General Description

The CTKD6P20A uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as -10V. This device is suitable for use as a wide variety of applications.

Features

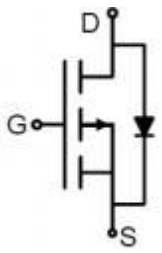
- Low Gate Charge
- 100% UIS Tested, 100% DVDS Tested
- High Power and current handing capability
- Lead free product is acquired

Application

- PWM Applications
- Load Switch
- Power Management

Key Performance Parametes

Parameter	Value	Unit
V_{DS}	-200	V
$R_{DS(ON)_TYP}$	650	mΩ
I_D	-6	A
Q_G	80	nC



Schematic Diagram



TO-252(DPAK) top view

Package Marking and Ordering Information

Device/Ordering Code	Marking	Package	Reel Size	Tape width	Quantity
CTKD6P20A		TO-252	\	\	\

Table 1. Absolute Maximum Ratings (T_C=25℃ unless otherwise noted)

Symbol	Parameter	Limit	Unit
V_{DS}	Drain-Source Voltage (V_{GS}=0V)	-200	V
V_{GS}	Gate-Source Voltage (V_{DS}=0V)	±28	V
I_D	Drain Current-Continuous(T_C=25℃)	-7	A
	Drain Current-Continuous(T_C=100℃)	-4.2	A
$I_{DM\ (pluse)}$	Drain Current-Continuous@ Current-Pulsed (Note 1)	-24	A
P_D	Maximum Power Dissipation(T_C=25℃)	78	W
	Maximum Power Dissipation(T_C=100℃)	38.5	W
E_{AS}	Avalanche energy (Note 2)	81	mJ
T_J, T_{STG}	Operating Junction and Storage Temperature Range	-55 To 175	℃

Table 2. Thermal Characteristic

Symbol	Parameter	Typ	Max	Unit
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case		2	℃/W

Table 3. Electrical Characteristics (T_J=25℃ unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
On/Off States						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V I_D=-250μA	-200			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=-200V, V_{GS}=0V T_J=25℃			-1	μA
		V_{DS}=-200V, V_{GS}=0V T_J=125℃			-100	μA
I_{GSS}	Gate-Body Leakage Current	V_{GS}=±28V, V_{DS}=0V			±100	nA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D=-250μA	-2		-4	V
g_{FS}	Forward Transconductance	V_{DS}=-10V, I_D=-3A		5.5		S
$R_{DS(ON)}$	Drain-Source On-State Resistance	V_{GS}=-10V, I_D=-2A T_J=25℃		650	840	mΩ
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS}=-25V,V_{GS}=0V, f=1.0MHz		2145		pF
C_{oss}	Output Capacitance			49.3		pF
C_{rss}	Reverse Transfer Capacitance			40.4		pF
R_g	Gate resistance	V_{GS}=0V, V_{DS}=0V, f=1.0MHz		5.4		Ω
Switching Parameters						
$t_{d(on)}$	Turn-on Delay Time	V_{GS}=-10V, V_{DS}=-50V, R_L=16Ω, R_{GEN}=3Ω		17.3		nS
t_r	Turn-on Rise Time			4.2		nS
$t_{d(off)}$	Turn-Off Delay Time			49.6		nS
t_f	Turn-Off Fall Time			28		nS
Q_g	Total Gate Charge	V_{GS}=-10V, V_{DS}=-50V, I_D=-3A		80		nC
Q_{gs}	Gate-Source Charge			15		nC
Q_{gd}	Gate-Drain Charge			28		nC
Source-Drain Diode Characteristics						
I_{SD}	Source-Drain Current (Body Diode)				-6	A
V_{SD}	Forward on Voltage (Note 3)	V_{GS}=0V, I_S=-3A			-1.2	V
t_{rr}	Reverse Recovery Time	I_F=-3A, dI/dt=-100A/μs		63.6		ns
Q_{rr}	Reverse Recovery Charge	I_F=-3A, dI/dt=-100A/μs		194		nC

Notes 1.Repetitive Rating: Pulse width limited by maximum junction temperature.
Notes 2.E_{AS} condition: T_J=25℃,V_{DD}=-50V,V_G=-10V, Rg=25Ω, L=0.5mH.
Notes 3.Repetitive Rating: Pulse width limited by maximum junction temperature.

