DESCRIPTION

The MX4407A uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 4.5V. This device is suitable for use as a load switch or in PWM applications.

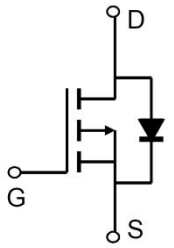
GENERAL FEATURES

- V_{DS} = -30V, I_D = -12A
  $R_{DS(ON)}$ (Typ.) = 9.0mΩ @ V_{GS}=-10V
  $R_{DS(ON)}$ (Typ.) = 12mΩ @ V_{GS}=-4.5V
- High Power and current handing capability
- Lead free product is acquired
- Surface Mount Package

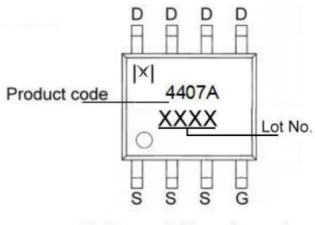
APPLICATION

- PWM applications
- Load switch
- Power management

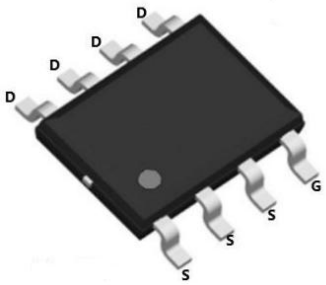
PINOUT



Schematic diagram



Marking and pin Assignment



SOP8 top view

KEY PERFORMANCE PARAMETERS

Parameter	Value	Unit
V_{DS} @ T_A=25°C	-30	V
$R_{DS(on)}$(Typ.) @ V_{GS}=-10V	9.0	mΩ
$R_{DS(on)}$(Typ.) @ V_{GS}=-4.5V	12	mΩ
Q_g(Type)	61.9	nC
I_D @ T_A=25°C	-14	A
P_D @ T_A=25°C	2.9	W
T_J, TSTG	-55 to 150	°C

PACKAGE INFORMATION

Package	SOP8

ABSOLUTE MAXIMUM RATINGS(T_A=25°C unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	-30	V
Gate-Source Voltage	V_{GS}	±25	V
Drain Current-Continuous	I_D	-12	A
Drain Current-Pulsed(Note1)	I_{DM}	-56	A
Maximum Power Dissipation	P_D	2.9	W
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 To 150	℃

THERMAL RESISTANCE

Parameter	Symbol	Max.	Unit
Thermal Resistance, Junction-to-Ambient(Note2)	$R_{\theta JA}$	42	°C/W

Note 1. Repetitive Rating: Pulse width limited by maximum junction temperature
Note 2. Surface Mounted on FR4 Board, t≤10 sec.

ELECTRICAL CHARACTERISTICS(T_A=25℃unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V, I_D=-250μA	-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}=±25V,V_{DS}=0V	-	-	±100	nA
On Characteristics(Note3)						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=VGS, I_D=-250μA	-1.2	-1.7	-2.3	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=-10V, I_D=-14A	-	9.0	11.5	mΩ
		V_{GS}=-4.5V, I_D=-7A	-	12	16	mΩ
Forward Transconductance	g_{FS}	V_{DS}=-10V, I_D =-10A	20	-	-	S
Dynamic Characteristics(Note4)						
Input Capacitance	C_{lss}	V_{DS}=-15V, V_{GS}=0V, F=1.0MHz	-	3351	-	PF
Output Capacitance	C_{oss}		-	327.6	-	PF
Reverse Transfer Capacitance	C_{rss}		-	285	-	PF
Switching Characteristics(Note4)						
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=-15V, I_D=-10A, V_{GS}=-10V,R_{GEN}=3Ω	-	12	-	nS
Turn-on Rise Time	t_r		-	7	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	53	-	nS
Turn-Off Fall Time	t_f		-	16.5	-	nS
Total Gate Charge	Q_g	V_{DS}=30V, I_D=2.5A, V_{GS}=4.5V	-	61.9	-	nC
Gate-Source Charge	Q_{gs}		-	9.85	-	nC
Gate-Drain Charge	Q_{gd}		-	11.5	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage(Note3)	V_{SD}	V_{GS}=0V,I_S=-14A	-	-0.7	-1.2	V

