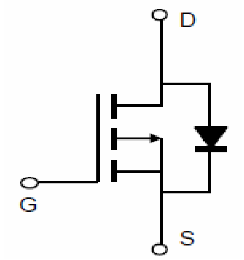
• Product Summary

Part #	V_{DS}	$R_{DS(on).typ}$ (@V_{GS}=10V)	$R_{DS(on).typ}$ (@V_{GS}=4.5V)	I_D
EFM3451A	-30V	41mΩ	47mΩ	-4A



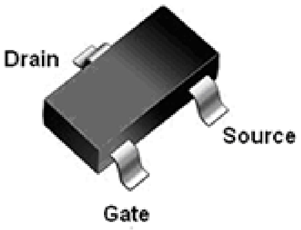
P-Channel MOSFET

• Features

- ■*Low $R_{DS(on)}$ @V_{GS}=-10V*
- ■*- 4.5V Logic Level Control*
- ■*P Channel SOT23-3L Package*
- ■*Pb−Free, RoHS Compliant*

•Application

- ■ Notebook
- ■ *Load Switch*
- ■ Battery Protection
- ■ Hand-Held Instruments



SOT23-3L

•Ordering Information:

Part NO.	EFM3451A
Marking	BP****
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	-4	A
Drain Current-Pulsed (Note 1)	I_{DM}	-27	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)	$R_{\theta JA}$	100	℃/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	-1.5	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=-10V I_D=-4A	--	41	50	mΩ
		V_{GS}=-4.5VI_D=-3.5A	--	47	60	mΩ
Dynamic Characteristics (Note4)						
Input Capacitance	C_{iss}	V_{DS}=-15V V_{GS} =0V F=1.0MHz	--	645	--	PF
Output Capacitance	C_{oss}		--	80	--	PF
Reverse Transfer Capacitance	C_{rss}		--	55	--	PF
Switching Characteristics (Note 4)						
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=-15V I_D=-4A V_{GS}=-10V R_G=3Ω,	--	6.5	--	nS
Turn-on Rise Time	t_r		--	3.5	--	nS
Turn-Off Delay Time	$t_{d(off)}$		--	41	--	nS
Turn-Off Fall Time	t_f		--	9	--	nS
Total Gate Charge	Q_g	V_{DS}=-15V I_D=-4A V_{GS}=-10V	--	14	--	nC
Gate-Source Charge	Q_{gs}		--	1.5	--	nC
Gate-Drain Charge	Q_{gd}		--	2.5	--	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage (Note 3)	V_{SD}	V_{GS}=0V I_S=-4A	--	-0.84	-1.2	V
Diode Forward Current (Note 2)	I_S		--	--	-4	A

Notes:

① Pulse width limited by maximum allowable junction temperature

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

• Typical Characteristics

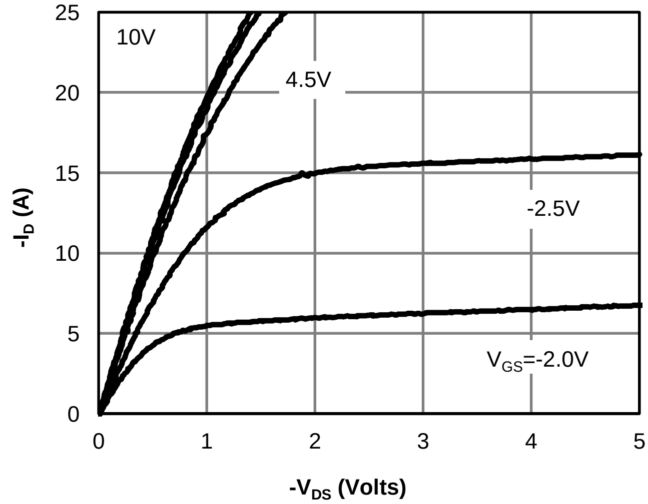


Fig 1: On-Region Characteristics (Note E)

