

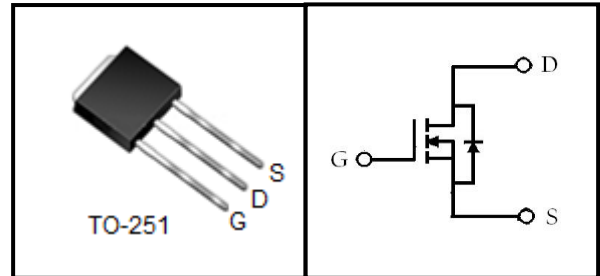
200V N-Channel Trench MOSFET

FEATURES

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

APPLICATIONS

- Switch Mode Power Supply (SMPS)
- Uninterruptible Power Supply (UPS)
- Hard switched and high frequency circuits



Device Marking and Package Information

Device	Package	Marking
CTU20N170	TO-251	CTU20N170

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

Parameter	Symbol	Value	Unit
Drain-Source Voltage ($V_{GS} = 0V$)	V_{DSS}	200	V
Continuous Drain Current $T_C = 25^\circ\text{C}$ (note1)	I_D	18	A
Continuous Drain Current $T_C = 100^\circ\text{C}$ (note1)		12	A
Drain Current-Continuous@ Current-Pulsed (note2)	I_{DM}	40	A
Gate-Source Voltage ($V_{DS}=0V$)	V_{GSS}	± 20	V
Single Pulse Avalanche Energy (note3)	E_{AS}	15	mJ
Maximum Power Dissipation($T_C=25^\circ\text{C}$) (note4)	P_D	83	W
Operating Junction and Storage Temperature Range	T_J, T_{stg}	$-55 \sim +175$	$^\circ\text{C}$

Thermal Characteristics

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-Case (note1)	$R_{\theta JC}$	3.6	$^\circ\text{C/W}$
Thermal Resistance, Junction-to-Ambient (note1)	$R_{\theta JA}$	62	

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 = 250μA	200	--	--	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 200V, V _{GS} = 0V, T _J = 25°C	--	--	1	uA
		V _{DS} = 200V, V _{GS} = 0V, T _J = 55°C	--	--	5	
Gate-Source Leakage	I _{GSS}	V _{GS} = ±20V	--	--	±100	nA
Gate-Source Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250μA	1.2	--	2.5	V
Drain-Source On-Resistance	R _{DS(on)}	V _{GS} = 10V, I _D = 8A	--	140	170	mΩ
		V _{GS} = 4.5V, I _D = 8A	--	150	180	mΩ
Dynamic						
Input Capacitance	C _{iss}	V _{GS} = 0V, V _{DS} = 25V, f = 1.0MHz	--	2047	--	pF
Output Capacitance	C _{oss}		--	109	--	
Reverse Transfer Capacitance	C _{rss}		--	70	--	
Total Gate Charge	Q _g	V _{DS} = 80V, I _D = 9A, V _{GS} = 10V	--	45	--	nC
Gate-Source Charge	Q _{gs}		--	9	--	
Gate-Drain Charge	Q _{gd}		--	10.5	--	
Turn-on Delay Time	t _{d(on)}	V _{DS} = 100V, I _D = 9A, R _G = 3Ω, V _{GS} =10V,	--	13	--	ns
Turn-on Rise Time	t _r		--	8.2	--	
Turn-off Delay Time	t _{d(off)}		--	25	--	
Turn-off Fall Time	t _f		--	11	--	
Body Diode Characteristics						
Continuous Body Diode Current	I _S		--	--	18	A
Pulsed Diode Forward Current	I _{SM}		--	--	40	
Body Diode Voltage	V _{SD}	T _J = 25°C, I _{SD} = 9A, V _{GS} = 0V	--	--	1.2	V
Reverse Recovery Time	t _{rr}	I _F = 9A di _F /dt = 100A/μs T _J =25°C	--	37	--	ns
Reverse Recovery Charge	Q _{rr}		--	103	--	nC

Notes

1. The data tested by surface mounted on a 1 inch² FR-4 board with 20Z copper.
2. The data tested by pulsed , pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$
3. The EAS data shows Max. rating . The test condition is $V_{DD} = 25V, V_{GS} = 10V, L = 0.1mH$
4. The power dissipation is limited by 175°C junction temperature
5. The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation.

