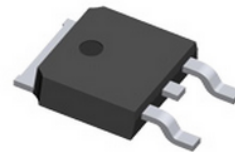


P-Channel TrenchPower MOSFET

RC40P70K

■ Features

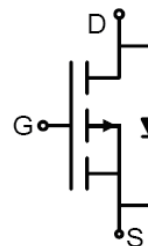
- $V_{DS} = -40V$, $I_D = -63A$
 $R_{DS(ON)} < 10.8m\Omega$ @ $V_{GS} = -10V$
 $R_{DS(ON)} < 17.5m\Omega$ @ $V_{GS} = -4.5V$
- High Power and current handing capability
- Lead free product is acquired



TO-252(DPAK) top view

■ Application

- Uninterruptible power supply
- Power switching application
- PWM Applications



Schematic Diagram

■ Absolute Maximum Ratings ($T_A=25^\circ C$ unless otherwise noted)

Symbol	Parameter	Limit	Unit
V_{DS}	Drain-Source Voltage ($V_{GS}=0V$)	-40	V
V_{GS}	Gate-Source Voltage ($V_{DS}=0V$)	± 20	V
I_D	Drain Current-Continuous($T_C=25^\circ C$)	-63	A
	Drain Current-Continuous($T_C=100^\circ C$)	-44.8	A
I_{DM} (pluse)	Drain Current-Continuous@ Current-Pulsed (Note 1)	-252	A
P_D	Maximum Power Dissipation($T_C=25^\circ C$)	79	W
	Maximum Power Dissipation($T_C=100^\circ C$)	39.5	W
E_{AS}	Avalanche energy (Note 2)	272	mJ
T_J, T_{STG}	Operating Junction and Storage Temperature Range	-55 To 175	$^\circ C$

■ Thermal Characteristic

Symbol	Parameter	Typ	Max	Unit
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case		1.9	$^\circ C/W$

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■ Electrical Characteristics (T_J=25°C 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	-40			V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =-40V, 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	-1.7	-2.5	V
g _{FS}	Forward Transconductance	V _{DS} =-5V, I _D =-15A		33		S
R _{DS(ON)}	Drain-Source On-State Resistance	V _{GS} =-10V, I _D =-15A		9	10.8	mΩ
		V _{GS} =-4.5V, I _D =-10A		13.5	17.5	mΩ
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{DS} =-20V, V _{GS} =0V, f=1.0MHz		3404		pF
C _{oss}	Output Capacitance			230		pF
C _{rss}	Reverse Transfer Capacitance			170		pF
Switching Parameters						
t _{d(on)}	Turn-on Delay Time	V _{GS} =-10V, V _{DS} =-20V, R _L =1Ω, R _{GEN} =3Ω		11.5		nS
t _r	Turn-on Rise Time			13.5		nS
t _{d(off)}	Turn-Off Delay Time			39		nS
t _f	Turn-Off Fall Time			13		nS
Q _g	Total Gate Charge	V _{GS} =-10V, V _{DS} =-20V, I _D =-20A		61		nC
Q _{gs}	Gate-Source Charge			8.7		nC
Q _{gd}	Gate-Drain Charge			15.3		nC
Source-Drain Diode Characteristics						
I _{SD}	Source-Drain Current (Body Diode)				-63	A
V _{SD}	Forward on Voltage ^(Note 3)	V _{GS} =0V, I _S =-15A			-1.2	V
t _{rr}	Reverse Recovery Time	I _F =-20A, di/dt=100A/μs		43		ns
Q _{rr}	Reverse Recovery Charge	I _F =-20A, di/dt=100A/μs		48		nC

Notes 1.Repetitive Rating: Pulse width limited by maximum junction temperature.

Notes 2.E_{AS} condition: T_J=25°C, V_{DD}=40V, V_G=-10V, R_g=25Ω, L=0.5mH.

Notes 3.Repetitive Rating: Pulse width limited by maximum junction temperature.

