

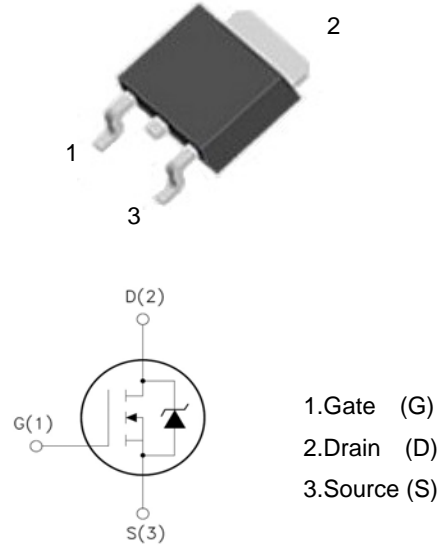
CTKD20N03

30V N-Channel MOSFET

Features:

- Low Intrinsic Capacitances.
- Excellent Switching Characteristics.
- Extended Safe Operating Area.
- Unrivalled Gate Charge :Qg= 17.5nC (Typ.).
- BVDSS=30V,I_D=20A
- R_{DS(on)} : 0.020Ω (Max) @V_G=10V
- 100% Avalanche Tested

TO-252



Absolute Maximum Ratings (T_C=25°C unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V _{DSS}	30	V
Gate-Source Voltage	V _{GSS}	±20	V
Drain Current-Continuous	I _D	20	A
Drain Current-Continuous(T _C =100°C)	I _D (100°C)	14	A
Pulsed Drain Current	I _{DM}	60	A
Maximum Power Dissipation	P _D	35	W
Derating factor		0.27	W/°C
Single pulse avalanche energy ^(Note 5)	E _{AS}	72	mJ
Operating Junction and Storage Temperature Range	T _J ,T _{STG}	-55 To 175	°C

Thermal Characteristic

Thermal Resistance,Junction-to-Case ^(Note 2)	R _{θJC}	4.3	°C/W
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Electrical Characteristics ($T_C=25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	30	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=30V, V_{GS}=0V$	-	-	1	μA
Gate-Body Leakage Current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	± 100	nA
On Characteristics (Note 3)						
Gate Threshold Voltage	V_{GSS}	$V_{DS}=V_{GS}, I_D=250\mu A$	1.0	1.5	2.2	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=5A$	-	14	20	m Ω
		$V_{GS}=4.5V, I_D=5A$	-	19	28	m Ω
Forward Transconductance	g_{FS}	$V_{DS}=5V, I_D=20A$	26	-	-	S
Dynamic Characteristics (Note 4)						
Input Capacitance	C_{ISS}	$V_{DS}=15V, V_{GS}=0V,$ $F=1.0MHz$	-	865	-	PF
Output Capacitance	C_{OSS}		-	135	-	PF
Reverse Transfer Capacitance	C_{RSS}		-	87	-	PF
Switching Characteristics (Note 4)						
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=15V, R_L=0.75\Omega$ $V_{GS}=10V, R_G=3\Omega$	-	5	-	nS
Turn-on Rise Time	t_r		-	12	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	19	-	nS
Turn-Off Fall Time	t_f		-	6	-	nS
Total Gate Charge	Q_g	$V_{DS}=15V, I_D=10A,$ $V_{GS}=10V$	-	17.5	-	nC
Gate-Source Charge	Q_{gs}		-	3	-	nC
Gate-Drain Charge	Q_{gd}		-	4.1	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage (Note 3)	V_{SD}	$V_{GS}=0V, I_S=20A$	-	-	1.2	V
Diode Forward Current (Note 2)	I_S		-	-	20	A
Reverse Recovery Time	t_{rr}	$T_J = 25^\circ\text{C}, I_F = 20A$ $di/dt = 100A/\mu s$ (Note 3)	-	19	-	nS
Reverse Recovery Charge	Q_{rr}		-	10	-	nC
Forward Turn-On Time	t_{on}	Intrinsic turn-on time is negligible (turn-on is dominated by LS+LD)				

