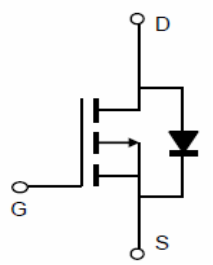
EFM4435A

P-Channel Advanced MOSFET

• Product Summary

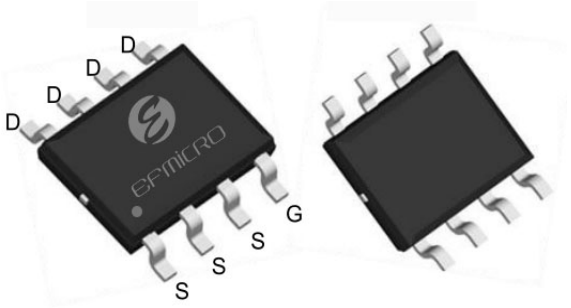
Part #	V_{DS}	$R_{DS(on).typ}$ ($@V_{GS}$=10V)	$R_{DS(on).typ}$ ($@V_{GS}$=4.5V)	I_D
EFM4435A	-30V	13mΩ	18mΩ	-11A



P-Channel MOSFET

• Description

- The EFM4435A is the high cell density trenched
- N-ch MOSFETs which provide excellent
- RDSON and gate cherge for most of the
- synchronous buck converter applications.
- The EFM4435A meet the RoHS and Green
- Prod uct requirement, 100 % EAS guaranteed
- with full function reliability approved.



SOP-8

•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.	EFM4435A
Marking	4435 ******
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}	±20	V
Drain Current-Continuous	I_D	-11	A
Drain Current-Pulsed (Note 1)	I_{DM}	40	A
Maximum Power Dissipation	P_D	3.7	W
Operating Junction and Storage Temperature Range	T_J,T_{STG}	-55 To 150	℃

•Thermal Characteristic

Thermal Resistance,Junction-to-Ambient (Note 2)	$R_{\theta JA}$	35	℃/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	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=-10A	--	13	16	mΩ
		V_{GS}=-4.5V I_D=-8A	--	18	25	mΩ
Forward Transconductance	g_{FS}	V_{DS}=-5V I_D=-8A	--	30	--	S
Gate Resistance	Rg	V_{DS}=-10V V_{GS}=0V	--	2.5	--	Ω
Dynamic Characteristics (Note4)						
Input Capacitance	C_{lss}	V_{DS}=-15V V_{GS}=0V F=1.0MHz	--	1330	--	PF
Output Capacitance	C_{oss}		--	183	--	PF
Reverse Transfer Capacitance	C_{rss}		--	156	--	PF
Switching Characteristics (Note 4)						
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=-15V I_D=-10A V_{GS}=-10V R_G=2.5Ω,	--	9	--	nS
Turn-on Rise Time	t_r		--	13	--	nS
Turn-Off Delay Time	$t_{d(off)}$		--	48	--	nS
Turn-Off Fall Time	t_f		--	20	--	nS
Total Gate Charge	Q_g	V_{DS}=-15V I_D=-8A V_{GS}=-10V	--	22	--	nC
Gate-Source Charge	Q_{gs}		--	1.0	--	nC
Gate-Drain Charge	Q_{gd}		--	1.8	--	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage (Note 3)	V_{SD}	V_{GS}=0V I_S=-11A	--	-0.8	-1.2	V
Diode Forward Current (Note 2)	I_S		--	--	-11	A

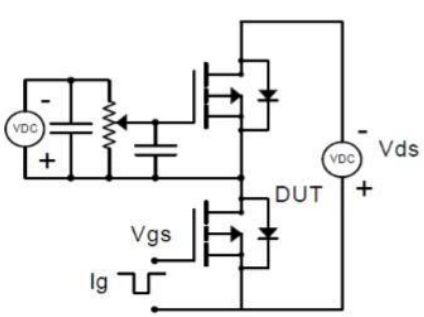
Notes:1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature

