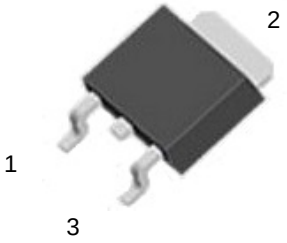
CTKD50N10V

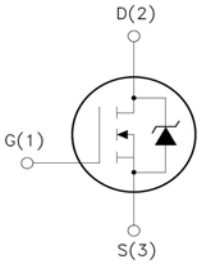
100V N-Channel MOSFET

Features:

- ☐ Low Intrinsic Capacitances.
- ☐ Excellent Switching Characteristics.
- ☐ Extended Safe Operating Area.
- ☐ Unrivalled Gate Charge :Qg= 24nC (Typ.).
- ☐ BVDSS=100V,I_D=50A
- ☐ R_{DS}(on) : 13mΩ (Max) @V_G=10V
- ☐ 100% Avalanche Tested

TO-252





1.Gate (G)
2.Drain (D)
3.Sourse (S)

Absolute Maximum Ratings* (Tc=25℃ Unless otherwise noted)

Symbol	PARAMETER		Value	Unit
V_{DSS}	Drain-Source Voltage		100	V
I_D	Drain Current	T_C=25℃	50	A
		T_C=100℃	38	
$V_{GS(TH)}$	Gate Threshold Voltage		1.2~2.2	V
E_{AS}	Single Pulse Avalanche Energy (note1)		6.0	mJ
I_{AR}	Avalanche Current (note2)		60	A
P_D	Power Dissipation (Tc=25℃)		66~78	W
T_j	Junction Temperature(MAX)		150	℃
T_{stg}	Storage Temperature		-55~+150	℃
TL	Maximum lead temperature for soldering purpose,1/8" from case for 5 seconds		300	℃

Thermal Characteristics

Symbol	PARAMETER	Typ.	MAX.	Unit
$R_{\theta JC}$	Thermal Resistance,Junction to Case	-	1.9	℃/W
$R_{\theta JA}$	Thermal Resistance,Junction to Ambient	-	62.0	℃/W
$R_{\theta CS}$	Thermal Resistance,Case to Sink	-	260	℃/W

Electrical Characteristics (T_C=25℃unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V I_D=250μA	100	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=100V,V_{GS}=0V	-	-	1	μA
Gate-Body Leakage Current	I_{GSS}	V_{GS}=±20V,V_{DS}=0V	-	-	±100	nA
On Characteristics (Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS},I_D=250μA	1.2	-	2.2	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=28A	-	13	17.5	mΩ
Forward Transconductance	g_{FS}	V_{DS}=25V,I_D=28A	32	-	-	S
Dynamic Characteristics (Note4)						
Input Capacitance	C_{lss}	V_{DS}=25V,V_{GS}=0V, F=1.0MHz	-	1382	-	PF
Output Capacitance	C_{oss}		-	184	-	PF
Reverse Transfer Capacitance	C_{rss}		-	5.8	-	PF
Switching Characteristics (Note 4)						
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=50V,I_D=20A V_{GS}=10V,R_{GEN}=3.0Ω	-	5.6	-	nS
Turn-on Rise Time	t_r		-	29	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	28	-	nS
Turn-Off Fall Time	t_f		-	9.9	-	nS
Total Gate Charge	Q_g	V_{DS}=50V,I_D=20A, V_{GS}=10V	-	24	-	nC
Gate-Source Charge	Q_{gs}		-	5.3	-	nC
Gate-Drain Charge	Q_{gd}		-	5.7	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage (Note 3)	V_{SD}	V_{GS}=0V,I_S=20A	-	-	1.4	V
Diode Forward Current (Note 2)	I_S		-	-	60	A
Reverse Recovery Time	t_{rr}	TJ = 25°C, IF = 20A di/dt = 100A/μs (Note3)	-	41	-	nS
Reverse Recovery Charge	Qrr		-	42	-	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 ≤ 10 sec.
3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
4. Guaranteed by design, not subject to production
5. EAS condition：Tj=25℃,V_{DD}=50V,V_G=10V,L=0.5mH,Rg=17.5Ω