Note 1. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
Note 2. Guaranteed by design, not subject to production

TYPICAL CHARACTERISTICS(TJ = 25°C, unless otherwise noted)

Figure 1. Maximum Safe Operating Area

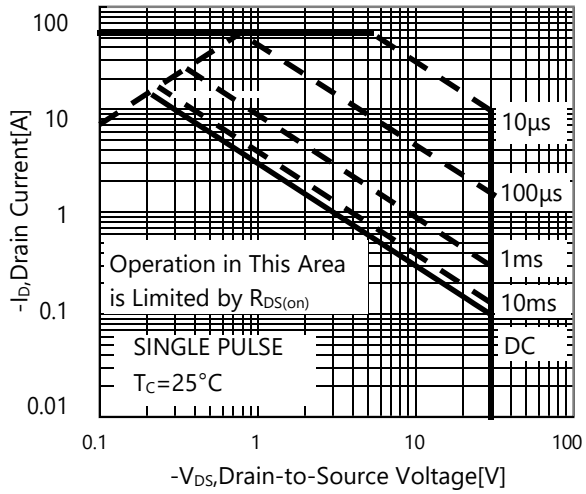


Figure 2. Maximum Power Dissipation vs Ambient Temperature

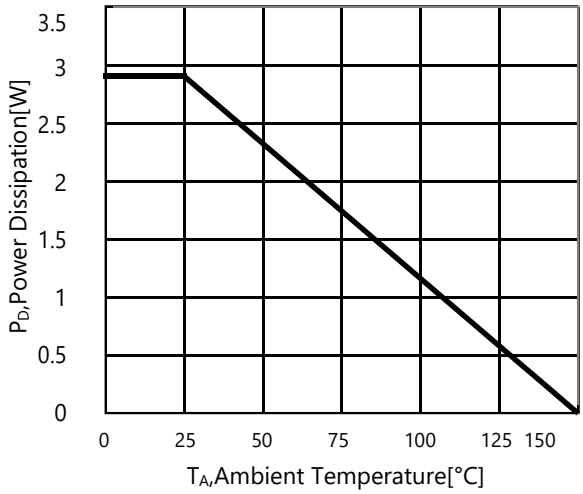