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

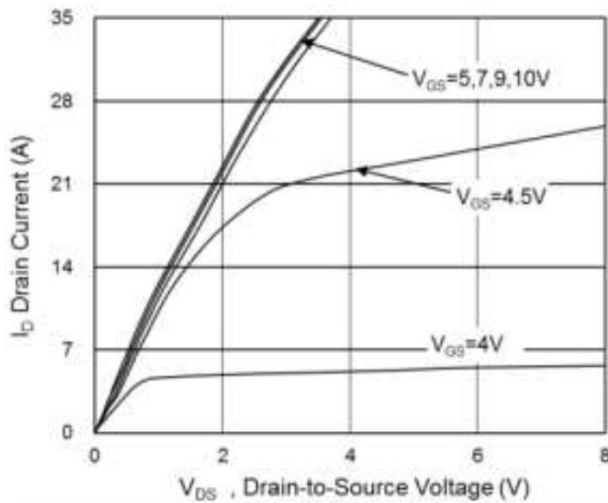


Fig.1 Typical Output Characteristics

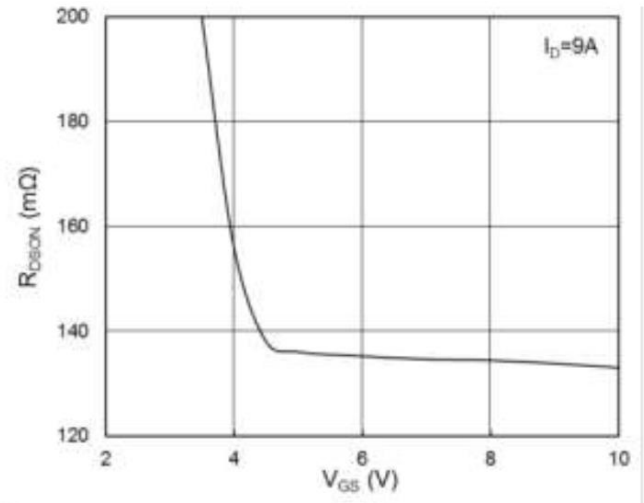


Fig.2 On-Resistance vs. G-S Voltage

