

• Product Summary

Part #	V_{DS}	$R_{DS(on).typ}$ (@ $V_{GS}=10V$)	$R_{DS(on).typ}$ (@ $V_{GS}=4.5V$)	I_D
EFM3406	30V	50m Ω	60m Ω	3.6A

• Features

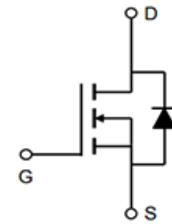
- Low $R_{DS(on)}$ @ $V_{GS}=10V$
- 4.5V Logic Level Control
- N Channel SOT23 Package
- Pb-Free, RoHS Compliant

• Application

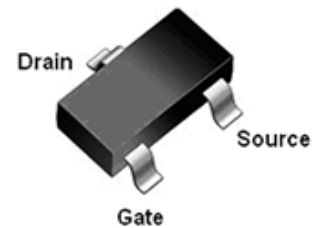
- Load Switch
- Battery switch
- DC/DC Converter

• Ordering Information:

Part NO.	EFM3406
Marking	3406
Packing Information	REEL TAPE
Basic ordering unit (pcs)	3000



N- Channel MOSFET



SOT- 23



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

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	30	V
Gate-Source Voltage	V_{GS}	± 20	V
Drain Current-Continuous	I_D	3.6	A
Drain Current-Pulsed ^(Note 1)	I_{DM}	15	A
Maximum Power Dissipation	P_D	1.4	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)	$R_{\theta JA}$	125	$^{\circ}C/W$
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• 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	μA
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 =3.6A	--	50	65	mΩ
		V _{GS} =4.5V I _D =3A	--	60	75	mΩ
Dynamic Characteristics ^(Note4)						
Input Capacitance	C _{ISS}	V _{DS} =15V V _{GS} =0V F=1.0MHz	--	288	--	PF
Output Capacitance	C _{OSS}		--	57	--	PF
Reverse Transfer Capacitance	C _{RSS}		--	39	--	PF
Gate Resistance	R _g	F=1.0MHz	--	3	--	Ω
Switching Characteristics ^(Note 4)						
Turn-on Delay Time	t _{d(on)}	V _{DD} =15V I _D =3A V _{GS} =10V R _G =3.3Ω,	--	4.6	--	nS
Turn-on Rise Time	t _r		--	1.9	--	nS
Turn-Off Delay Time	t _{d(off)}		--	21	--	nS
Turn-Off Fall Time	t _f		--	2.6	--	nS
Total Gate Charge	Q _g	V _{DS} =15V I _D =3.6A V _{GS} =10V	--	6.5	--	nC
Gate-Source Charge	Q _{gs}		--	1.2	--	nC
Gate-Drain Charge	Q _{gd}		--	1.6	--	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage ^(Note 3)	V _{SD}	V _{GS} =0V I _S =1A	--	0.79	1	V
Diode Forward Current ^(Note 2)	I _S		--	--	2.5	A

Notes:

- A: The value of R_{θJA} is measured with the device mounted on 1in FR-4 board with 2oz. Copper, in a still air environment with T_A=25°C. The value in any given application depends on the user's specific board design. The current rating is based on the t≤ 10s thermal resistance rating.
- B: Repetitive rating, pulse width limited by junction temperature.
- C: The R_{θJA} is the sum of the thermal impedance from junction to lead R_{θJL} and lead to ambient.
- D: The static characteristics in Figures 1 to 6,12,14 are obtained using 80μs pulses, duty cycle 0.5% max.
- E: These tests are performed with the device mounted on 1 in² FR-4 board with 2oz. Copper, in a still air environment with T_A=25°C. The SOA curve provides a single pulse rating.