Figure 3. Maximum Continuous Drain Current vs Ambient Temperature

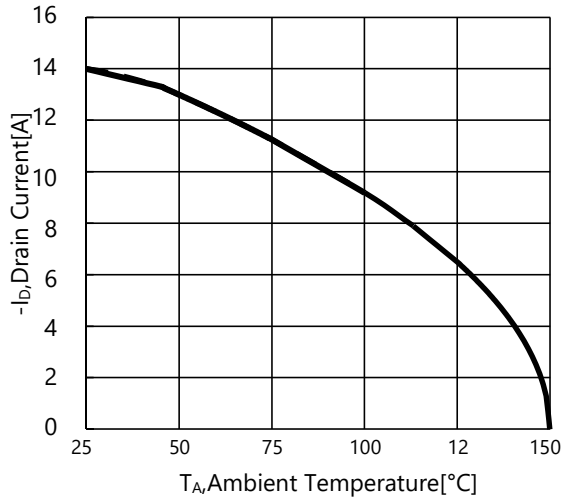


Figure 4. Typical output Characteristics

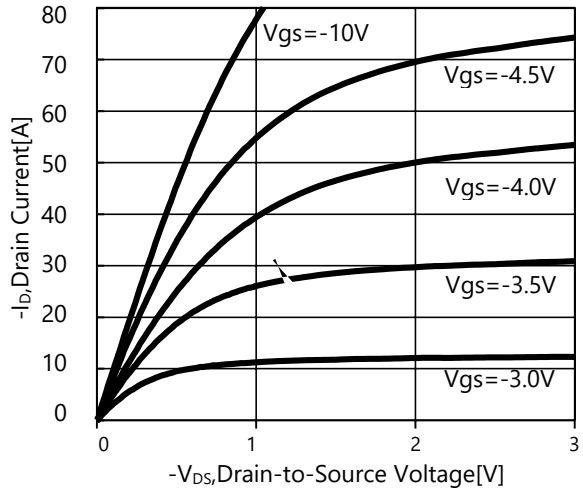
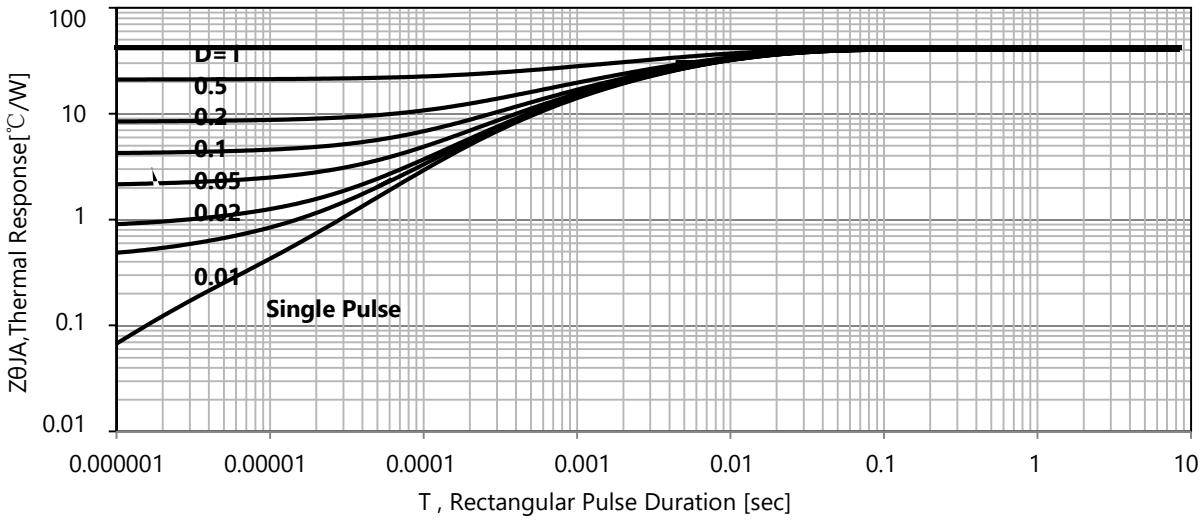


Figure 5: Maximum Effective Thermal Impedance , Junction to Ambient



TYPICAL CHARACTERISTICS(TJ = 25°C, unless otherwise noted)