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, $t \leq 10$ sec.
3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.
4. Guaranteed by design, not subject to production
5. EAS condition: $T_J=25^\circ\text{C}, V_{DD}=30V, V_G=10V, L=0.5mH, R_G=25\Omega$

Typical Characteristics

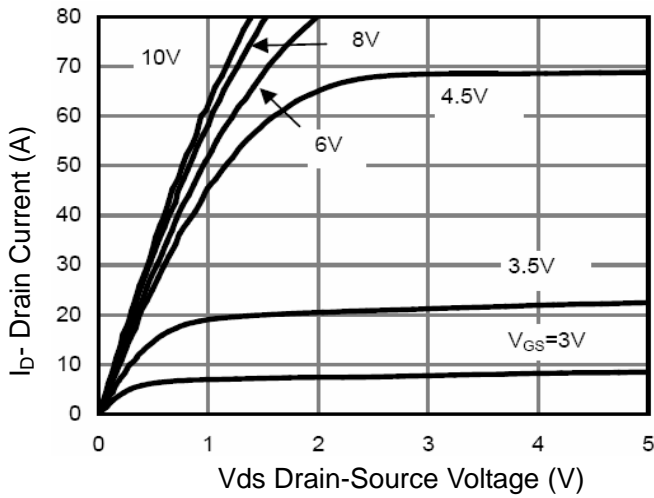


Figure 1 Output Characteristics

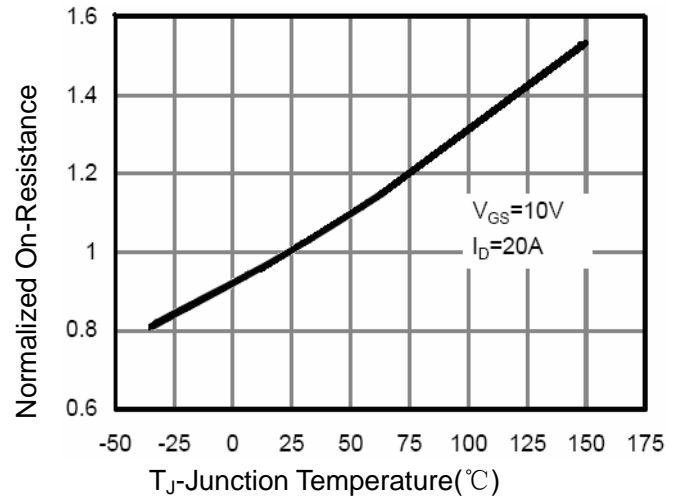


Figure 4 Rdson-Junction Temperature

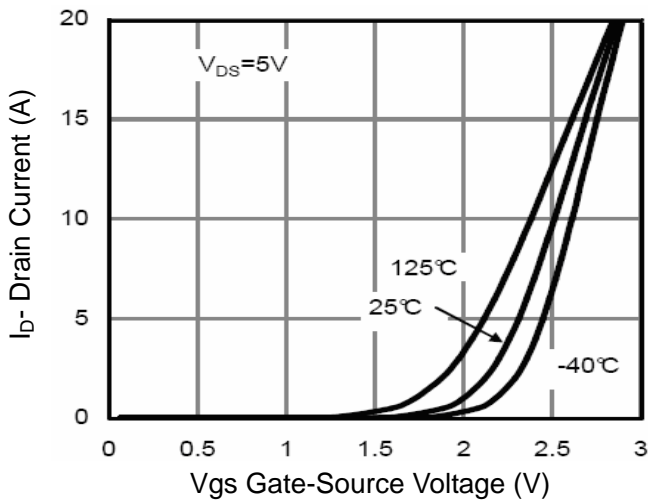


Figure 2 Transfer Characteristics

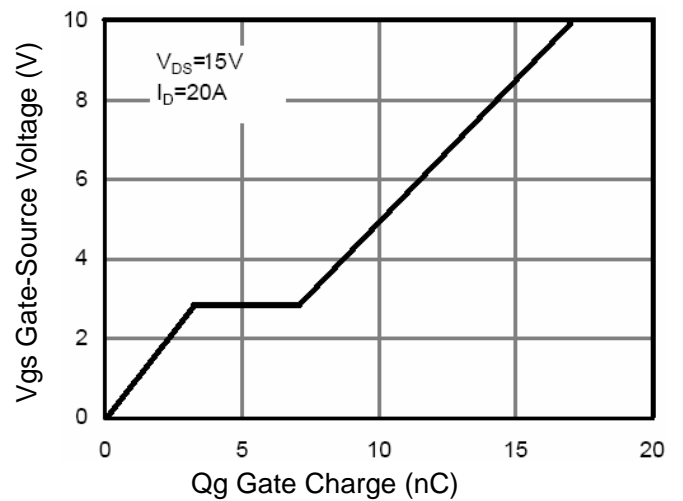