图 1. 输出特性　漏源电压 - V_{DS}(V)

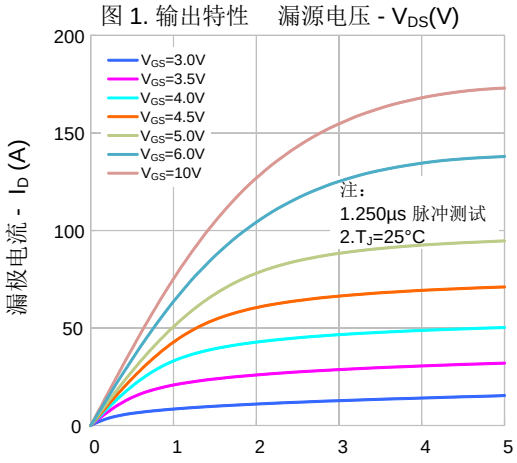


图 2. 传输特性　栅源电压 - V_{GS} (V)

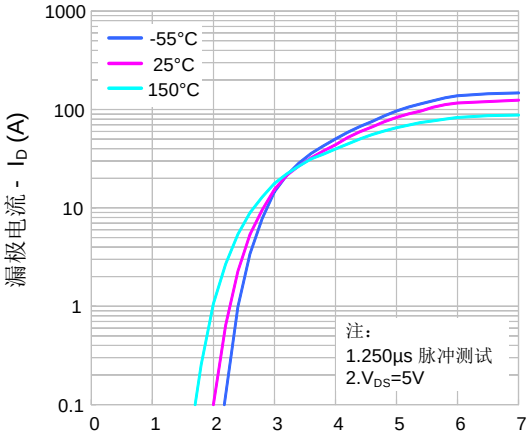


图 3. 导通电阻 vs. 漏极电流　漏极电流 - I_D (A)

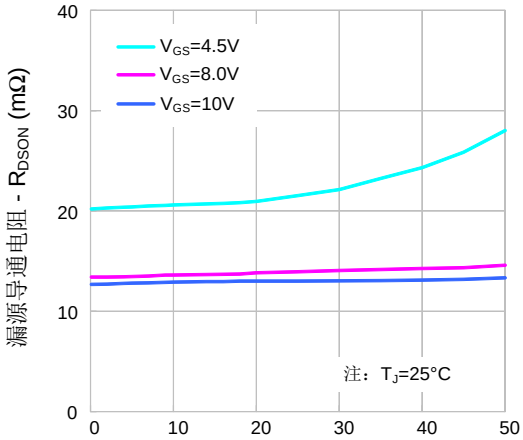


图 4. 导通电阻 vs. 栅源电压　栅源电压 - V_{GS} (V)

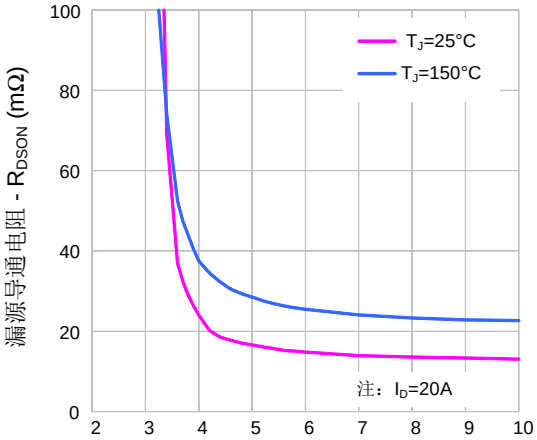


图 5. 开启电压 vs. 温度特性　结温 - T_J(°C)