Figure 6. Typical Transfer Characteristics

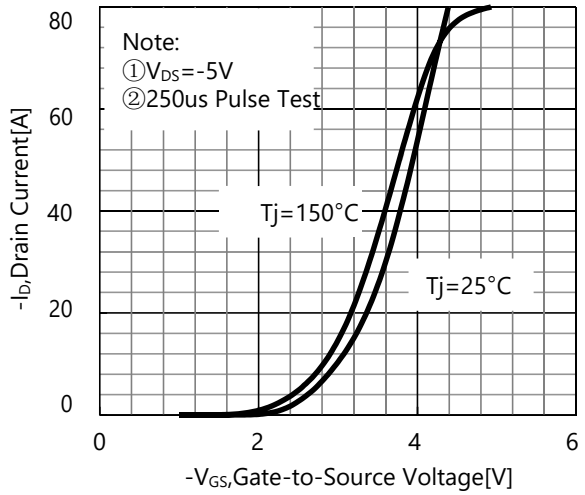


Figure 7. Typical Body Diode Transfer Characteristics

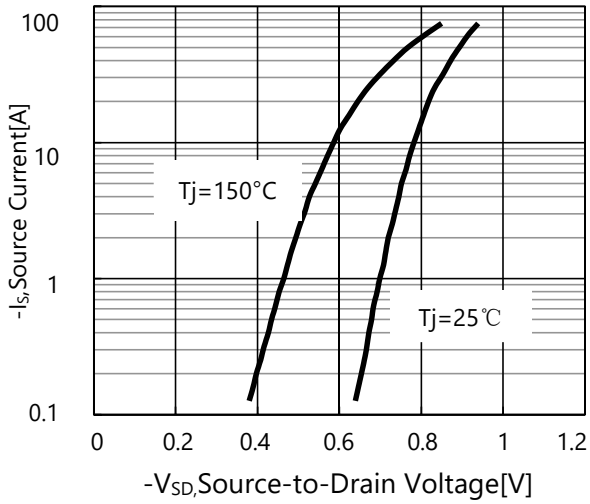


Figure 8. Drain-to-Source On Resistance vs Drain Current

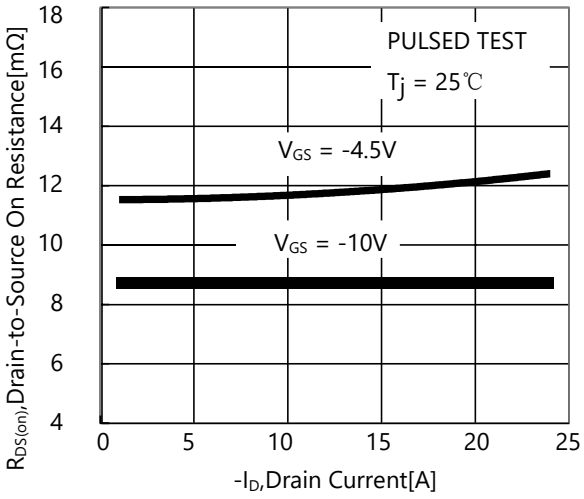


Figure 9. Normalized On Resistance vs Junction Temperature

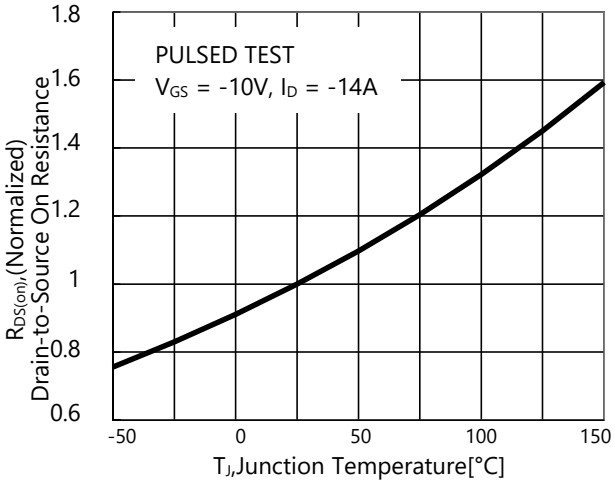


