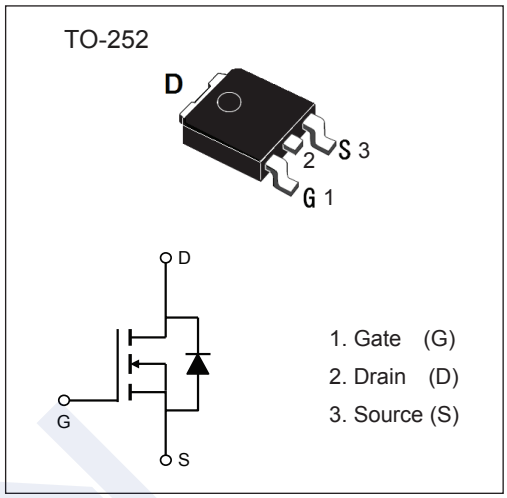
N-Channel MOSFET

2KK5056

■ Features

- $V_{DS\ (V)}$ = 40 V
- I_D = 60 A
- $R_{DS(ON)}$ (at V_{GS} = 10 V) < 8 mΩ
- $R_{DS(ON)}$ (at V_{GS} = 4.5 V) < 10.5 mΩ



■ Absolute Maximum Ratings (T_C = 25℃ unless otherwise noted)

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V_{DS}	40	V
Gate-Source Voltage	V_{GS}	±20	
Continuous Drain Current	I_D	60	A
Pulsed Drain Current (Note 1)	I_{DM}	200	
Single Pulse Avalanche Energy (Note 2)	E_{AS}	142	mJ
Peak Diode Recovery dv/dt (Note 3)	dv/dt	7	V/ns
Power Dissipation	P_D	40	W
Thermal Resistance, Junction- to-Ambient	$R_{\theta JA}$	110	℃/W
Thermal Resistance, Junction- to-Case	$R_{\theta JC}$	3.125	
Junction Temperature	T_J	150	℃
Storage Temperature Range	T_{stg}	-55 to 150	

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. V_{DD}=25V,L=0.1mH, I_{AS}=53.2A, R_G=25Ω, Starting T_J = 25℃.
3. I_{SD} ≤ 30A, di/dt ≤ 200A/μs, V_{DD} ≤ BV_{DSS}, Starting T_J = 25℃.

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■ Electrical Characteristics (T_C = 25℃ unless othewise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	I_D = 250 μA, V_{GS} = 0V	40			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 40 V, V_{GS} = 0 V			1	μA
		V_{DS} = 32 V, V_{GS} = 0 V, T_J=125℃			10	
Gate to Source Leakage Current	I_{GSS}	V_{DS} = 0 V, V_{GS} = ±20 V			±100	nA
On Characteristics (Note 1)						
Gate to Source Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS} , I_D = 250μA	1.0		2.5	V
Static Drain-Source On-Resistance	$R_{DS(ON)}$	V_{GS} = 10 V, I_D = 25 A			8	mΩ
		V_{GS} = 4.5 V, I_D = 20 A			10.5	
Dynamic Characteristics (Note 1)						
Input Capacitance	C_{iss}	V_{GS} = 0 V, V_{DS} = 20 V, f = 1 MHz		4500		pF
Output Capacitance	C_{oss}			800		
Reverse Transfer Capacitance	C_{rss}			350		
Switching Characteristics (Note 1)						
Total Gate Charge	Q_g	V_{GS} = 10V, V_{DS} = 32 V, I_D = 50 A (Note 2)		82		nC
Gate Source Charge	Q_{gs}			24		
Gate Drain Charge	Q_{gd}			18		
Turn-On DelayTime	$t_{d(on)}$	V_{GS} = 10V, V_{DD} = 20 V, I_D = 50A, R_G = 25 Ω (Note 2)		40		ns
Turn-On Rise Time	t_r			50		
Turn-Off DelayTime	$t_{d(off)}$			204		
Turn-Off Fall Time	t_f			120		
Drain-Source Diode Characteristics						
Body Diode Reverse Recovery Time	t_{rr}	I_S = 30A, dI/dt = 100 A/μs		53		ns
Body Diode Reverse Recovery Charge	Q_{rr}			80		nC
Maximum Body-Diode Continuous Current	I_S	V_G=V_D=0V , Force Current			50	A
Diode Forward Voltage	V_{SD}	V_{GS} = 0 V, I_S = 1 A			1	V

Notes:

1. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
2. Essentially independent of operating ambient temperature.

