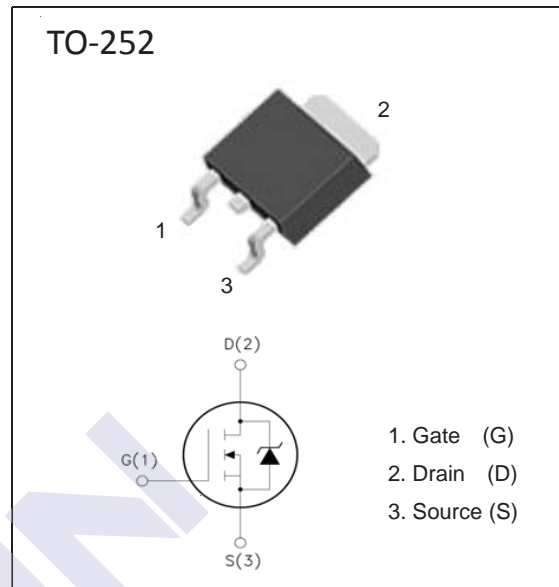


N-Channel MOSFET

2KK5054

■ Features

- Low Intrinsic Capacitances.
- Excellent Switching Characteristics.
- Extended Safe Operating Area.
- Unrivalled Gate Charge : $Q_g=15.5\text{nC(Typ.)}$.
- $BV_{DSS}=150\text{V}, I_D=15\text{A}$
- $R_{DS(on)} : 0.29\Omega$ (Max) @ $V_G=10\text{V}$
- 100% Avalanche Tested

■ Absolute Maximum Ratings ($T_c = 25^\circ\text{C}$, unless otherwise specified)

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V_{DS}	150	V
Gate-Source Voltage	V_{GS}	± 20	
Continuous Drain Current	I_D	$T_c = 25^\circ\text{C}$	15
		$T_c = 100^\circ\text{C}$	6.5
Pulsed Drain Current	I_{DM}	58	A
Single Pulse Avalanche Energy (Note 5)	E_{AS}	150	mJ
Thermal Resistance, Junction-to-Case (Note 2)	$R_{\theta JC}$	4.17	$^\circ\text{C/W}$
Maximum Power Dissipation	P_D	30	W
Operating Junction and Storage Temperature Range	T_J, T_{stg}	-55 to 150	$^\circ\text{C}$

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■ Electrical Characteristics (T_c = 25°C, unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV _{DSS}	I _D =250μA, V _{GS} =0V	150			V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =150V, V _{GS} =0V			1	μA
Gate-Body Leakage Current	I _{GSS}	V _{DS} =0V, V _{GS} =±20V			±100	nA
On Characteristics (Note 3)						
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250μA	1.5	1.8	2.5	V
Static Drain-Source On-Resistance	R _{DS(on)}	V _{GS} =10V, I _D =5A		255	290	mΩ
Forward Transconductance	g _{FS}	V _{DS} =25V, I _D =6A	3.5			S
Dynamic Characteristics (Note4)						
Input Capacitance	C _{iss}	V _{GS} =0V, V _{DS} =25V, f=1MHz		690		pF
Output Capacitance	C _{oss}			120		
Reverse Transfer Capacitance	C _{rss}			90		
Switching Characteristics (Note 4)						
Turn-On Delay Time	t _{d(on)}	V _{DD} =30V, I _D =2A, R _L =15Ω, V _{GS} =10V, R _G =2.5Ω		11		ns
Turn-On Rise Time	t _r			7.4		
Turn-Off Delay Time	t _{d(off)}			35		
Turn-Off Fall Time	t _f			9.1		
Total Gate Charge	Q _g	V _{DS} =30V, I _D =3A, V _{GS} =10V		15.5		nC
Gate Source Charge	Q _{gs}			3.2		
Gate Drain Charge	Q _{gd}			4.7		
Drain-Source Diode Characteristics						
Body Diode Voltage	V _{SD}	I _S =9A, V _{GS} =0V			1.5	V
Diode Forward Current (Note 2)	I _S				15	A
Body Diode Reverse Recovery Time	t _{rr}	T _J = 25 °C, I _F = 6 A, dI/dt = 100 A/μs (Note 3)		21		ns
Body Diode Reverse Recovery Charge	Q _{rr}				97	
Forward Turn-On Time	t _{on}	Intrinsic turn-on time is negligible (turn-on is dominated by L _s and L _D)				

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: T_J=25°C, V_{DD}=50V, V_G=10V, L=0.5mH, R_g=25Ω