Figure 10. Normalized Threshold Voltage vs Junction Temperature

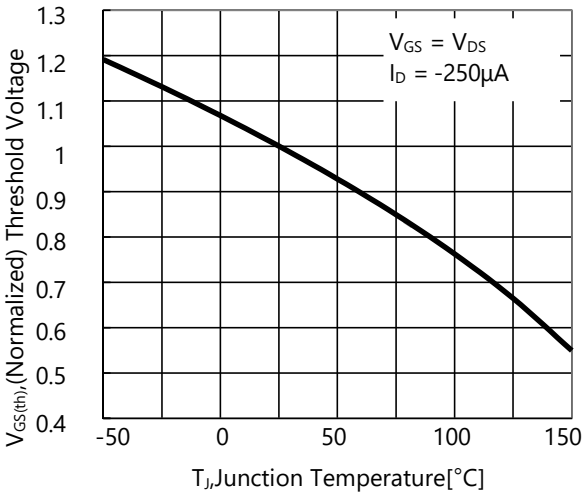
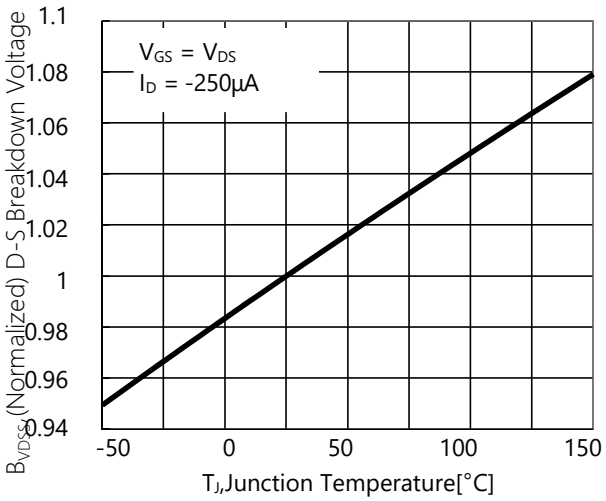


Figure 11. Normalized Breakdown Voltage vs Junction Temperature



TYPICAL CHARACTERISTICS(TJ = 25°C, unless otherwise noted)

Figure 12: Capacitance Characteristics

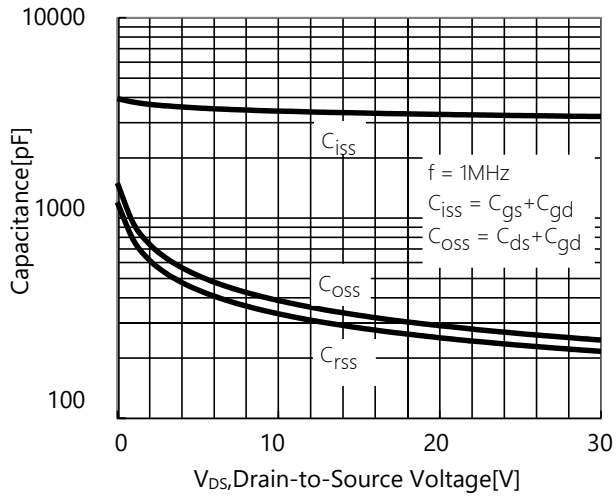
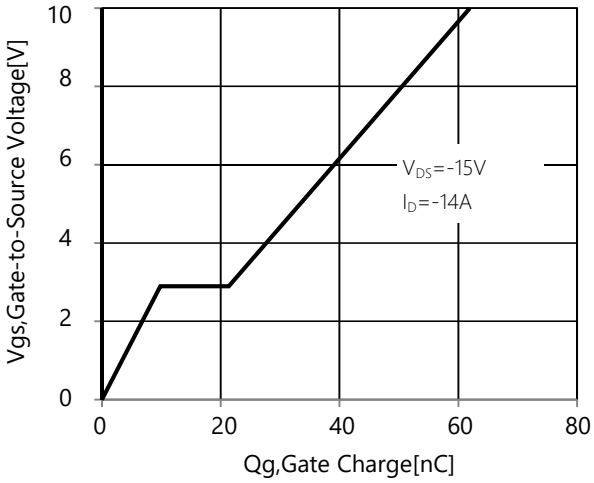


