3050K（文件编号：S&CIC1691） N-Channel Trench Power MOSFET

N-C hannel Trench Power MOSFET

General Description

The 3050K uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 4.5V. This device is suitable for use as a wide variety of applications.

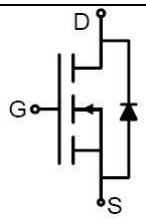
Features

- V_{DS} = 30V,ID =50A
  $R_{DS(ON)}$ < 9mΩ @ V_{GS} =10V
  $R_{DS(ON)}$ < 17mΩ @ V_{GS} =4.5V
- High Power and current handing capability
- Lead free product is acquired
- Surface Mount Package

Application

- PWM applications
- Load switch
- Power management

100% UIS TESTED!
100% ΔVds TESTED!



Schematic Diagram

Marking and pin Assignment

TO-252(DPAK) top view

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
3050K	3050K	TO-252	325mm	16mm	2500

Table 1. Absolute Maximum Ratings (T_A=25℃)

Symbol	Parameter	Value	Unit
V_{DS}	Drain-Source Voltage (V_{GS}=0V）	30	V
V_{GS}	Gate-Source Voltage (V_{DS}=0V)	±20	V
I_D	Drain Current-Continuous(Tc=25℃) (Note 1)	50	A
	Drain Current-Continuous(Tc=100℃)	35	A
$I_{DM\ (pluse)}$	Drain Current-Continuous@ Current-Pulsed (Note 2)	200	A
P_D	Maximum Power Dissipation(Tc=25℃)	50	W
	Maximum Power Dissipation(Tc=100℃)	25	W
E_{AS}	Avalanche energy (Note 3)	90	mJ
T_J,T_{STG}	Operating Junction and Storage Temperature Range	-55 To 175	℃

Table 2. Thermal Characteristic

Symbol	Parameter	Typ	Max	Unit
$R_{\theta JC}$	Thermal Resistance,Junction-to-Case	-	3	℃/W

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Table 3. Electrical Characteristics (TA=25℃unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
On/Off States						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V I_D=250μA	30			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=30V,V_{GS}=0V			1	μA
I_{GSS}	Gate-Body Leakage Current	V_{GS}=±20V,V_{DS}=0V			±100	nA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS},I_D=250μA	1.0	1.5	2.5	V
g_{FS}	Forward Transconductance	V_{DS}=5V,I_D=20A	10	20		S
$R_{DS(ON)}$	Drain-Source On-State Resistance	V_{GS}=10V, I_D=20A		7.2	9.0	mΩ
		V_{GS}=4.5V, I_D=15A		11	17	mΩ
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS}=15V,V_{GS}=0V, f=1.0MHz		1050		pF
C_{oss}	Output Capacitance			145		pF
C_{rss}	Reverse Transfer Capacitance			120		pF
Rg	Gate resistance	V_{GS}=0V, V_{DS}=0V,f=1.0MHz		2		Ω
Switching Times						
$t_{d(on)}$	Turn-on Delay Time	V_{GS}=10V, V_{DS}=15V, R_L=0.75Ω,R_{GEN}=3Ω		7		nS
t_r	Turn-on Rise Time			22		nS
$t_{d(off)}$	Turn-Off Delay Time			30		nS
t_f	Turn-Off Fall Time			5		nS
Q_g	Total Gate Charge	V_{GS}=10V, V_{DS}=25V, I_D=12A		22		nC
Q_{gs}	Gate-Source Charge			4		nC
Q_{gd}	Gate-Drain Charge			7		nC
Source-Drain Diode Characteristics						
I_{SD}	Source-Drain Current(Body Diode)				50	A
V_{SD}	Forward on Voltage	V_{GS}=0V,I_S=20A			1.2	V

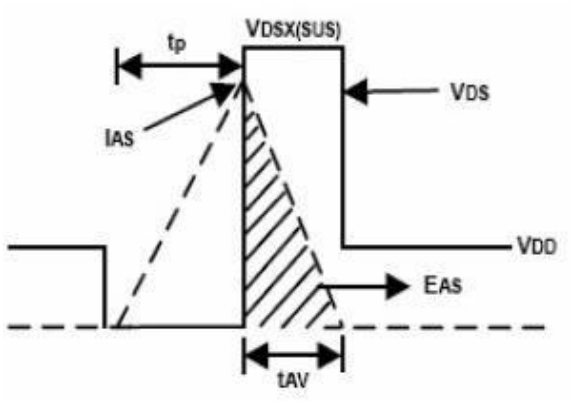
Notes 1.The maximum current rating is packagelimited.