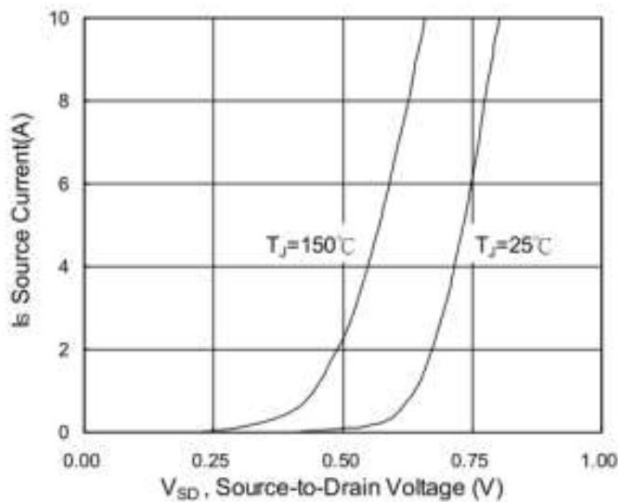


Fig.3 Forward Characteristics of Reverse Diode

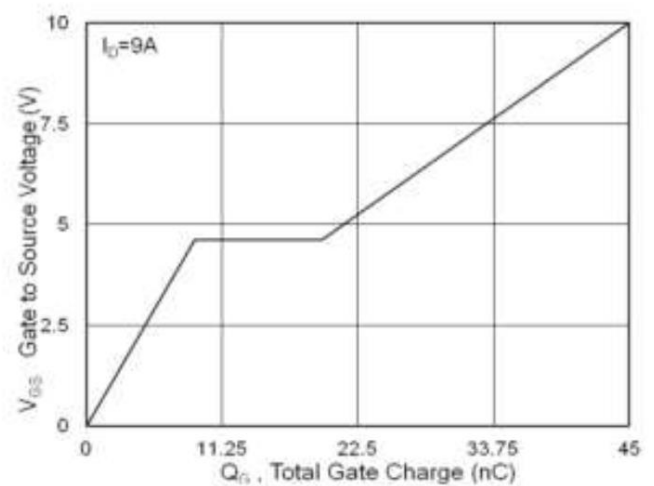


Fig.4 Gate-Charge Characteristics

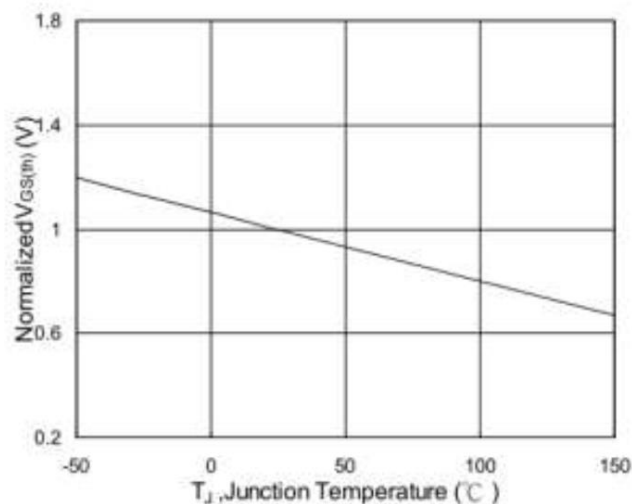


