

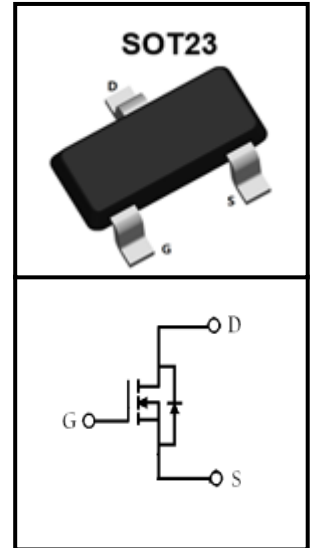
20V N-Channel Trench MOSFET

FEATURES

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

APPLICATIONS

- Load switch
- Battery protection
- Power management



Device Marking and Package Information

Device	Package	Marking
CTZ2302A	SOT23	2302A

Absolute Maximum Ratings at $T_j = 25^\circ\text{C}$ unless otherwise noted

Parameter	Symbol	Value	Unit
Drain-Source Voltage ($V_{GS} = 0\text{V}$)	V_{DSS}	20	V
Continuous Drain Current $T_A = 25^\circ\text{C}$ (note1)	I_D	2.5	A
Pulsed Drain Current (note2)	I_{DM}	10	A
Gate Source Voltage	V_{GSS}	± 12	V
Power Dissipation (note3)	P_D	1	W
Operating Junction and Storage Temperature Range	T_J, T_{stg}	-55~150	$^\circ\text{C}$