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Typical Characteristics

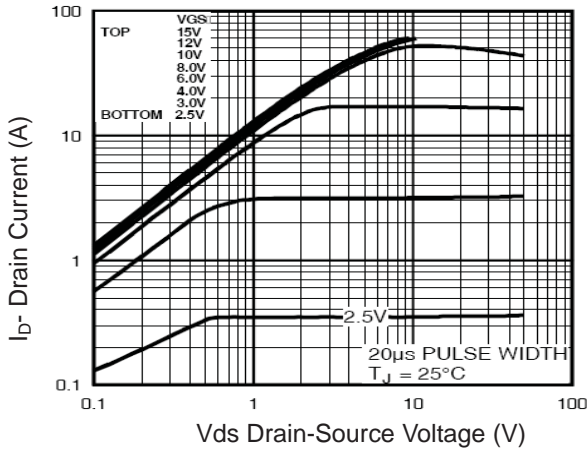


Figure 1 Output Characteristics

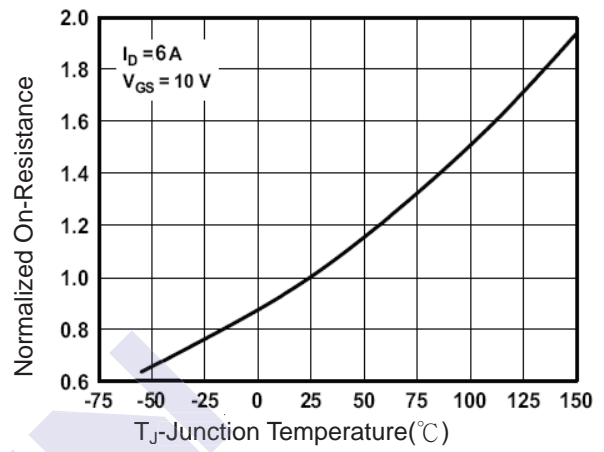


Figure 4 Rdson-Junction Temperature

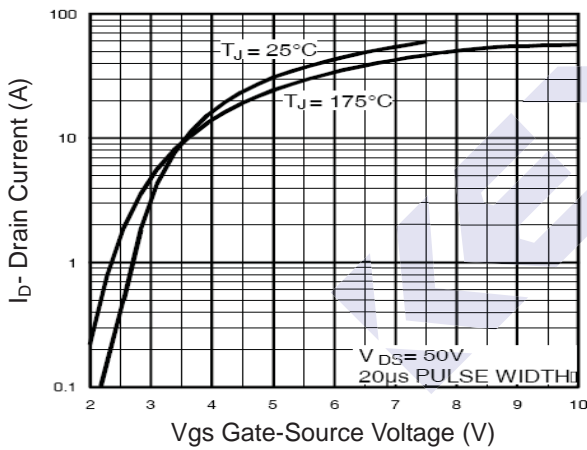


Figure 2 Transfer Characteristics

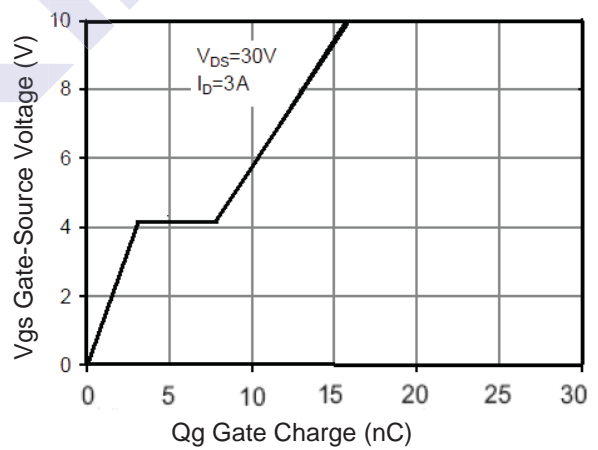


Figure 5 Gate Charge

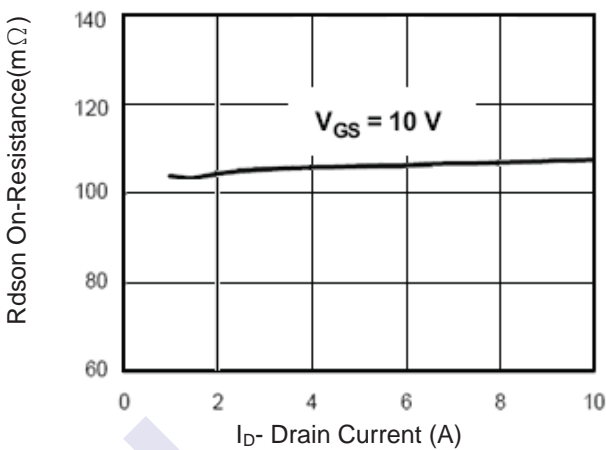


Figure 3 Rdson- Drain Current

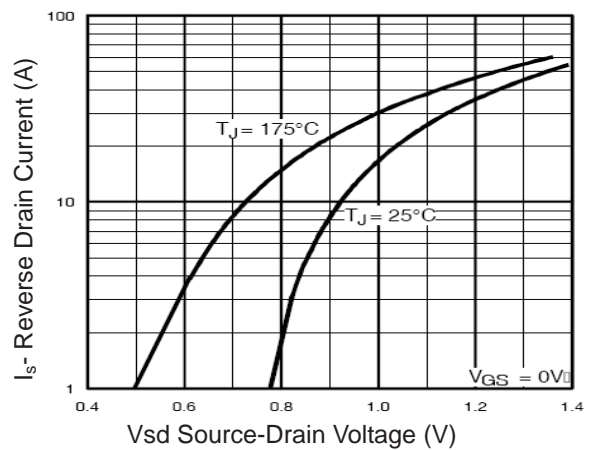


Figure 6 Source- Drain Diode Forward

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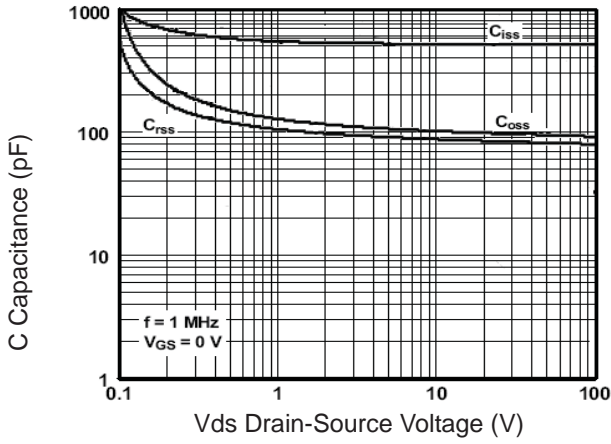