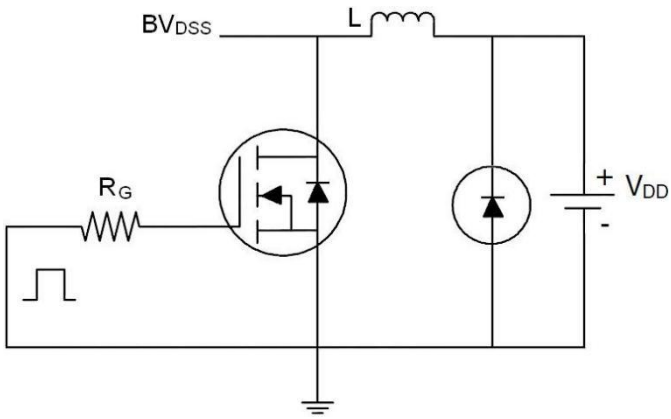
Notes 2.Repetitive Rating: Pulse width limited by maximum junction temperature

Notes 3.EAS condition: T_J=25℃,VDD=30V,V_G=10V, RG=25Ω

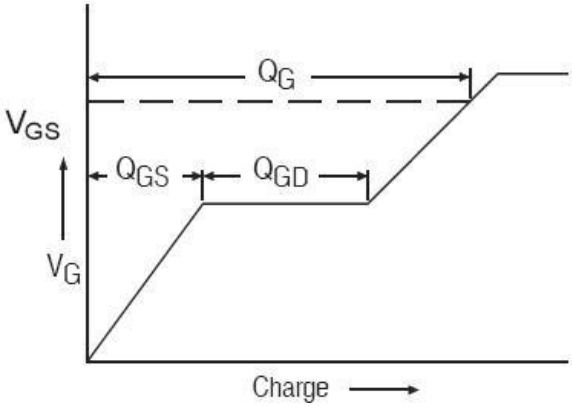
Test Circuit

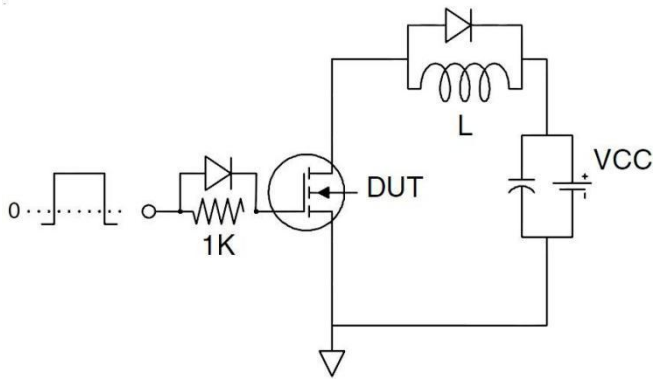
1) E_{AS} TestCircuits



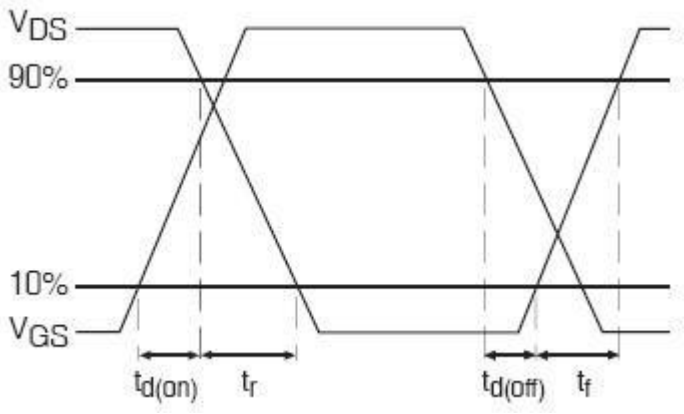


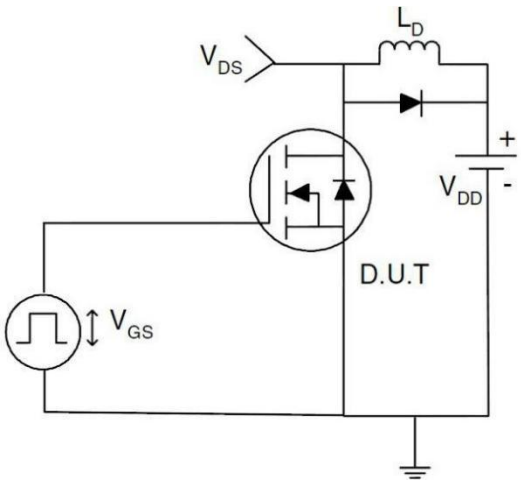
2) Gate Charge Test Circuit:





3) Switch Time TestCircuit：





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TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS(Curves)