Figure 5 Gate Charge

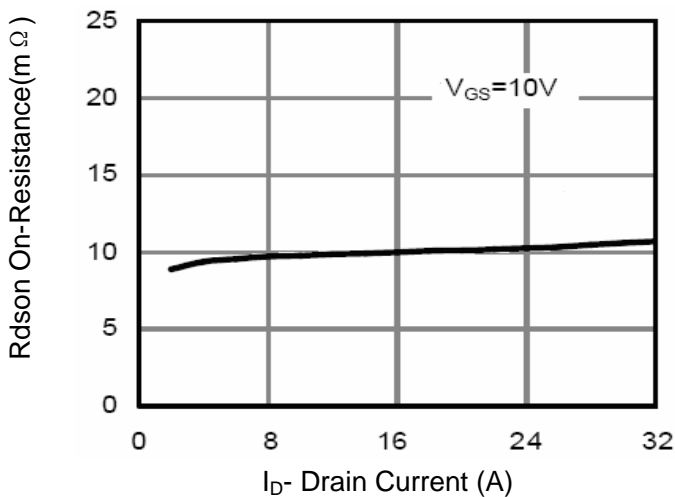


Figure 3 Rdson- Drain Current

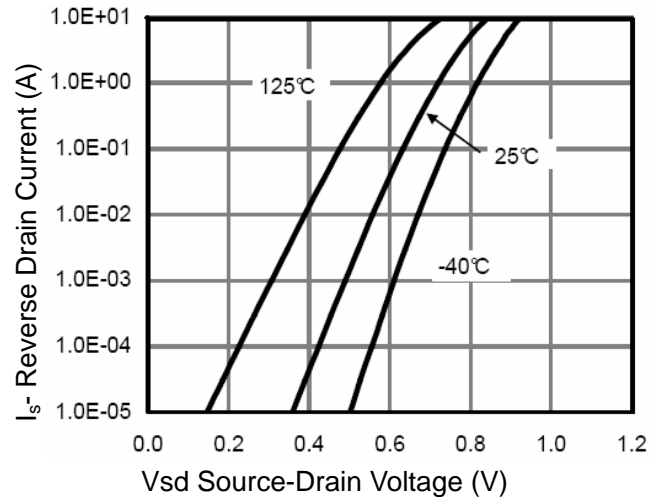


Figure 6 Source- Drain Diode Forward

Typical Characteristics

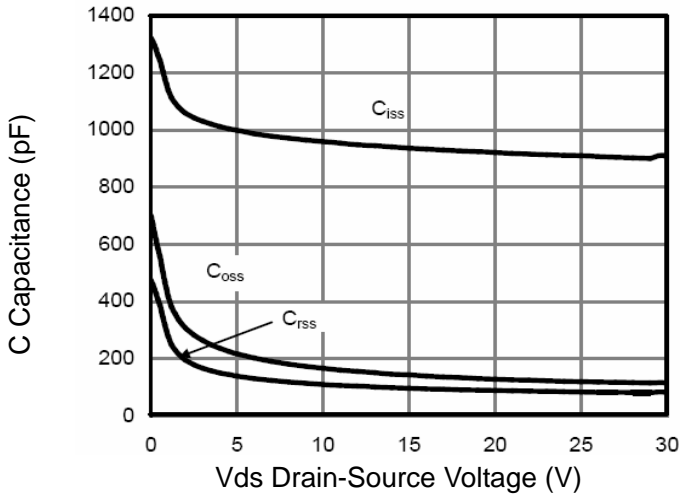


Figure 7 Capacitance vs Vds