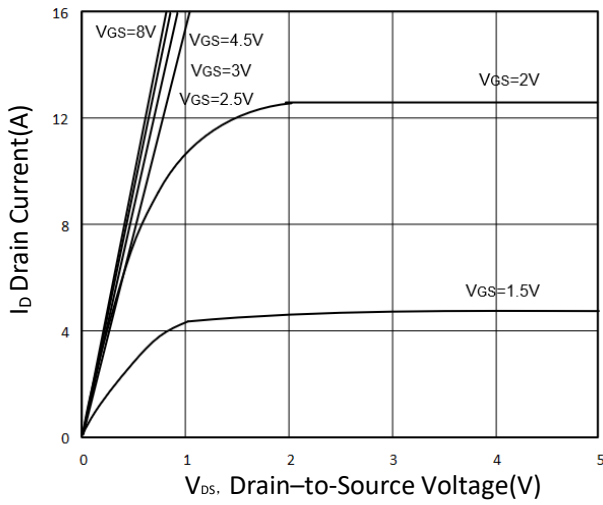
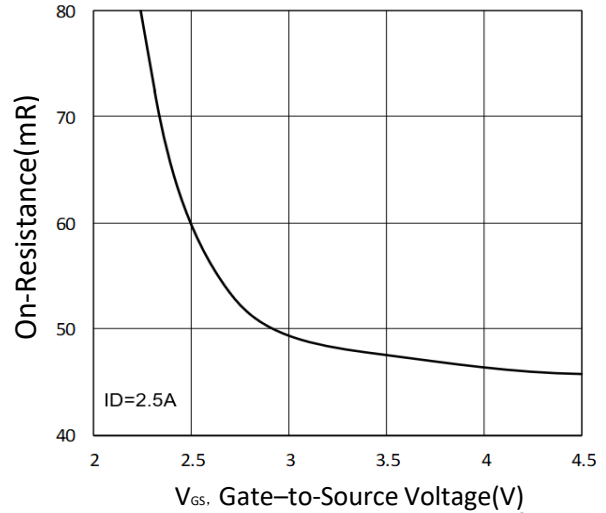
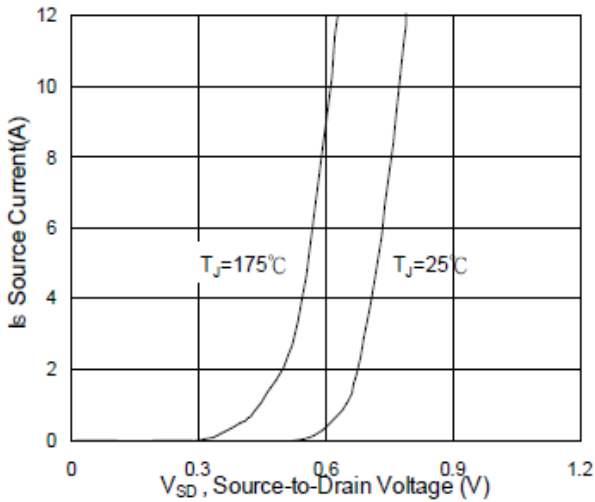
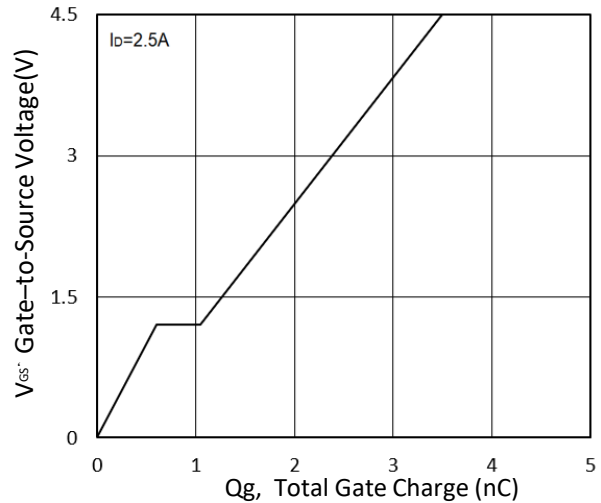
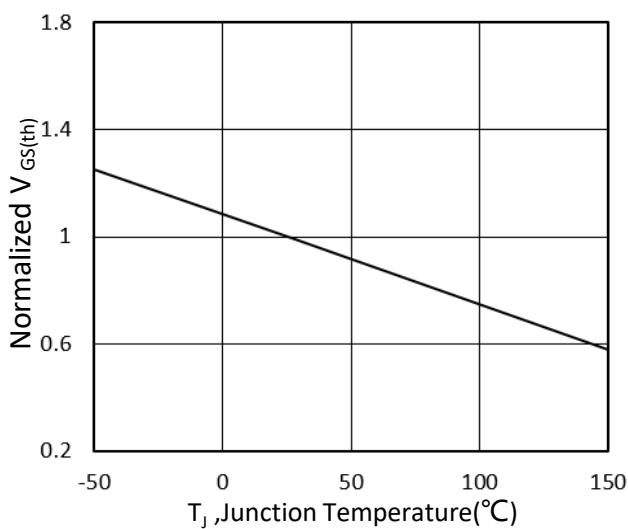
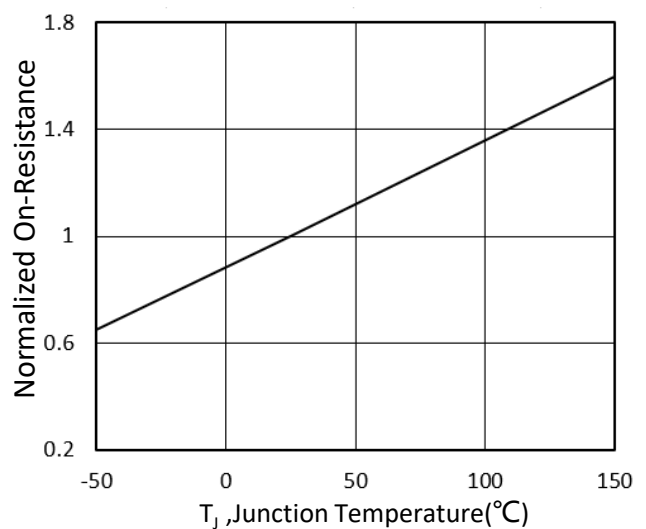
Thermal Characteristics

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-Ambient (note1)	$R_{\theta JA}$	125	$^\circ\text{C/W}$

Electrical Characteristics $T_J = 25^\circ\text{C}$ unless otherwise specified						
Parameter	Symbol	Test Conditions	Value			Unit
			Min.	Typ.	Max.	
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 250\mu A$	20	--	--	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 20V, V_{GS} = 0V, T_J = 25^\circ\text{C}$	--	--	1	μA
Gate-Source Leakage	I_{GSS}	$V_{GS} = \pm 12V$	--	--	± 100	nA
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	0.5	0.65	1.0	V
