



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

## Product Summary



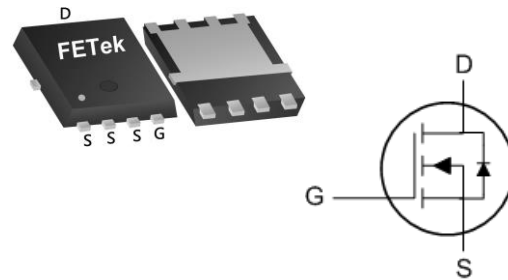
BVDSS	RDSON	ID
60V	12mΩ	44A

## Description

The FKBB6016 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 FKBB6016 meet the RoHS and Green Product requirement, 100% EAS guaranteed with full function reliability approved.

## PRPAK3X3 Pin Configuration



## Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V <sub>DS</sub>	Drain-Source Voltage	60	V
V <sub>GS</sub>	Gate-Source Voltage	±20	V
I <sub>D</sub> @T <sub>C</sub> =25°C	Continuous Drain Current <sup>1</sup>	44	A
I <sub>D</sub> @T <sub>C</sub> =100°C	Continuous Drain Current <sup>1</sup>	28	A
I <sub>DM</sub>	Pulsed Drain Current <sup>2</sup>	100	A
EAS	Single Pulse Avalanche Energy <sup>3</sup>	72.2	mJ
I <sub>AS</sub>	Avalanche Current	38	A
P <sub>D</sub> @T <sub>C</sub> =25°C	Total Power Dissipation <sup>4</sup>	42	W
T <sub>STG</sub>	Storage Temperature Range	-55 to 150	°C
T <sub>J</sub>	Operating Junction Temperature Range	-55 to 150	°C

## Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
R <sub>θJA</sub>	Thermal Resistance Junction-Ambient <sup>1</sup>	---	75	°C/W
R <sub>θJC</sub>	Thermal Resistance Junction-Case <sup>1</sup>	---	3	°C/W

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

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$BV_{DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	60	---	---	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance <sup>2</sup>	$V_{GS}=10V, I_D=8A$	---	---	12	m $\Omega$
		$V_{GS}=4.5V, I_D=6A$	---	---	15	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=250\mu A$	1.2	---	2.5	V
$I_{DSS}$	Drain-Source Leakage Current	$V_{DS}=48V, V_{GS}=0V, T_J=25^\circ\text{C}$	---	---	1	$\mu A$
		$V_{DS}=48V, V_{GS}=0V, T_J=55^\circ\text{C}$	---	---	5	
$I_{GSS}$	Gate-Source Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$	---	---	$\pm 100$	nA
$g_{fs}$	Forward Transconductance	$V_{DS}=5V, I_D=8A$	---	75	---	S
$R_g$	Gate Resistance	$V_{DS}=0V, V_{GS}=0V, f=1\text{MHz}$	---	1.5	---	$\Omega$
$Q_g$	Total Gate Charge (4.5V)	$V_{DS}=30V, V_{GS}=4.5V, I_D=8A$	---	28.7	---	nC
$Q_{gs}$	Gate-Source Charge		---	10.5	---	
$Q_{gd}$	Gate-Drain Charge		---	9.9	---	
$T_{d(on)}$	Turn-On Delay Time	$V_{DD}=30V, V_{GS}=10V, R_G=3.3\Omega, I_D=8A$	---	10.4	---	ns
$T_r$	Rise Time		---	9.2	---	
$T_{d(off)}$	Turn-Off Delay Time		---	63	---	
$T_f$	Fall Time		---	4.8	---	
$C_{iss}$	Input Capacitance	$V_{DS}=15V, V_{GS}=0V, f=1\text{MHz}$	---	3240	---	pF
$C_{oss}$	Output Capacitance		---	210	---	
$C_{rss}$	Reverse Transfer Capacitance		---	146	---	

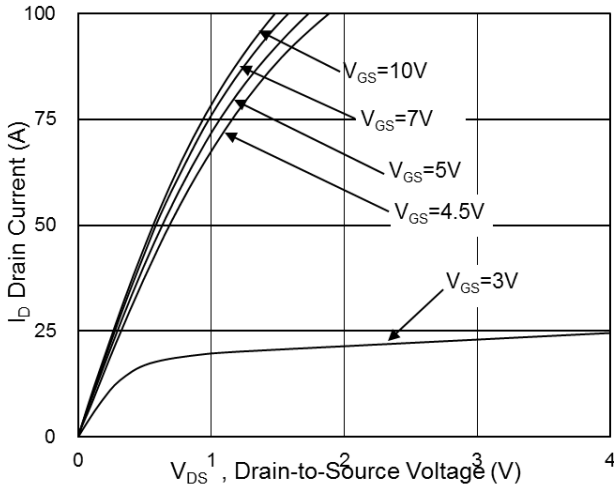
**Diode Characteristics**

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$I_S$	Continuous Source Current <sup>1,5</sup>	$V_G=V_D=0V, \text{Force Current}$	---	---	44	A
$I_{SM}$	Pulsed Source Current <sup>2,5</sup>		---	---	100	A
$V_{SD}$	Diode Forward Voltage <sup>2</sup>	$V_{GS}=0V, I_S=A, T_J=25^\circ\text{C}$	---	---	1.2	V
$t_{rr}$	Reverse Recovery Time	$I_F=8A, di/dt=100A/\mu s,$	---	18	---	nS
$Q_{rr}$	Reverse Recovery Charge	$T_J=25^\circ\text{C}$	---	14	---	nC