Figure 13: Typical Gate Charge vs Gate to Source Voltage



TEST CIRCUIT AND WAVEFORM

Figure A. Gate Charge Test Circuit and Waveform

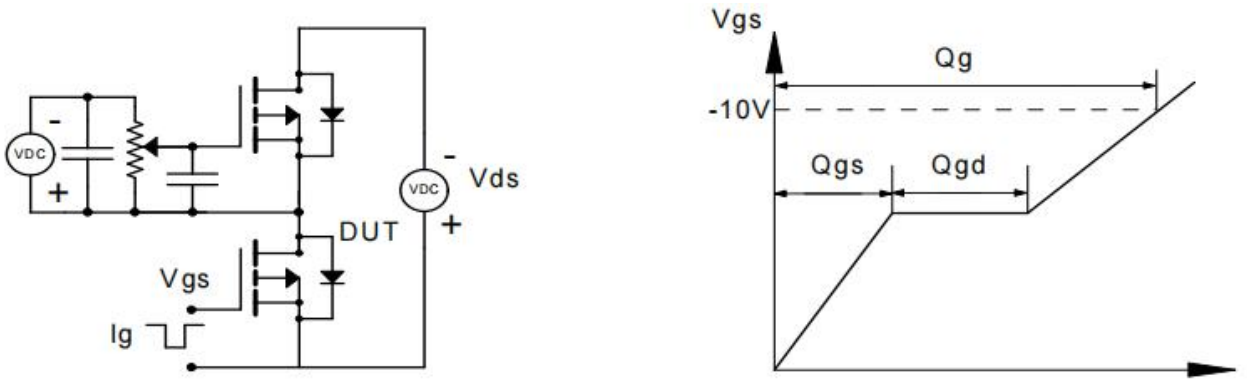


Figure B. Resistive Switching Test Circuit and Waveform

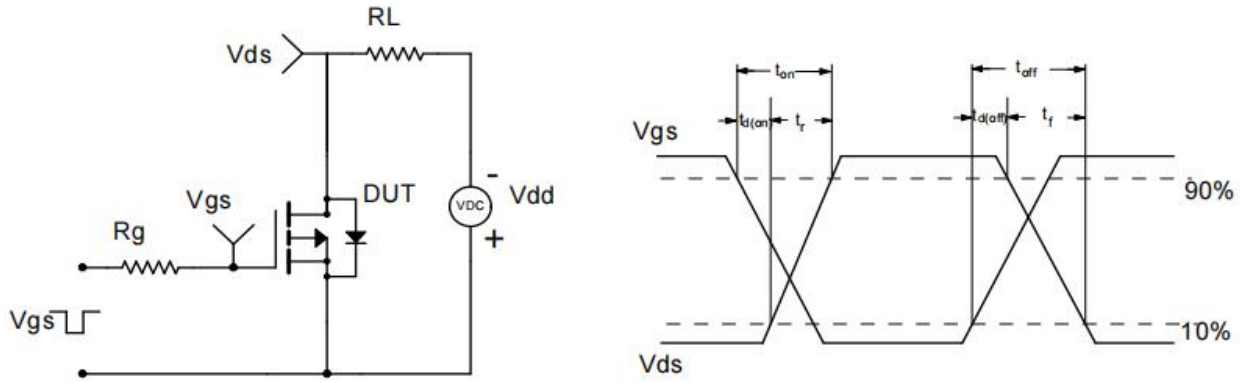
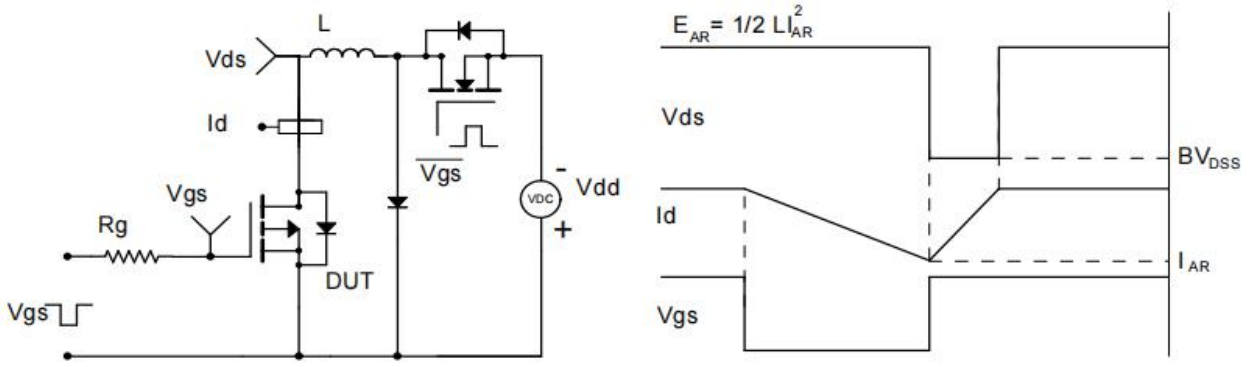


