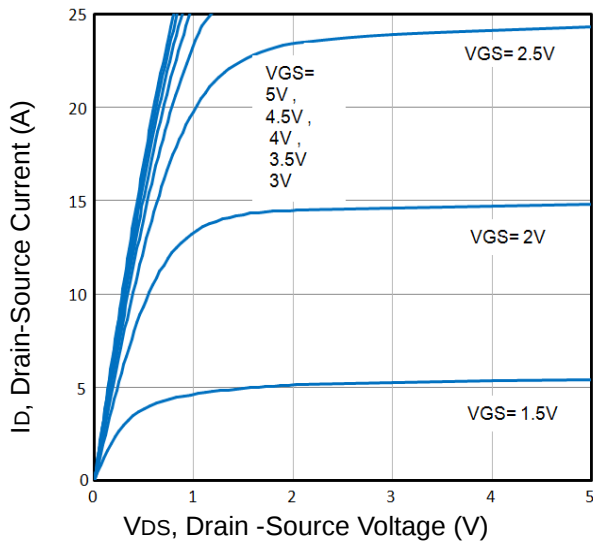


Fig1. Typical Output Characteristics

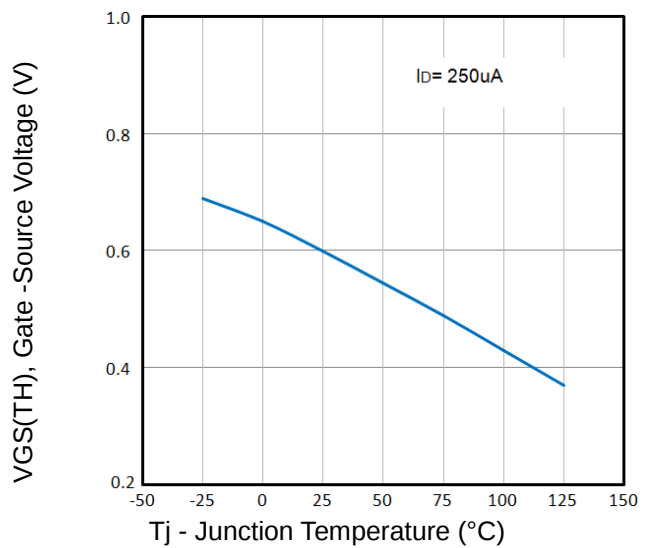


Fig2. Normalized Threshold Voltage Vs. Temperature

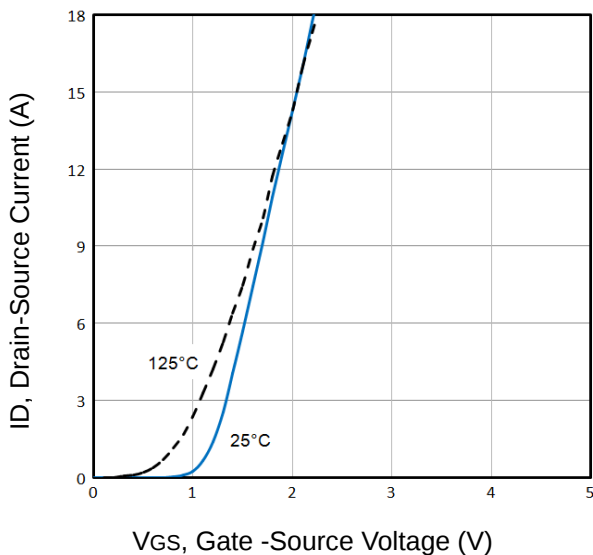


Fig3. Typical Transfer Characteristics