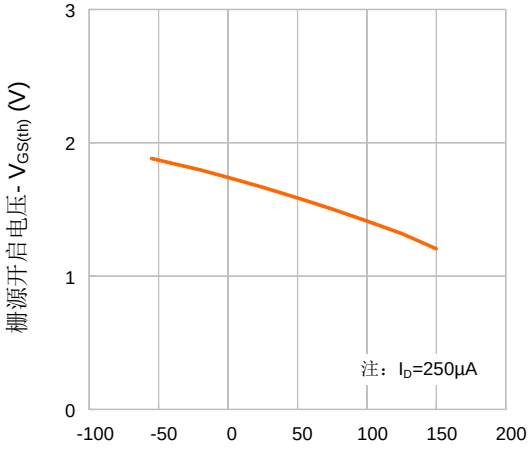


图 6. 体二极管正向压降 vs. 源极电流和温度

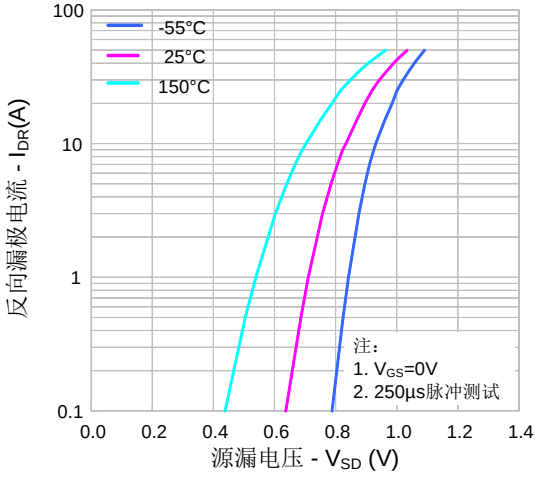


图7. 电容特性　漏源电压 - V_{DS}(V)

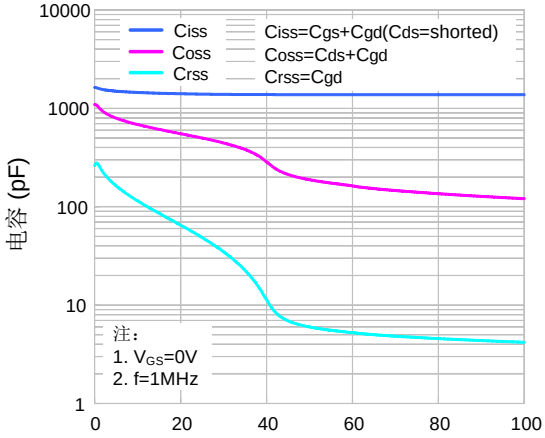


图 8. 电荷量特性 总栅极电荷 - Q_G (nC)

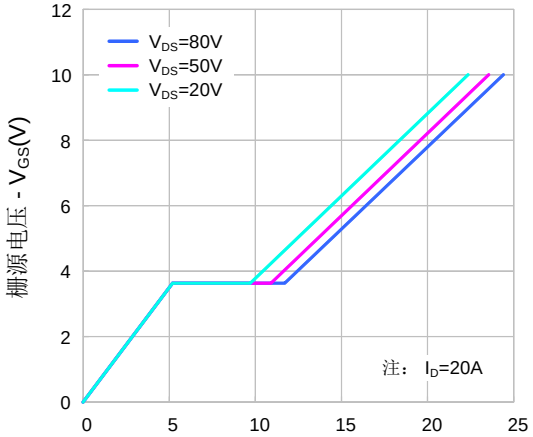


图 9. 击穿电压 vs. 温度特性 结温 - T_J(°C)