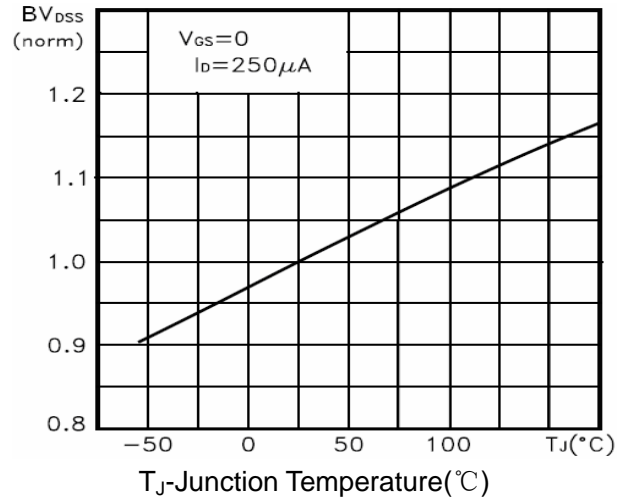


Figure 9 BV_{DSS} vs Junction Temperature

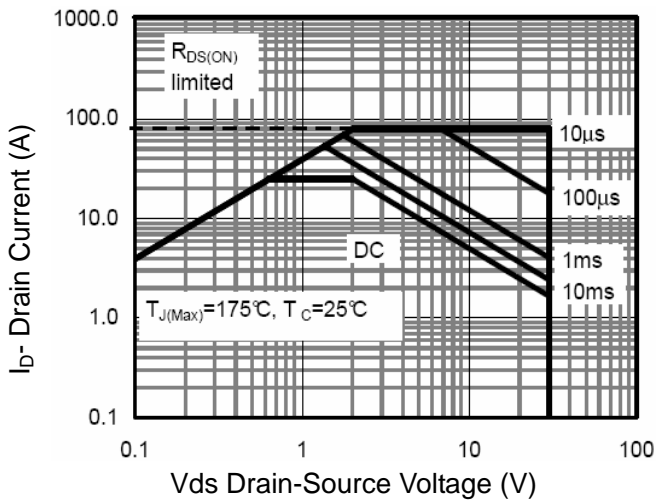


Figure 8 Safe Operation Area

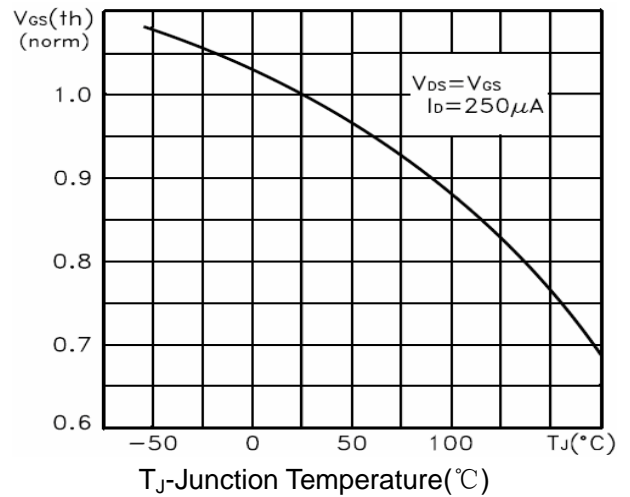
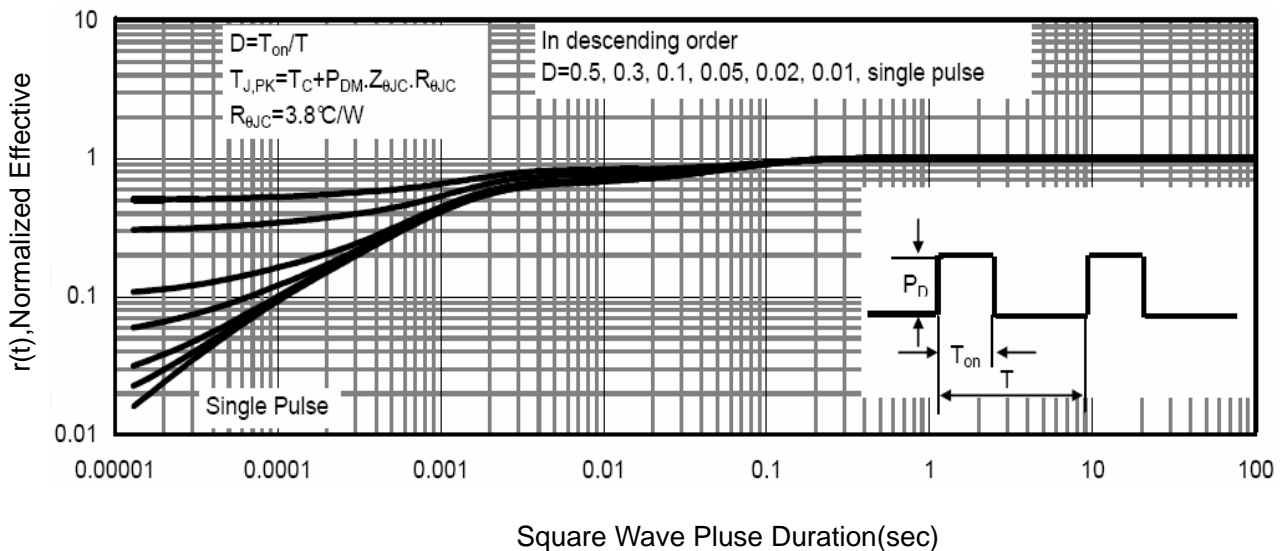
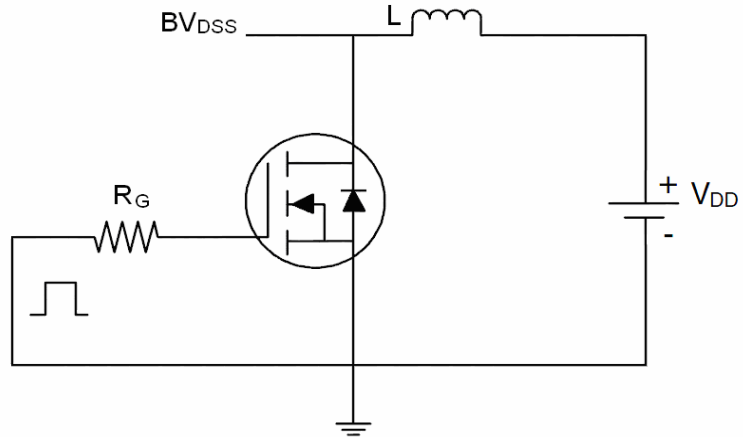