Figure 7 Capacitance vs Vds

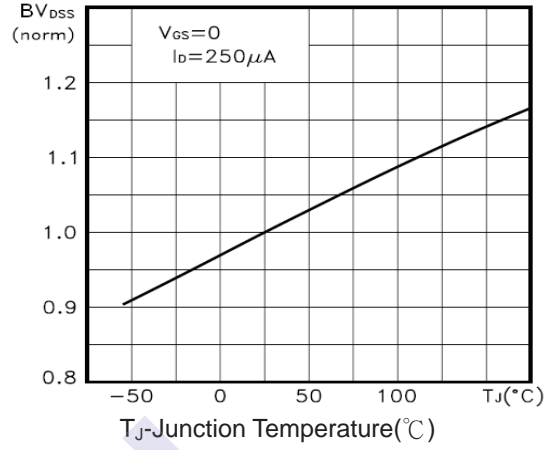


Figure 9 BV_{DSS} vs Junction Temperature

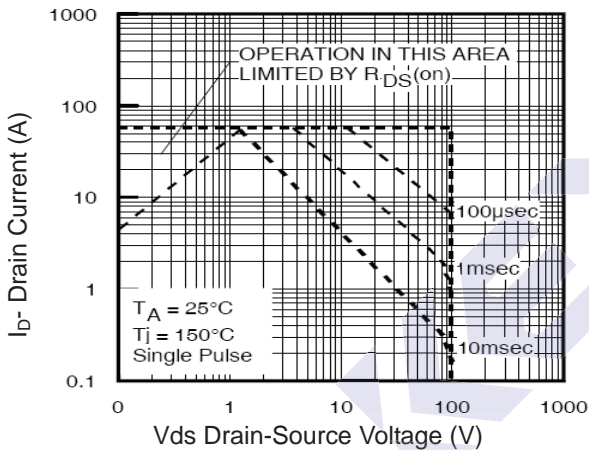


Figure 8 Safe Operation Area

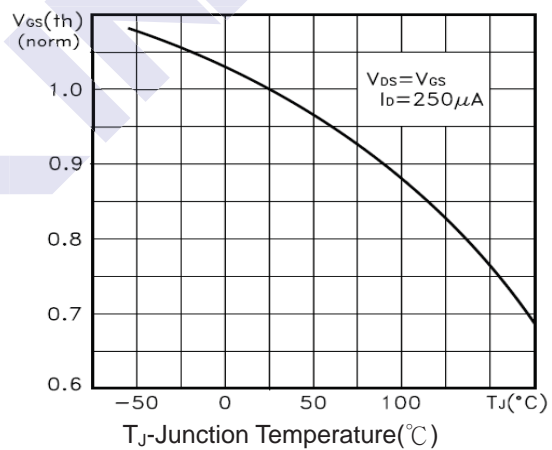


Figure 10 $V_{GS(th)}$ vs Junction Temperature