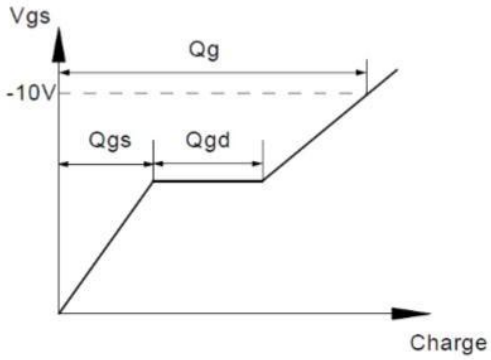
2. EAS condition: T_J=25℃, V_{GS}=10V, R_G=25Ω, L=0.5mH, I_{AS}=-12.7A

3. Pulse Test: Pulse Width≤300μs, Duty Cycle≤0.5%

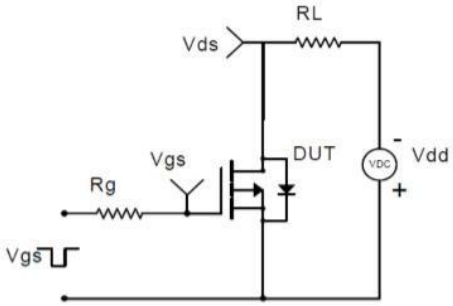
• Test Circuit

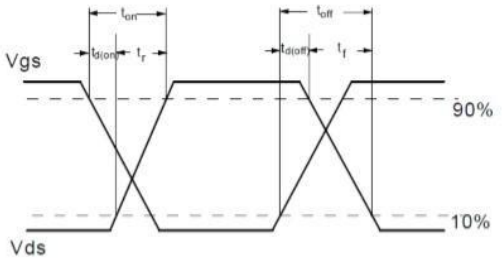
Gate Charge Test Circuit & Waveform



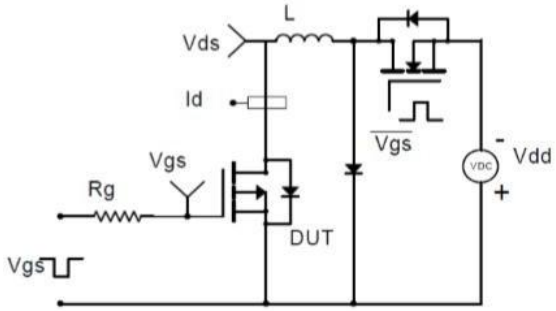


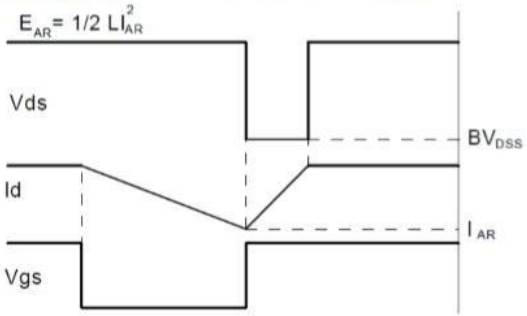
Resistive Switching Test Circuit & Waveforms



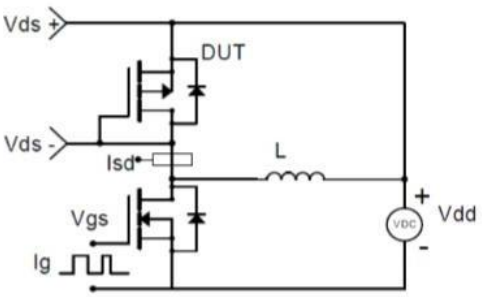


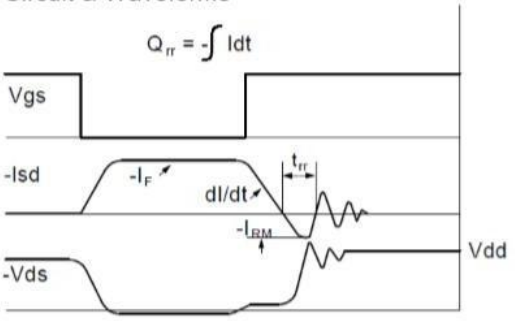
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms





Diode Recovery Test Circuit & Waveforms





• Typical Characteristics

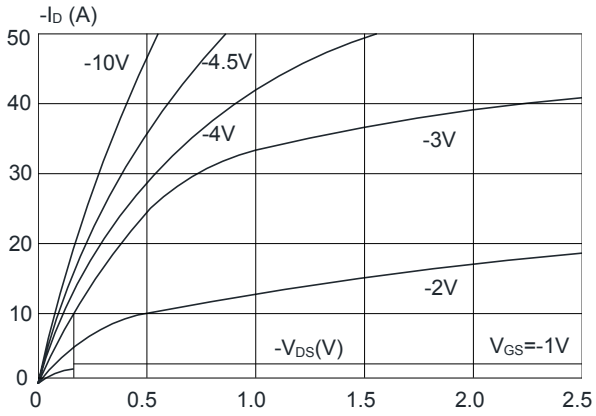


Figure1: Output Characteristics

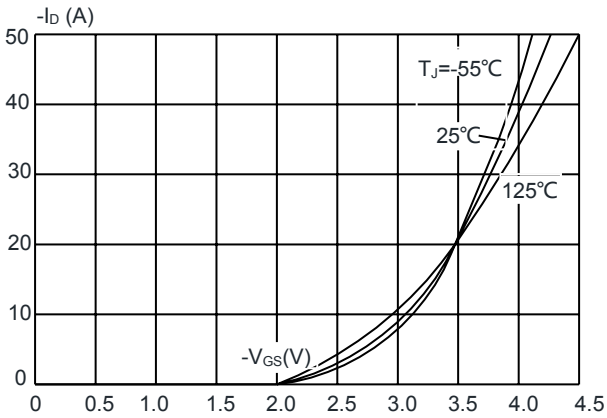


Figure 2: Typical Transfer Characteristics

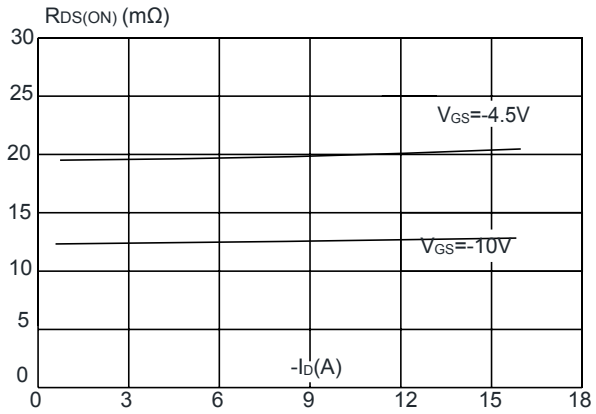


Figure 3: On-resistance vs. Drain Current

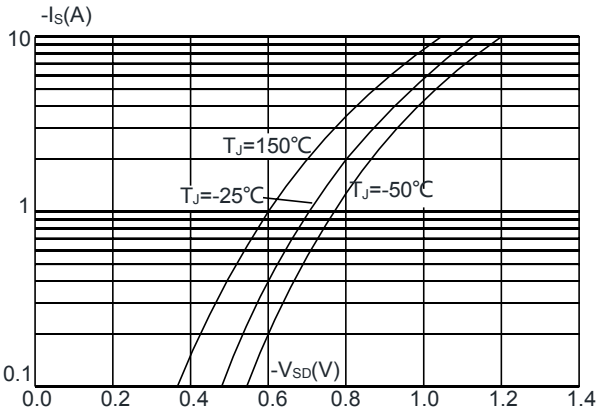


Figure 4: Body Diode Characteristics

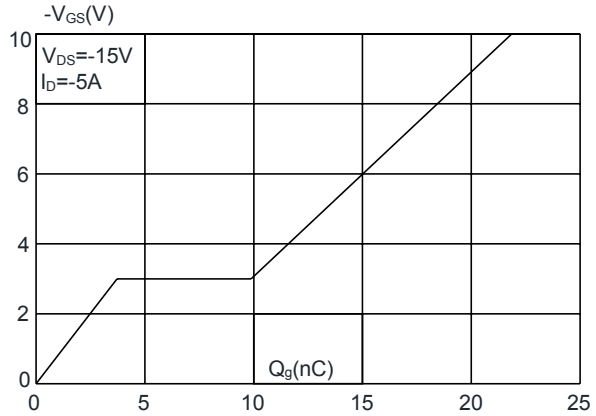


Figure 5: Gate Charge Characteristics

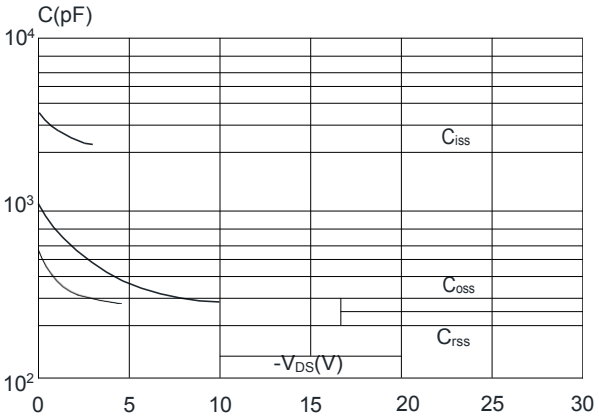


