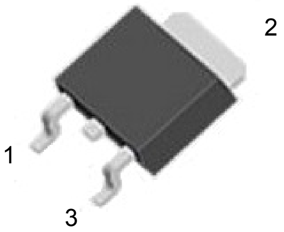
CTKD50N06

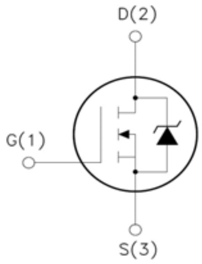
60V N-Channel MOSFET

Features:

- ☐ Low Intrinsic Capacitances.
- ☐ Excellent Switching Characteristics.
- ☐ Extended Safe Operating Area.
- ☐ Unrivalled Gate Charge :Qg= 31nC (Typ.).
- ☐ BVDSS=60V,I_D=50A
- ☐ R_{DS}(on) : 0.018Ω (Max) @V_G=10V
- ☐ 100% Avalanche Tested

TO-252





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

Absolute Maximum Ratings (Ta=25℃ unless otherwise noted)

Symbol	Parameter		Value	Unit
V_{DSS}	Drain-Source Voltage		60	V
I_D	Drain Current	T_C=25℃	50	A
		T_C=100℃	35.4	
$V_{GS(TH)}$	Gate Threshold Voltage		±25	V
E_{AS}	Single Pulse Avalanche Energy (note1)		360	mJ
I_{AR}	Avalanche Current (note2)		50	A
P_D	Power Dissipation (Ta=25℃)		83	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
$R_{θJC}$	Thermal Resistance,Junction to Case	-	1.24	℃/W
$R_{θJA}$	Thermal Resistance,Junction to Ambient	-	62.5	℃/W

Electrical Characteristics Tc=25℃ unless other wise noted

Symbol	Parameter	Test Condition	Min.	Typ.	Max	Units
Off Characteristics						
BV_{DSS}	Drain-Sourse Breakdown Voltage	ID=250μA，VGS=0	60	--	--	V
$\triangle BV_{DSS}/\triangle T_J$	Breakdown Voltage Temperature Conficient	I_D=250μA,Reference to 25℃	--	0.06	--	V/℃
IDSS	Zero Gate Voltage Drain Current	Vds=60V, Vgs=0V	--	--	1	μA
		Vds=48V, Tc=125 ℃			10	μA
IGSSF	Gate-body leakage Current,Forward	Vgs=+25V, Vds=0V	--	--	100	nA
IGSSR	Gate-body leakage Current,Reverse	Vgs=-25V, Vds=0V	--	--	-100	nA
On Characteristics						
$V_{GS(th)}$	Date Threshold Voltage	Id=250uA,Vds=Vgs	2	--	4	V
$R_{DS(on)}$	Static Drain-Sourse On-Resistance	Id=25A,Vgs=10V	--	--	0.018	Ω
Dynamic Characteristics						
Ciss	Input Capacitance	VDS=25V，VGS=0，f=1.0MHz	--	1180	1540	pF
Coss	Output Capacitance		--	440	580	pF
Crss	Reverse Transfer Capacitance		--	65	90	pF
Switching Characteristics						
Td(on)	Turn-On Delay Time	VDD=250V，ID=25A RG=25Ω (Note 3,4)	--	15	40	nS
Tr	Turn-On Rise Time		--	105	220	nS
Td(off)	Turn-Off Delay Time		--	60	130	nS
Tf	Turn-Off Fall Time		--	65	140	nS
Qg	Total Gate Charge	VDS=400,VGS=10V，ID=25A (Note 3,4)	--	31	41	nC
Qgs	Gate-Sourse Charge		--	8	--	nC
Qgd	Gate-Drain Charge			13	--	nC
Drain-Sourse Diode Characteristics and Maximum Ratings						
I_S	Maximun Continuous Drain-Sourse Diode Forward Current		--	--	50	A
I_{SM}	Maximun Plused Drain-Sourse DiodeForwad Current		--	--	200	A
V_{SD}	Drain-Sourse Diode Forward Voltage	Id=25A	--	--	1.5	V
trr	Reverse Recovery Time	I_S=25A,V_{GS} =0V di_F/dt=100A/μs (Note3)	--	52	--	nS
Qrr	Reverse Recovery Charge		--	75	--	μC

*Notes
1, L=9.3mH, IAS=50A, VDD=50V, RG=25Ω, Starting TJ =25°C
2, Repetitive Rating : Pulse width limited by maximum junction temperature
3, Pulse Test : Pulse Width ≤ 300μs, Duty Cycle ≤ 2%
4, Essentially Independent of Operating Temperature

