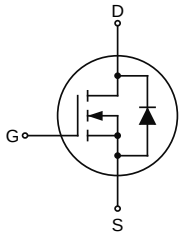
N-Channel Enhancement Mode MOSFET

1. Product Information

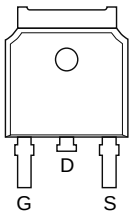
1.1 Features

Advanced Trench Technology
Excellent $R_{DS(ON)}$
Low gate charge
Lead free product is acquired



1.2 Applications

PWM applications
Load Switch
Power management



Top View
TO-252

1.3 Quick reference

V_{DS} = 30V, I_D = 90A
$R_{DS(ON)}$ ≦ 4.2mΩ @V_{GS}=10V（Type:3.2mΩ）
$R_{DS(ON)}$ ≦ 6.0mΩ @V_{GS}=4.5V（Type:5.0mΩ）

2. Package Marking and Ordering Information

Product Name	Package	Marking	Reel Size	Tape width	Quantity
KJ3090K	TO-252	KJ3090K	13 inch	-	2500

3. Absolute Maximum Ratings (T_A=25℃ unless otherwise noted)

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	30	V
V_{GS}	Gate-Source Voltage	±20	V
I_D	Continuous Drain Current (T_A=25℃)	90	A
I_D	Continuous Drain Current (T_A=100℃)	54	A
I_{DM}	Pulsed Drain Current ①	320	A
E_{AS}	Single Pulse Avalanche Energy ②	306	mJ
P_D	Power Dissipation	83	W
T_J, T_{stg}	Operating Junction and Storage Temperature Range	–55 to 150	℃
$R_{\theta JC}$	Thermal Resistance, Junction-Case ④	1.8	℃/W

4. Electrical Characteristics (T_A=25℃ unless otherwise noted)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V, I_D=250μA	30	-	-	V
Zero Gate Voltage Source Current	I_{DSS}	V_{DS}=30V, V_{GS}=0V	-	-	1	μA
Gate-Body Leakage Current	I_{GSS}	V_{GS}=±20V, V_{DS}=0V	-	-	±100	nA
Gate Threshold Voltage ③	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=250μA	1.0	1.5	2.5	V
Drain-Source On-State Resistance ③	$R_{DS(ON)}$	V_{GS}=10V, I_D=30A	-	3.2	4.2	mΩ
		V_{GS}=4.5V, I_D=20A	-	5.0	6.0	mΩ
Dynamic Characteristics						
Input Capacitance	C_{iss}	V_{GS}=0V, V_{DS}=15V Frequency=1MHz	-	2016	-	pF
Output Capacitance	C_{oss}		-	250	-	
Reverse Transfer Capacitance	C_{rss}		-	230	-	
Switching Characteristics						
Turn-on Delay Time	t_d(on)	V_{DD}=10V, I_D=30A V_{GS}=10V, R_G=3Ω	-	20	-	ns
Turn-on Rise Time	t_r		-	15	-	
Turn-off Delay Time	t_d(off)		-	60	-	
Turn-off Fall Time	t_f		-	10	-	
Total Gate Charge	Q_g	V_{DS}=10V, I_D=30A V_{GS} =10V	-	60.5	-	nC
Gate-Source Charge	Q_{gs}		-	8.1	-	
Gate-Drain Charge	Q_{gd}		-	7.8	-	
Source-Drain Diode Characteristics						
Diode Forward Voltage ③	V_{SD}	V_{GS}=0V, I_S=1A	-	-	1.2	V
Diode Forward current ③	I_S		-	-	90	A

Notes:

① Repetitive Rating: Pulse width limited by maximum junction temperature

② E_{AS} Condition: T_J=25℃, V_{DD}=25V,R_G=25Ω, L=0.5mH

③ Pulse Test: Pulse width ≤ 300μs, Duty Cycle ≤ 2%

④ Surface Mounted on FR4 Board, t ≤ 10 sec

5. Test Circuit & Waveforms

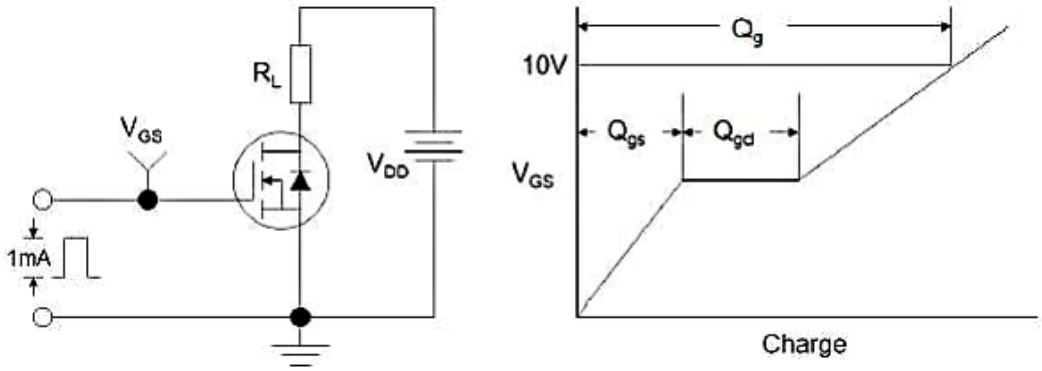


Figure 1: Gate Charge Test Circuit & Waveforms

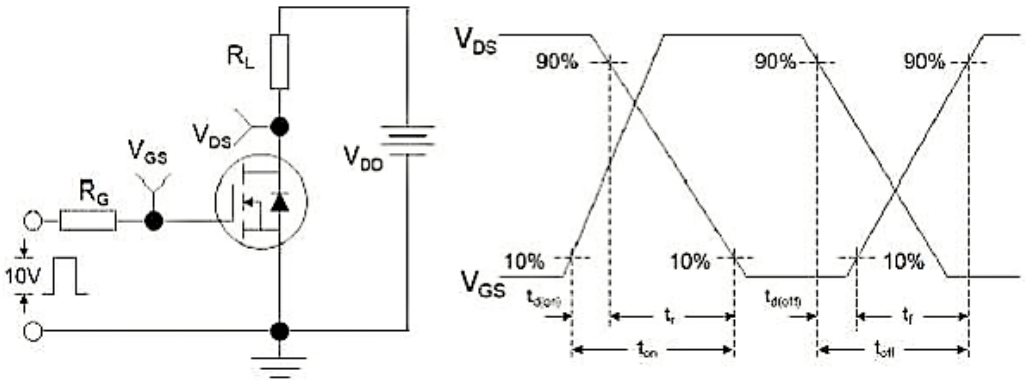


Figure 2: Resistive Switching Test Circuit & Waveforms

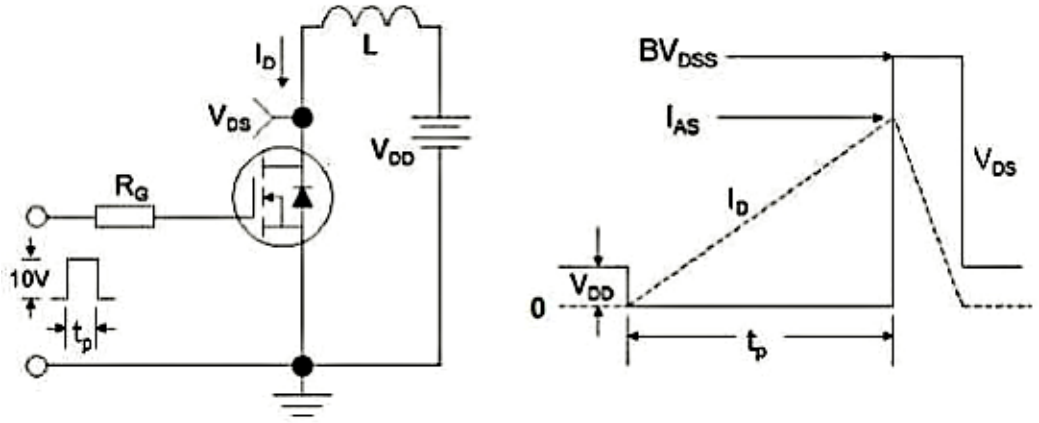


