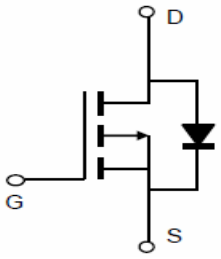
EFMICRO
Semiconductor Limited Company

EFM3403

P-Channel Advanced Power MOSFET

• Product Summary

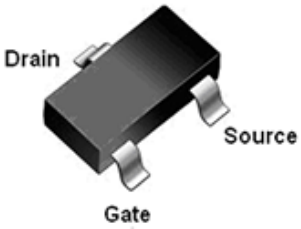
Part #	V_{DS}	$R_{DS(on).typ}$ ($@V_{GS}$=10V)	$R_{DS(on).typ}$ ($@V_{GS}$=4.5V)	I_D
EFM3403	-30V	88mΩ	103mΩ	-2.6A



P-Channel MOSFET

• Features

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



SOT - 23

RoHS

HF

•Application

- High-side Load Switch
- *Switching Circuits*
- *High Speed line Driver*

•Ordering Information:

Part NO.	EFM3403
Marking	A39T
Packing Information	REEL TAPE
Basic ordering unit (pcs)	3000

•Absolute Maximum Ratings (T_C=25℃)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	-30	V
Gate-Source Voltage	V_{GS}	±12	V
Drain Current-Continuous	I_D	-2.6	A
Drain Current-Pulsed (Note 1)	I_{DM}	-13	A
Maximum Power Dissipation	P_D	1.4	W
Operating Junction and Storage Temperature Range	T_J,T_{STG}	-55 To 150	℃

•Thermal Characteristic

Thermal Resistance,Junction-to-Ambient (Note 2)	$R_{\theta JA}$	125	℃/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	uA
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	-0.5	-0.8	-1.2	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=-10V I_D=-2.6A	--	88	115	mΩ
		V_{GS}=-4.5VI_D=-2A	--	103	150	mΩ
Dynamic Characteristics (Note4)						
Input Capacitance	C_{lss}	V_{DS}=-15V V_{GS}=0V F=1.0MHz	--	260	--	PF
Output Capacitance	C_{oss}		--	37	--	PF
Reverse Transfer Capacitance	C_{rss}		--	20	--	PF
Switching Characteristics (Note 4)						
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=-15V I_D=-2A V_{GS}=-10V R_G=3.3Ω,	--	6	--	nS
Turn-on Rise Time	t_r		--	3.5	--	nS
Turn-Off Delay Time	$t_{d(off)}$		--	20	--	nS
Turn-Off Fall Time	t_f		--	5	--	nS
Total Gate Charge	Q_g	V_{DS}=-15V I_D=-2.6A V_{GS}=-10V	--	5.9	--	nC
Gate-Source Charge	Q_{gs}		--	0.7	--	nC
Gate-Drain Charge	Q_{gd}		--	1	--	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage (Note 3)	V_{SD}	V_{GS}=0V I_S=-1A	--	-0.78	-1	V
Diode Forward Current (Note 2)	I_S		--	--	-1.5	A

Notes:

A. The value of $R_{\theta JA}$ is measured with the device mounted on 1in² 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.
B. The power dissipation P_D is based on $T_{J(MAX)}$=150° C, using ≤ 10s junction-to-ambient thermal resistance.
C. Repetitive rating, pulse width limited by junction temperature $T_{J(MAX)}$=150° C. Ratings are based on low frequency and duty cycles to keep initialT_J=25° C.
D. The $R_{\theta JA}$ is the sum of the thermal impedence from junction to lead $R_{\theta JL}$ and lead to ambient.
E. The static characteristics in Figures 1 to 6 are obtained using <300μs pulses, duty cycle 0.5% max.
F. These curves are based on the junction-to-ambient thermal impedence which is measured with the device mounted on 1in² FR-4 board with 2oz. Copper, assuming a maximum junction temperature of $T_{J(MAX)}$=150° C. The SOA curve provides a single pulse rating.

• Typical Characteristics

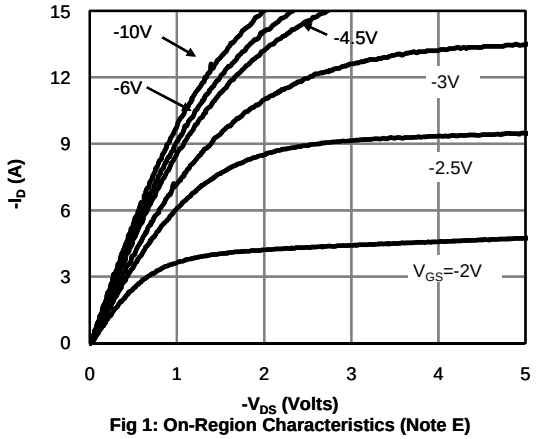


Fig 1: On-Region Characteristics (Note E)