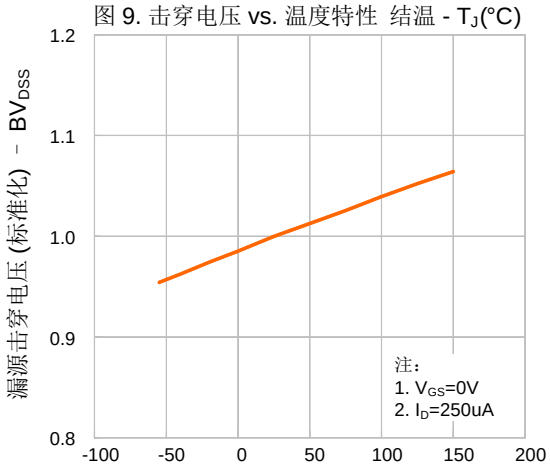


图 10. 导通电阻 vs. 温度特性 结温 - T_J(°C)

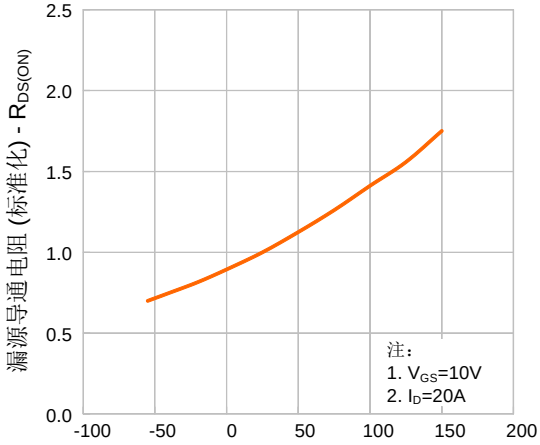


图 11-1. 最大安全工作区域 漏源电压 - V_{DS} (V)

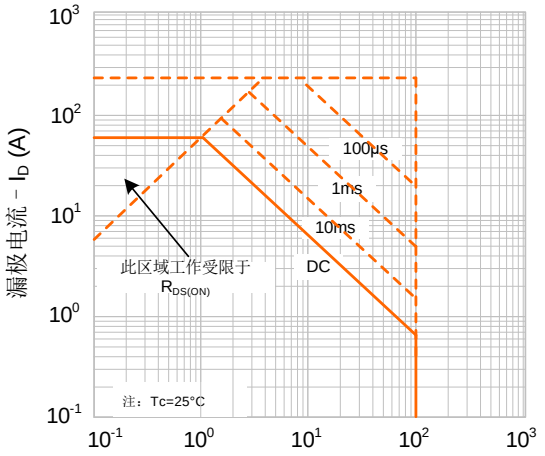


图 12-1. 耗散功率 vs. 温度　温度 - T_C(°C)

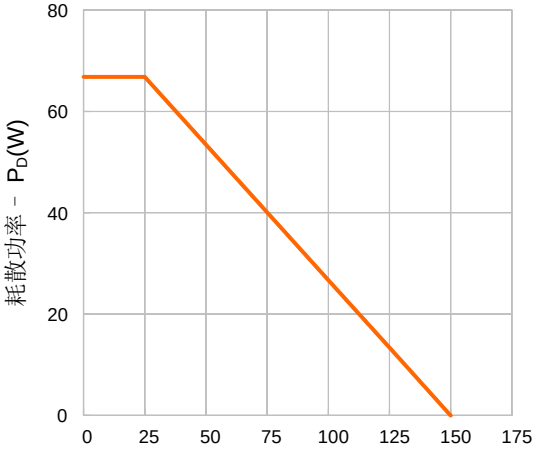


图 11-2. 最大安全工作区域 漏-源电压 - V_{DS} (V)

