

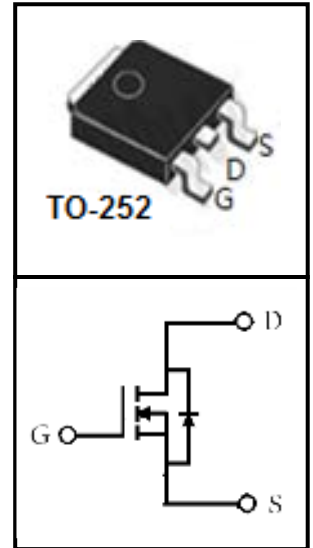
40V N-Channel Trench MOSFET

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
CTD04N7P5	TO-252	CTD04N7P5

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}	40	V
Drain Current-Continuous($T_c = 25^{\circ}\text{C}$) (note1)	I_D	65	A
Drain Current-Continuous($T_c = 100^{\circ}\text{C}$) (note1)		50	
Pulsed Drain Current (note2)	I_{DM}	120	A
Gate Source Voltage	V_{GSS}	± 20	V
Single Pulse Avalanche Energy (note3)	E_{AS}	76	mJ
Power Dissipation $T_c = 25^{\circ}\text{C}$ (note4)	P_D	53	W
Operating Junction and Storage Temperature Range	T_J, T_{stg}	-55~+175	$^{\circ}\text{C}$

Thermal Characteristics

Parameter	Symbol	Value	Unit
Thermal Resistance,Junction-Ambient (note1)	$R_{\theta JA}$	62	$^{\circ}\text{C/W}$
Thermal Resistance,Junction-Case (note1)	$R_{\theta JC}$	2.8	$^{\circ}\text{C/W}$

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 = 250μA	40	--	--	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 32V, V _{GS} = 0V, T _J = 25°C	--	--	1	uA
Zero Gate Voltage Drain Current		V _{DS} = 32V, 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 (note2)	R _{DS(on)}	V _{GS} = 10V, I _D = 20A	--	6.5	7.5	mΩ
		V _{GS} = 4.5V, I _D = 15A	--	8.5	10	mΩ
Dynamic						
Input Capacitance	C _{iss}	V _{GS} = 0V, V _{DS} = 15V, f = 1.0MHz	--	2332	--	pF
Output Capacitance	C _{oss}		--	193	--	
Reverse Transfer Capacitance	C _{rss}		--	138	--	
Total Gate Charge (4.5V)	Q _g	V _{DS} = 30V, I _D = 18A, V _{GS} = 10V	--	18.8	--	nC
Gate-Source Charge	Q _{gs}		--	4.7	--	
Gate-Drain Charge	Q _{gd}		--	8.2	--	
Turn-on Delay Time	t _{d(on)}	V _{DS} = 30V, I _D =20A V _{GS} = 10V,R _G = 3.3Ω	--	14.2	--	ns
Turn-on Rise Time	t _r		--	2.6	--	
Turn-off Delay Time	t _{d(off)}		--	77	--	
Turn-off Fall Time	t _f		--	4.8	--	
Body Diode Characteristics						
Source-Drain Current(Body Diode)	I _{SD}		--	--	65	A
Pulsed Source-Drain Current(Body Diode)	I _{SDM}		--	--	120	A
Body Diode Voltage	V _{SD}	T _J = 25°C, I _{SD} = 5A, V _{GS} = 0V	--	--	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 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