• Typical Characteristics

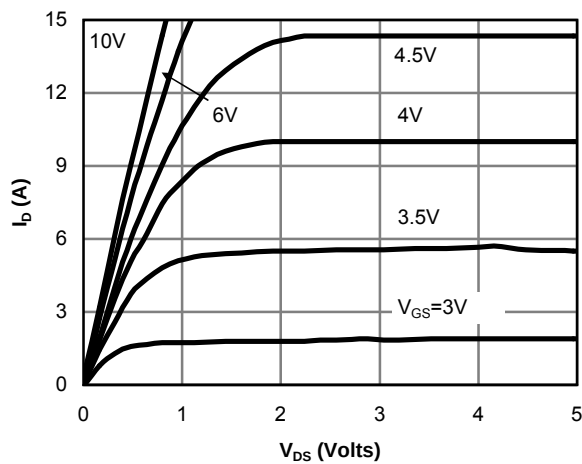


Fig 1: On-Region Characteristics

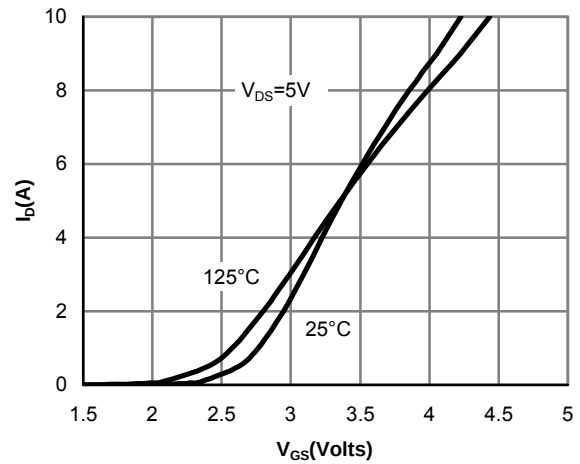


Figure 2: Transfer Characteristics

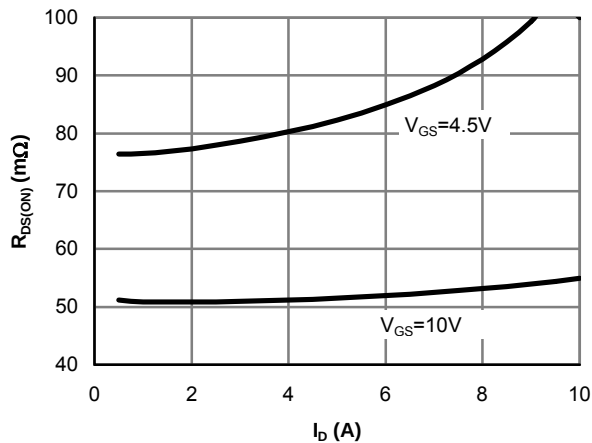


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

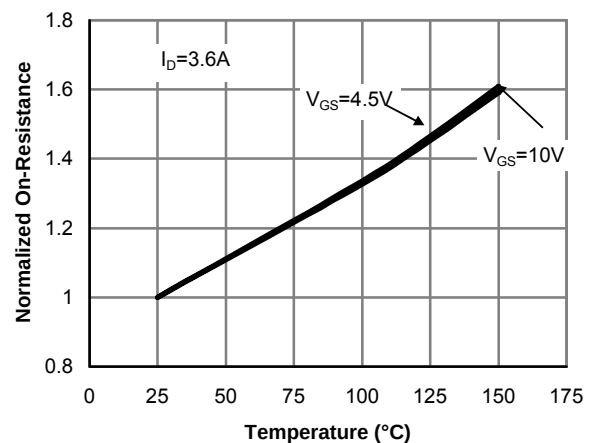


Figure 4: On-Resistance vs. Junction Temperature

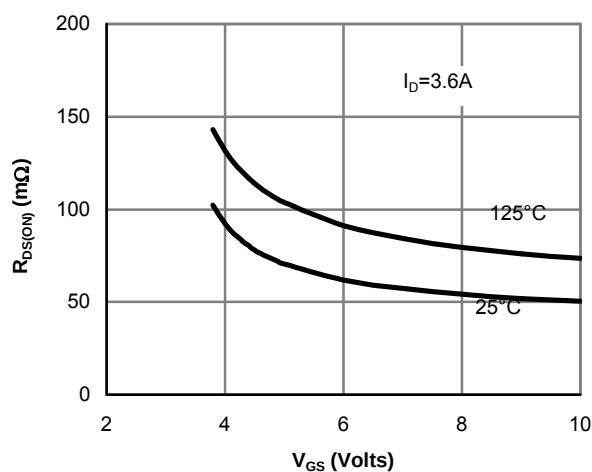


Figure 5: On-Resistance vs. Gate-Source Voltage

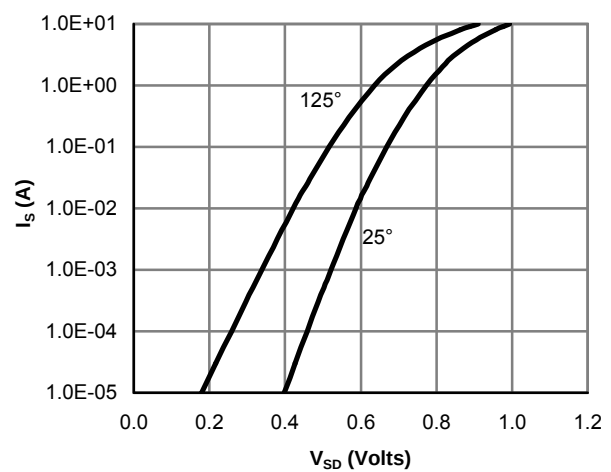