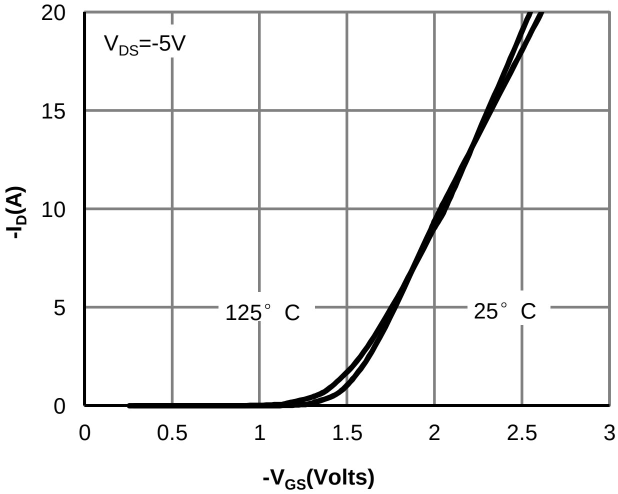


Figure 2: Transfer Characteristics (Note E)

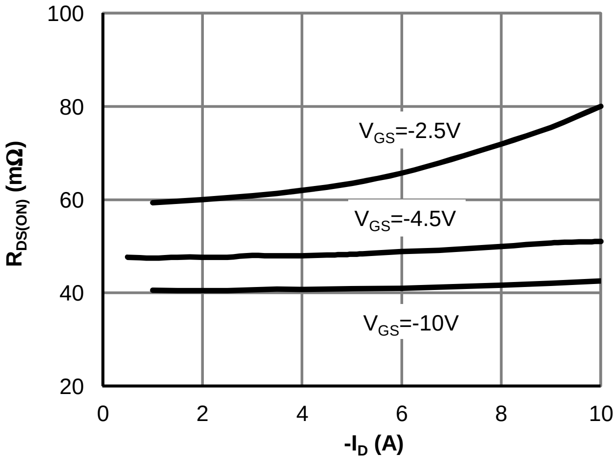


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

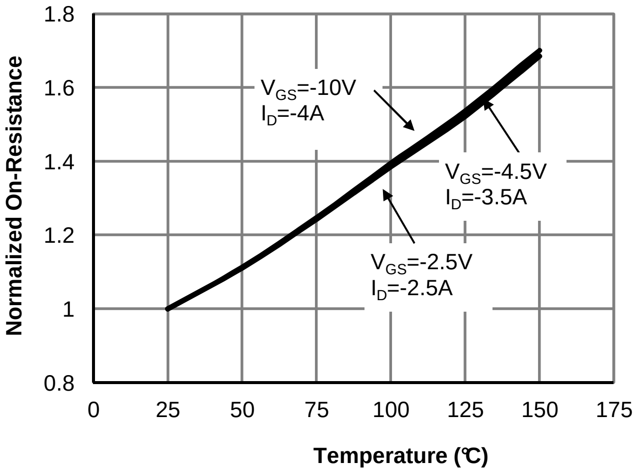


Figure 4: On-Resistance vs. Junction Temperature (Note E)

