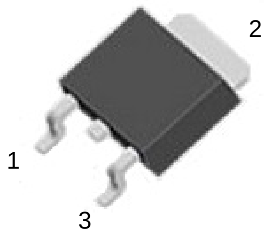
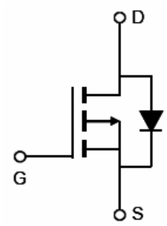
CTKD50P04

TO-252



Features

- V_{DS}= -40V, I_D = -50A
  $R_{DS(on)}$ < 15 mΩ @ V_{GS} = -10V
  $R_{DS(on)}$ < 20 mΩ @ V_{GS} = -4.5V
- Green Device Available
- Low Gate Charge
- Advanced High Cell Density Trench Technology
- 100% EAS Guaranteed



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

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

Parameter		Symbol	Value	Unit
Drain-Source Voltage		V_{DS}	-40	V
Gate-Source Voltage		V_{GS}	±20	V
Continuous Drain Current	T_C=25°C	I_D	-50	A
	T_C=100°C		-35	
Pulsed Drain Current[1]		I_{DM}	-200	A
Single Pulse Avalanche Energy[2]		EAS	80	mJ
Total Power Dissipation	T_C=25°C	P_D	55	W
Operating Junction and Storage Temperature Range		T_J, T_{STG}	-55 to 150	°C

Thermal Characteristics

Parameter	Symbol	Value	Unit
Thermal Resistance from Junction-to-Ambient[3]	$R_{\theta JA}$	61	°C/W
Thermal Resistance from Junction-to-Case	$R_{\theta JC}$	2.27	°C/W

Electrical Characteristics（T_J = 25°C, unless otherwise noted）

Parameter		Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static Characteristics							
Drain-Source Breakdown Voltage		$V_{(BR)DSS}$	V_{GS} = 0V, I_D = -250μA	-40	-	-	V
Gate-body Leakage current		I_{GSS}	V_{DS} = 0V, V_{GS} = ±20V	-	-	±100	nA
Zero Gate Voltage Drain Current	T_J=25°C	I_{DSS}	V_{DS} = -40V, V_{GS} = 0V	-	-	1	μA
	T_J=100°C			-	-	100	
Gate-Threshold Voltage		$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = -250μA	-1.0	-1.6	-2.5	V
Drain-Source On-Resistance[4]		$R_{DS(on)}$	V_{GS} = -10V, I_D = -16A	-	12	15	mΩ
			V_{GS} = -4.5V, I_D = -10A	-	16	20	
Forward Transconductance[4]		g_{fs}	V_{DS} = -10V, I_D = -16A	-	44	-	S
Dynamic Characteristics[5]							
Input Capacitance		C_{iss}	V_{DS} = -20V, V_{GS} =0V, f =1MHz	-	3050	-	pF
Output Capacitance		C_{oss}		-	282	-	
Reverse Transfer Capacitance		C_{rss}		-	230	-	
Gate Resistance		R_g	f =1MHz	-	9	-	Ω
Switching Characteristics[5]							
Total Gate Charge		Q_g	V_{GS} = -10V,V_{DS} = -20V, I_D= -16A	-	28	-	nC
Gate-Source Charge		Q_{gs}		-	8	-	
Gate-Drain Charge		Q_{gd}		-	8.5	-	
Turn-on Delay Time		$t_{d(on)}$	V_{GS} =-10V, V_{DD} = -15V, R_G = 3Ω, I_D= -16A	-	38	-	ns
Rise Time		t_r		-	31	-	
Turn-off Delay Time		$t_{d(off)}$		-	90	-	
Fall Time		t_f		-	9.2	-	
Drain-Source Body Diode Characteristics							
Diode Forward Voltage[4]		V_{SD}	I_S = -1A, V_{GS} = 0V	-	-	-1.2	V
Continuous Source Current	T_C=25°C	I_S	-	-	-	-50	A

Notes:

1. Repetitive rating, pulse width limited by junction temperature $T_{J(MAX)}$=150°C.
2. The EAS data shows Max. rating . The test condition is V_{DD}= -25V, V_{GS}= -10V,L=0.1mH,I_{AS}= -50A.
3. The data tested by surface mounted on a 1 inch2 FR-4 board with 2OZ copper, The value in any given application depends on the user's specific board design.
4. The data tested by pulsed , pulse width ≤ 300us , duty cycle ≤ 2%.
5. This value is guaranteed by design hence it is not included in the production test..