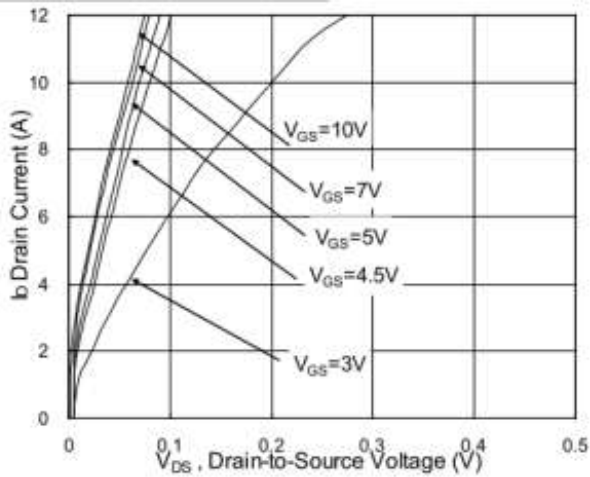


Fig.1 Typical Output Characteristics

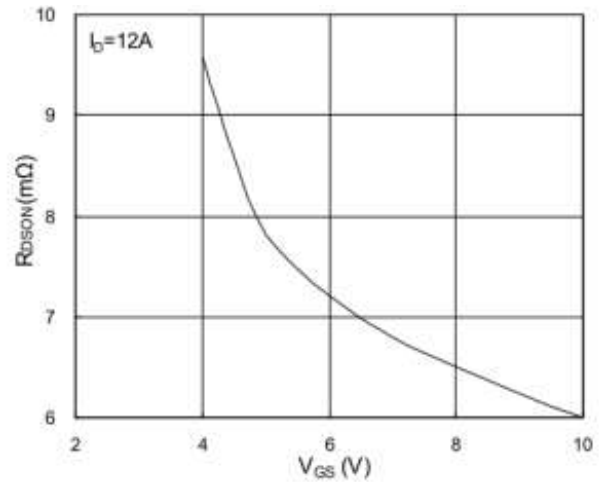


Fig.2 On-Resistance vs. G-S Voltage

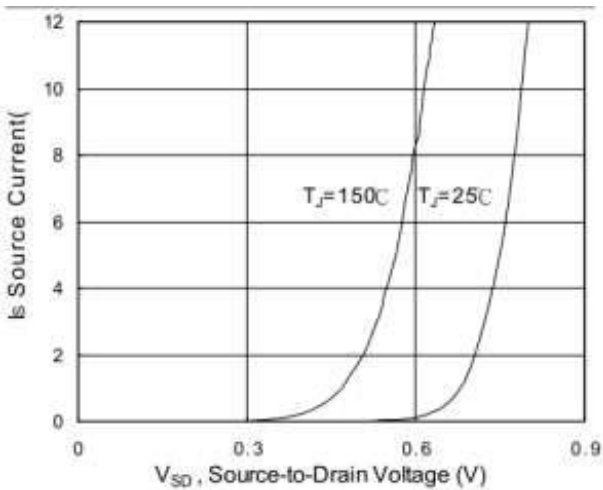


Fig.3 Forward Characteristics of Reverse diode

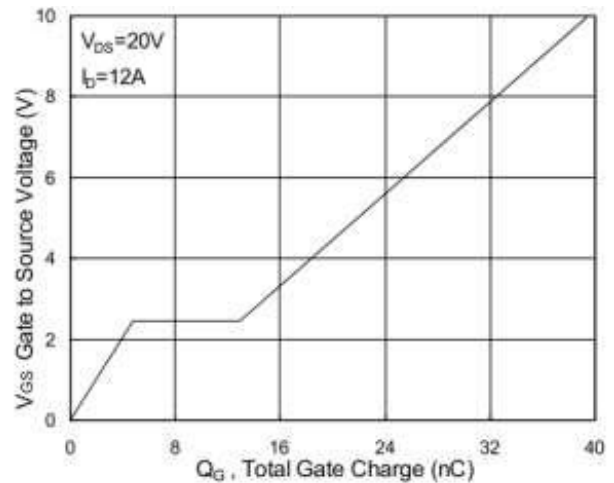