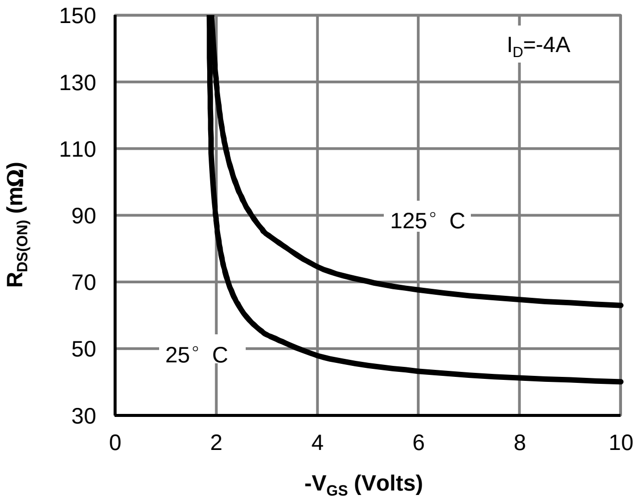


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

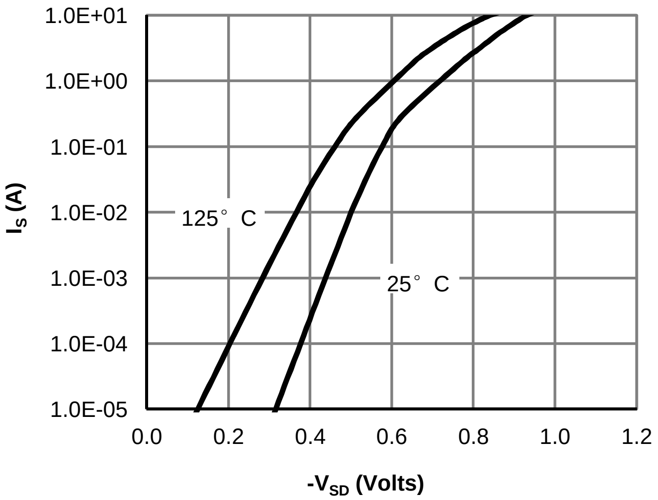


Figure 6: Body-Diode Characteristics (Note E)