Typical Characteristics

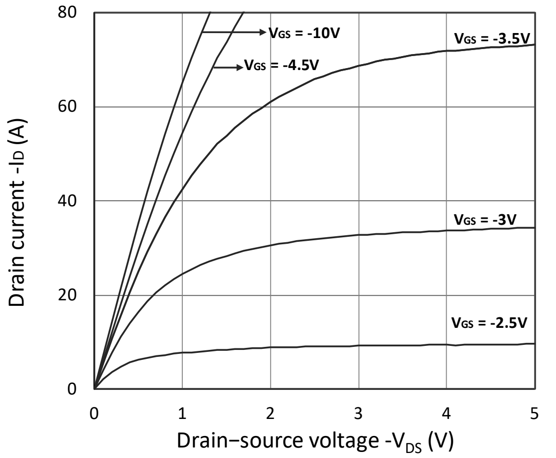


Figure 1. Output Characteristics

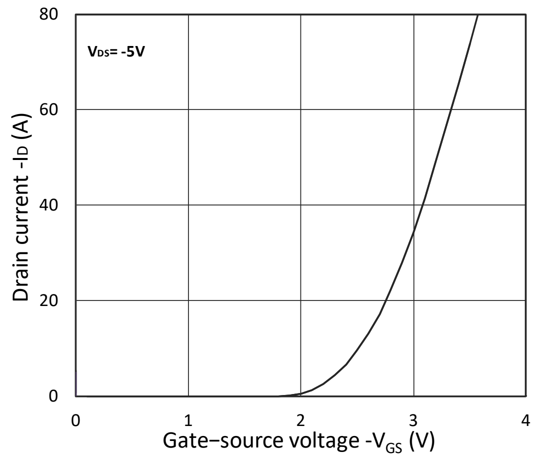


Figure 2. Transfer Characteristics

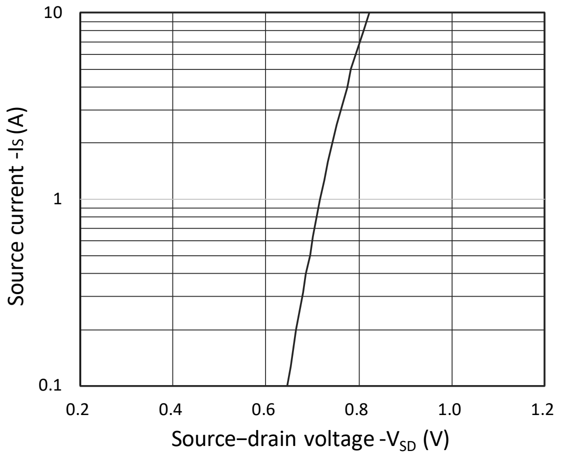


Figure 3. Forward Characteristics of Reverse

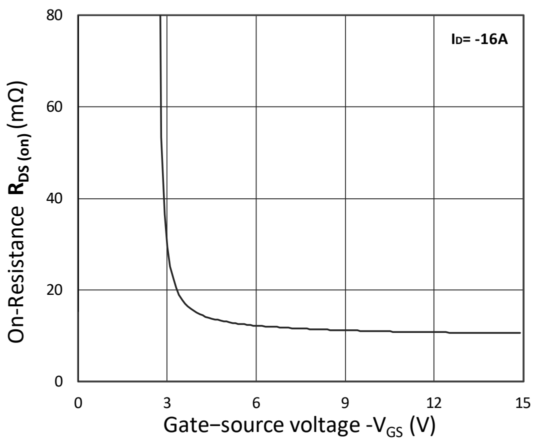


Figure 4. $R_{DS(ON)}$ vs. V_{GS}