Drain-Source On-Resistance (note2)	$R_{DS(on)}$	$V_{GS} = 4.5V, I_D = 2.5A$	--	46	60	$m\Omega$
		$V_{GS} = 2.5V, I_D = 1A$	--	61	85	$m\Omega$
Dynamic						
Input Capacitance	C_{iss}	$V_{GS} = 0V,$ $V_{DS} = 10V,$ $f = 1.0MHz$	--	180	--	pF
Output Capacitance	C_{oss}		--	38	--	
Reverse Transfer Capacitance	C_{rss}		--	20	--	
Total Gate Charge (4.5V)	Q_g	$V_{DD} = 10V, I_D = 2.5A,$ $V_{GS} = 4.5V$	--	3.5	--	nC
Gate-Source Charge	Q_{gs}		--	0.6	--	
Gate-Drain Charge	Q_{gd}		--	0.45	--	
Turn-on Delay Time	$t_{d(on)}$	$V_{DS} = 10V, I_D = 2.5A$ $V_{GS} = 4.5V, R_G = 2.5\Omega, RL = 15\Omega$	--	8	--	nS
Turn-on Rise Time	t_r		--	7	--	
Turn-off Delay Time	$t_{d(off)}$		--	30	--	
Turn-off Fall Time	t_f		--	7	--	
Body Diode Characteristics						
Continuous Body Diode Current	I_S		--	--	2.5	A
Pulsed Diode Forward Current	I_{SM}		--	--	10	
Body Diode Voltage	V_{SD}	$T_J = 25^\circ\text{C}, I_{SD} = 2.5A, V_{GS} = 0V$	--	0.75	1.2	V