Typical Characteristics

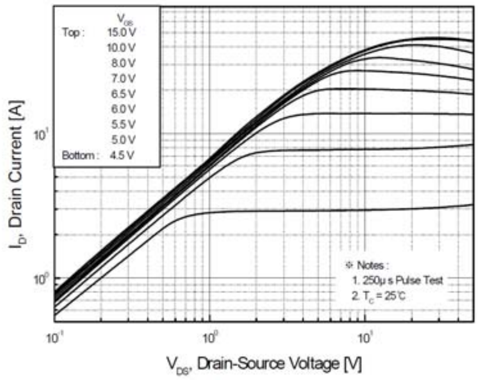


Figure 1. On-Region Characteristics

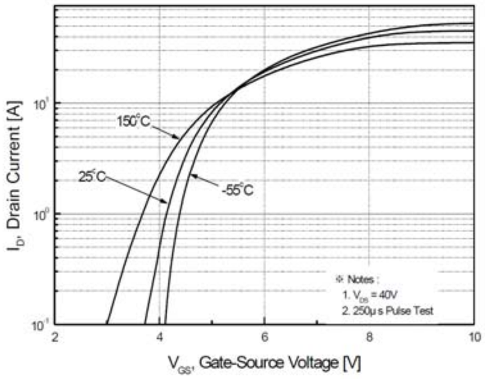


Figure 2. Transfer Characteristics

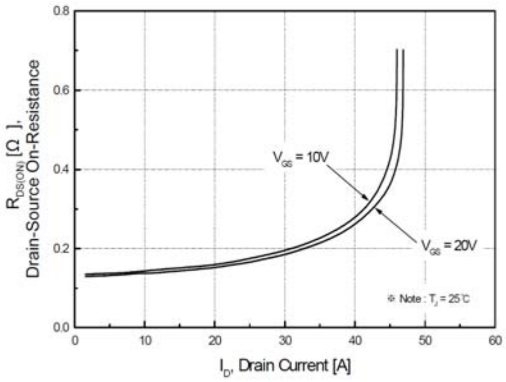


Figure 3. On-Resistance Variation vs Drain Current and Gate Voltage

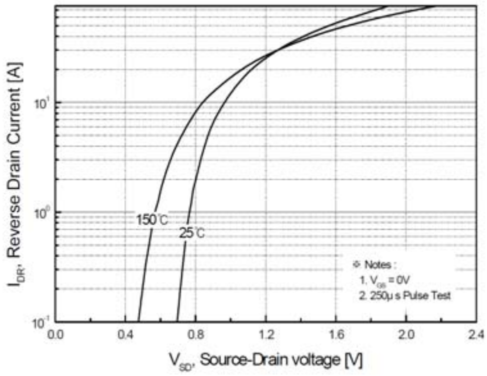


Figure 4. Body Diode Forward Voltage Variation with Source Current and Temperature

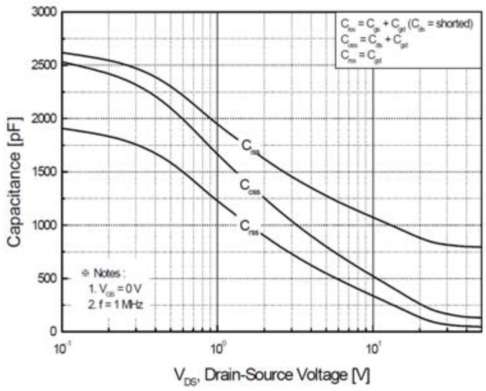


Figure 5. Capacitance Characteristics

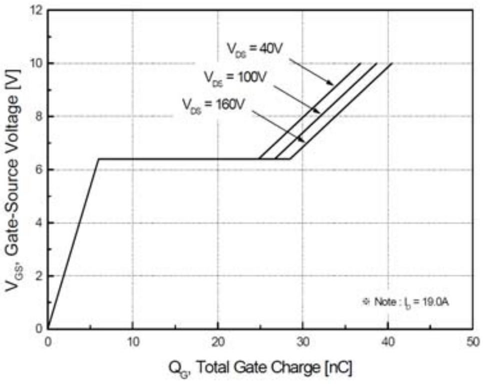
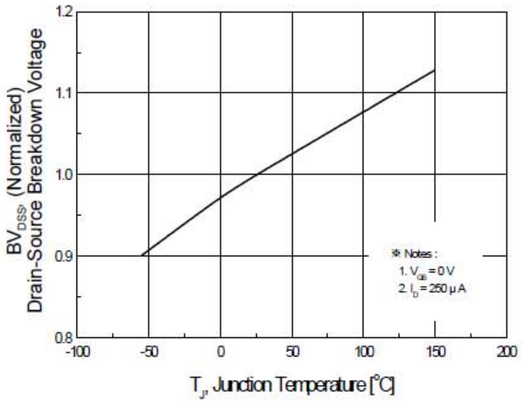


