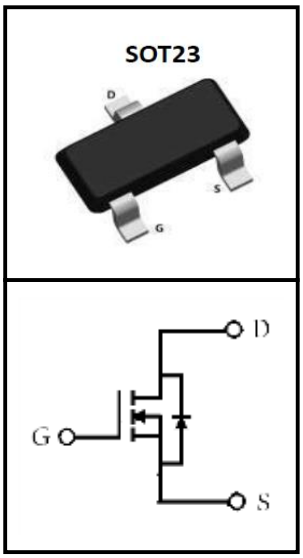
20V N-Channel Trench MOSFET

FEATURES

- Super Low Gate Charge
- 100% EAS Guaranteed
- RoHS compliant
- Green Device Available
- Excellent CdV/dt effect decline
- Advanced high cell density Trench technology



APPLICATIONS

- Switch Mode Power Supply (SMPS)
- Uninterruptible Power Supply (UPS)
- Power Factor Correction (PFC)

RoHS

Device Marking and Package Information

Device	Package	Marking
CTZ2312A	SOT-23	2312A

Absolute Maximum Ratings at T_j= 25ºC unless otherwise noted

Parameter	Symbol	Value	Unit
Drain-Source Voltage (V_{GS} = 0V)	V_{DSS}	20	V
Drain Current-Continuous(Tc =25℃)	I_D	5	A
Drain Current-Continuous(Tc =100℃)		4	
Pulsed Drain Current	I_{DM}	20	A
Gate Source Voltage	V_{GSS}	±12	V
Single Pulse Avalanche Energy	E_{AS}	15	mJ
Avalanche Current	I_{AS}	10	A
Power Dissipation T_C = 25ºC	P_D	1.56	W
Power Dissipation T_C = 100ºC		0.62	
Operating Junction and Storage Temperature Range	T_J, T_{stg}	-55~+175	ºC

Thermal Characteristics

Parameter		Symbol	Value	Unit
Thermal Resistance,Junction-to-Case	(note1)	$R_{\theta JC}$	80	℃/W
Thermal Resistance,Junction-to-Ambient	(note1)	$R_{\theta JA}$	125	℃/W

Electrical Characteristics T_j= 25ºC unless otherwise specified						
Parameter	**Symbol**	**Test Conditions**	**Value**			**Unit**
			Min.	**Typ.**	**Max.**	
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D = 250μA	20	--	--	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 20V, V_{GS} = 0V, T_J = 25ºC	--	--	1	uA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 20V, V_{GS} = 0V, T_J = 100ºC	--	--	25	
Gate-Source Leakage	I_{GSS}	V_{GS} = ±12V	--	--	±100	nA
Gate-Source Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250μA	0.5	0.7	0.9	V
Drain-Source On-Resistance (note2)	$R_{DS(on)}$	V_{GS} = 10V, I_D = 4A	--	13.6	18	mΩ
		V_{GS} = 4.5V, I_D = 4A	--	14.9	20	mΩ
		V_{GS} = 2.5V, I_D = 4A	--	18	25	mΩ
Forward Transconductance (note2)	gfs	V_{GS} = 5V, I_D = 6A	--	25	--	s
Dynamic						
Input Capacitance	C_{iss}	V_{GS} = 0V, V_{DS} = 10V, f = 1.0MHz	--	870	--	pF
Output Capacitance	C_{oss}		--	119	--	
Reverse Transfer Capacitance	C_{rss}		--	110	--	
Total Gate Charge （10V）	Q_g	V_{DS} = 10V, I_D = 5A, V_{GS} = 10V	--	22.1	--	nC
Total Gate Charge （4.5V）			--	11	--	
Gate-Source Charge	Q_{gs}		--	2	--	
Gate-Drain Charge	Q_{gd}		--	2	--	
Turn-on Delay Time	$t_{d(on)}$	V_{DS} = 10V, V_{GS} = 10V, I_D = 3A,R_G = 2.5Ω	--	4	--	ns
Turn-on Rise Time	t_r		--	8.2	--	
Turn-off Delay Time	$t_{d(off)}$		--	22	--	
Turn-off Fall Time	t_f		--	7	--	
Body Diode Characteristics						
Continuous Body Diode Current	I_{SD}	T_C = 25 ºC	--	--	5	A
Pulsed Diode Forward Current	I_{SM}		--	--	20	
Body Diode Voltage	V_{SD}	T_J = 25ºC, I_{SD} = 5A, V_{GS} = 0V	--	--	1.2	V