Notes

1. The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper.
2. The data tested by pulsed , pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$
3. The power dissipation is limited by 150 $^\circ\text{C}$ junction temperature
4. The data is theoretically the same as ID and IDM , in real applications , should be limited by total power dissipation.

Typical Characteristics $T_J = 25^{\circ}\text{C}$, unless otherwise noted

Fig.1 Typical Output Characteristics

Fig. 2 On-Resistance vs. G-S Voltage

Fig.3 Forward Characteristics of Reverse Diode

Fig.4 Gate-Charge Characteristics

Fig.5 Normalized $V_{GS(th)}$ vs. T_J

Fig.6 Normalized $R_{DS(on)}$ vs. T_J

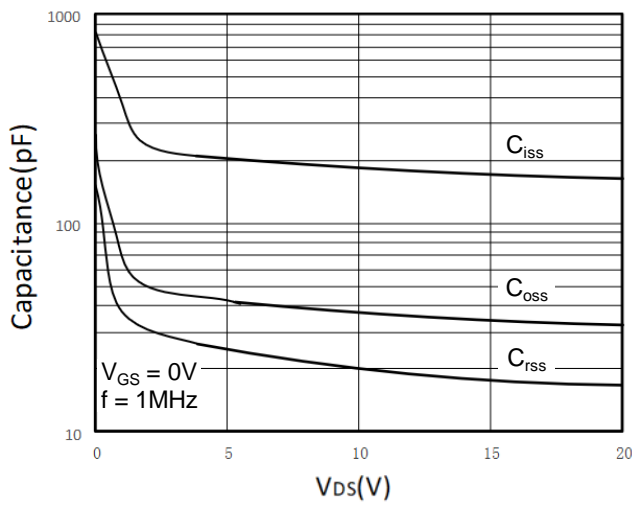
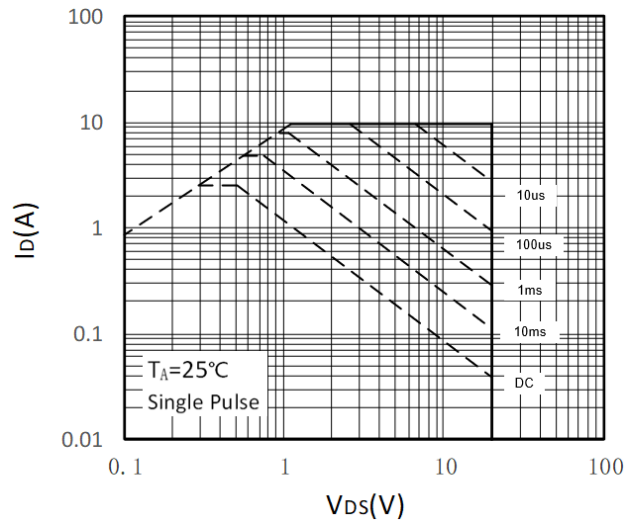
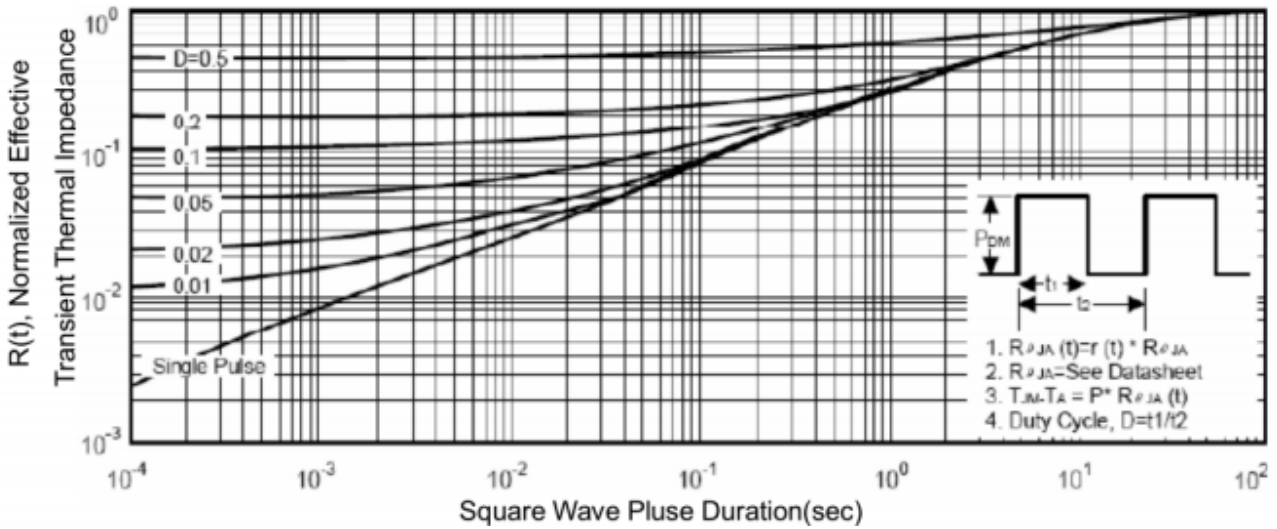
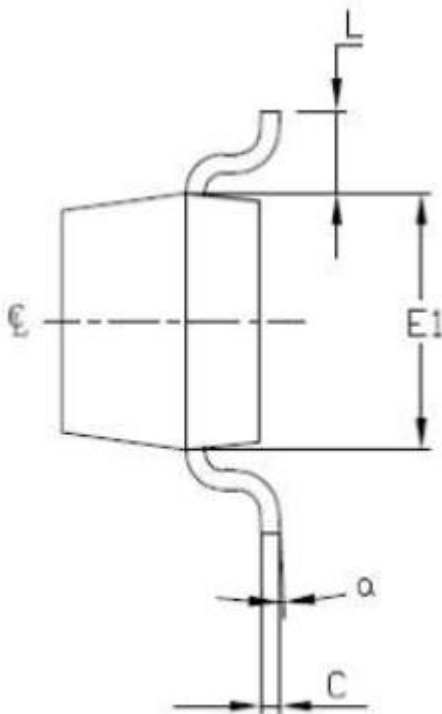
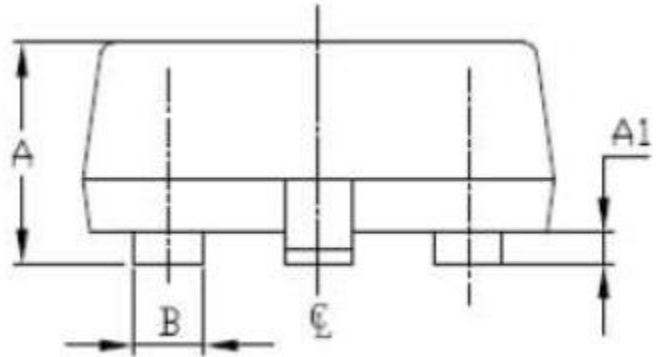
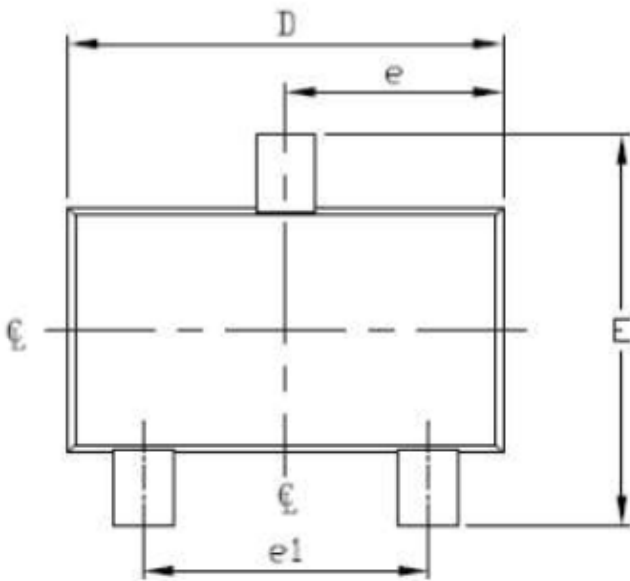
Typical Characteristics $T_J = 25^\circ\text{C}$, unless otherwise noted

Fig.7 Capacitance

Fig.8 Safe Operating Area

Fig.9 Normalized Maximum Transient Thermal Impedance

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
a	0°	2.5°	7°

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