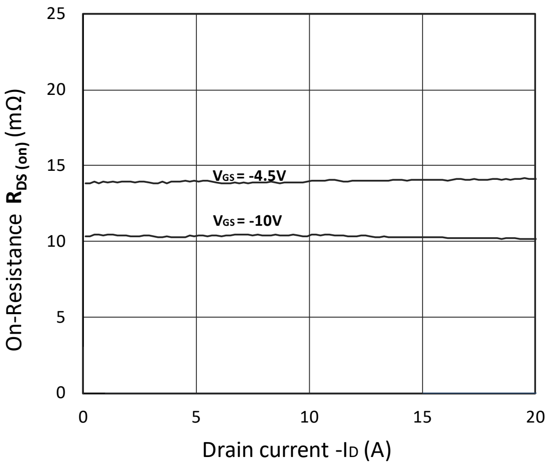


Figure 5. $R_{DS(ON)}$ vs. I_D

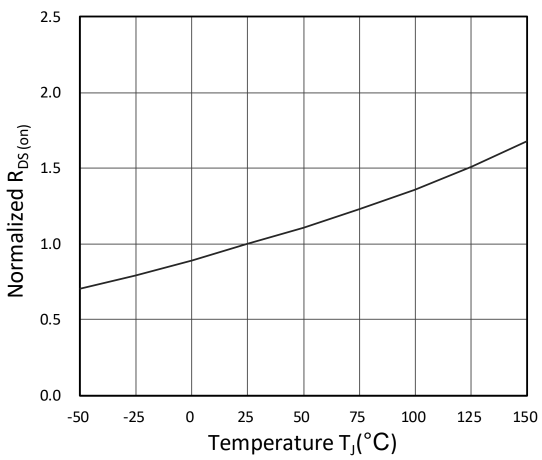


Figure 6. Normalized $R_{DS(on)}$ vs. Temperature

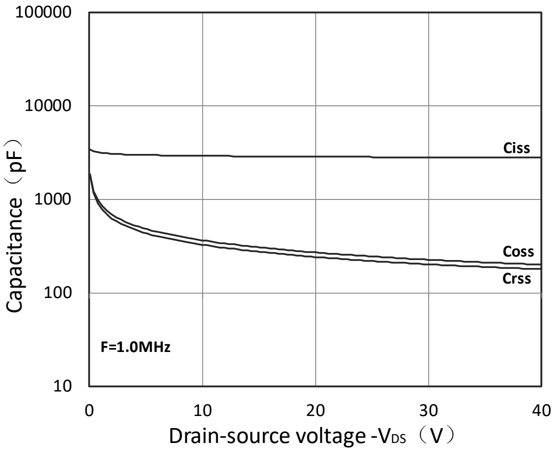


Figure 7. Capacitance Characteristics

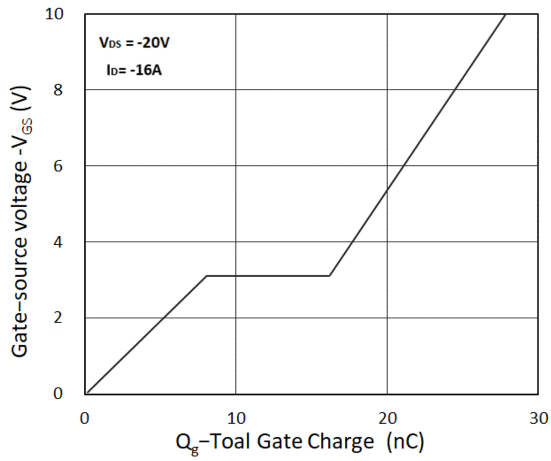


Figure 8. Gate Charge Characteristics