Notes

1.Repetitive Rating: Pulse Width limited by maximum junction temperature
2.VDD = 20V, RG = 25Ω, Starting TJ = 25° C
3.Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 1%

Typical Characteristics T_J = 25ºC, unless otherwise noted

Figure 1. Output Characteristics

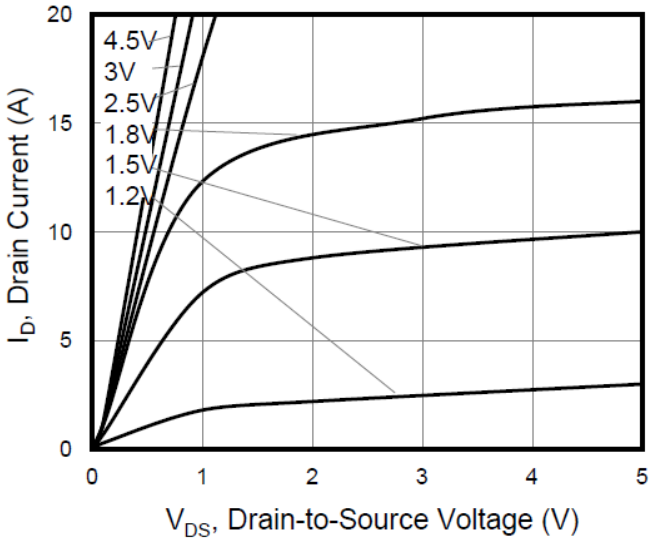