Figure 1. Output Characteristics

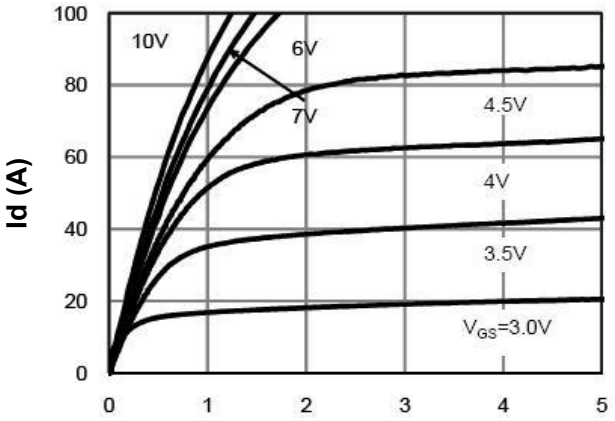


Figure 2. Transfer Characteristics

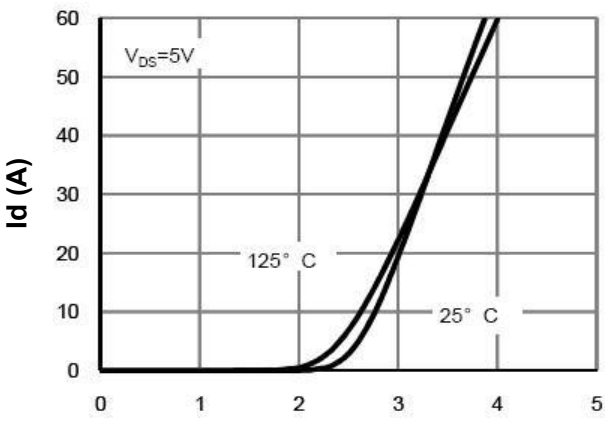


Figure 3. Max BV_{DSS} vs Junction Temperature

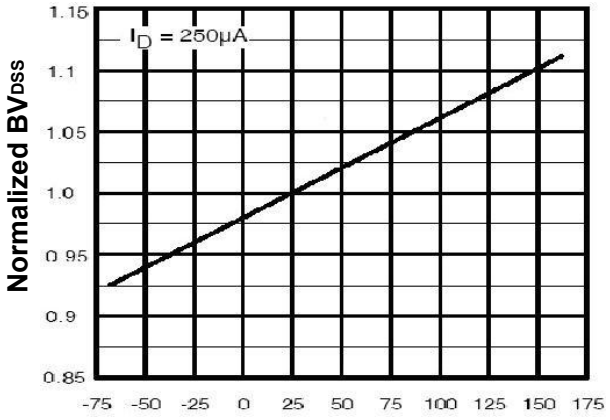


Figure 4. Drain Current

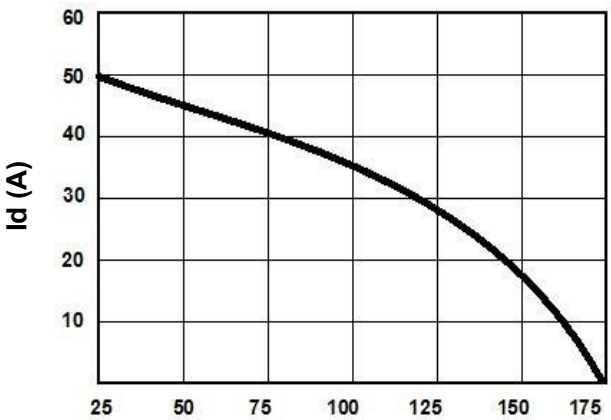


