



N-Ch 100V Fast Switching MOSFETs

- ★ 100% EAS Guaranteed
- ★ Green Device Available
- ★ Super Low Gate Charge
- ★ Excellent CdV/dt effect decline
- ★ Advanced high cell density Trench technology

Product Summary



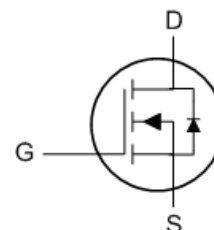
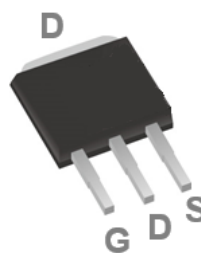
BVDSS	RDSON	ID
100V	14mΩ	70A

Description

The FKR0040 is the high cell density trenched N-ch MOSFETs, which provide excellent RDSON and gate charge for most of the synchronous buck converter applications.

The FKR0040 meet the RoHS and Green Product requirement, 100% EAS guaranteed with full function reliability approved.

TO251S Pin Configuration



Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	100	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_D@T_C=25^{\circ}C$	Continuous Drain Current, $V_{GS} @ 10V^1$	70	A
$I_D@T_C=100^{\circ}C$	Continuous Drain Current, $V_{GS} @ 10V^1$	43	A
I_{DM}	Pulsed Drain Current ²	140	A
EAS	Single Pulse Avalanche Energy ³	101	mJ
I_{AS}	Avalanche Current	45	A
$P_D@T_C=25^{\circ}C$	Total Power Dissipation ⁴	89	W
T_{STG}	Storage Temperature Range	-55 to 150	$^{\circ}C$
T_J	Operating Junction Temperature Range	-55 to 150	$^{\circ}C$

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-Ambient ¹	---	62	$^{\circ}C/W$
$R_{\theta JC}$	Thermal Resistance Junction-Case ¹	---	1.4	$^{\circ}C/W$

**Electrical Characteristics ($T_J=25^\circ\text{C}$, unless otherwise noted)**

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V$, $I_D=250\mu A$	100	---	---	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance ²	$V_{GS}=10V$, $I_D=10A$	---	---	14	$m\Omega$
	Static Drain-Source On-Resistance ²	$V_{GS}=4.5V$, $I_D=10A$	---	---	17	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}$, $I_D=250\mu A$	1.2	---	2.4	V
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=80V$, $V_{GS}=0V$, $T_J=25^\circ\text{C}$	---	---	1	μA
		$V_{DS}=80V$, $V_{GS}=0V$, $T_J=55^\circ\text{C}$	---	---	5	
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=\pm 20V$, $V_{DS}=0V$	---	---	± 100	nA
g_{fs}	Forward Transconductance	$V_{DS}=5V$, $I_D=10A$	---	43	---	S
R_g	Gate Resistance	$V_{DS}=0V$, $V_{GS}=0V$, $f=1\text{MHz}$	---	0.7	---	Ω
Q_g	Total Gate Charge (10V)	$V_{DS}=80V$, $V_{GS}=10V$, $I_D=20A$	---	75	---	nC
Q_{gs}	Gate-Source Charge		---	15.5	---	
Q_{gd}	Gate-Drain Charge		---	20.3	---	
$T_{d(on)}$	Turn-On Delay Time	$V_{DD}=40V$, $V_{GS}=10V$, $R_G=3.3\Omega$, $I_D=20A$	---	18.5	---	ns
T_r	Rise Time		---	8.8	---	
$T_{d(off)}$	Turn-Off Delay Time		---	58.8	---	
T_f	Fall Time		---	15.8	---	
C_{iss}	Input Capacitance	$V_{DS}=25V$, $V_{GS}=0V$, $f=1\text{MHz}$	---	4708	---	pF
C_{oss}	Output Capacitance		---	326	---	
C_{rss}	Reverse Transfer Capacitance		---	247	---	