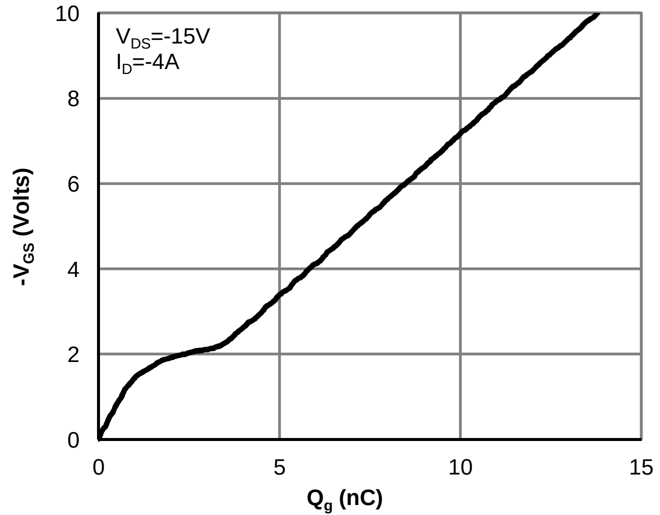


Figure 7: Gate-Charge Characteristics

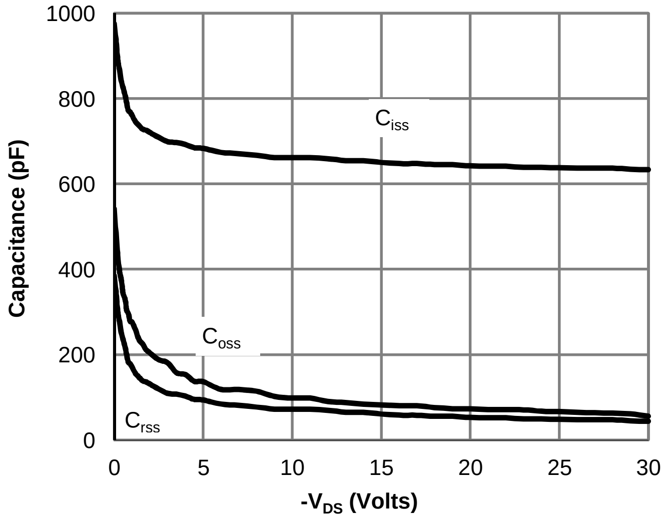


Figure 8: Capacitance Characteristics

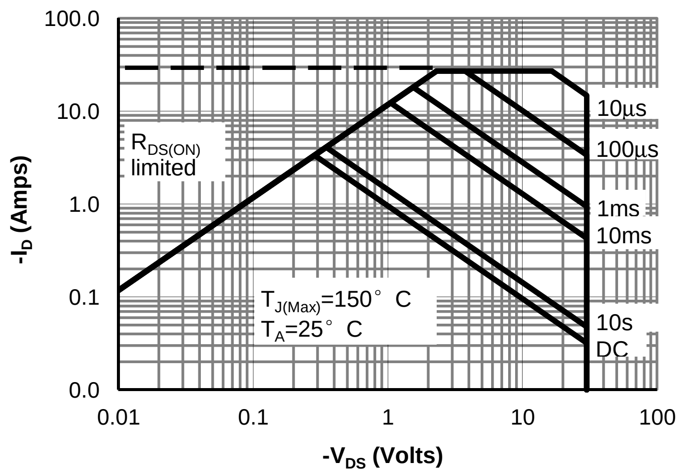


Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

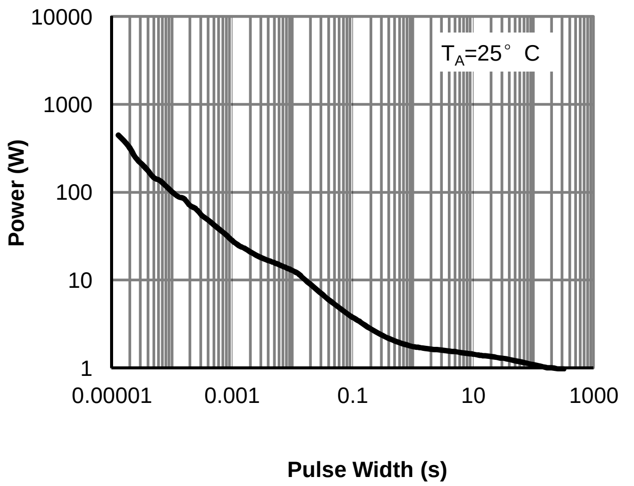


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note F)

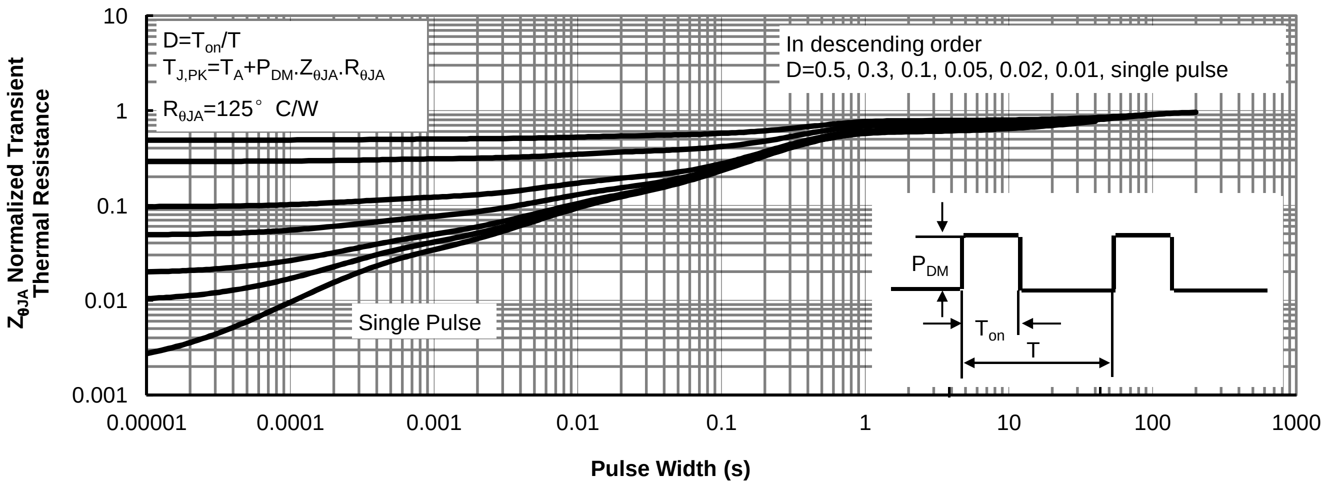
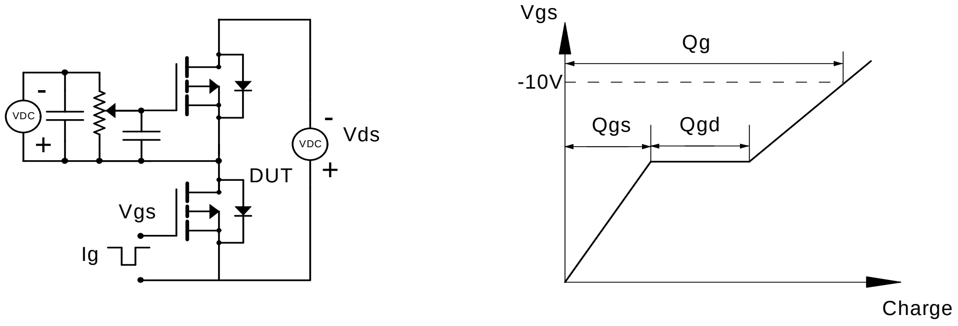