Figure 6. Gate Charge Characteristics

Typical Characteristics (Continued)



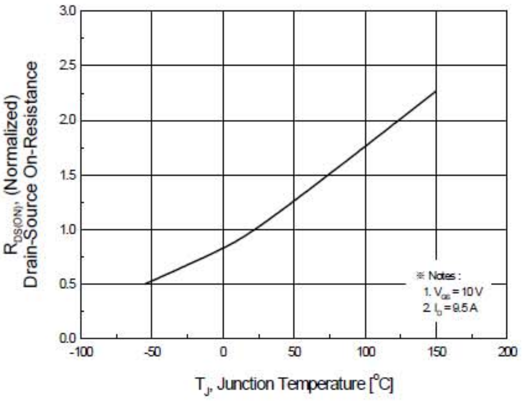
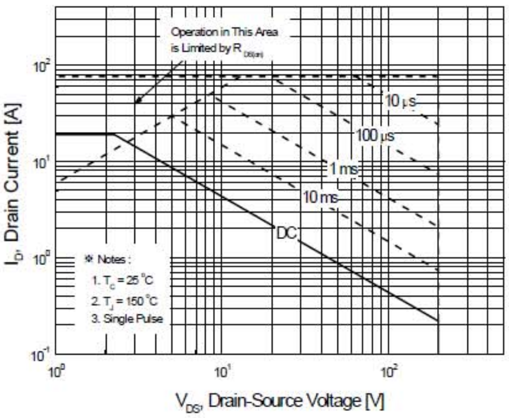


Figure 7. Breakdown Voltage Variation vs Temperature

Figure 8. On-Resistance Variation vs Temperature



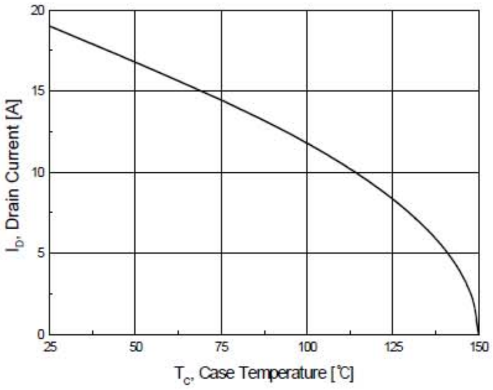


Figure 9. Maximum Safe Operating Area

Figure 10. Maximum Drain Current vs Case Temperature

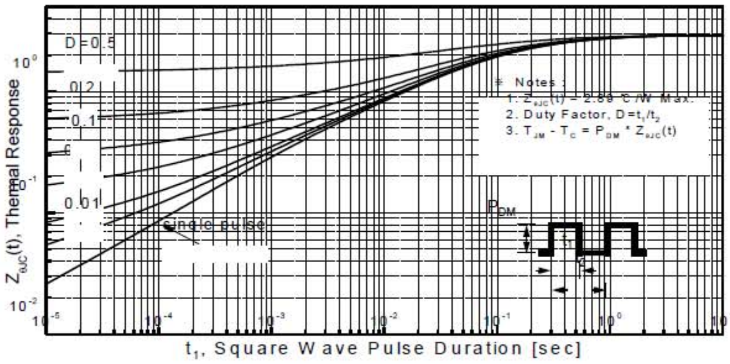
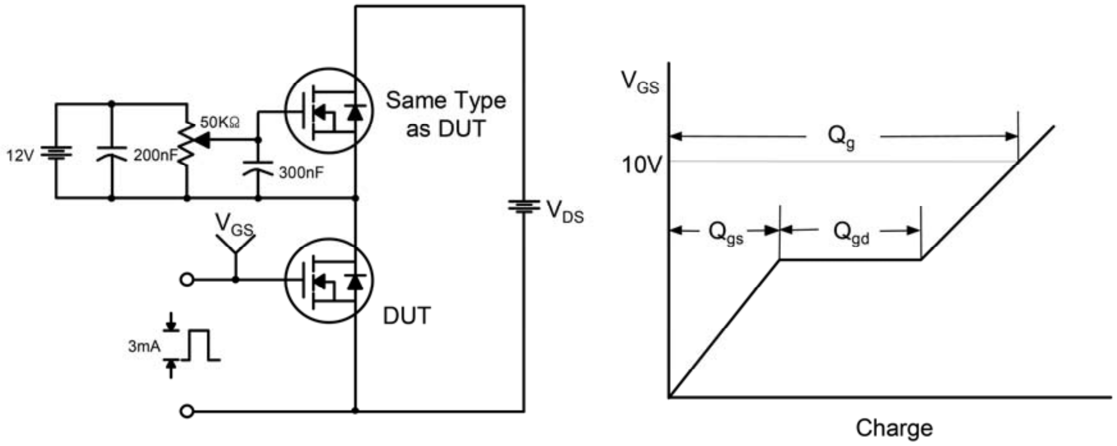
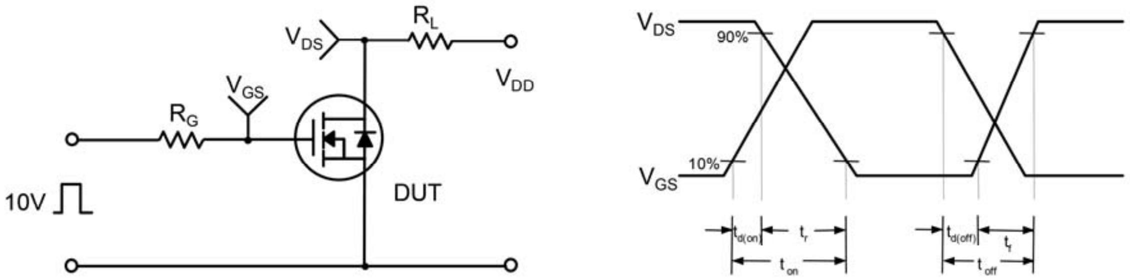