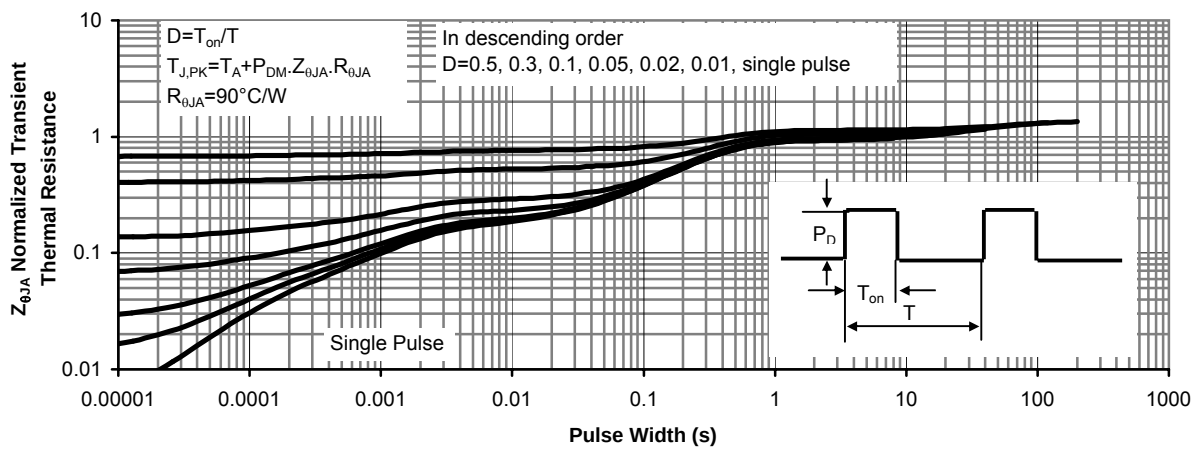
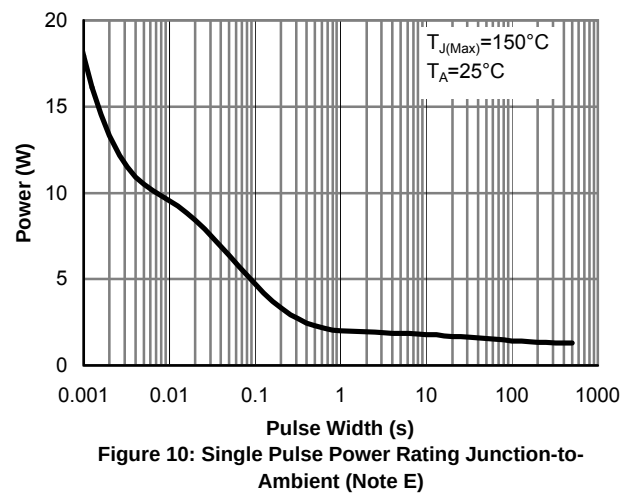
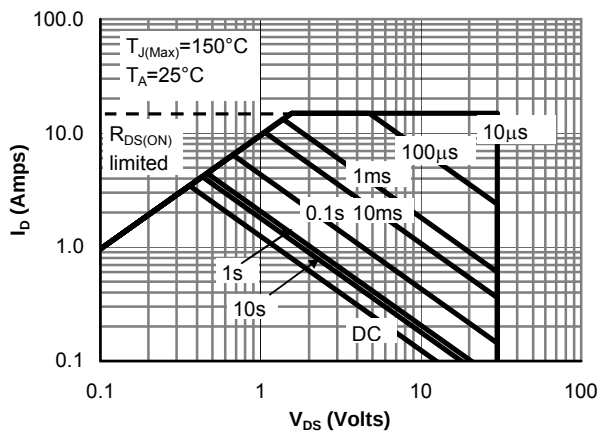
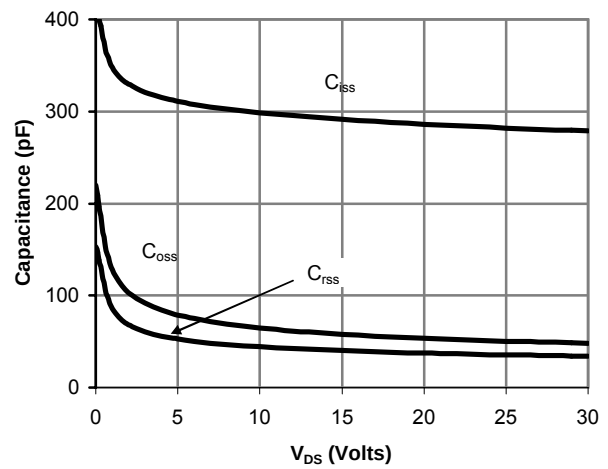
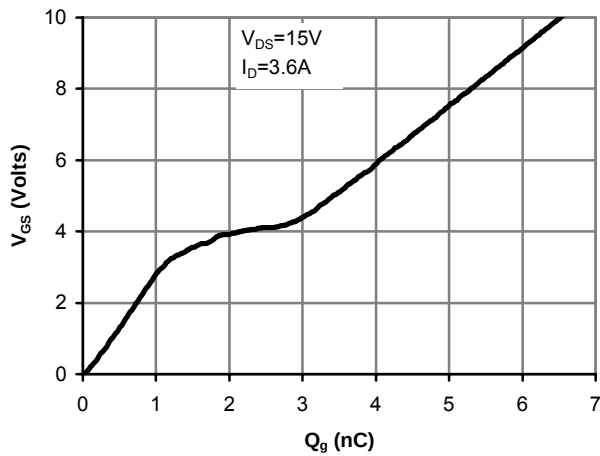
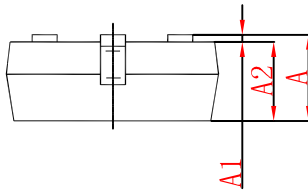
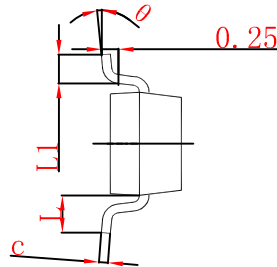
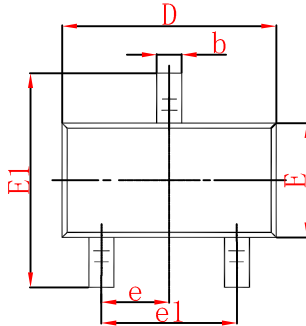


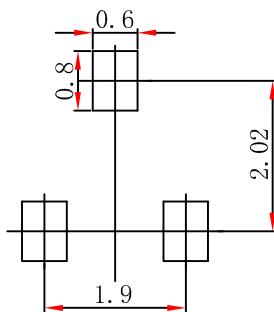
Figure 6: Body-Diode Characteristics



SOT-23 Package Outline Dimensions



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.900	1.150	0.035	0.045
A1	0.000	0.100	0.000	0.004
A2	0.900	1.050	0.035	0.041
b	0.300	0.500	0.012	0.020
c	0.080	0.150	0.003	0.006
D	2.800	3.000	0.110	0.118
E	1.200	1.400	0.047	0.055
E1	2.250	2.550	0.089	0.100
e	0.950 TYP		0.037 TYP	
e1	1.800	2.000	0.071	0.079
L	0.550 REF		0.022 REF	
L1	0.300	0.500	0.012	0.020
θ	0°	8°	0°	8°



Note:

1. Controlling dimension: in millimeters.
2. General tolerance: $\pm 0.05\text{mm}$.
3. The pad layout is for reference purposes only.