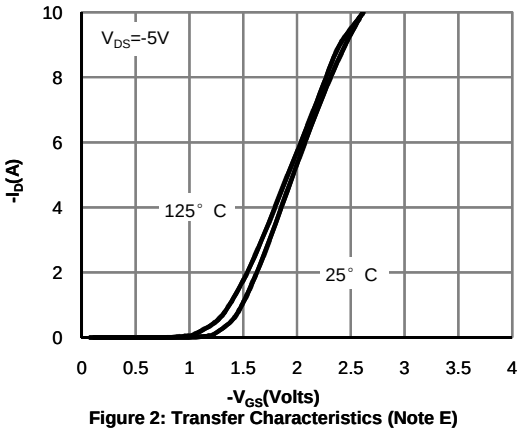


Figure 2: Transfer Characteristics (Note E)

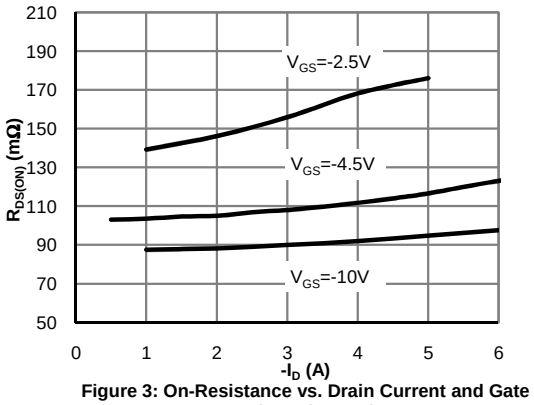


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

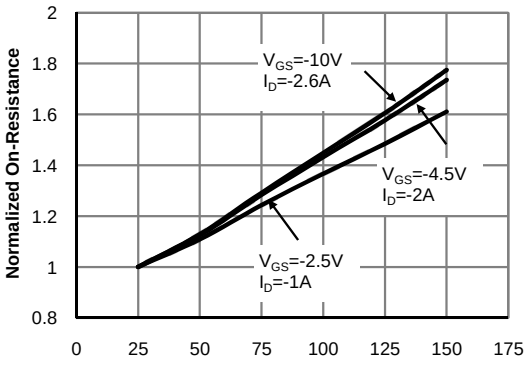


Figure 4: On-Resistance vs. Junction Temperature (Note E)

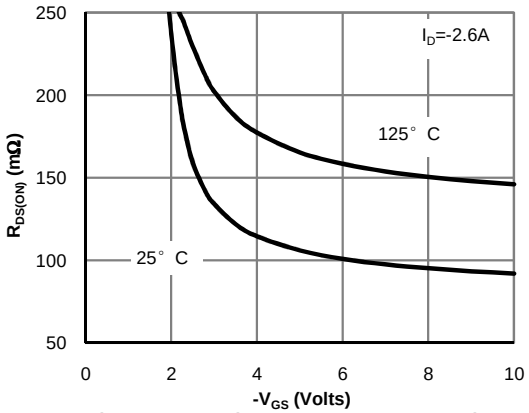


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

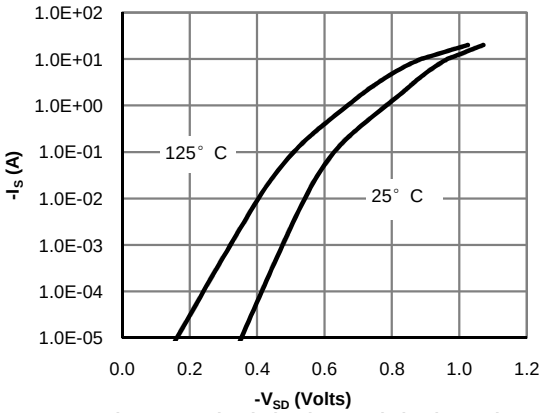


Figure 6: Body-Diode Characteristics (Note E)