Typical Electrical And Thermal Characteristics (Curves)

Figure 1. Output Characteristics

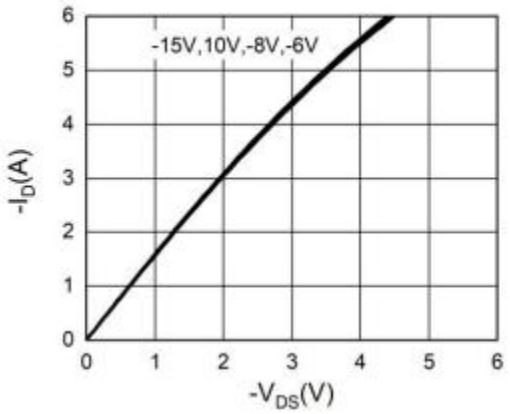


Figure 2. Transfer Characteristics

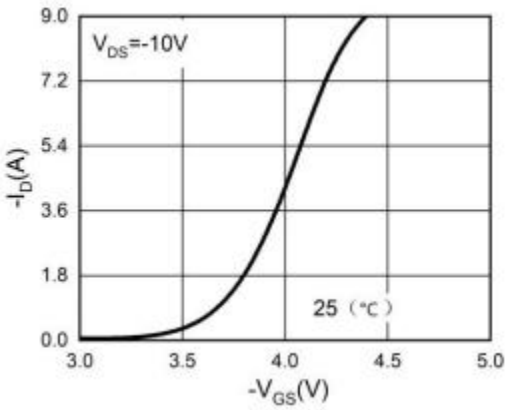


Figure 3. Power Dissipation

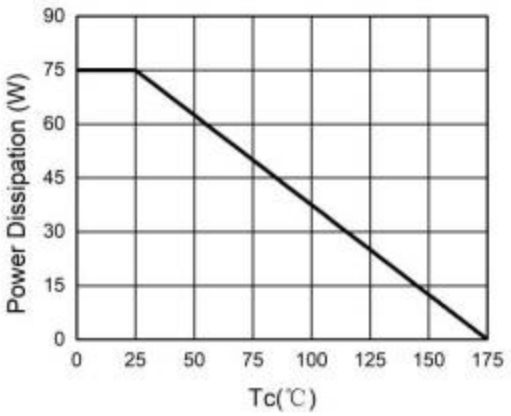


Figure 4. Drain Current

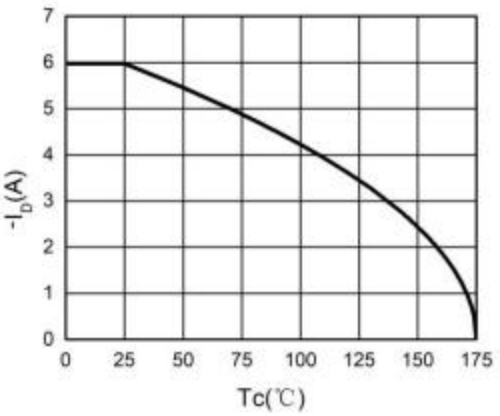


Figure 5. BV_{DSS} vs Junction Temperature

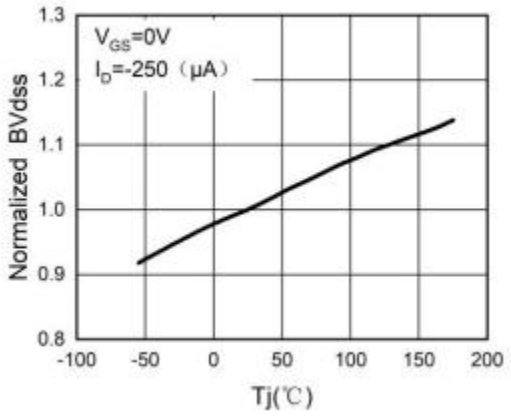
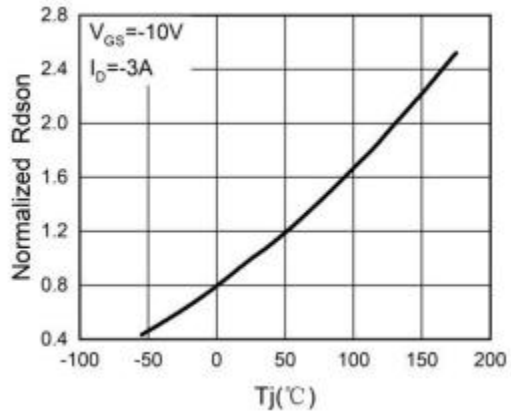


Figure 6. $R_{DS(ON)}$ vs Junction Temperature



Typical Electrical And Thermal Characteristics (Curves)