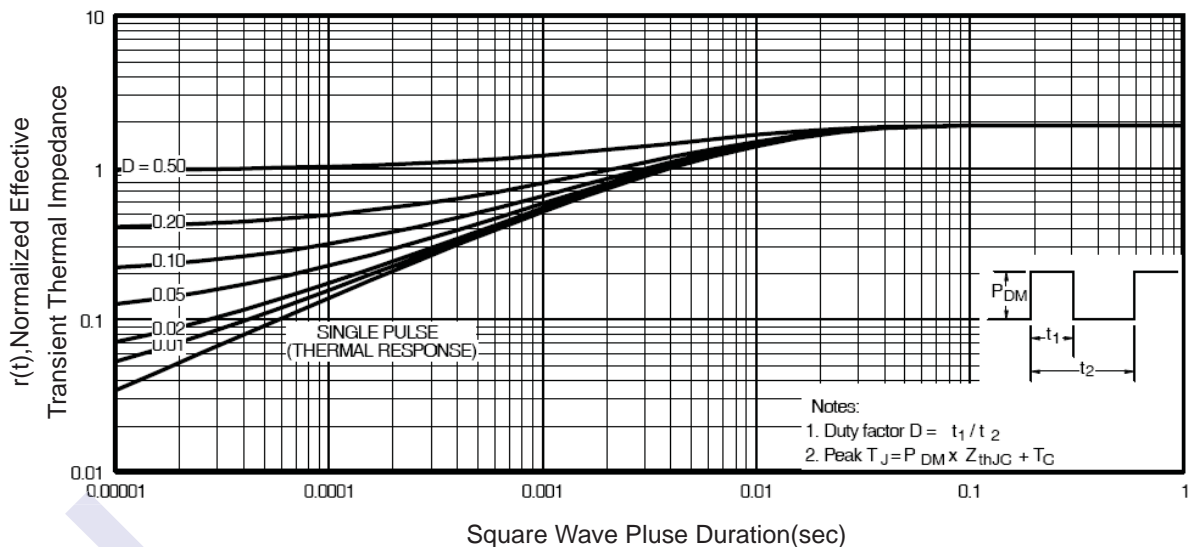


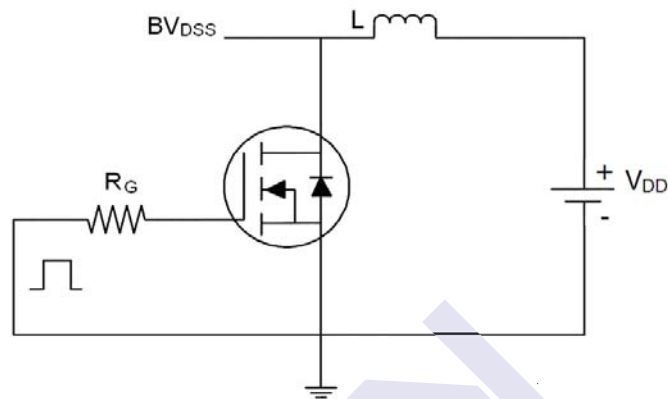
Figure 11 Normalized Maximum Transient Thermal Impedance

N-Channel MOSFET

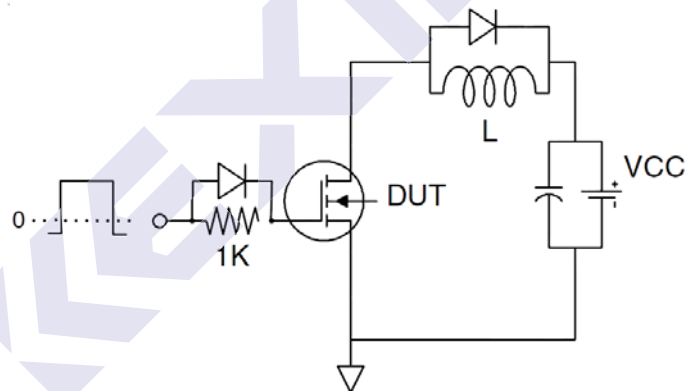
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■ Test Circuit