Fig.4 Gate-Charge Characteristics

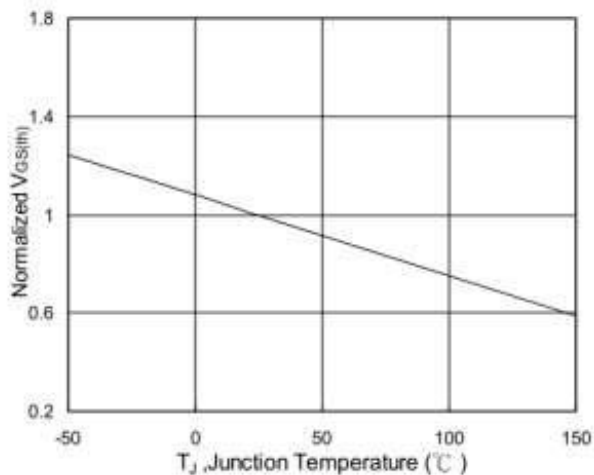


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

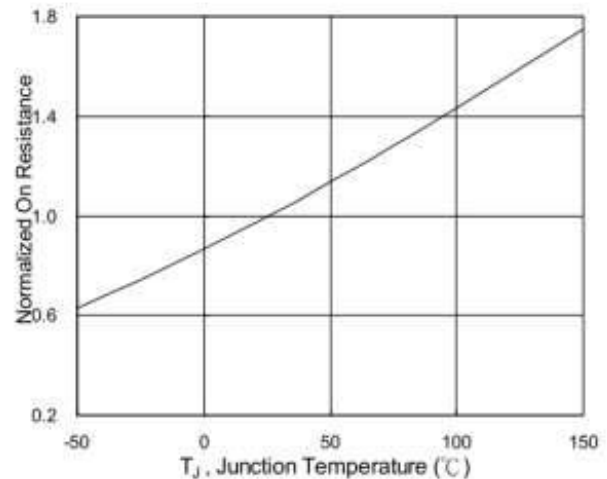


Fig.6 Normalized $R_{DS(on)}$ vs. T_J

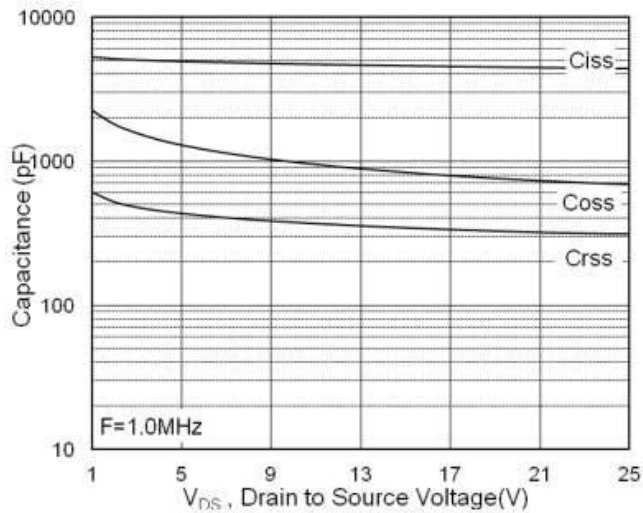
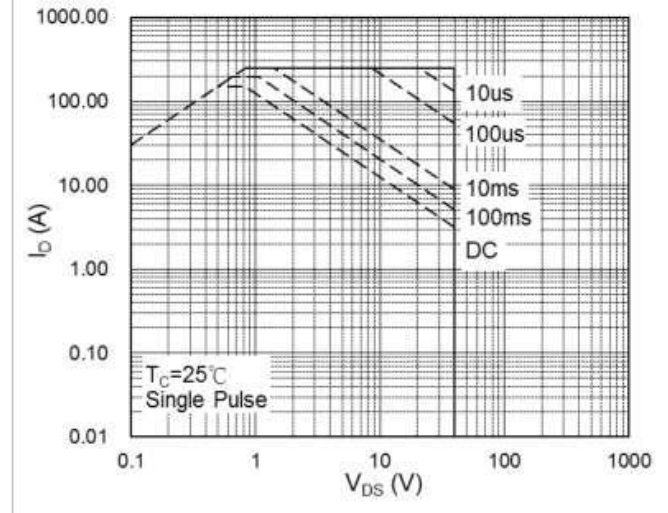
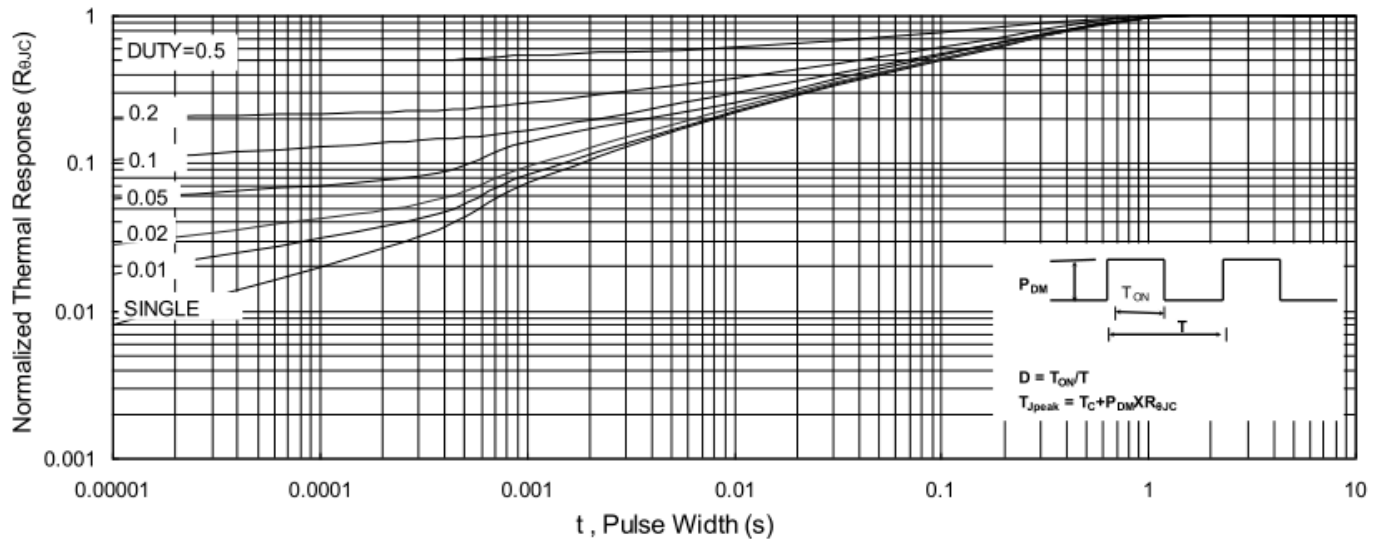