Figure 2. Transfer Characteristics

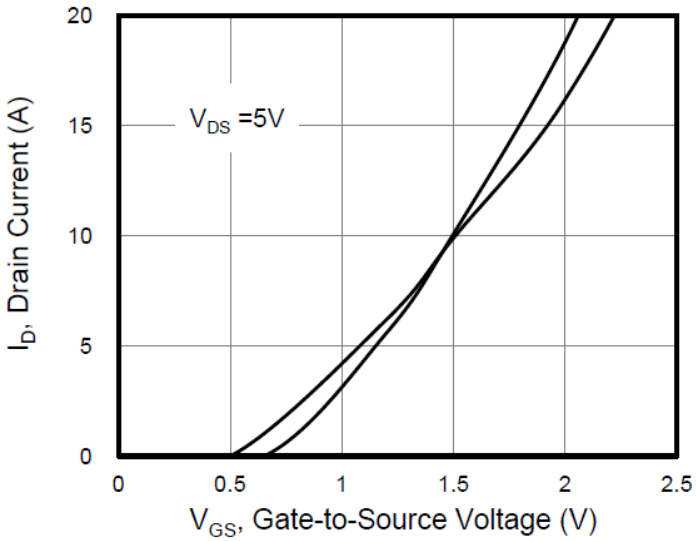


Figure 3. On-Resistance vs. Drain Current

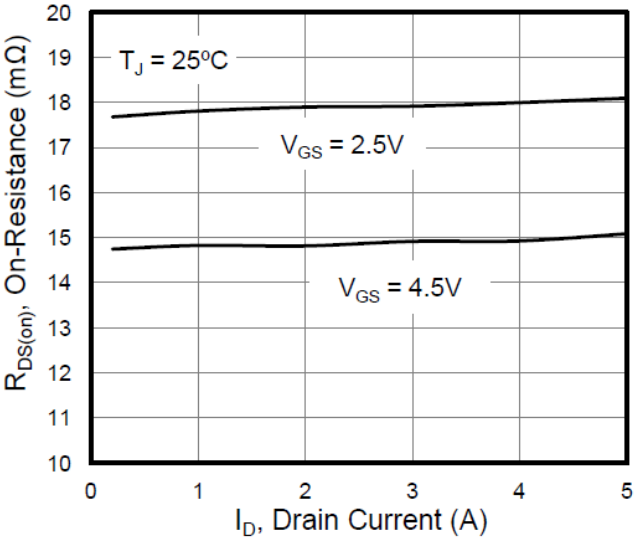


Figure 4. Capacitance

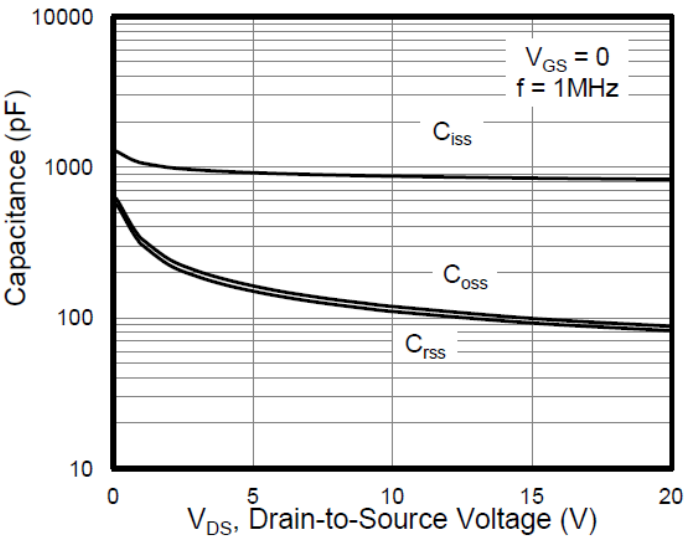


Figure 5. Gate Charge

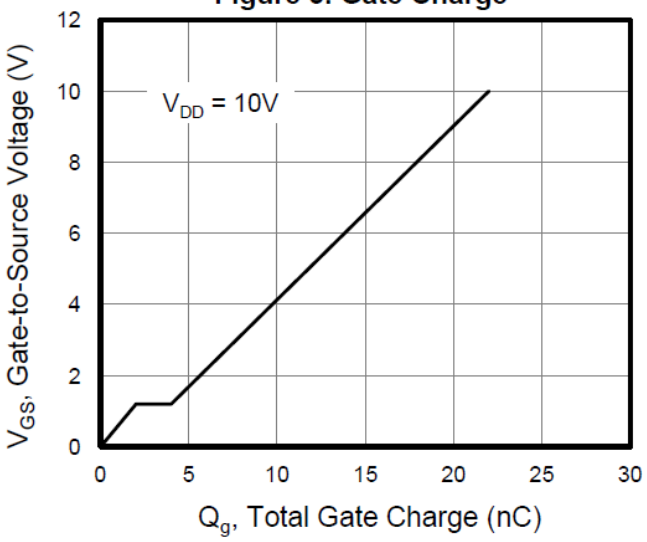
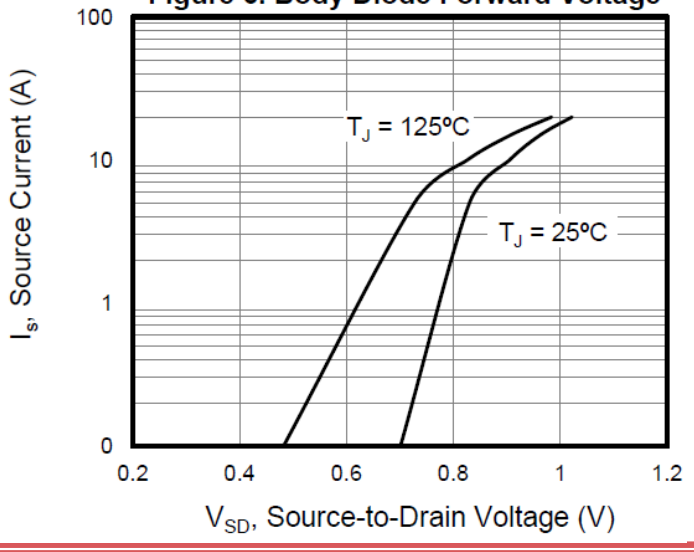