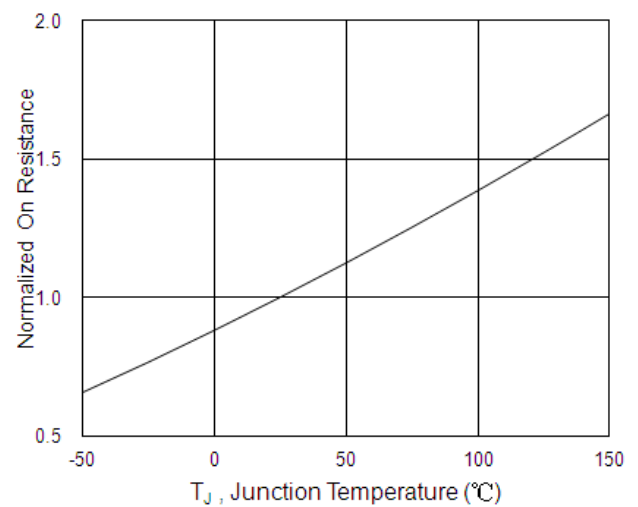
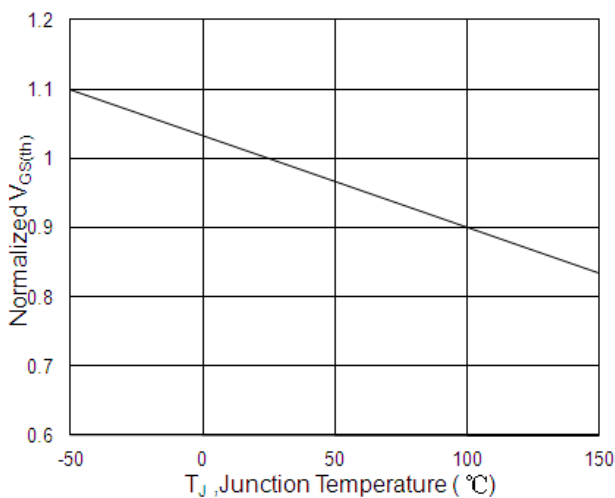
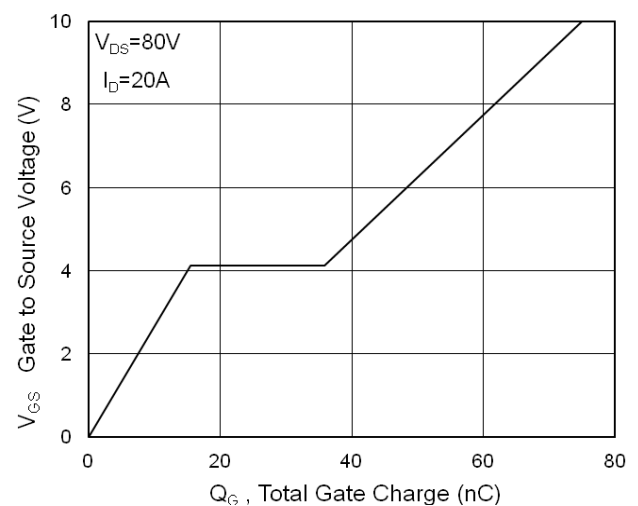
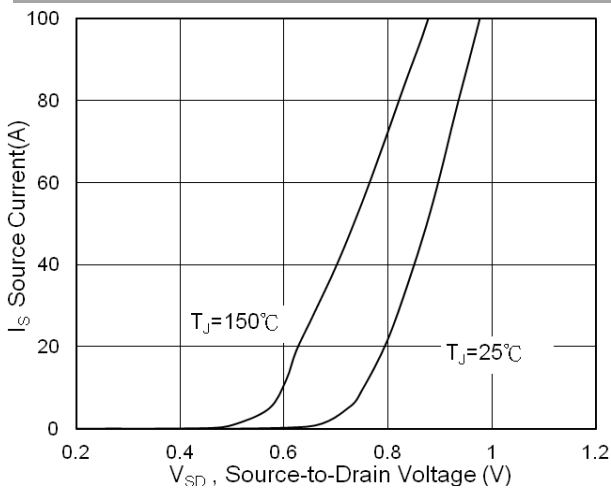
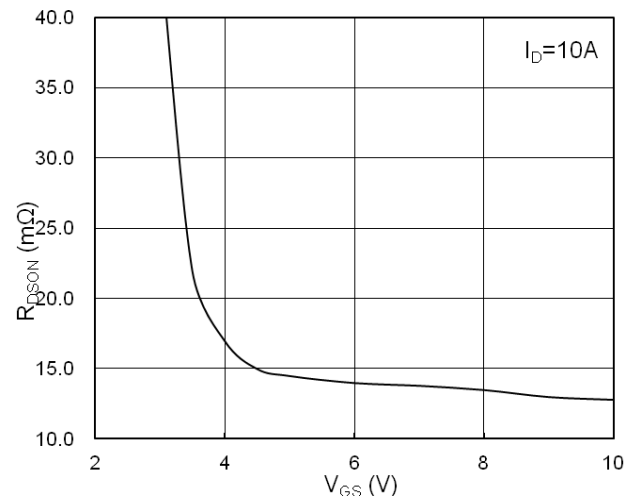
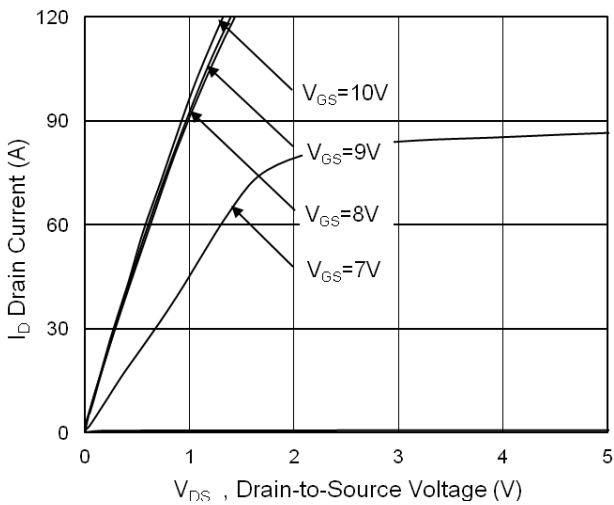
Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current ^{1,5}	$V_G=V_D=0V$, Force Current	---	---	70	A
I_{SM}	Pulsed Source Current ^{2,5}		---	---	140	A
V_{SD}	Diode Forward Voltage ²	$V_{GS}=0V$, $I_S=1A$, $T_J=25^\circ\text{C}$	---	---	1.2	V
t_{rr}	Reverse Recovery Time	$I_F=20A$, $dI/dt=100A/\mu s$, $T_J=25^\circ\text{C}$	---	24	---	nS
Q_{rr}	Reverse Recovery Charge		---	28	---	nC