Figure 6: Capacitance Characteristics

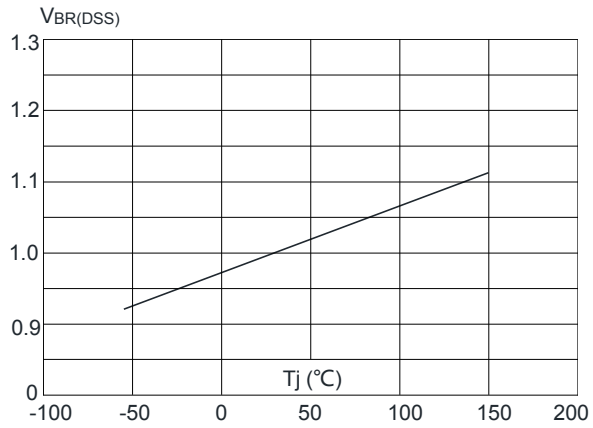


Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

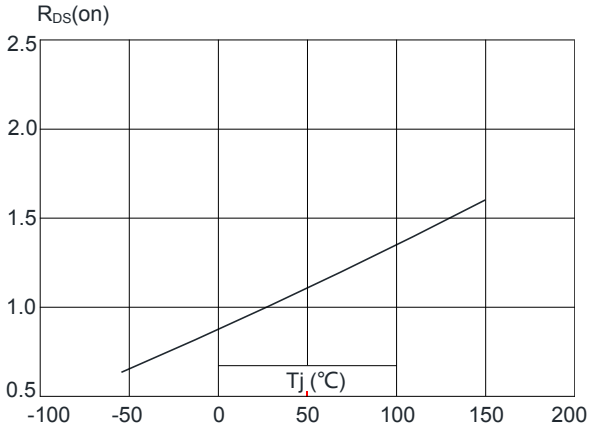


Figure 8: Normalized on Resistance vs. Junction Temperature

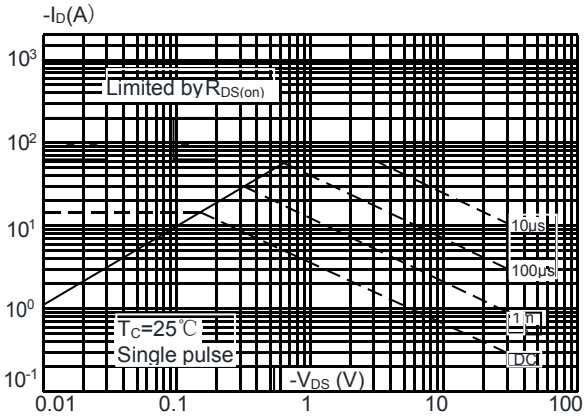


Figure 9: Maximum Safe Operating Area

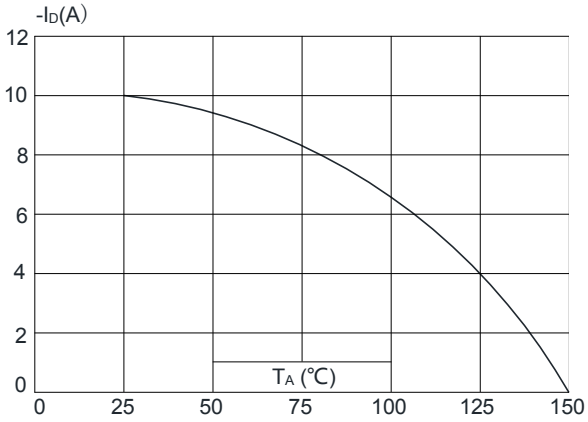


Figure 10: Maximum Continuous Drain Current vs. Ambient Temperature

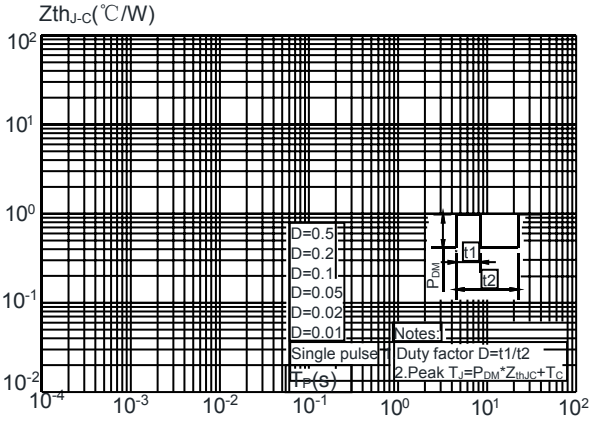
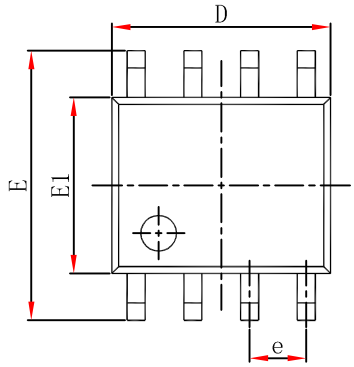
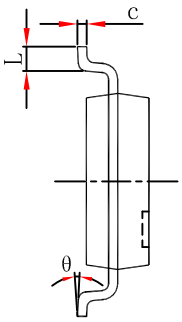
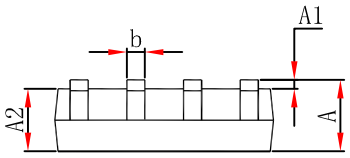


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Case

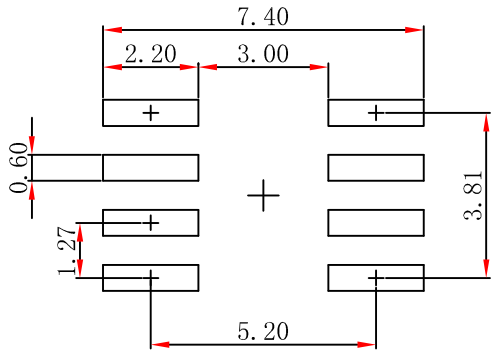
SOP8 Package Outline Dimensions







Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	**Max**	**Min**	**Max**
A	1.450	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.007	0.010
D	4.700	5.100	0.185	0.201
e	1.270（BSC）		0.050（BSC）	
E	5.800	6.200	0.228	0.244
E1	3.800	4.000	0.150	0.157
L	0.400	1.270	0.016	0.050
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.