Figure 6. Body Diode Forward Voltage



Typical Characteristics T_J = 25ºC, unless otherwise noted

Figure 7. On-Resistance vs. Junction Temperature

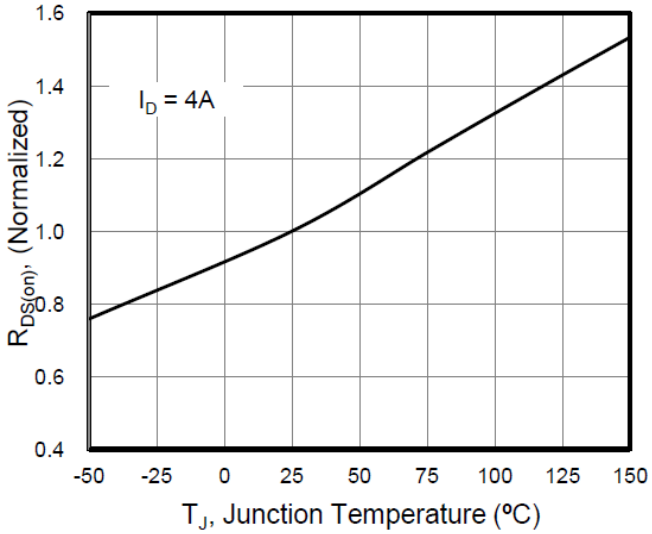


Figure 8. Threshold Voltage vs. Junction Temperature

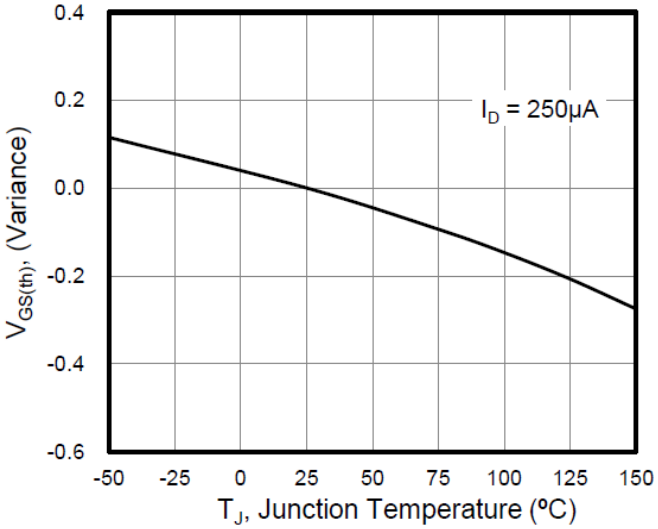


Figure 9. V(BR)DSS vs. Junction Temperature