Note :

1.The data tested by surface mounted on a 1 inch² FR-4 board with 20Z copper.2.The data tested by pulsed , pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$ 3.The EAS data shows Max. rating . The test condition is $V_{DD}=25V$, $V_{GS}=10V$, $L=0.1mH$, $I_{AS}=45A$ 4.The power dissipation is limited by 150°C junction temperature5.The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation.

Typical Characteristics



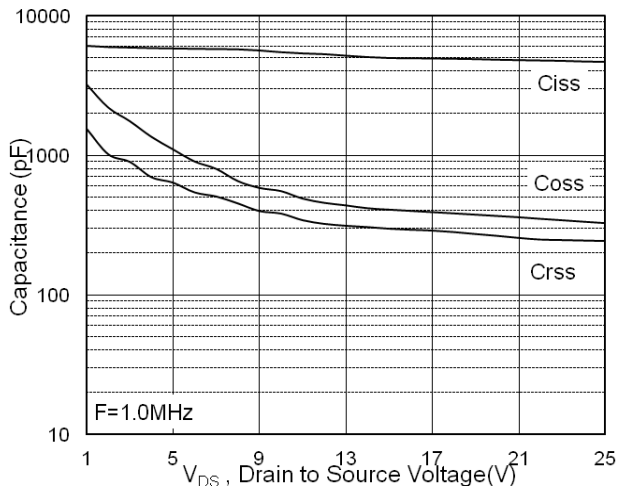


Fig.7 Capacitance

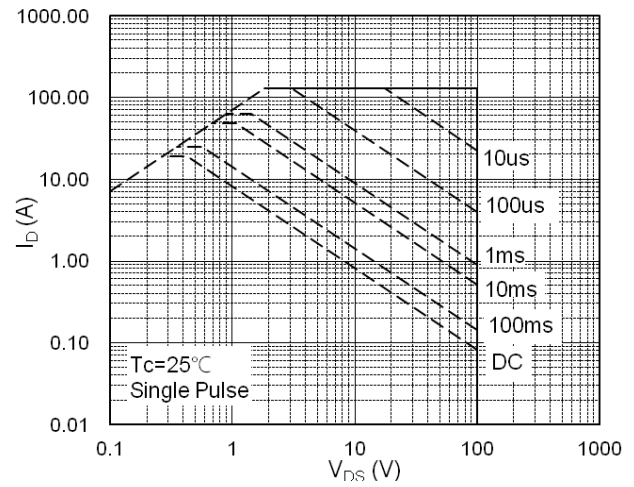


Fig.8 Safe Operating Area

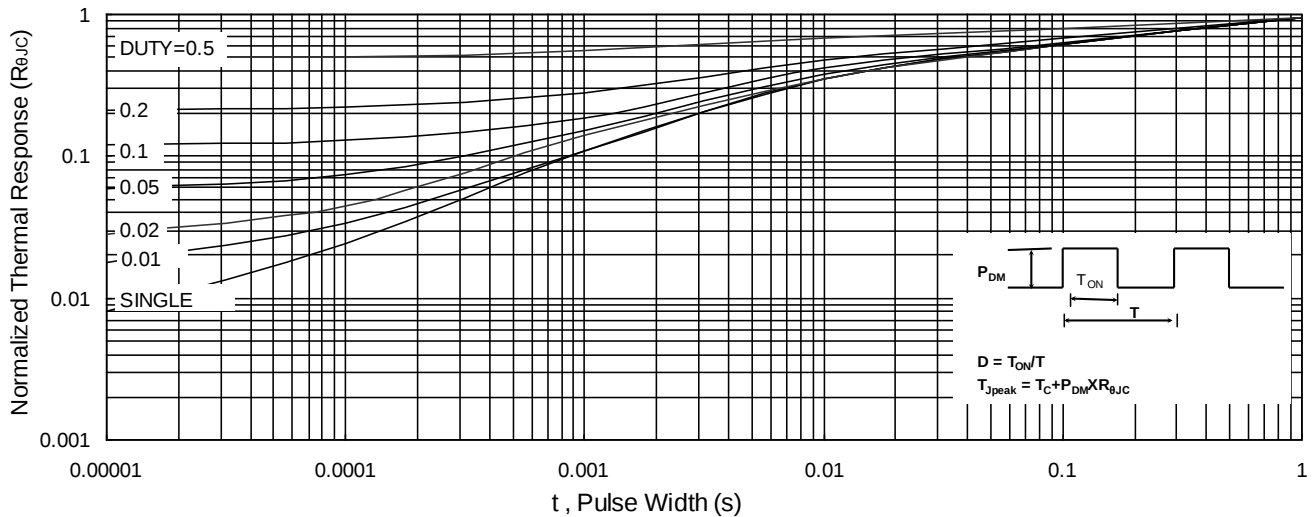


Fig.9 Normalized Maximum Transient Thermal Impedance

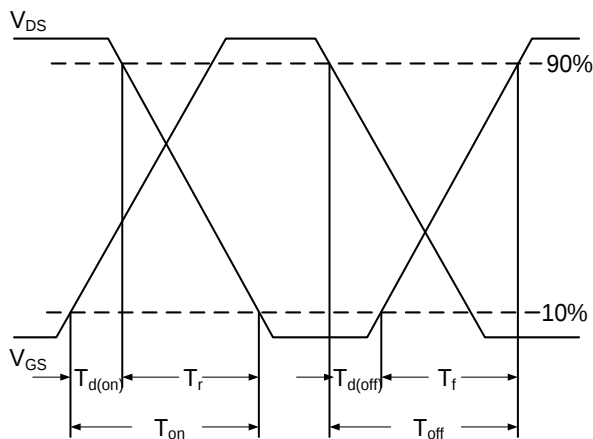


Fig.10 Switching Time Waveform

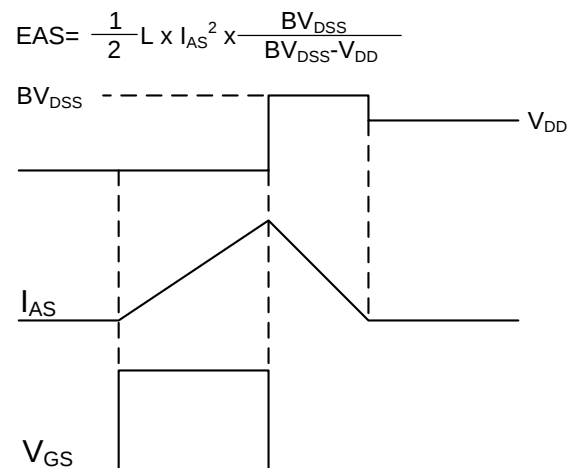


Fig.11 Unclamped Inductive Switching Waveform