Figure 10 V_{GS(th)} vs Junction Temperature

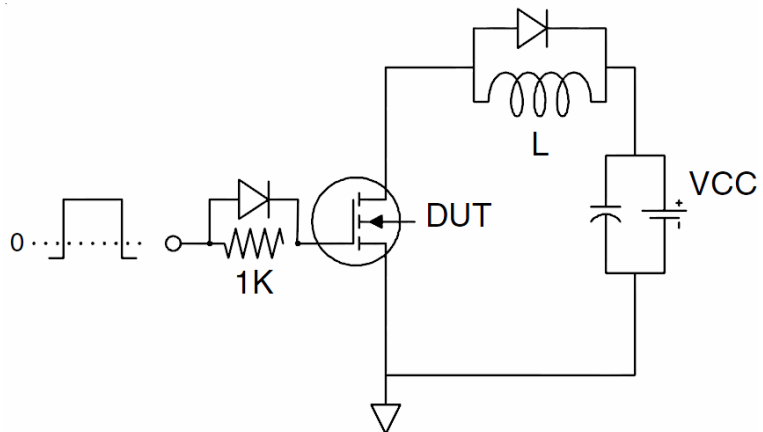


Test Circuit

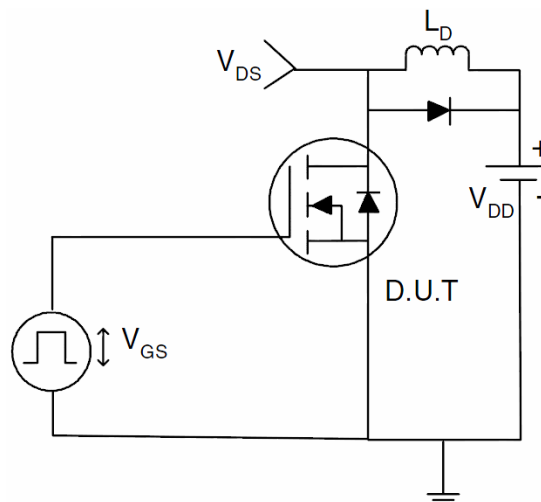
1) E_{AS} test Circuit



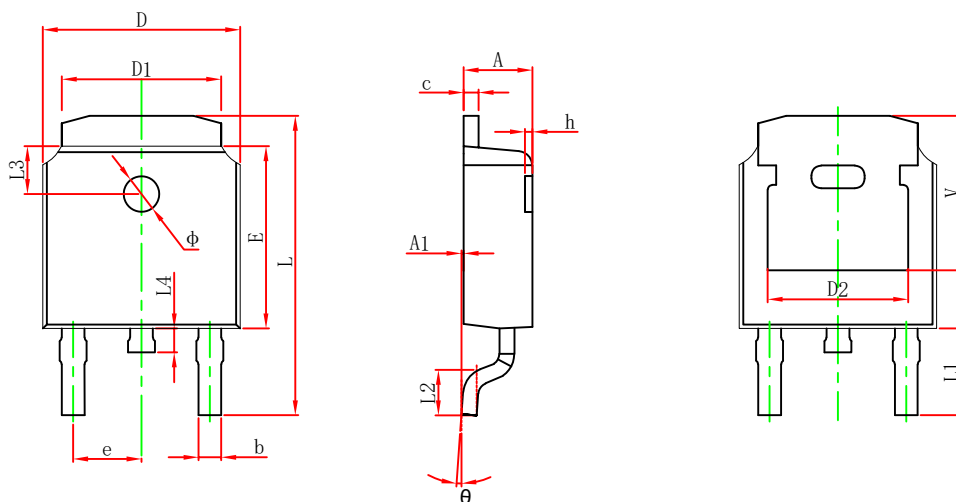
2) Gate charge test Circuit



3) Switch Time Test Circuit

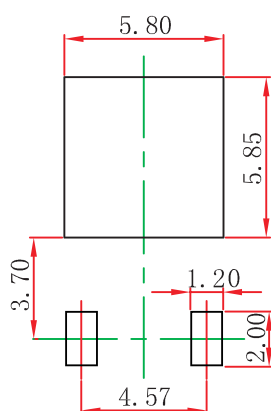


Package Dimension



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	0°	8°	0°	8°
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.