Figure 11. Transient Thermal Response Curve

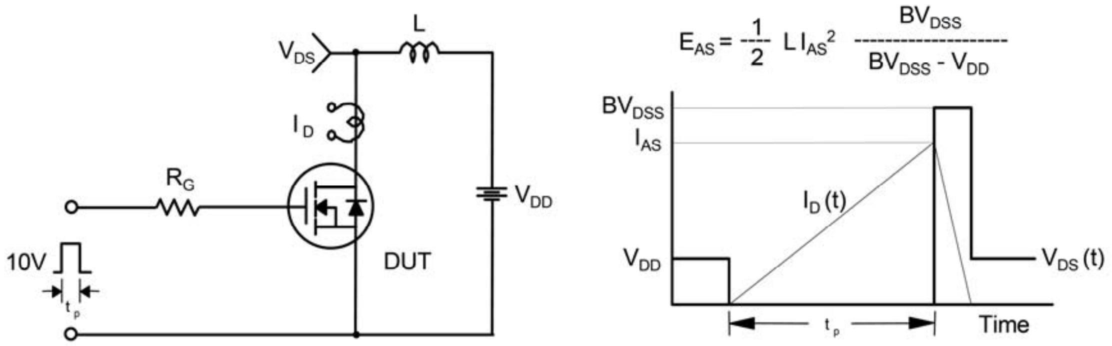
Gate Charge Test Circuit & Waveform



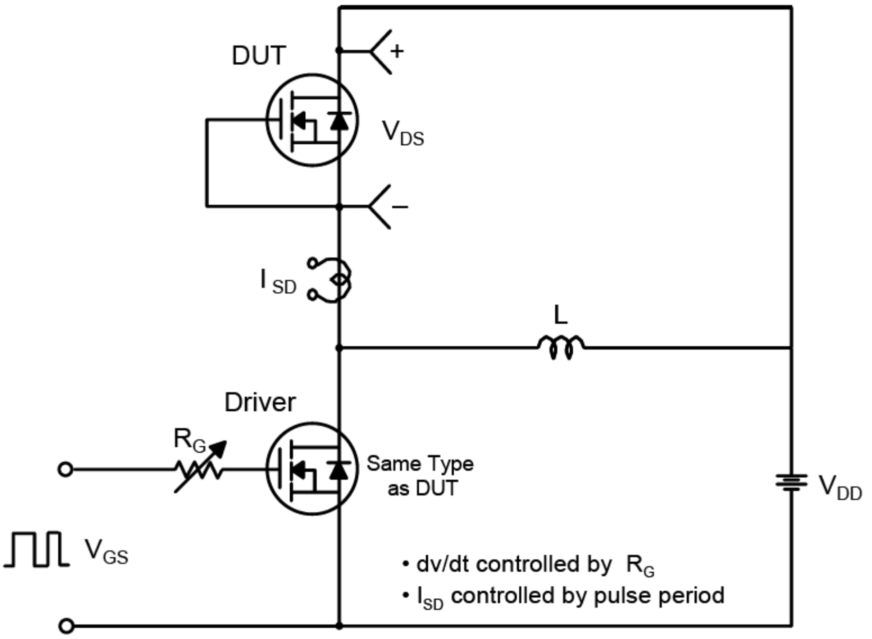
Resistive Switching Test Circuit & Waveforms