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

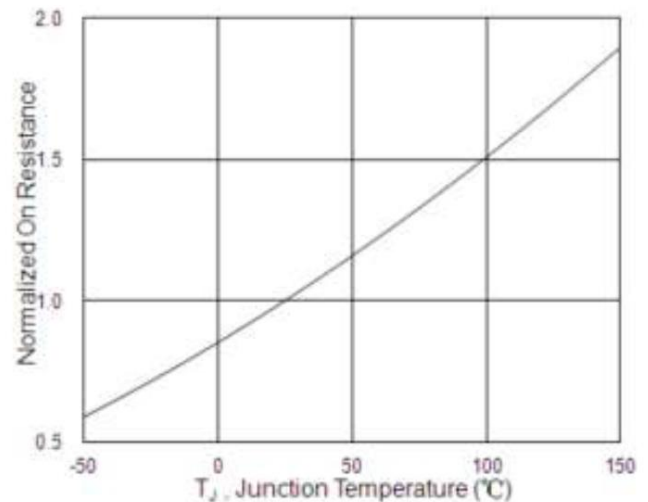


Fig.6 Normalized $R_{DS(on)}$ vs. T_J

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

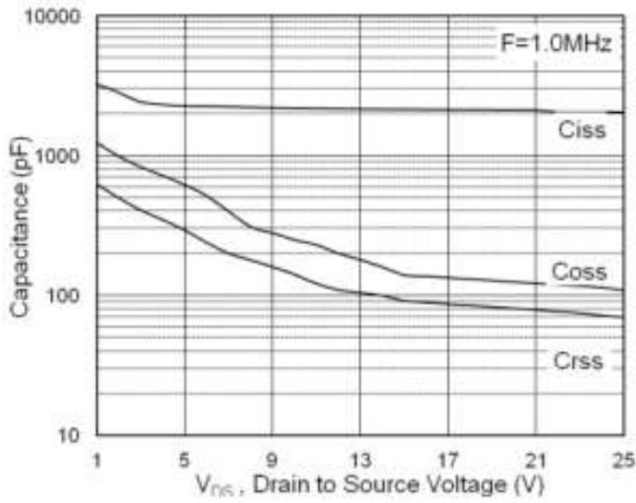


Fig.7 Capacitance