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■ Typical Electrical And Thermal Characteristics(Curves)

Figure 1. Output Characteristics

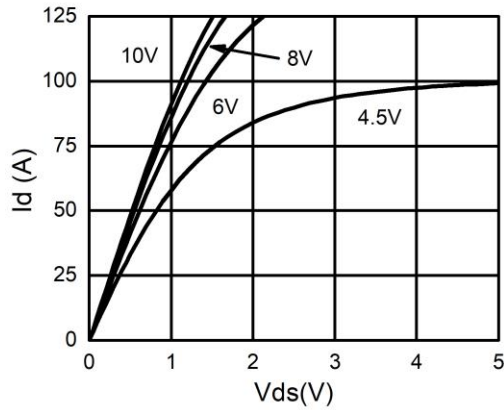


Figure 2. Transfer Characteristics

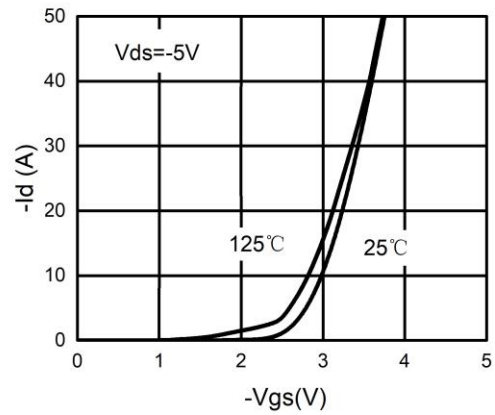


Figure 3. Power Dissipation

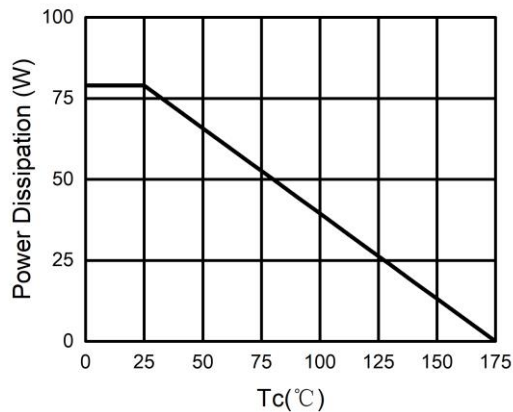


Figure 4. Drain Current

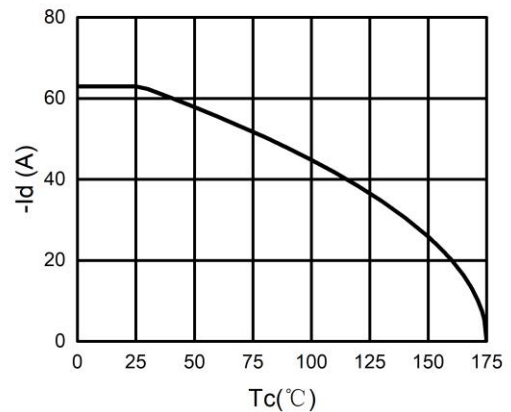


Figure 5. BV_{DSS} vs Junction Temperature

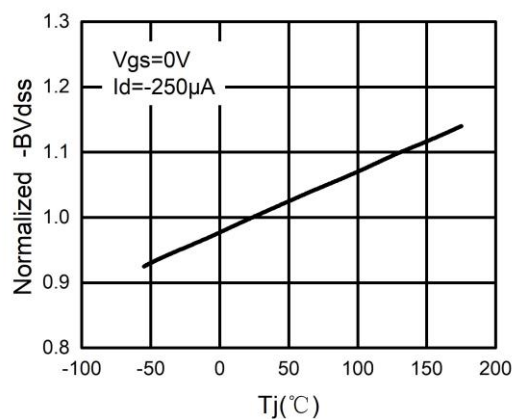
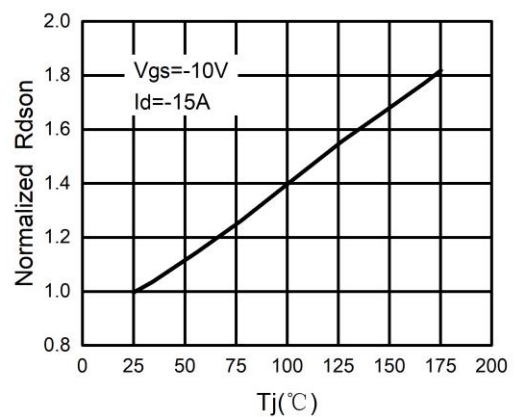