Figure 7. Gate Charge Waveforms

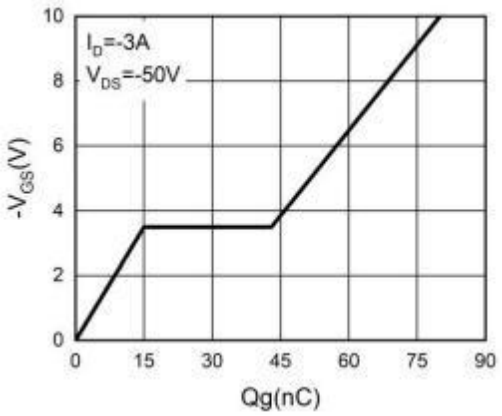


Figure 8. Capacitance

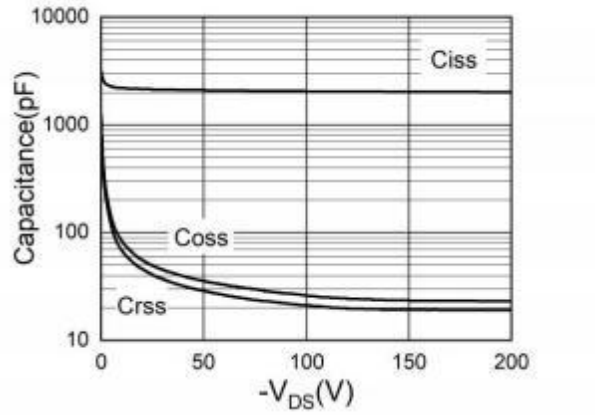


Figure 9. Body-Diode Characteristics

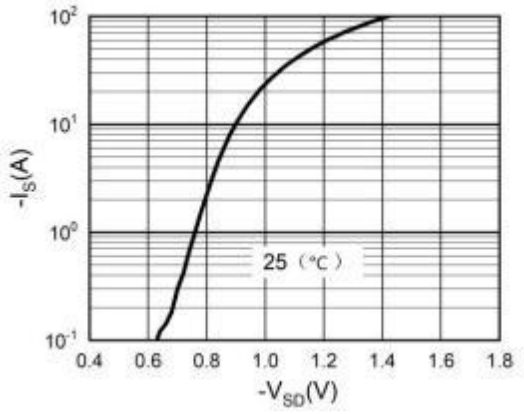
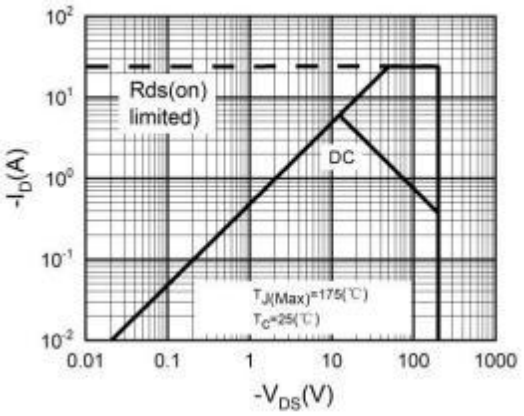
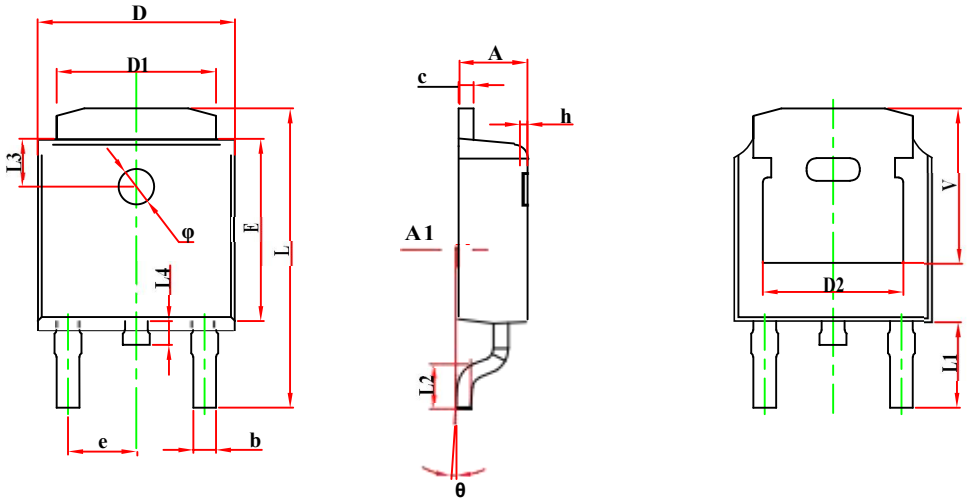


Figure 10. Maximum Safe Operating Area

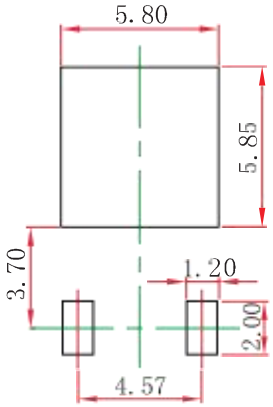


Package Dimension



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.400	0.087	0.094
A1	0.000	0.127	0.000	0.005
b	0.700	0.860	0.025	0.030
c	0.460	0.580	0.018	0.023
D	6.500	6.700	0.256	0.264
D1	5.100	5.460	0.201	0.215
D2	4.830 REF.		0.190 REF.	
E	6.000	6.300	0.236	0.244
e	2.186	2.386	0.086	0.094
L	9.712	10.312	0.382	0.406
L1	2.900 REF.		0.114 REF.	
L2	1.400	1.700	0.055	0.067
L3	1.600 REF.		0.063 REF.	
L4	0.600	1.000	0.024	0.039
Φ	1.100	1.300	0.043	0.051
θ	0o	8o	0o	8o
h	0.000	0.300	0.000	0.012
V	5.250 REF.		0.207 REF.	

TO-252-2L Suggest Pad Layout



NOTE:

1. Controlling dimension: in millimeters.
2. General tolerance: ±0.05mm.
3. The pad layout is for reference purposes only.