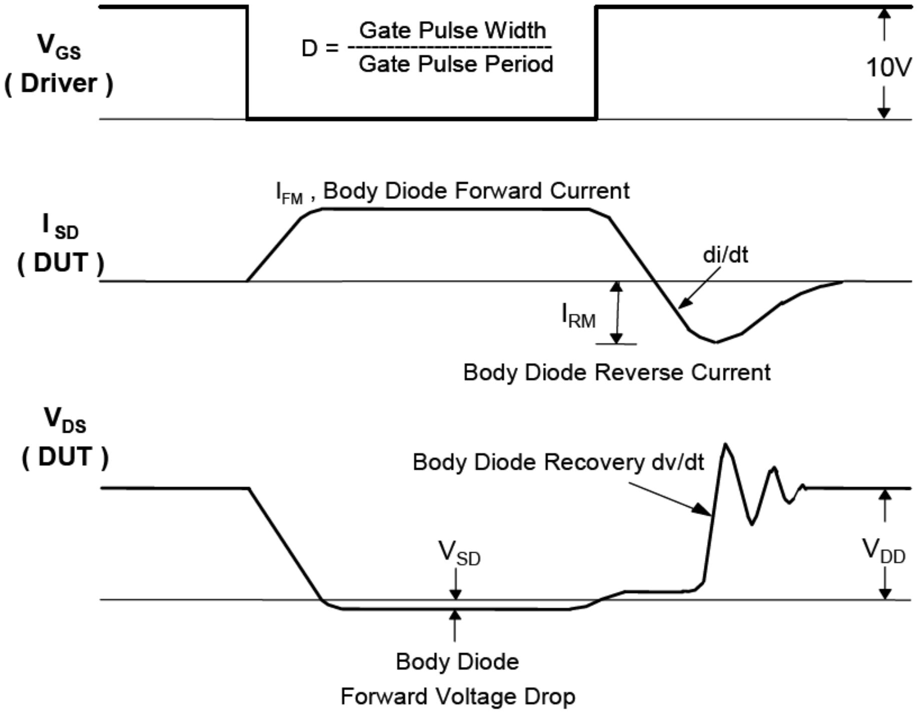


Unclamped Inductive Switching Test Circuit & Waveforms

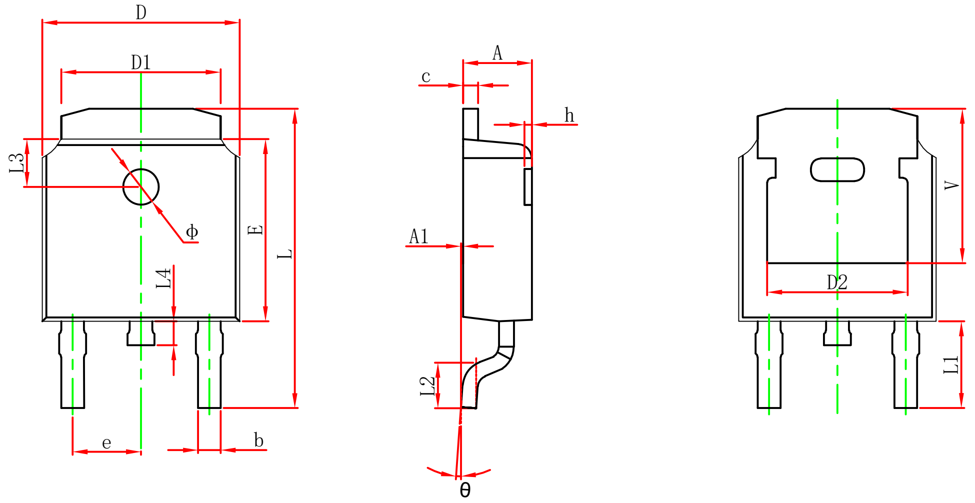


Peak Diode Recovery dv/dt Test Circuit & Waveform



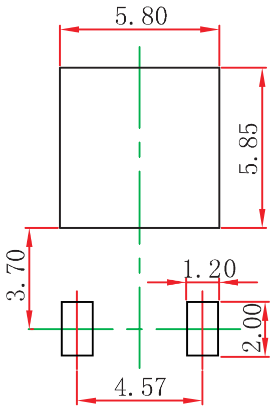


Package Dimension



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.