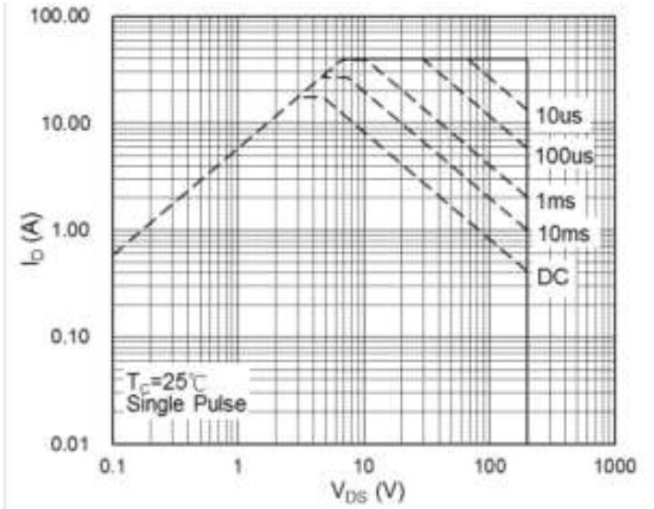


Fig.8 Safe Operating Area

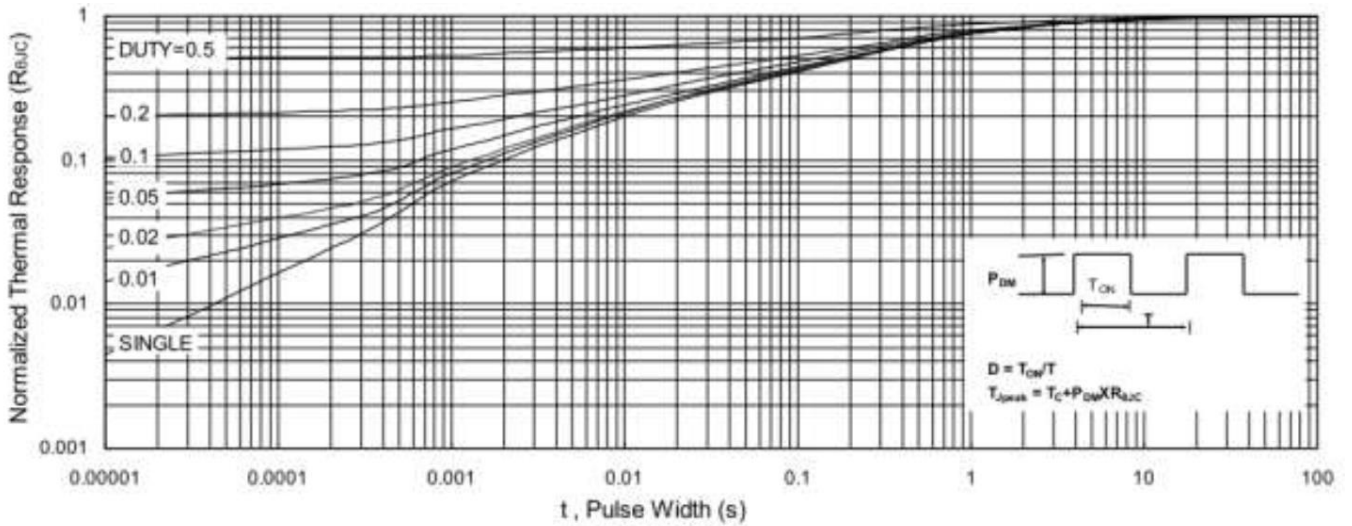
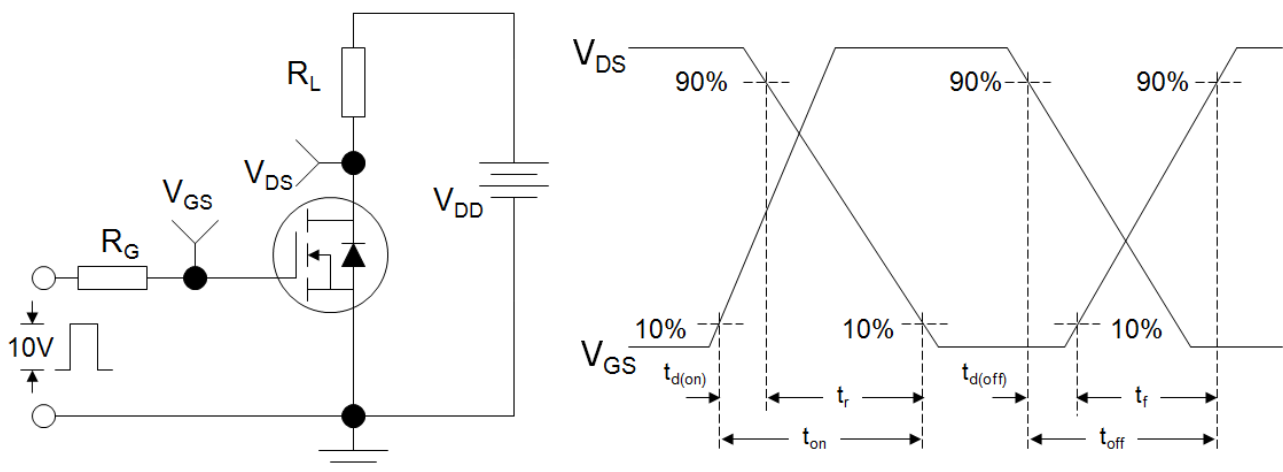
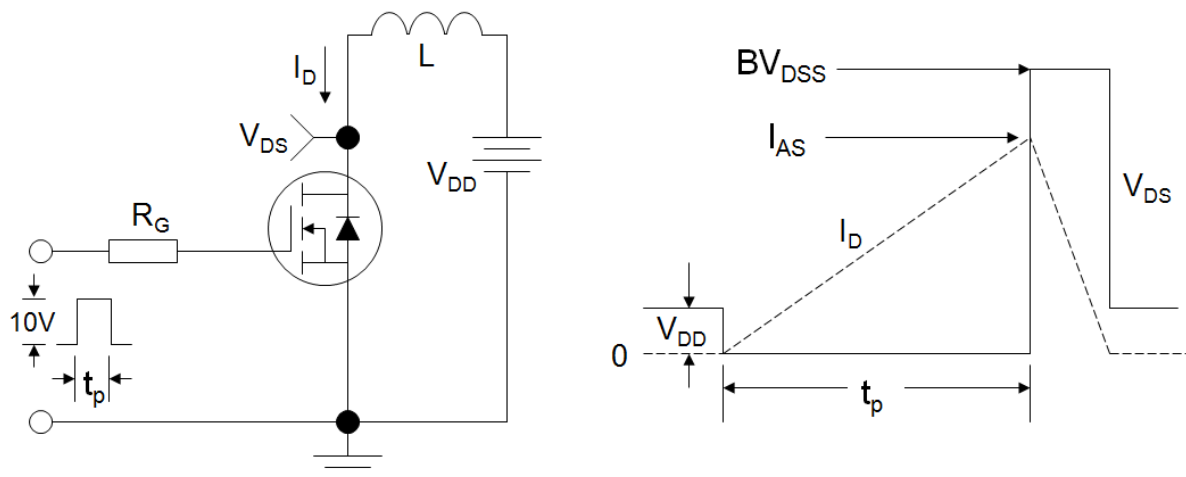
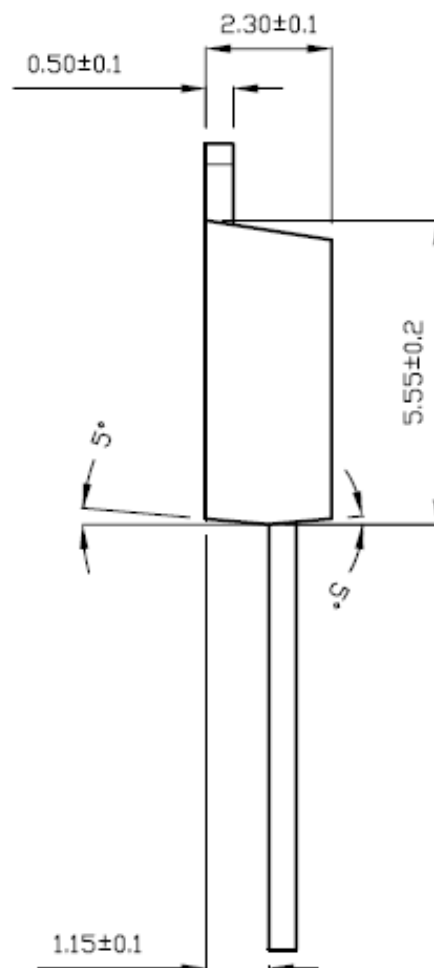