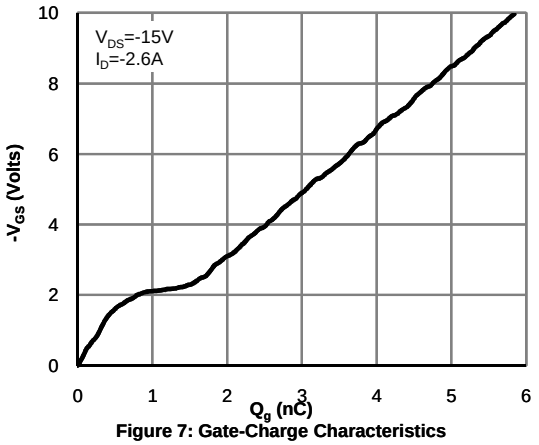


Figure 7: Gate-Charge Characteristics

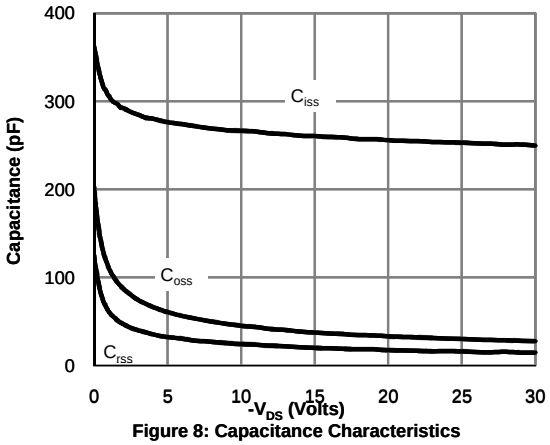


Figure 8: Capacitance Characteristics

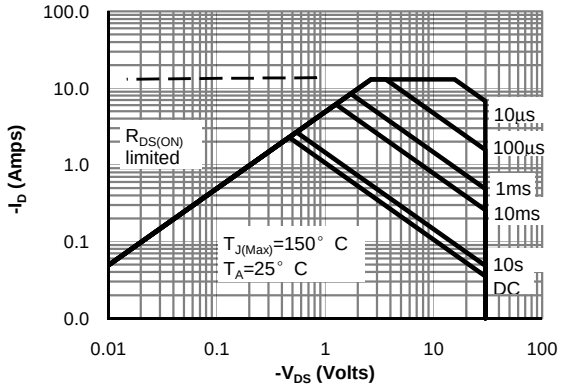


Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

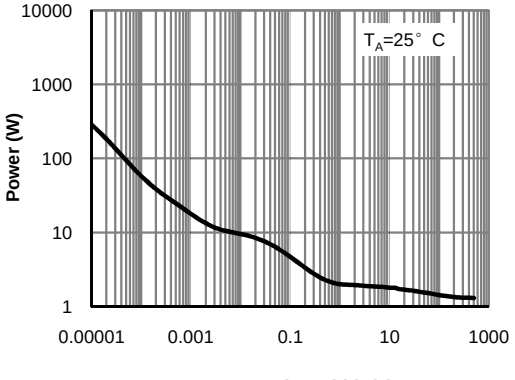


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note F)

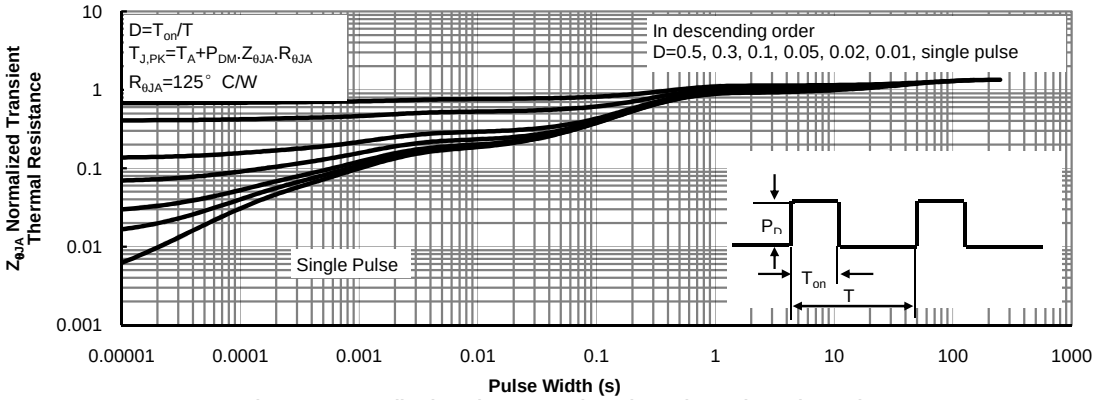
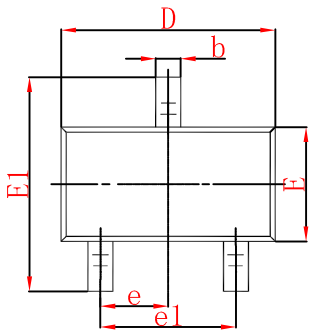
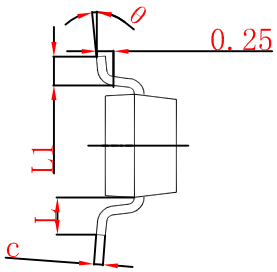
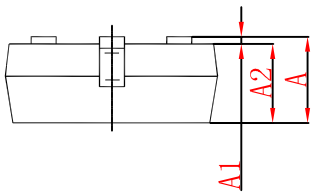


Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)

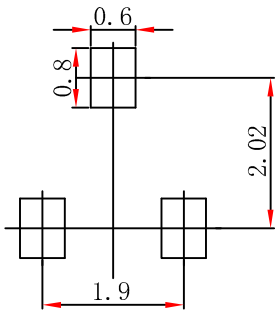
SOT-23 Package Outline Dimensions







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:± 0.05mm.
3.The pad layout is for reference purposes only.