Figure 6. $R_{DS(on)}$ vs Junction Temperature



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Figure 7. Gate Charge Waveforms

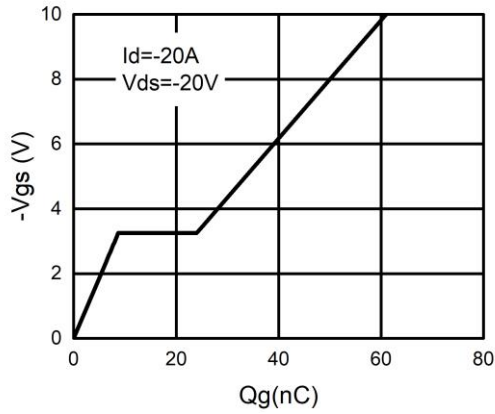


Figure 8. Capacitance

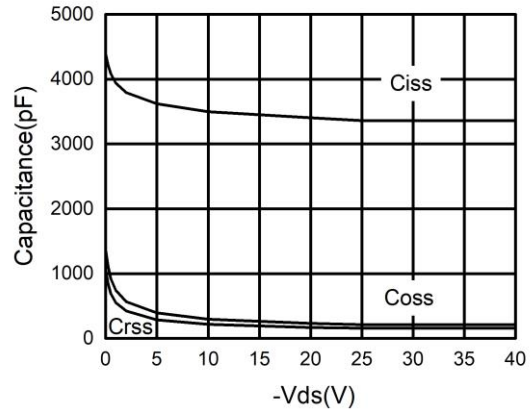


Figure 9. Body-Diode Characteristics

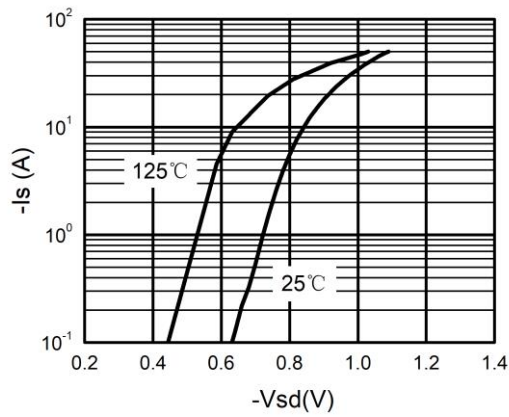
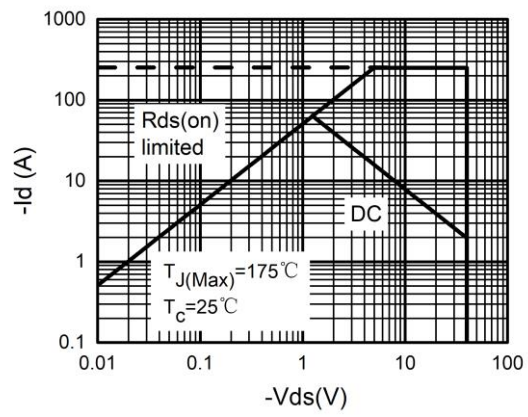