Figure 3: Unclamped Inductive Switching Test Circuit & Waveforms

6. Typical Characteristics

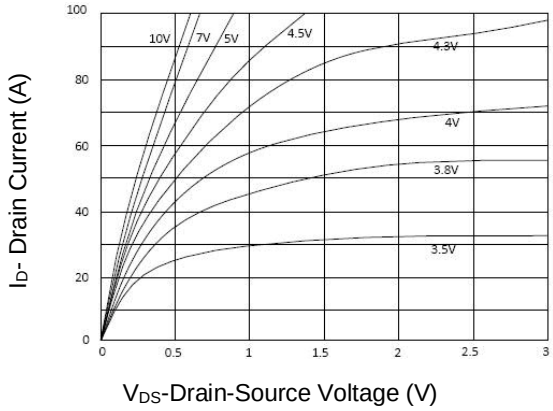


Figure 1: Output Characteristics

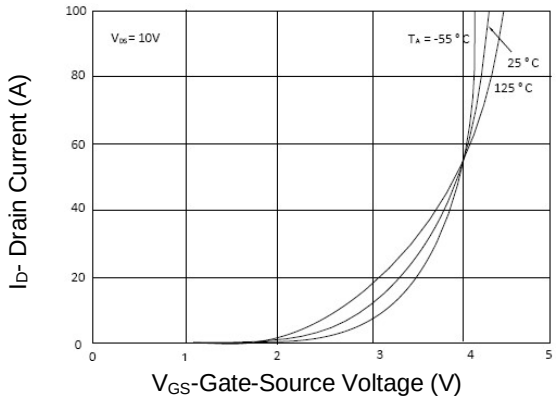


Figure 2: Transfer Characteristics

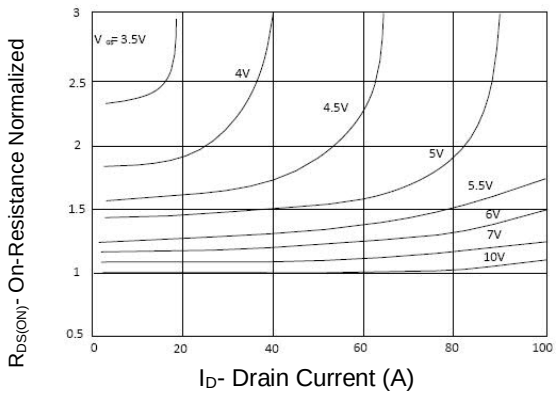


Figure 3: On-resistance vs. Drain Current

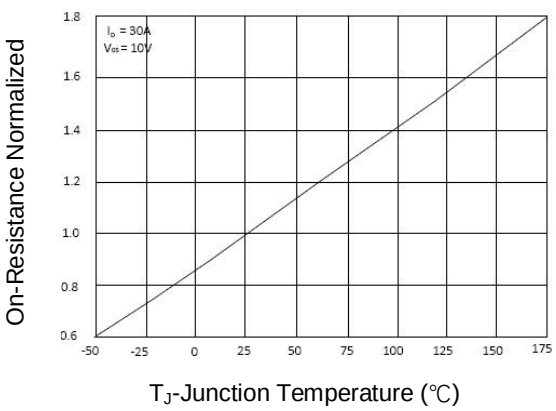


Figure 4: $R_{DS(ON)}$- Junction Temperature

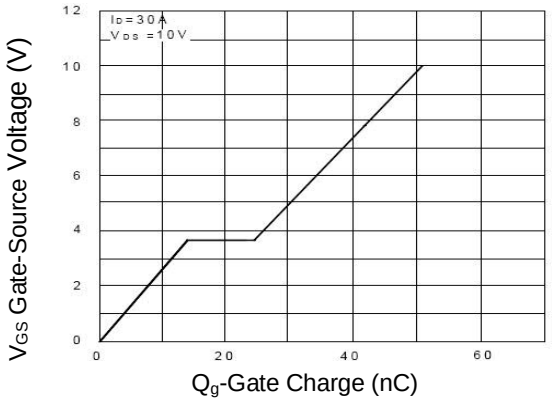


Figure 5: Gate Charge

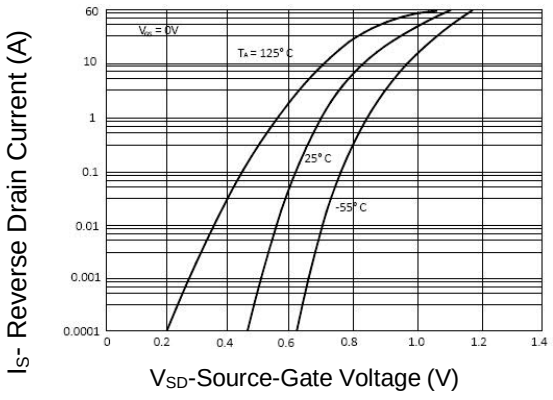