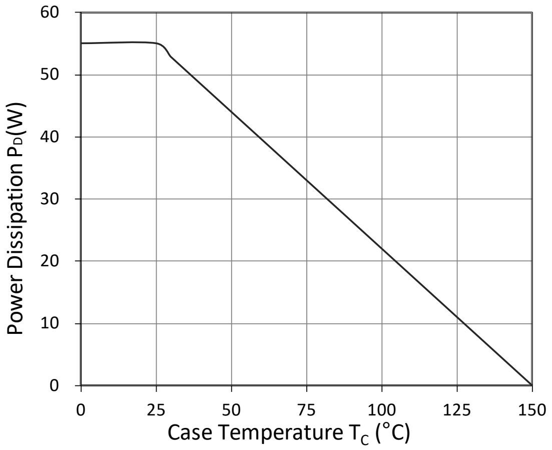


Figure 9. Power Dissipation

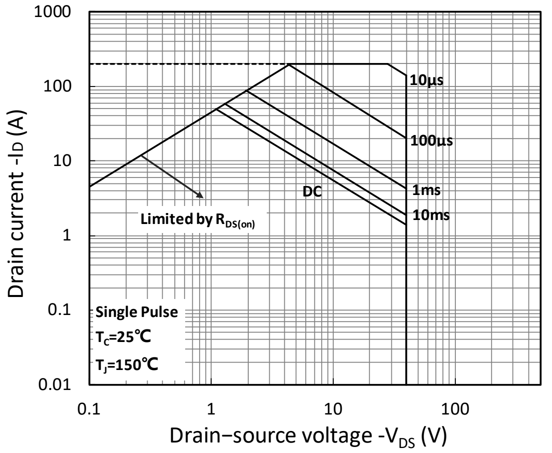


Figure10. Safe Operating Area

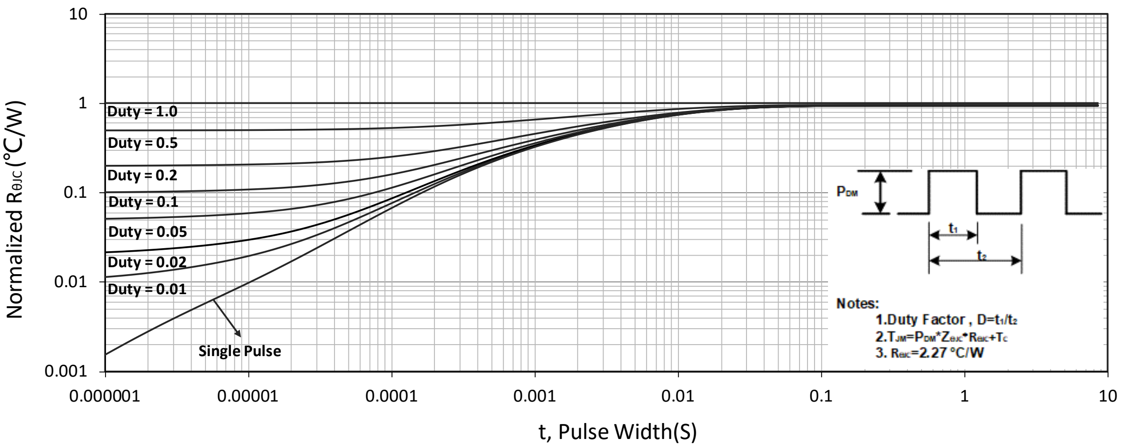


Figure 11. Normalized Maximum Transient Thermal Impedance

Test Circuit

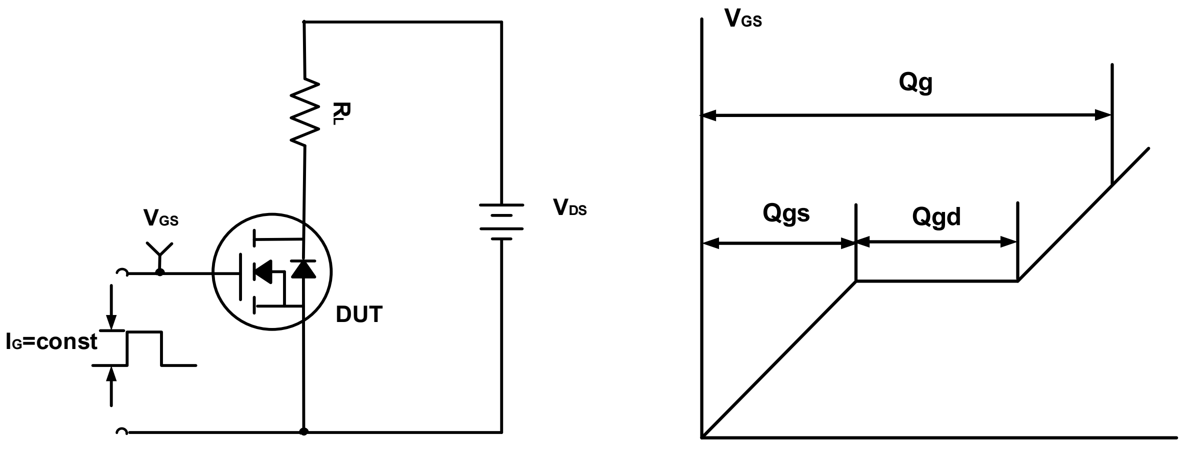


Figure A. Gate Charge Test Circuit & Waveforms