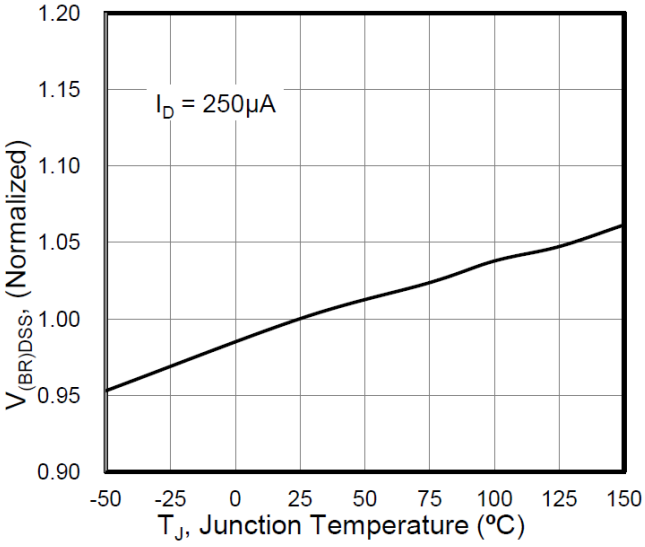


Figure 10. On-Resistance vs. Gate-to-Source Voltage

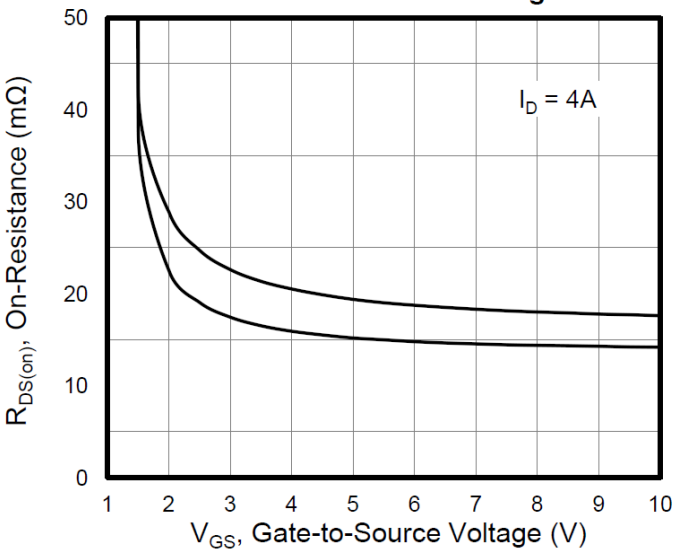


Figure 11. Transient Thermal Impedance

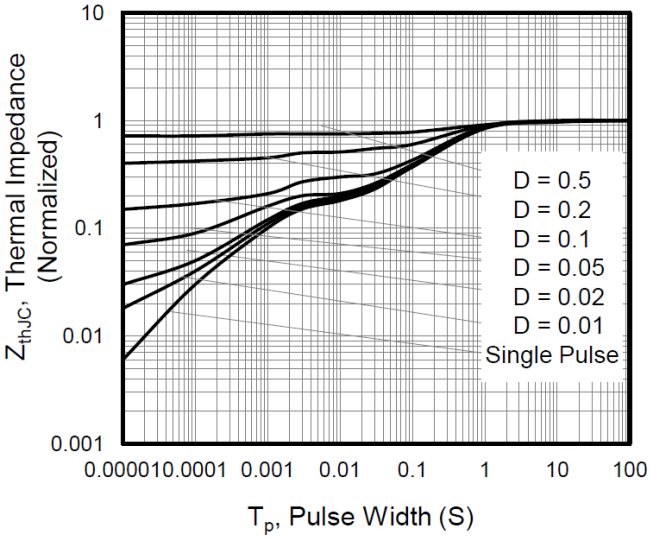


Figure 12. Safe operation area

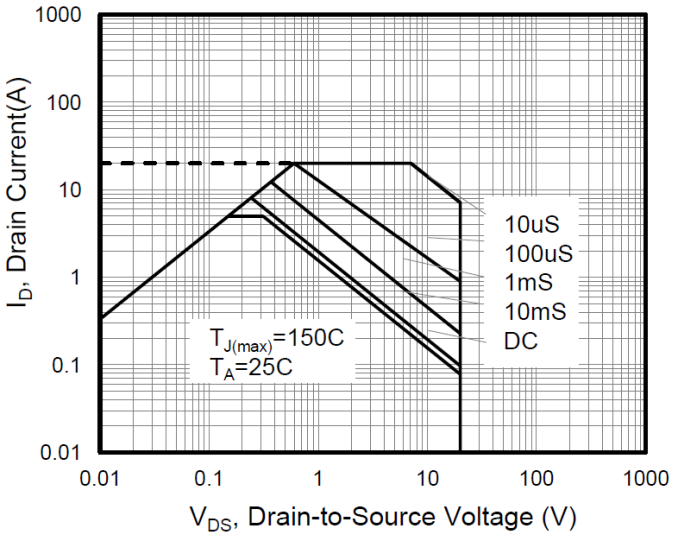


Figure A：Gate Charge Test Circuit and Waveform