Figure 5. $V_{GS(th)}$ vs Junction Temperature

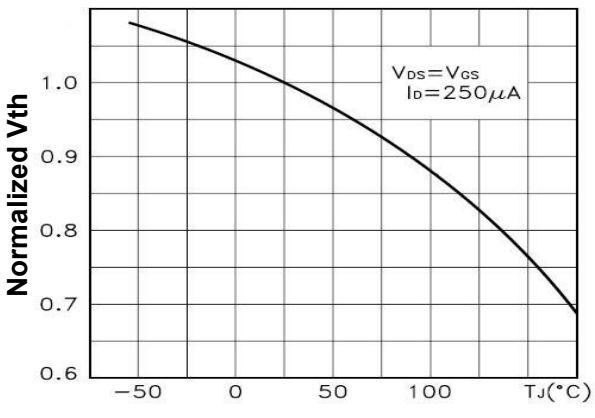


Figure 6. $R_{DS(ON)}$ vs Junction Temperature

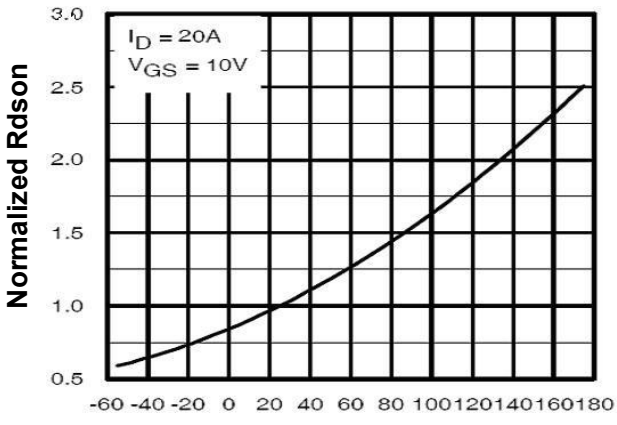


Figure 7. Gate Charge Waveforms

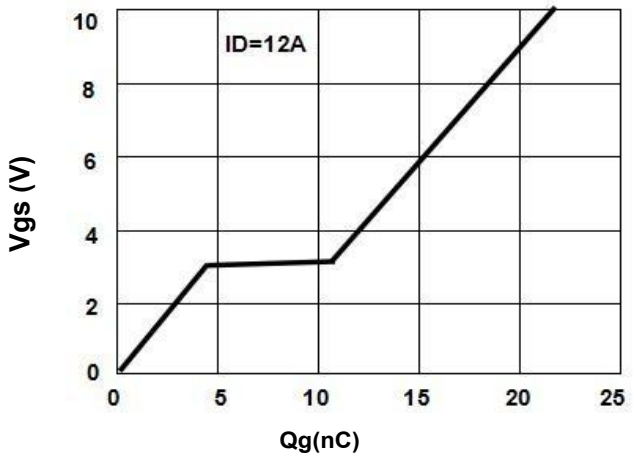


Figure 8. Capacitance

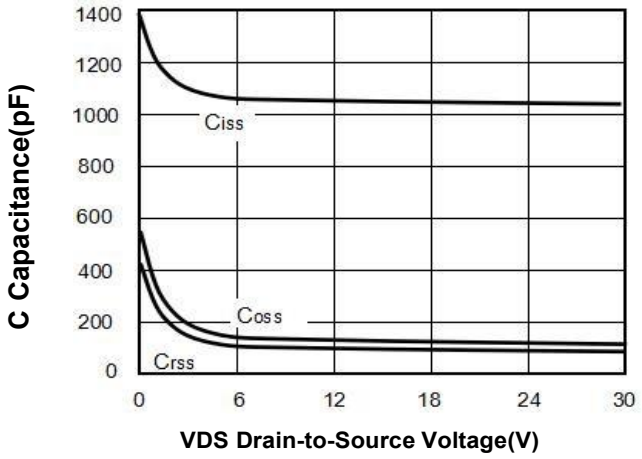