Figure 6: Source-Gate Diode Forward

6. Typical Characteristics (cont.)

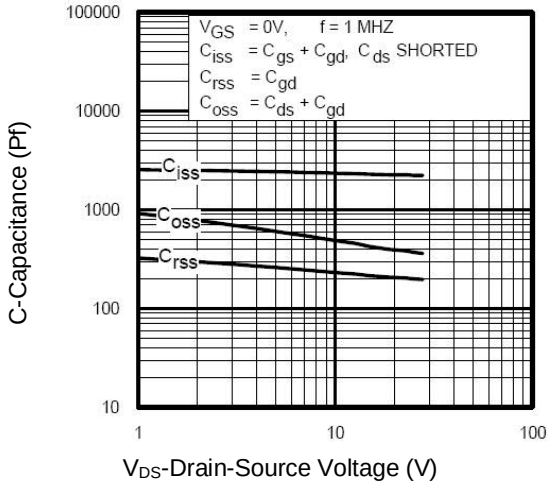


Figure 7: Capacitance vs. V_{DS}

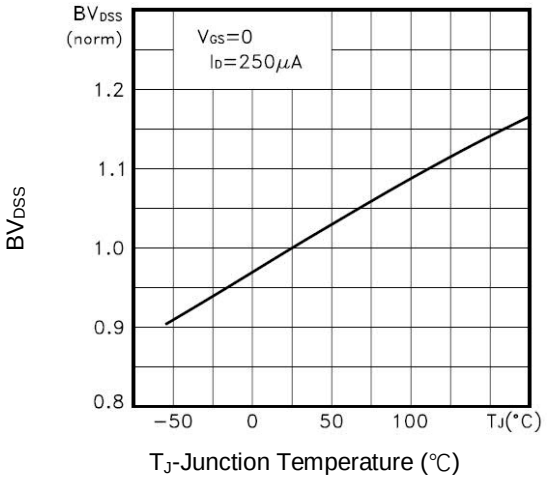


Figure 9: BV_{DSS}- Junction Temperature

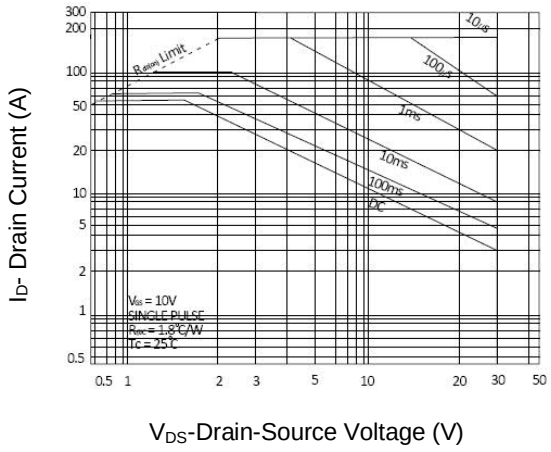


Figure 8: Safe Operation Area

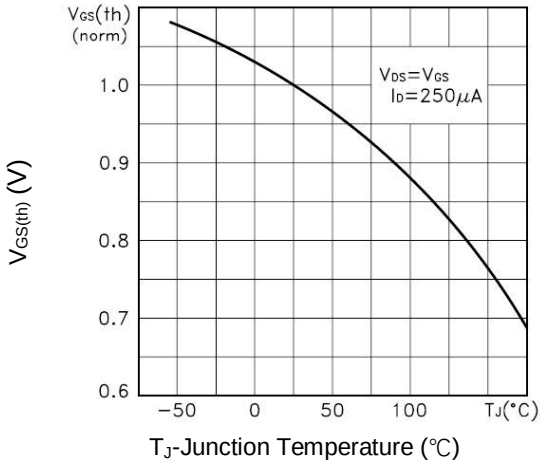


Figure 10: $V_{GS(th)}$ vs. Junction Temperature

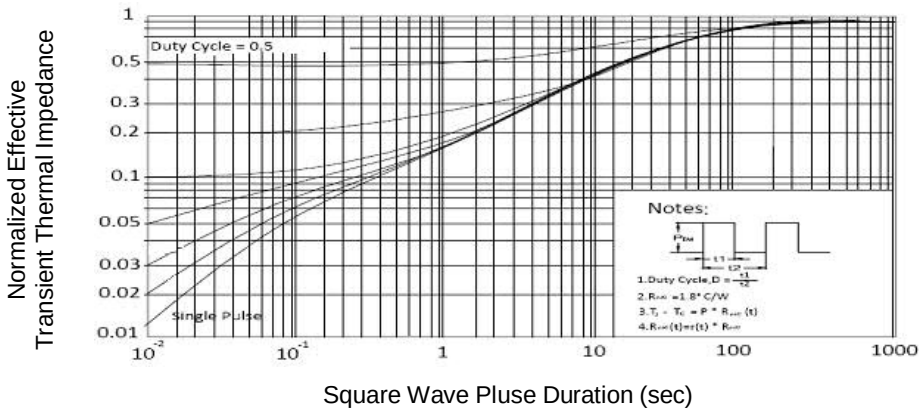
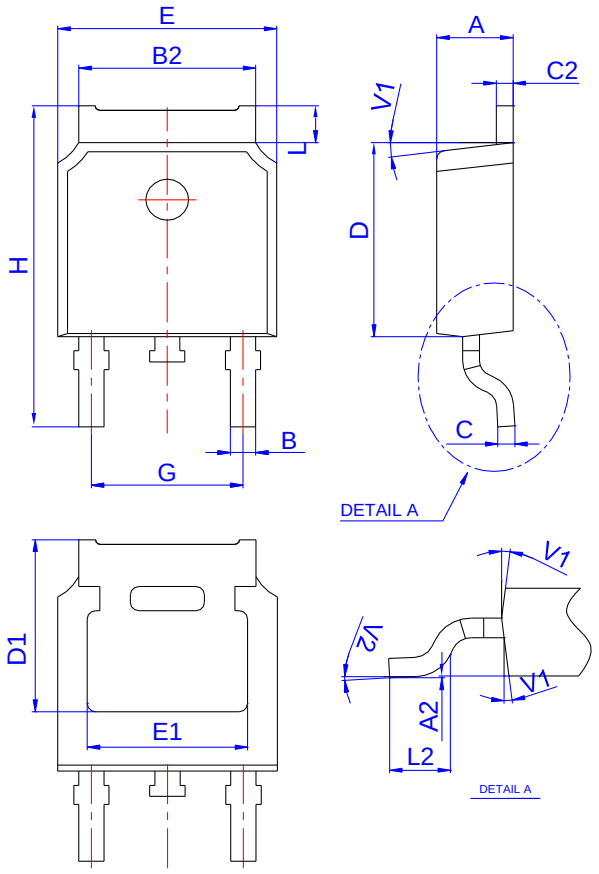


Figure 11: Normalized Maximum Transient Thermal Impedance

7. Package Dimensions

TO-252 Package



Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	2.10		2.50	0.083		0.098
A2	0		0.10	0		0.004
B	0.66		0.86	0.026		0.034
B2	5.18		5.48	0.202		0.216
C	0.40		0.60	0.016		0.024
C2	0.44		0.58	0.017		0.023
D	5.90		6.30	0.232		0.248
D1	5.30REF			0.209REF		
E	6.40		6.80	0.252		0.268
E1	4.63			0.182		
G	4.47		4.67	0.176		0.184
H	9.50		10.70	0.374		0.421
L	1.09		1.21	0.043		0.048
L2	1.35		1.65	0.053		0.065
V1		7°			7°	
V2	0°		6°	0°		6°