Figure C. Unclamped Inductive Switching Test Circuit and Waveform



PACKAGE INFORMATION

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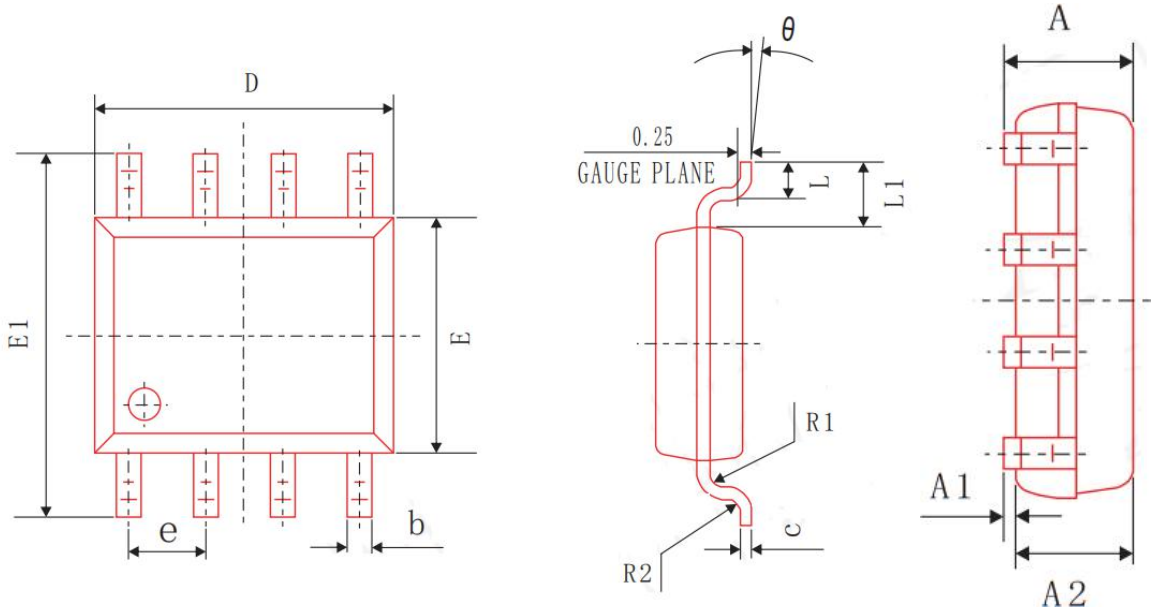

COMMON DIMENSIONS IN MILLIMETERS

SYMBOL	MIN	NOM	MAX
A	1.40	1.60	1.80
A1	0.05	0.15	0.25
A2	1.35	1.45	1.55
b	0.30	0.40	0.50
c	0.153	0.203	0.253
D	4.80	4.90	5.00
E	3.80	3.90	4.00
E1	5.80	6.00	6.20
L	0.45	0.70	1.00
θ	2°	4°	6°
L1	1.04 REF		
e	1.27 BSC		
R1	0.07 TYP		
R2	0.07 TYP		