Figure 9. Body-Diode Characteristics

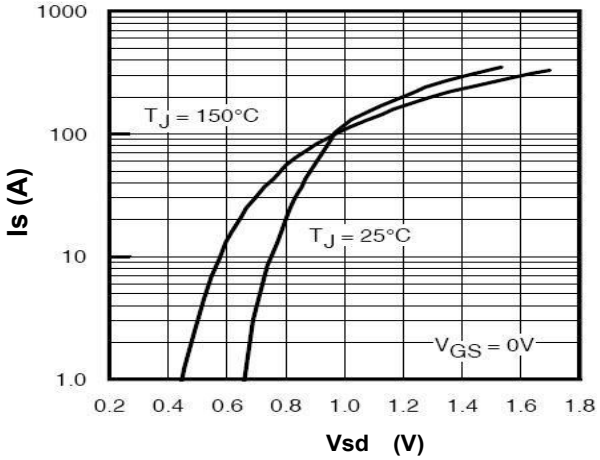


Figure 10. Maximum Safe Operating Area

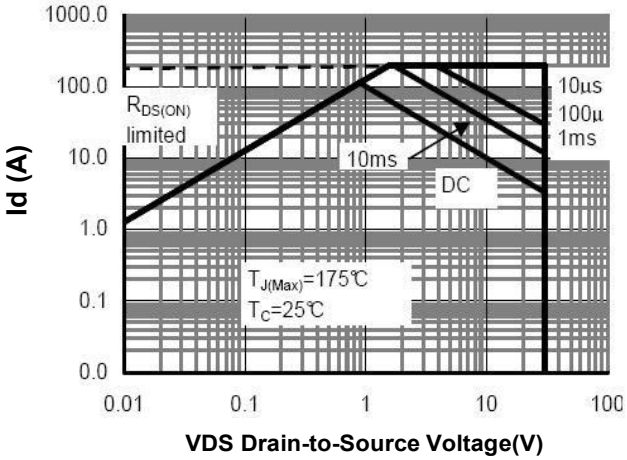
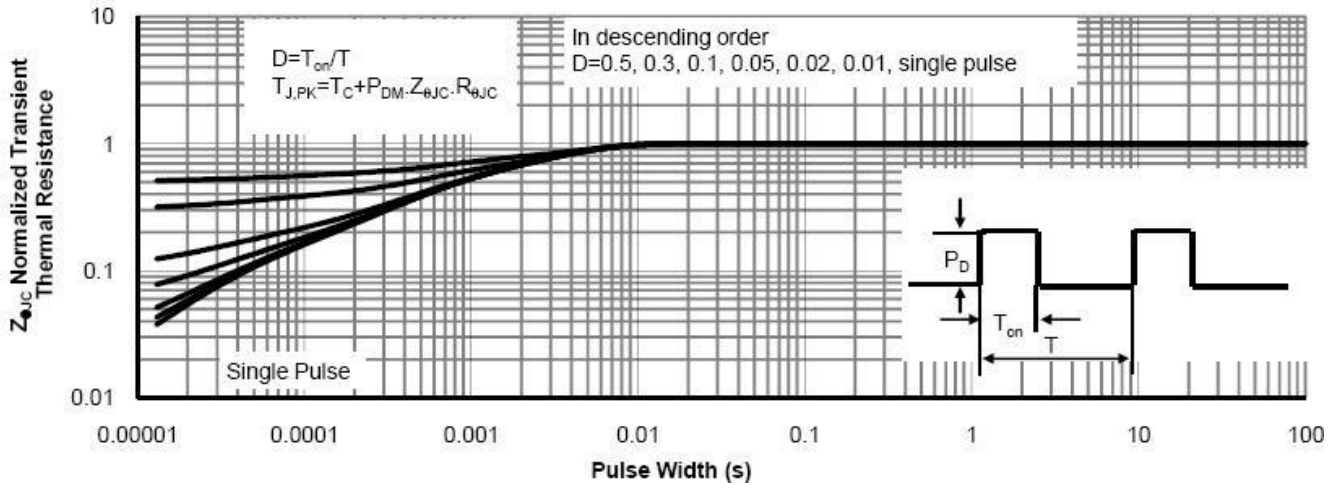
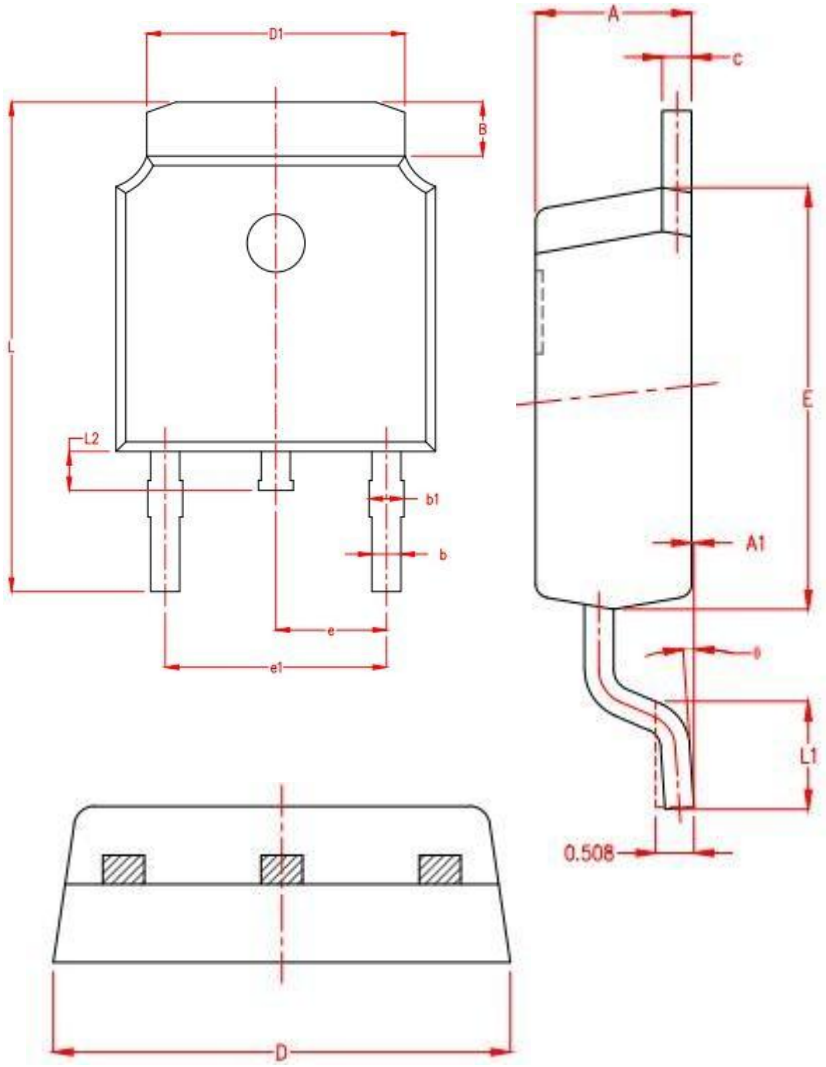


Figure 11. Normalized Maximum Transient Thermal Impedance



TO-252 Package Information



SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	2.15	2.25	2.35
A1	0.00	0.06	0.12
B	0.96	1.11	1.26
b	0.59	0.69	0.79
b1	0.69	0.81	0.93
c	0.34	0.42	0.50
D	6.45	6.60	6.75
D1	5.23	5.33	5.43
E	5.95	6.10	6.25
e	2.286TYP.		
e1	4.47	4.57	4.67
L	9.90	10.10	10.30
L1	1.40	1.55	1.70
L2	0.60	0.80	1.00
θ	0°	4°	8°