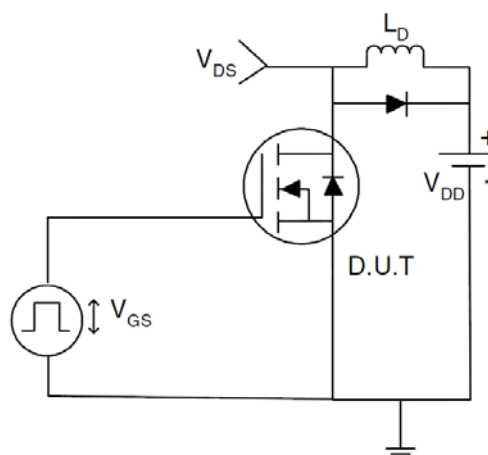
1) E_{AS} test Circuit



2) Gate charge test Circuit



3) Switch Time Test Circuit



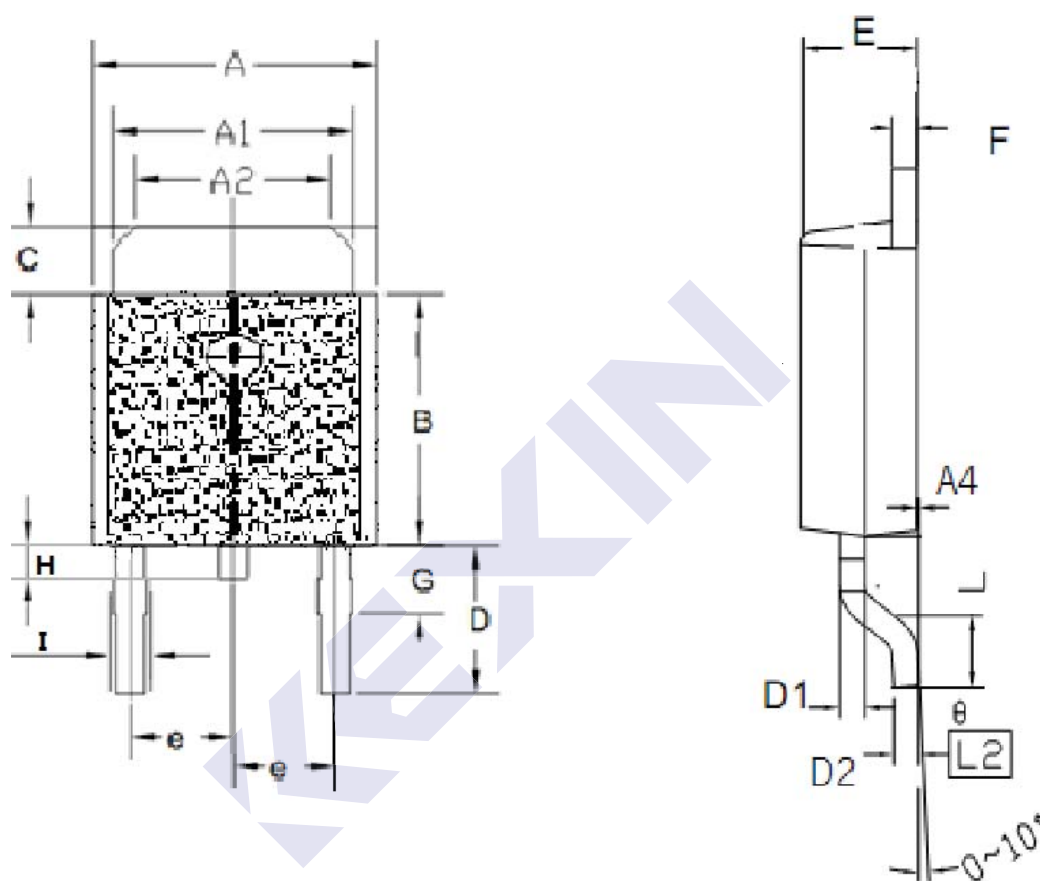
N-Channel MOSFET

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■ Package Dimension

TO-252

Units: mm



Symbol	Min	Max	Symbol	Min	Max
A	6.40	6.60	D	2.90	3.10
A1	5.20	5.40	D1	0.45	0.55
A2	4.40	4.60	D2	0.45	0.55
A3	4.40	4.60	e	2.30	
A4	0.00	0.15	E	2.20	2.40
A5	4.65	4.95	F	0.49	0.59
B	6.00	6.20	G	1.70	
B1	1.57	1.77	L	1.40	1.60
C	0.90	0.96	$\theta(^{\circ})$	0.00	10.00
I	0.60	0.90	H	0.49	0.52