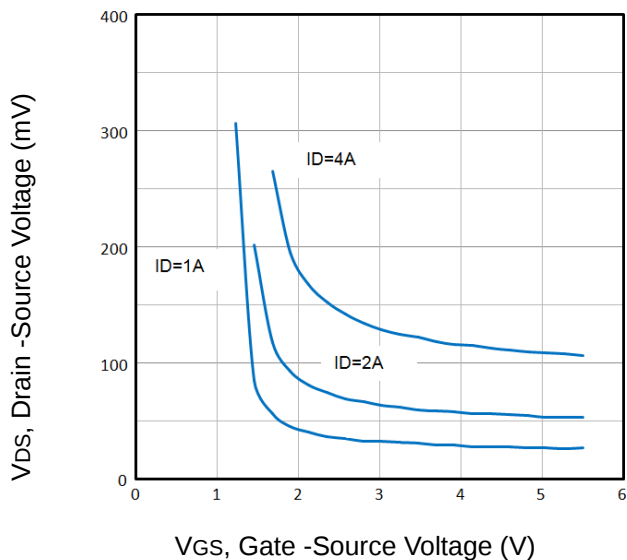


Fig4. Drain-Source Voltage vs Gate-Source Voltage

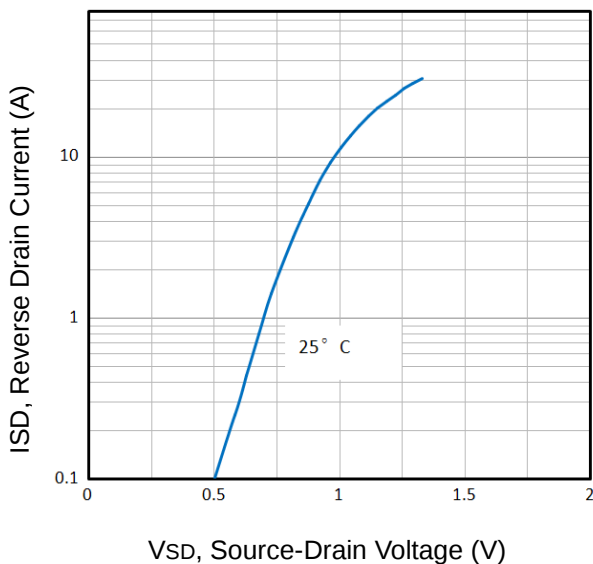


Fig5. Typical Source-Drain Diode Forward Voltage

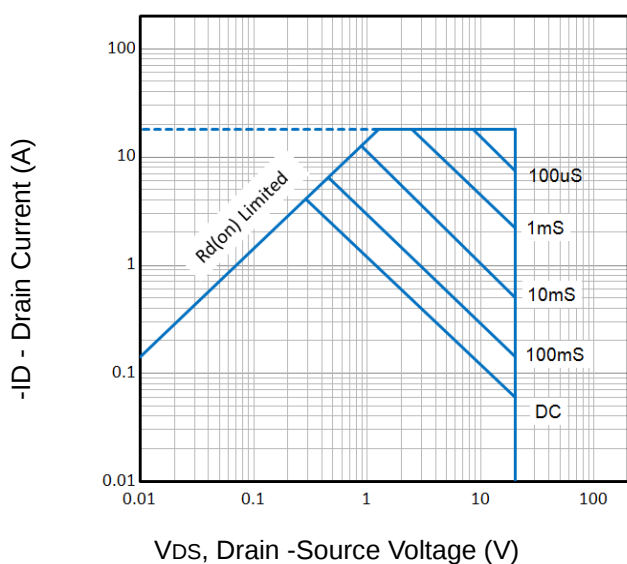