■ Marking

Marking	K5049 KC***

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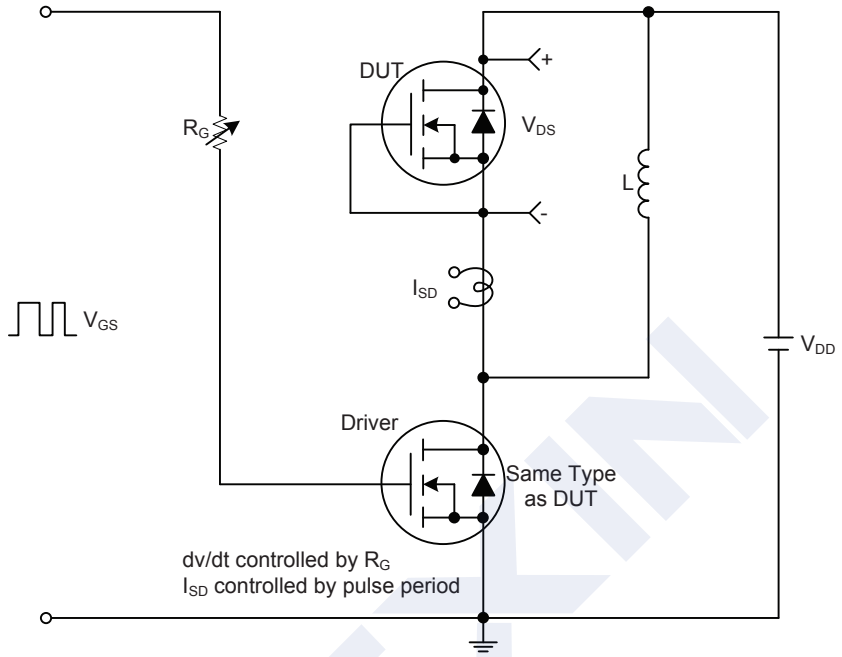
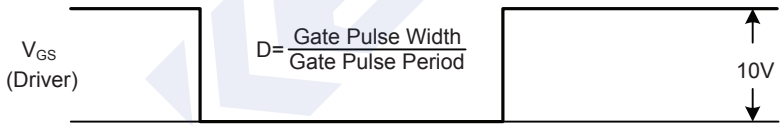
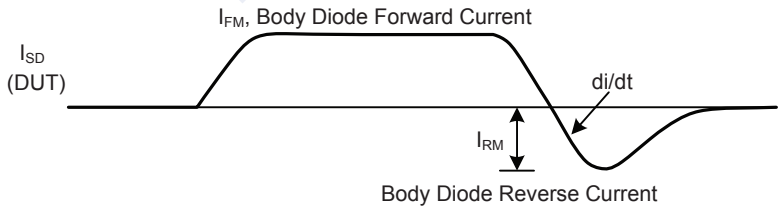
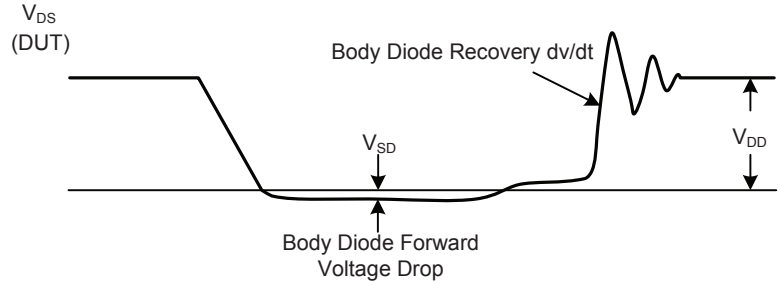
■ Test Circuits And Waveforms









Peak Diode Recovery dv/dt Test Circuit and Waveforms

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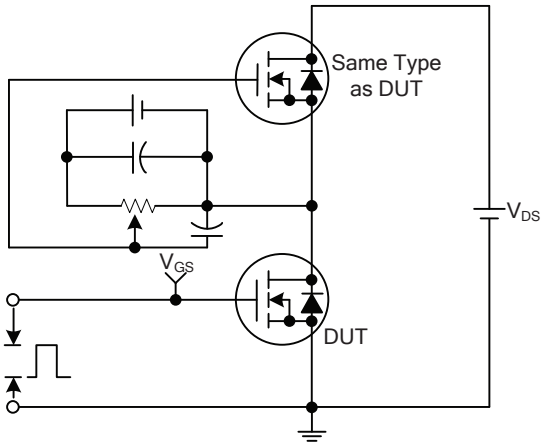
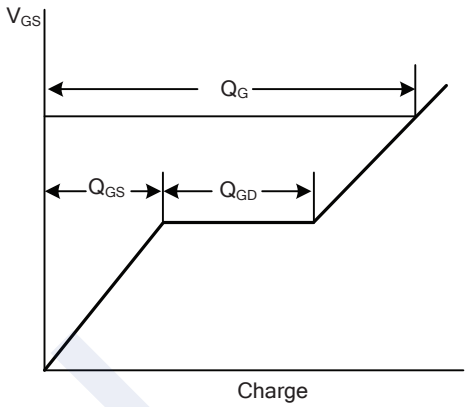
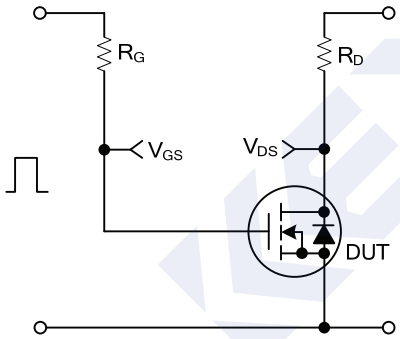