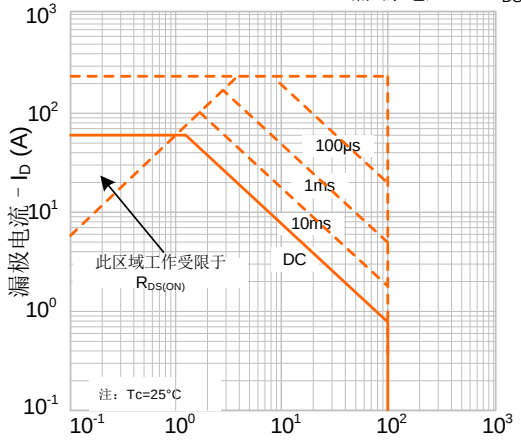
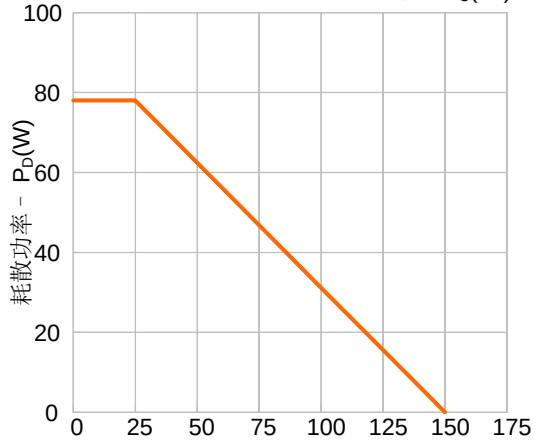
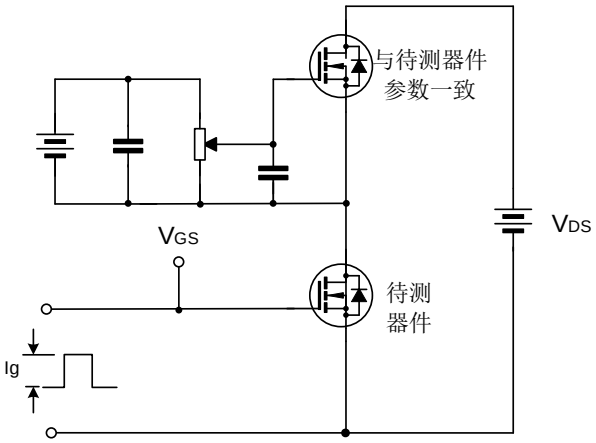
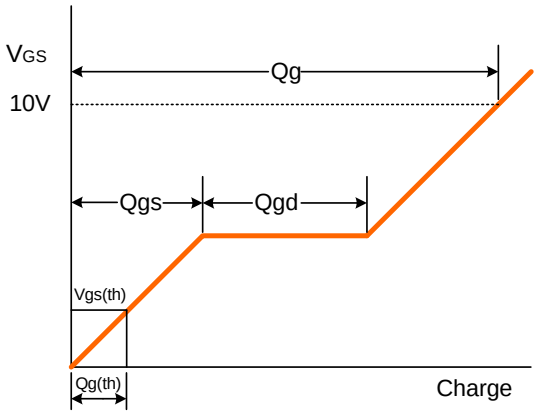


图 12-2. 耗散功率 vs. 温度　温度 - T_C(°C)