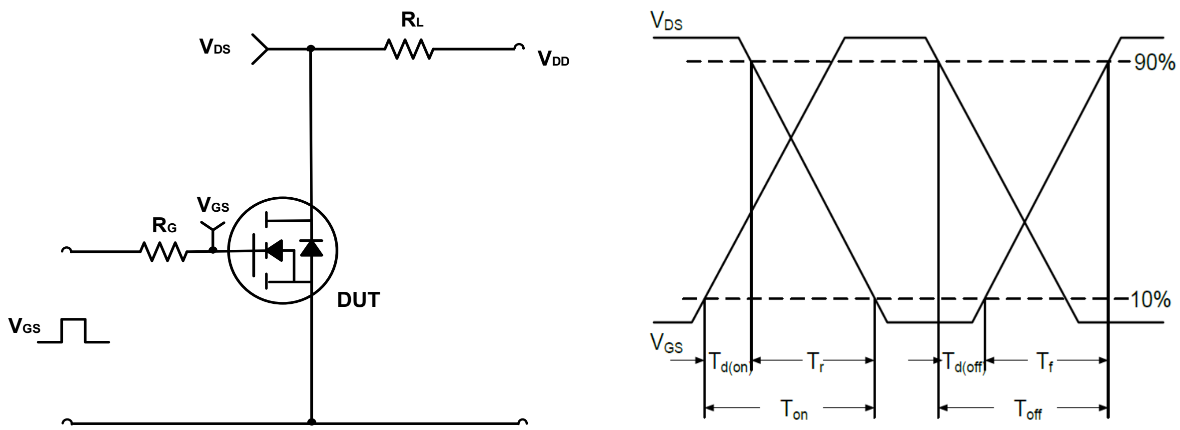


Figure B. Switching Test Circuit & Waveforms

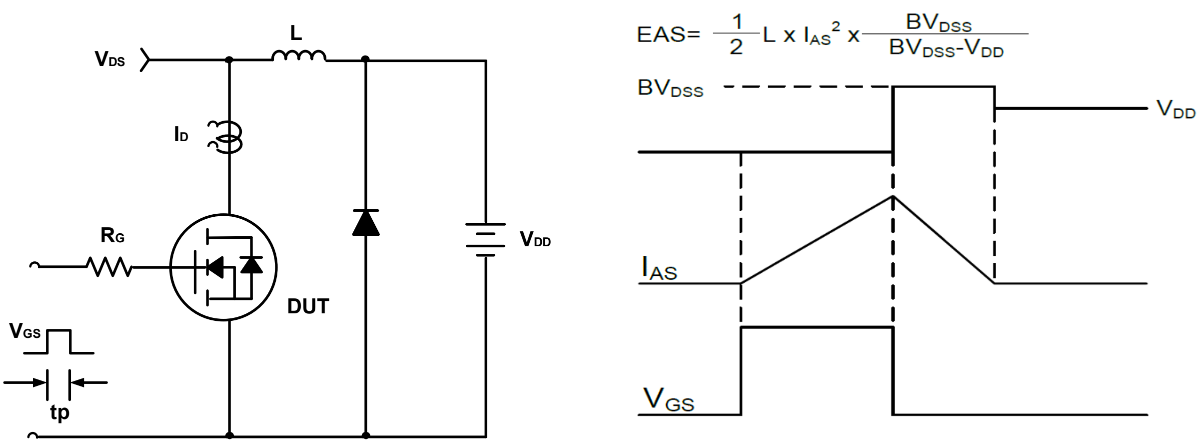
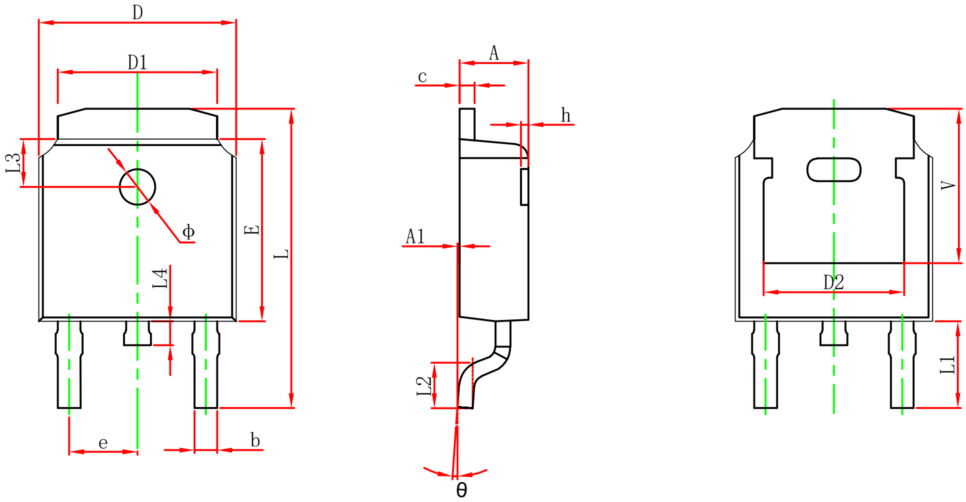


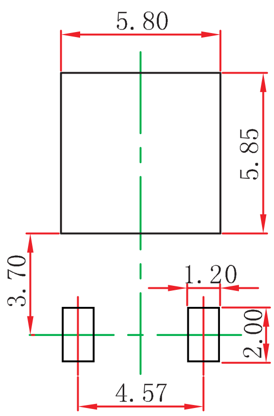
Figure C. Unclamped Inductive Switching Circuit & Waveforms

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.