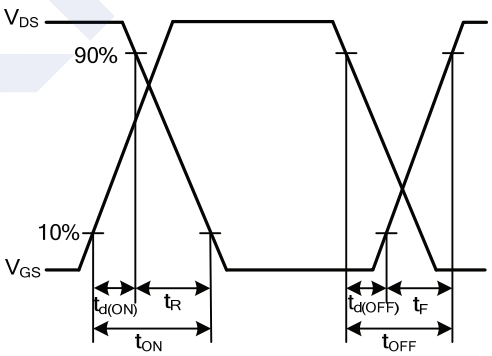
Gate Charge Test Circuit



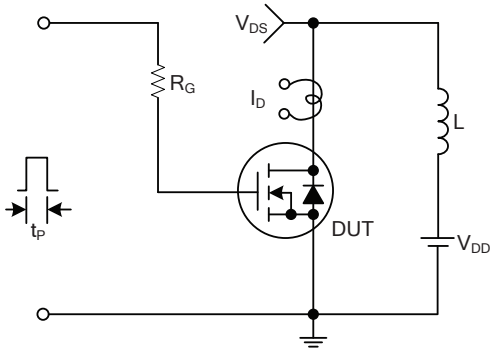
Gate Charge Waveforms



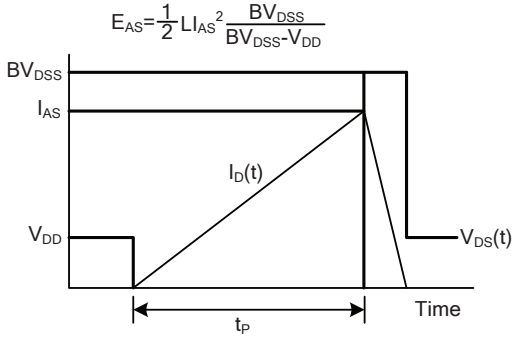
Resistive Switching Test Circuit



Resistive Switching Waveforms



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

N-Channel MOSFET

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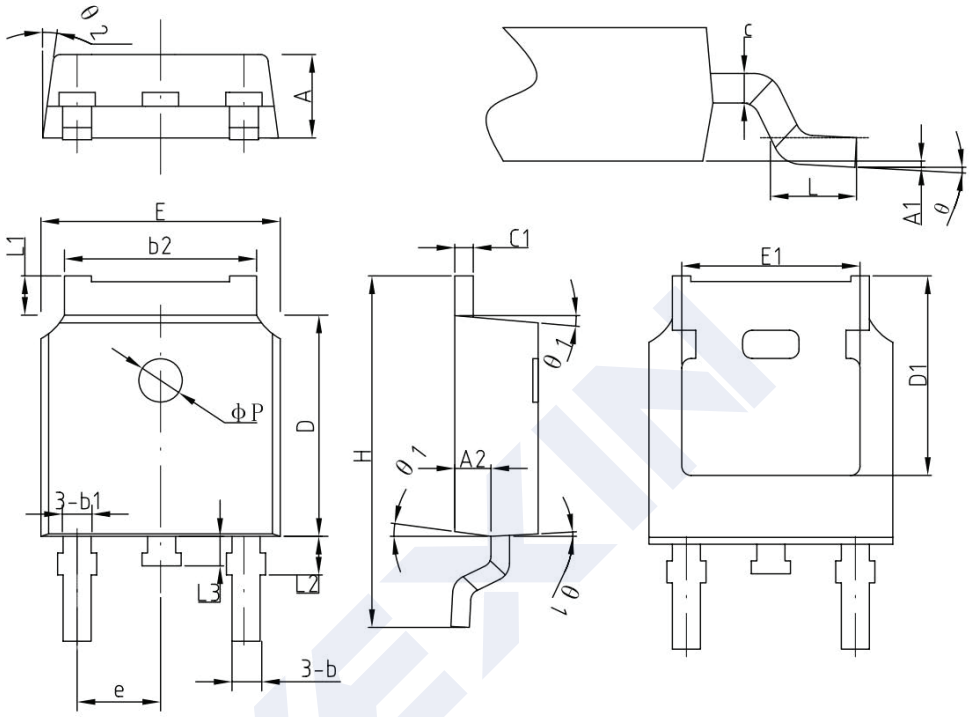
■ Package Dimension

TO-252

Units: mm



COMMON DIMENSIONS
(UNITS OF MEASURE=MILLIMETER)

SYMBOL	MIN	NOM	MAX
A	2.2	2.30	2.38
A1	0	–	0.10
A2	0.90	1.01	1.10
b	0.71	0.76	0.86
b1		0.76	
b2	5.13	5.33	5.46
c	0.47	0.50	0.60
c1	0.47	0.50	0.60
D	6.0	6.10	6.20
D1	–	5.30	–
E	6.50	6.60	6.70
E1	–	4.80	–
e		2.286BSC	
H	9.70	10.10	10.40
L	1.40	1.50	1.70
L1	0.90	–	1.25
L2		1.05	
L3		0.8	
ΦP		1.2	
θ	0°	–	8°
θ 1	5°	7°	9°
θ 2	5°	7°	9°