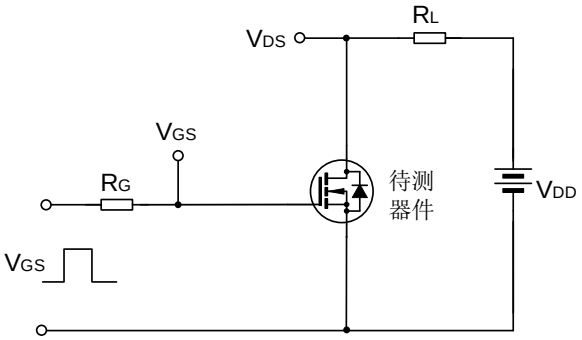


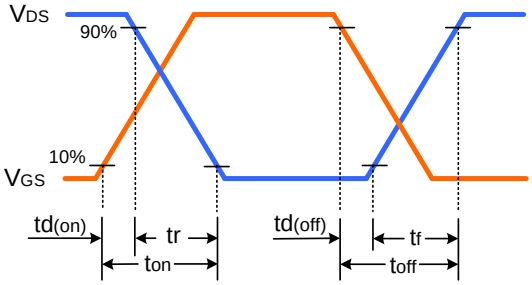
栅极电荷量测试电路及波形图



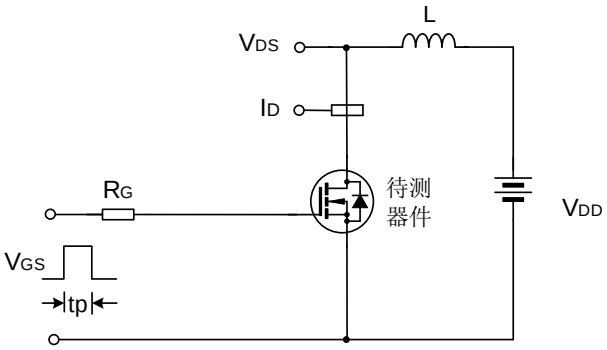


开关时间测试电路及波形图

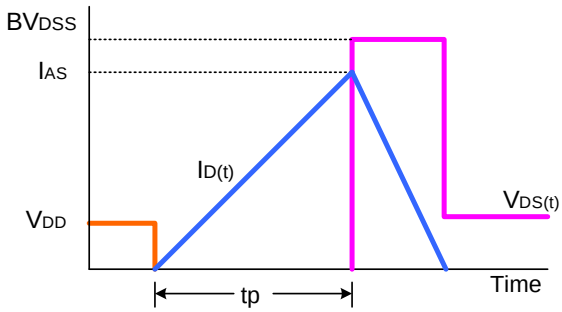




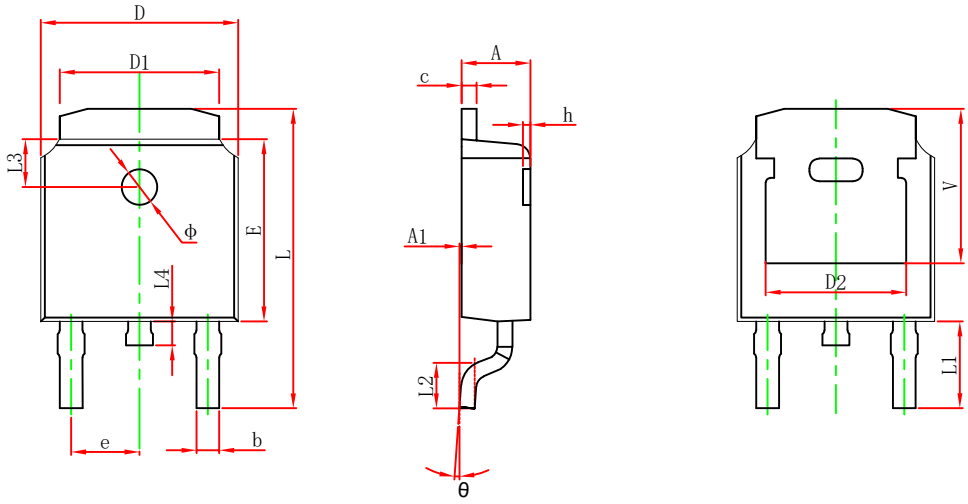
EAS测试电路及波形图



$$E_{AS} = \frac{1}{2} LI_{AS}^2 \frac{BV_{DSS}}{BV_{DSS} - V_{DD}}$$

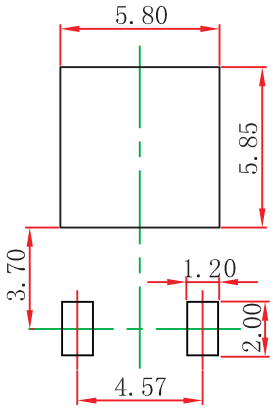


Package Dimension



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.