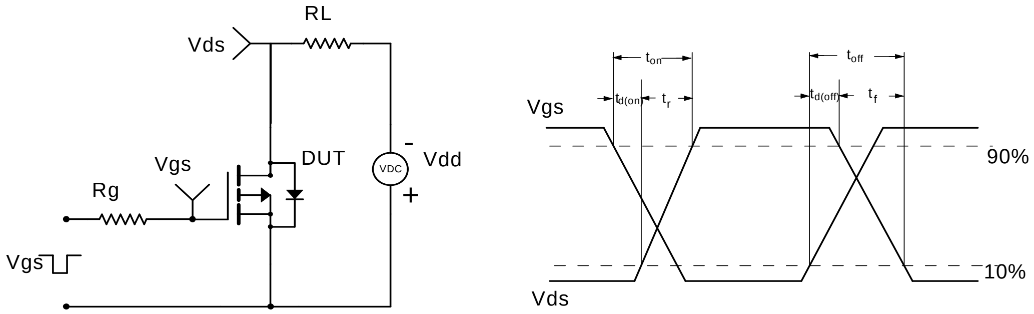
Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)

• Test circuit

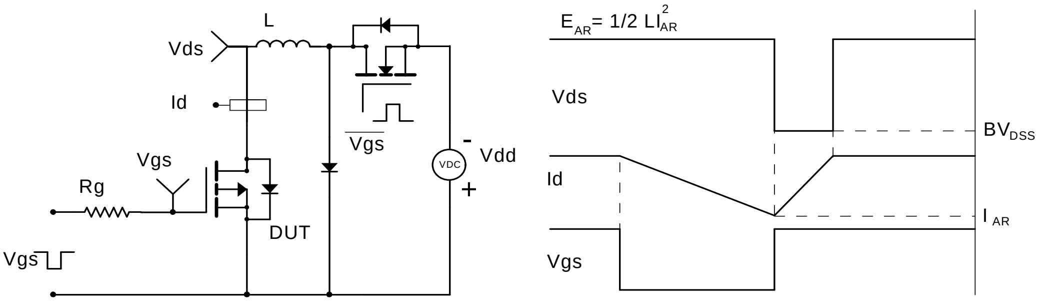
Gate Charge Test Circuit & Waveform



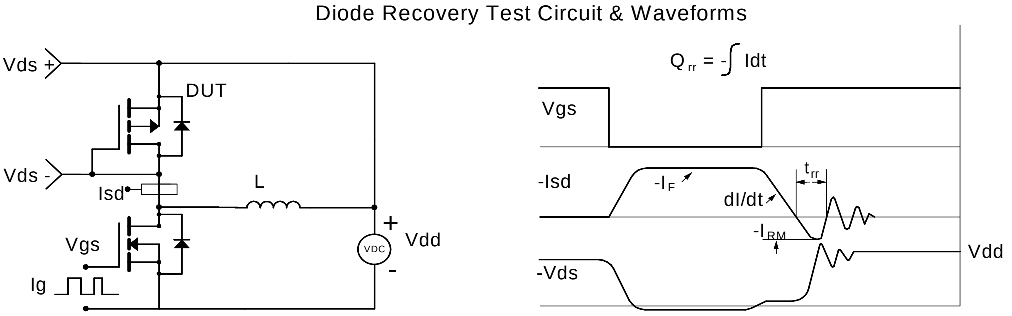
Resistive Switching Test Circuit & Waveforms