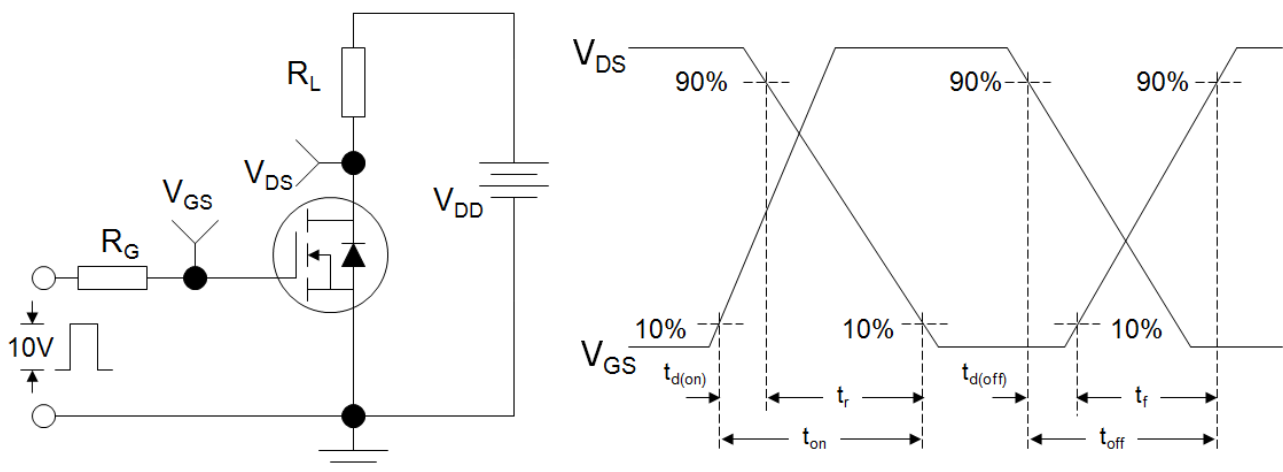
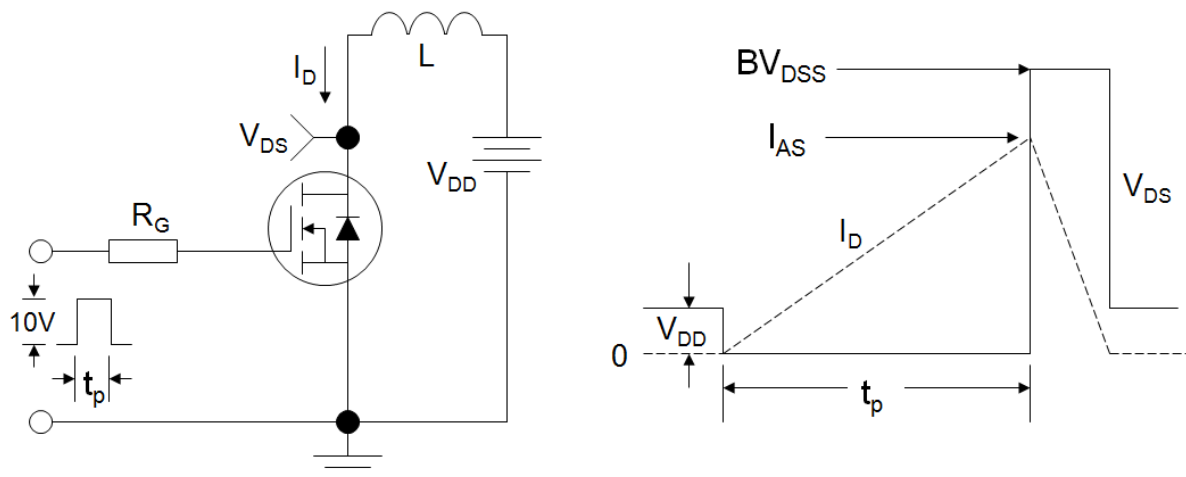
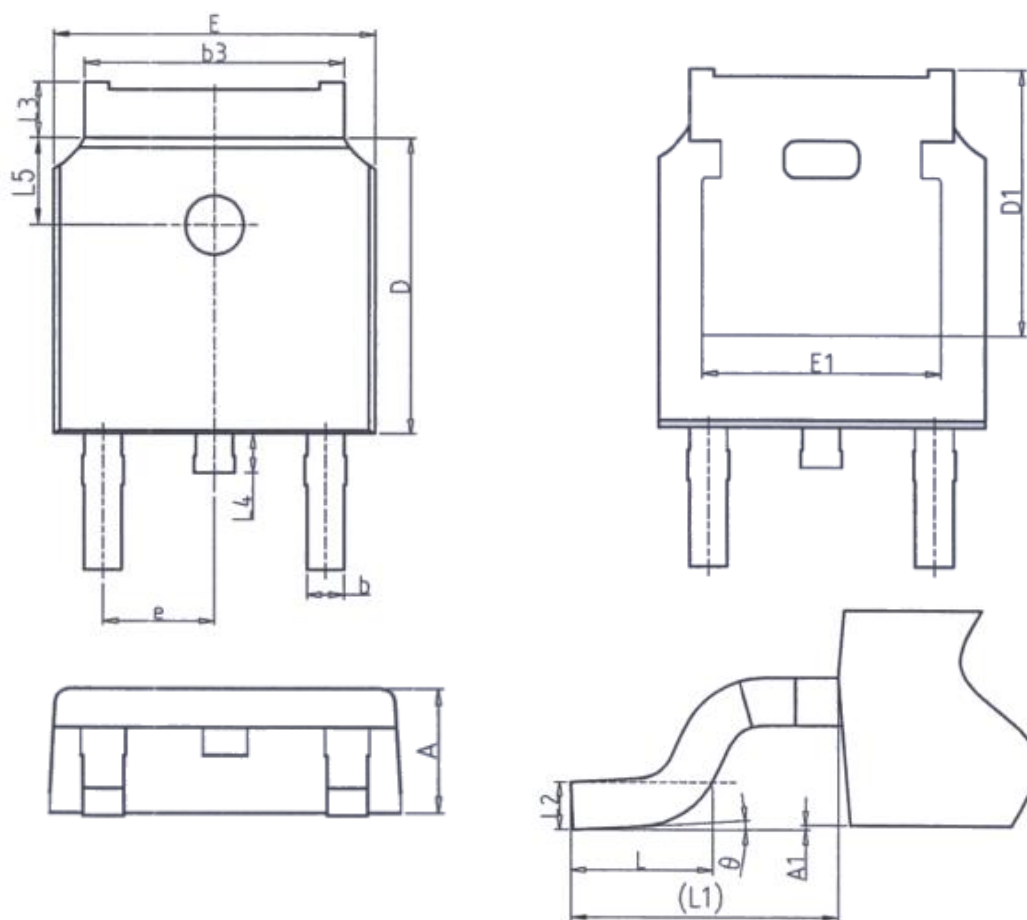
Typical Characteristics $T_J = 25^\circ\text{C}$, unless otherwise noted

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-252



Unit: mm		
Symbol	Min.	Max.
A	2.20	2.40
A1	0.00	0.20
A2	0.97	1.17
b	0.68	0.90
b3	5.20	5.50
c	0.43	0.63
D	5.98	6.22
D1	5.30REF	
E	6.40	6.80
E1	4.63	-

Unit: mm		
Symbol	Min.	Max.
e	2.286BSC	
H	9.40	10.50
L	1.38	1.75
L1	2.90REF	
L2	0.51BSC	
L3	0.88	1.28
L4	-	1.00
L5	1.65	1.95
θ	0°	8°

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