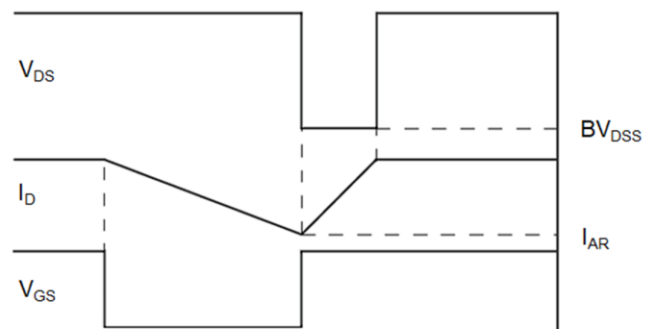
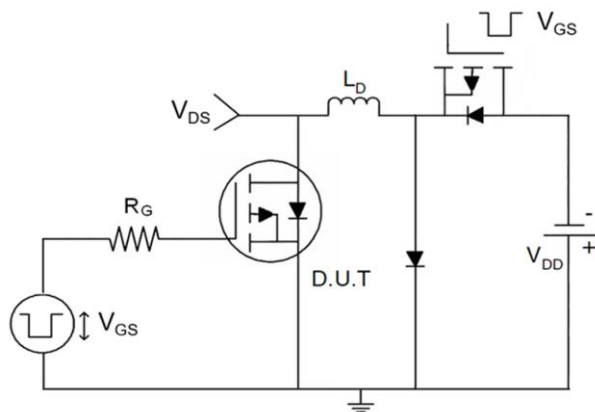
Figure 10. Maximum Safe Operating Area



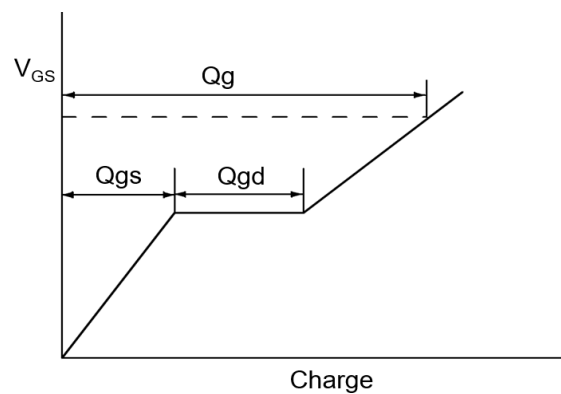
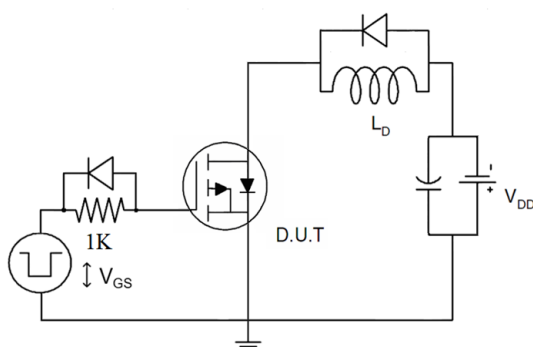
P-Channel TrenchPower MOSFET RC40P70K

■ Test Circuit

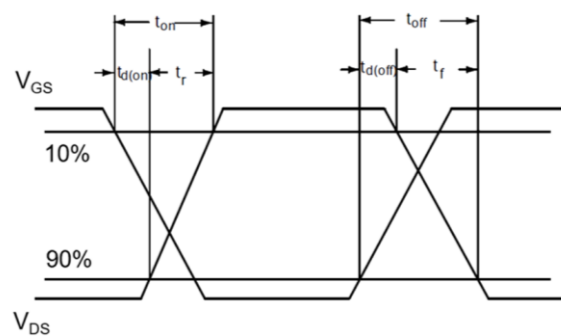
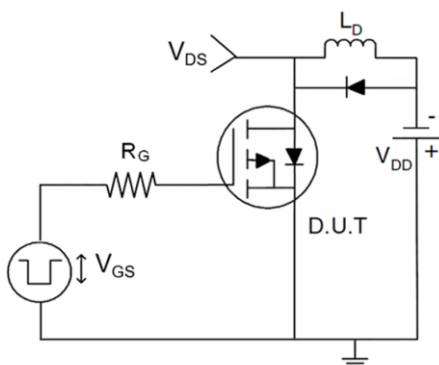
1) E_{AS} Test Circuits