Fig6. Maximum Safe Operating Area

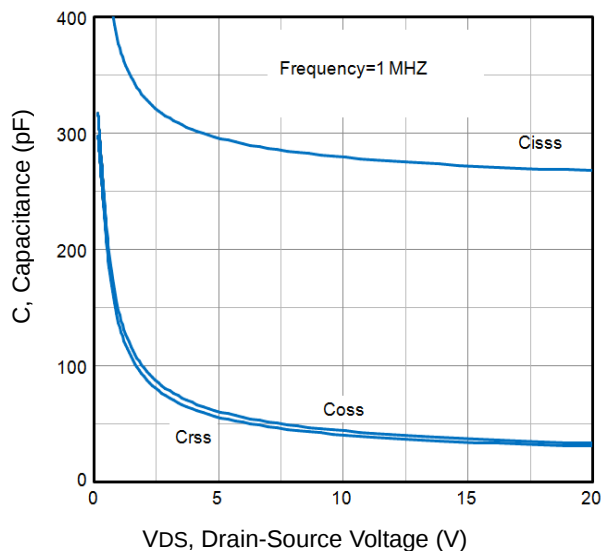


Fig7. Typical Capacitance Vs. Drain-Source Voltage

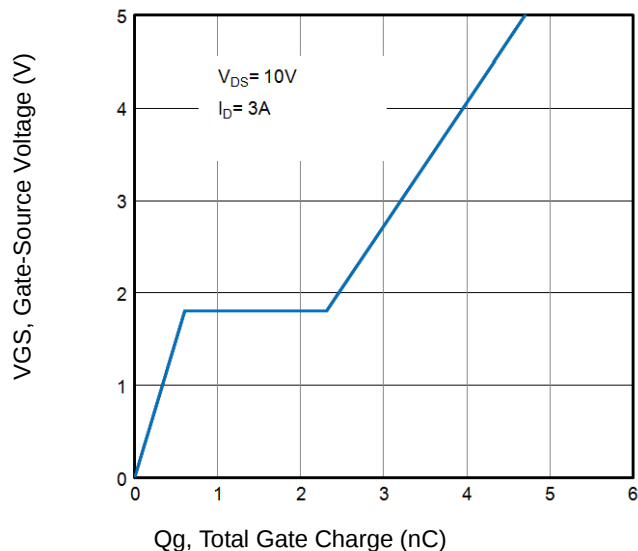


Fig8. Typical Gate Charge Vs. Gate-Source Voltage

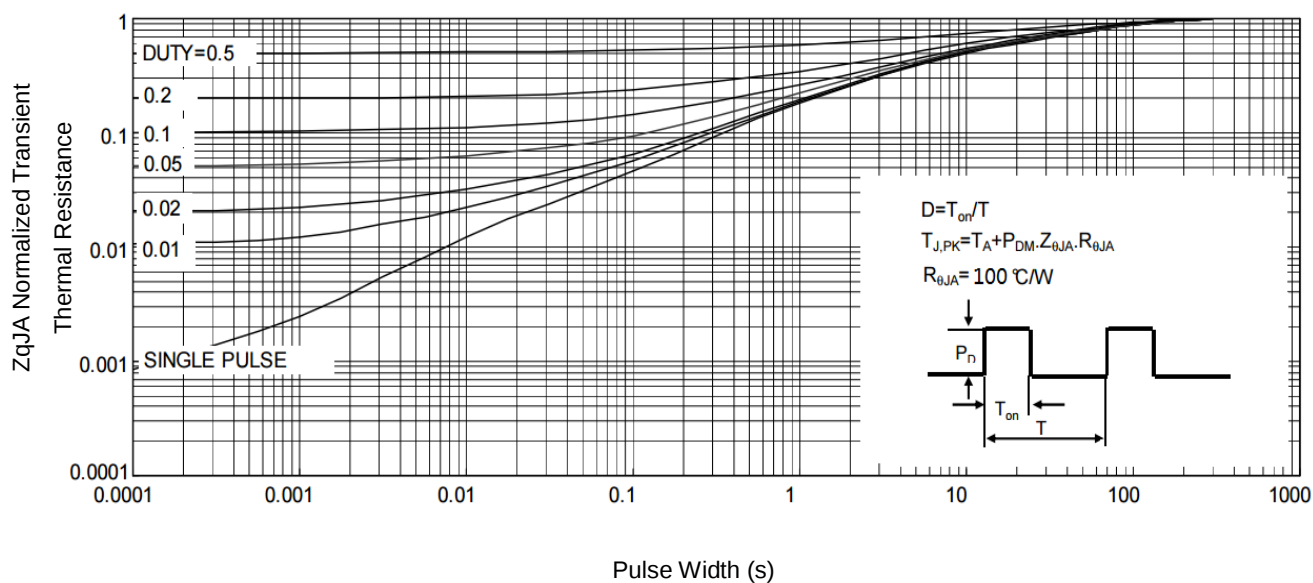