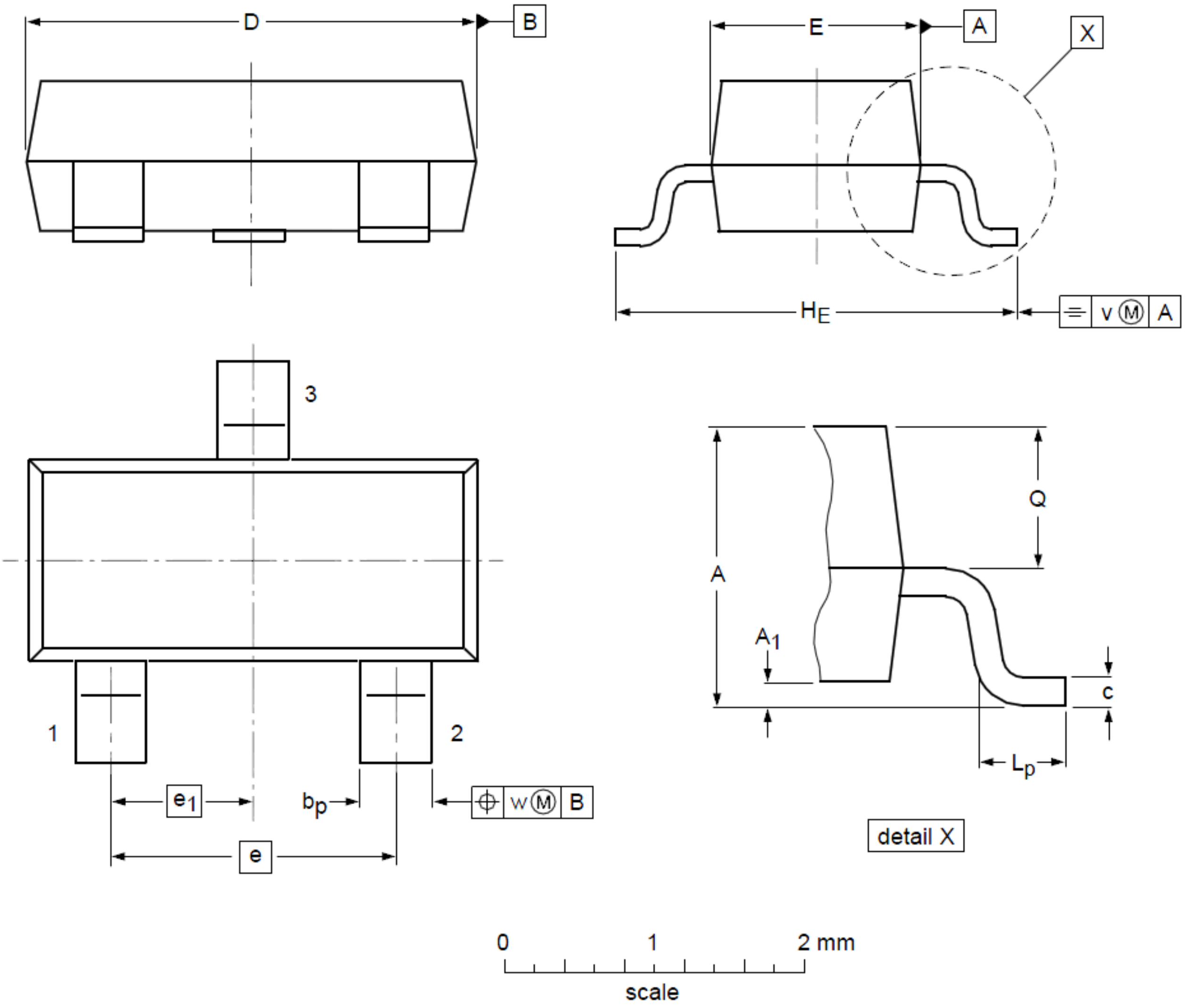
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & 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	--				