2) Gate Charge Test Circuit



3) Switch Time Test Circuit

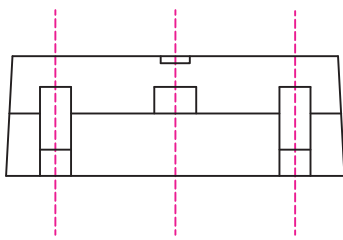
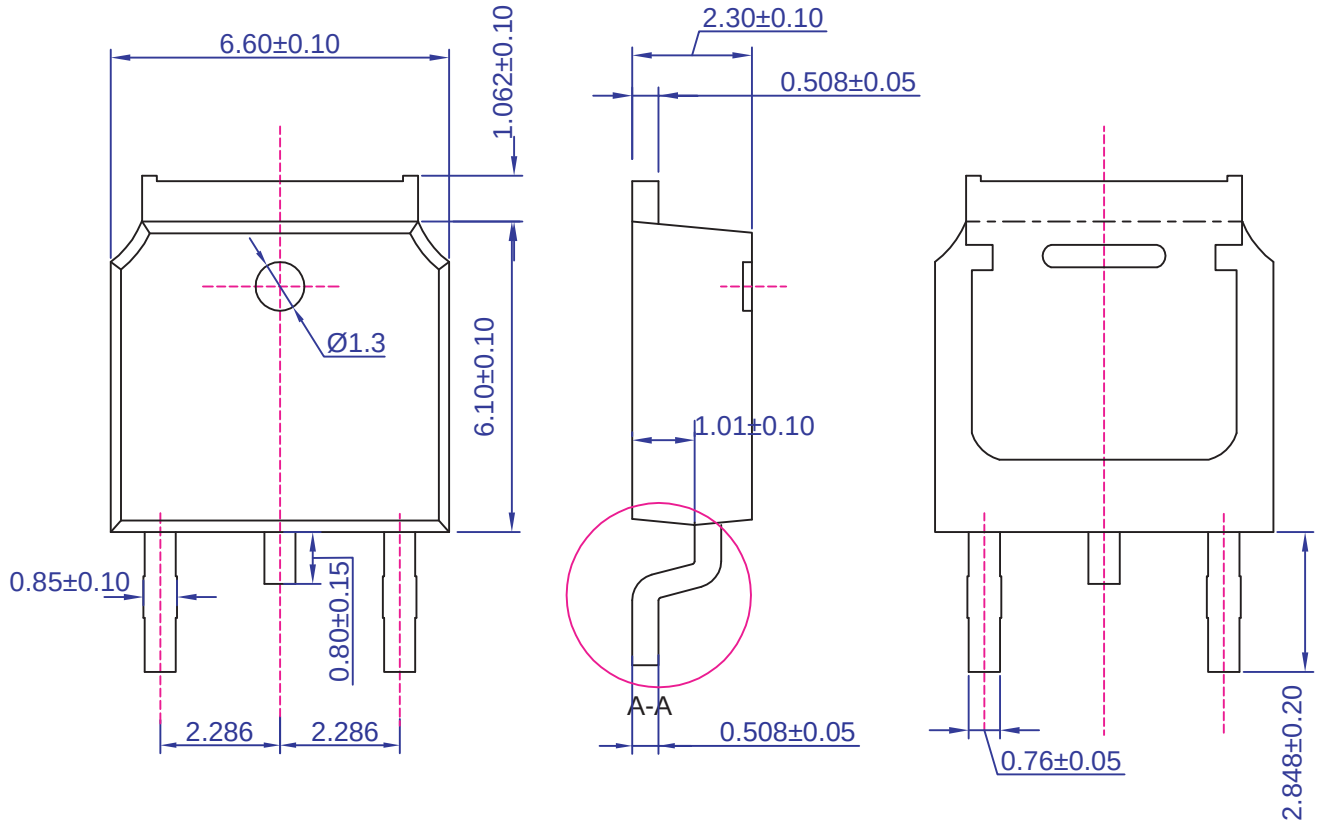


P-Channel TrenchPower MOSFET RC40P70K

■ Package Dimension

TO-252

Units: mm



A-A