Fig9. Normalized Maximum Transient Thermal Impedance

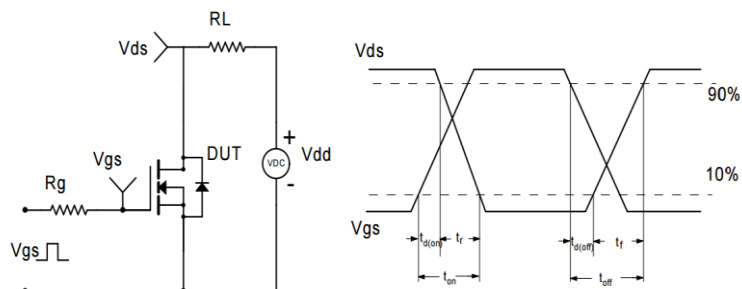
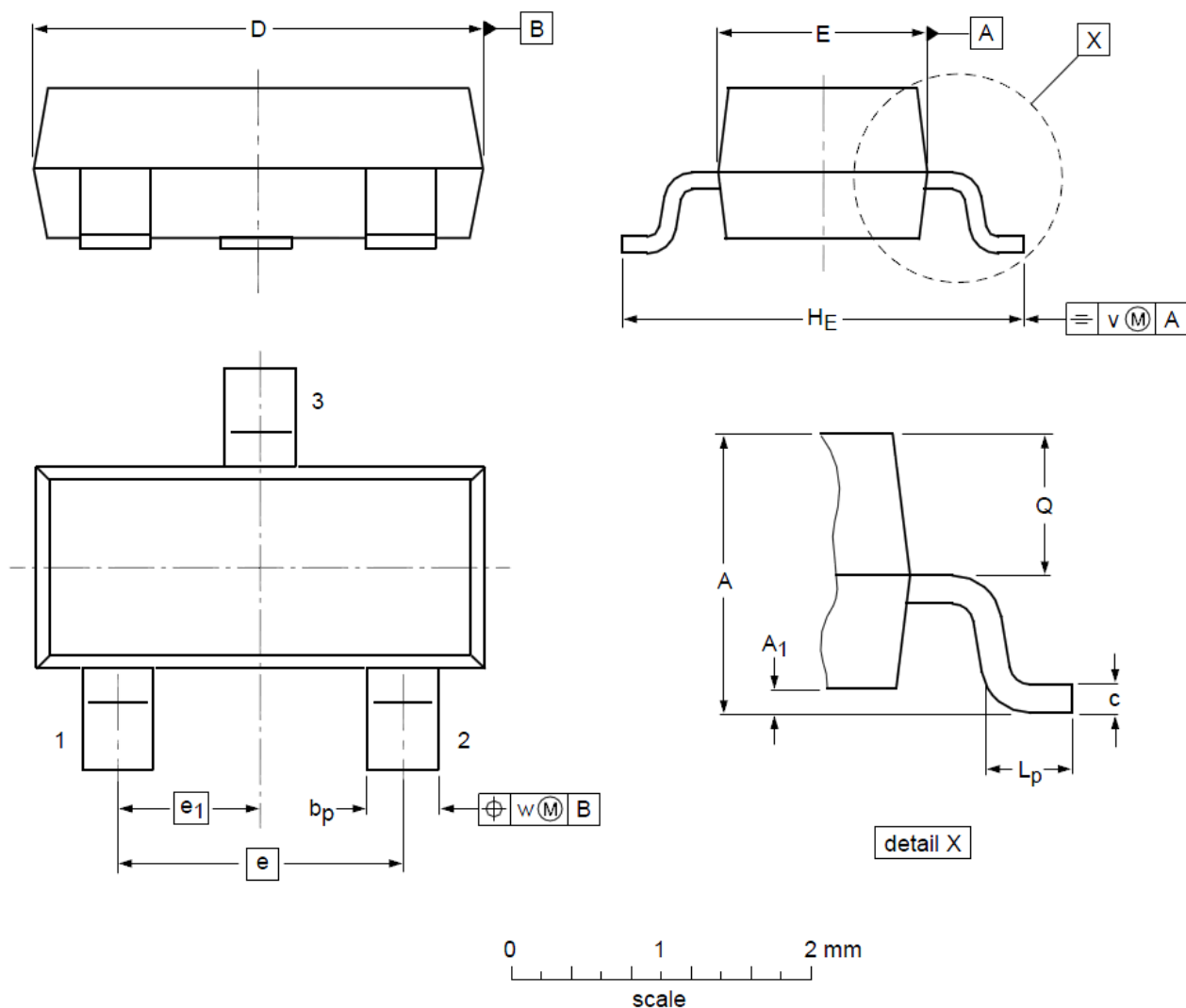


Fig10. Switching Time Test Circuit and waveforms

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	--				