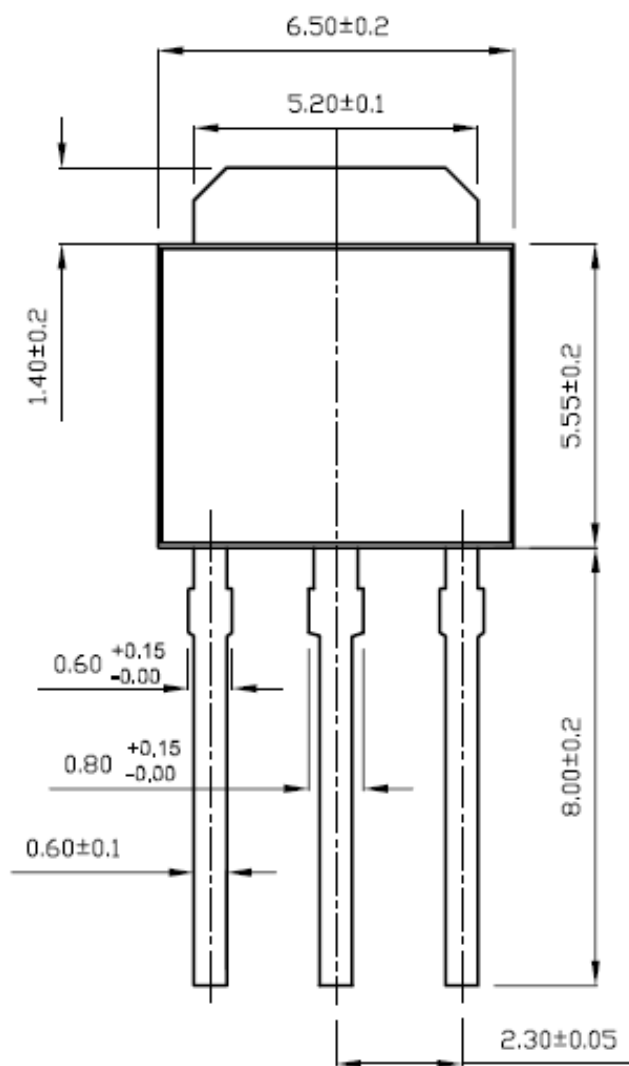


Fig.9 Normalized Maximum Transient Thermal Impedance

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


TO-251



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