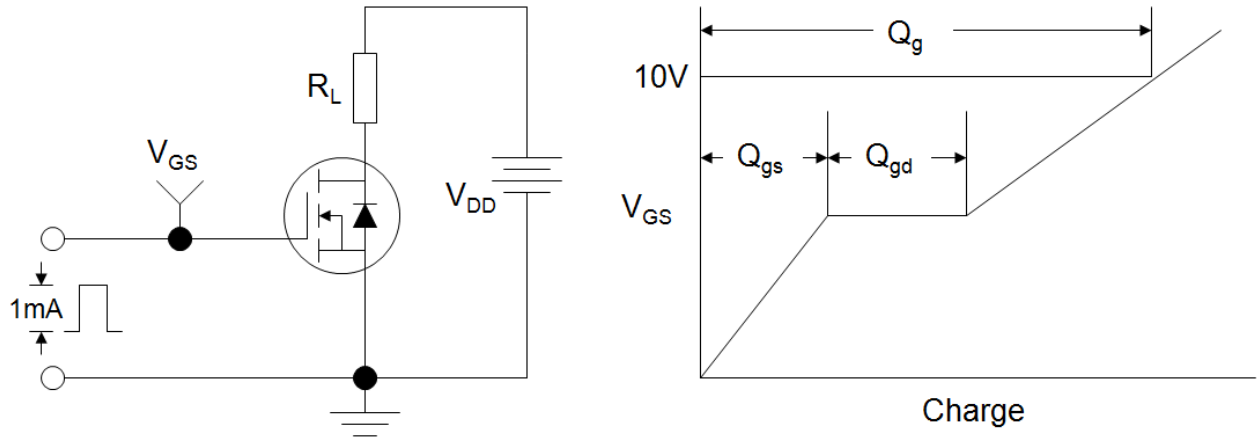


Figure B：Resistive Switching Test Circuit and Waveform

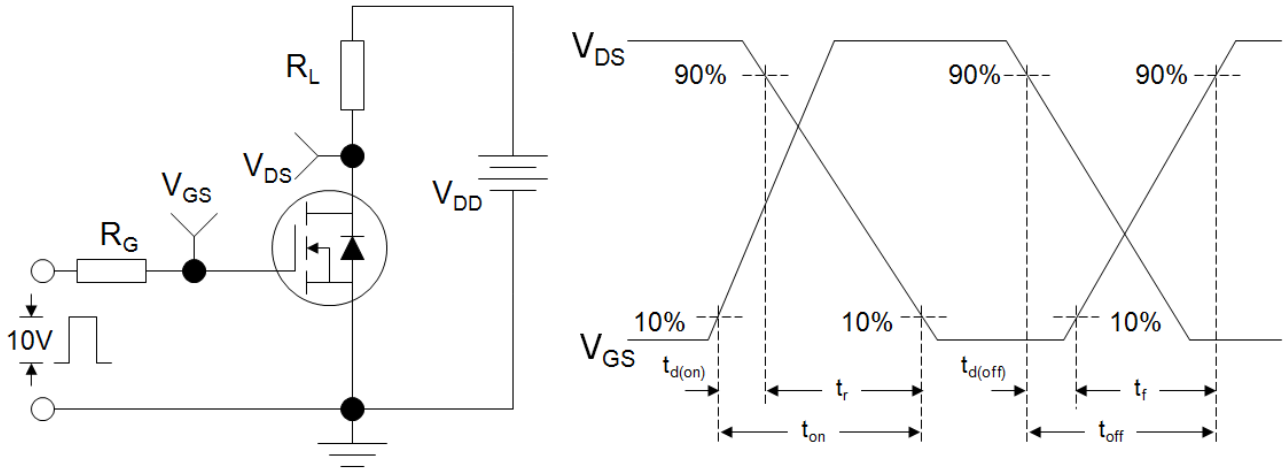
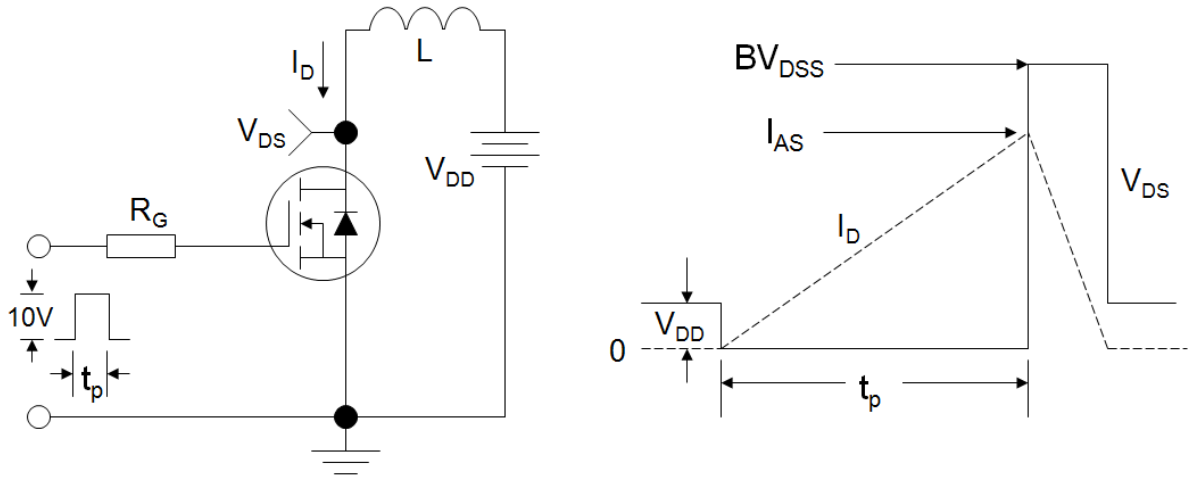
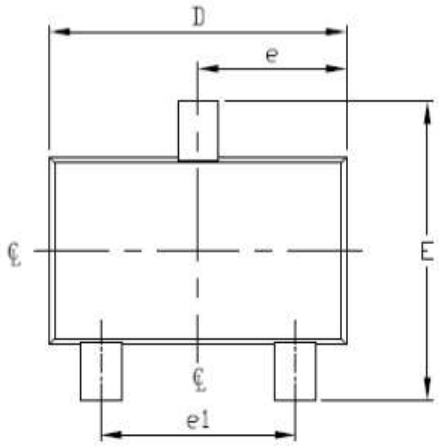
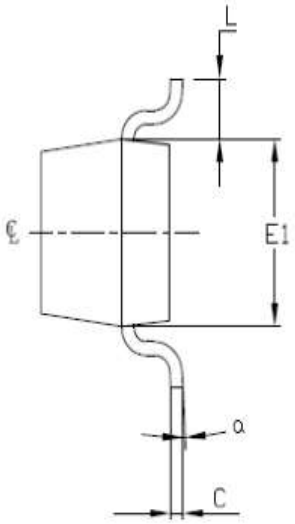


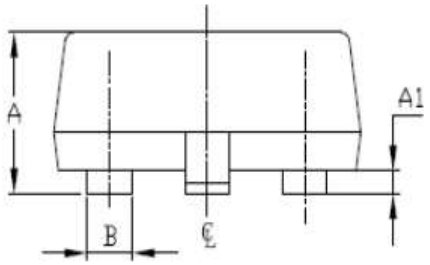
Figure C：Unclamped Inductive Switching Test Circuit and Waveform



SOT23







COMMON DIMENSIONS			
SYMBOL	mm		
	MIN	NOM	MAX
A	0.9	1.0	1.1
A1	0.00	0.06	0.1
B	0.3	0.4	0.5
C	0.07	0.09	0.18
D	2.8	2.9	3.04
E	2.1	2.33	2.64
E1	1.2	1.3	1.4
e	1.4	1.45	1.5
e1	1.80	1.90	2.00
L	0.45	0.54	0.63
α	0°	2.5°	7°

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