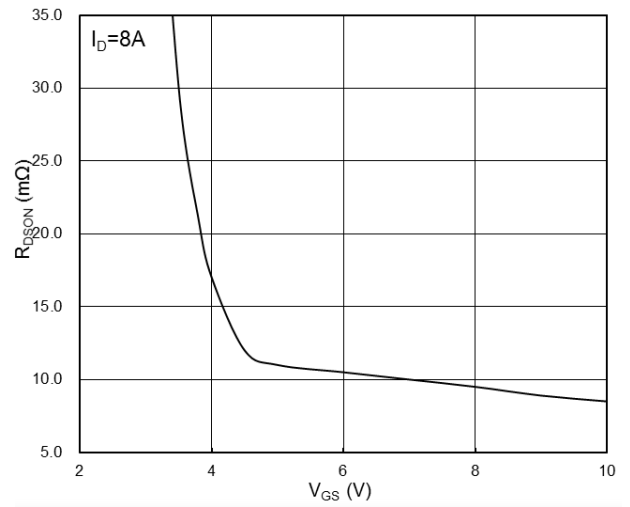
Note :

- The data tested by surface mounted on a 1 inch<sup>2</sup> FR-4 board with 2OZ copper.
- The data tested by pulsed, pulse width  $\leq 300\mu s$ , duty cycle  $\leq 2\%$
- The EAS data shows Max. rating. The test condition is  $V_{DD}=25V, V_{GS}=10V, L=0.1mH, I_{AS}=38A$
- The power dissipation is limited by 150 $^\circ\text{C}$  junction temperature
- The data is theoretically the same as  $I_D$  and  $I_{DM}$ , in real applications, should be limited by total power dissipation.

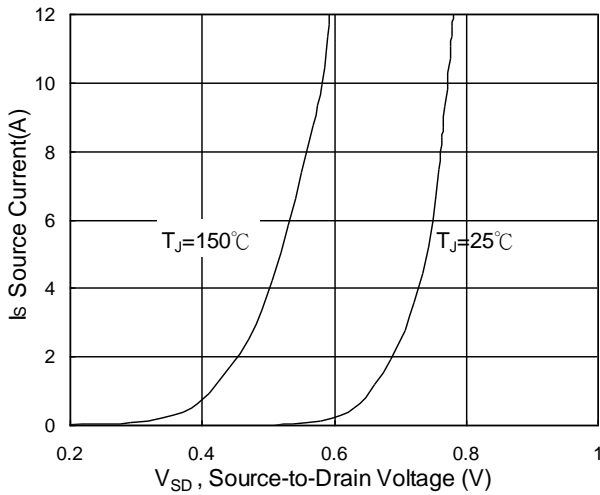
**Typical Characteristics**



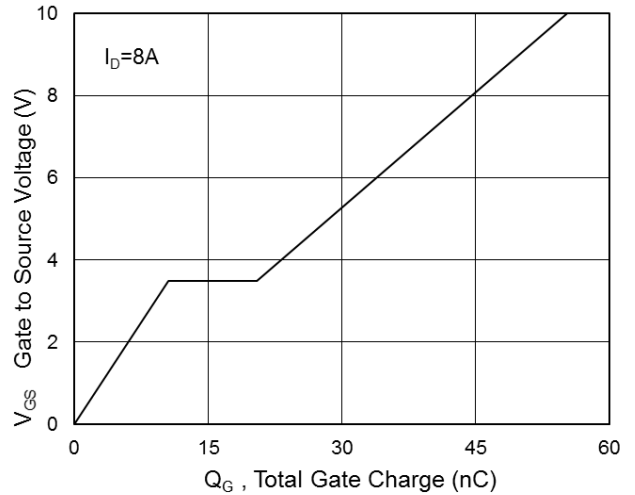
**Fig.1 Typical Output Characteristics**



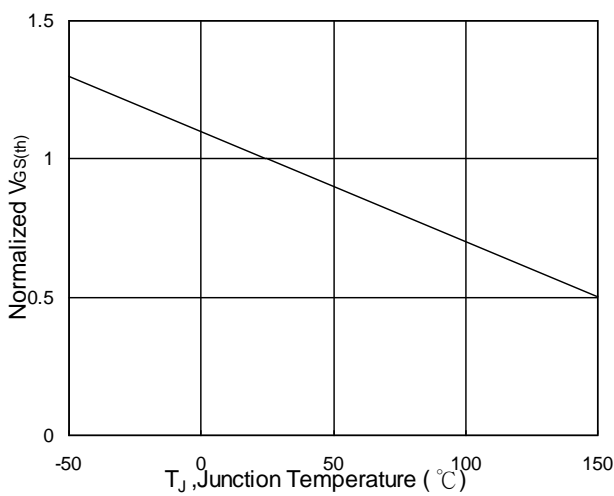
**Fig.2 On-Resistance vs. Gate-Source Voltage**



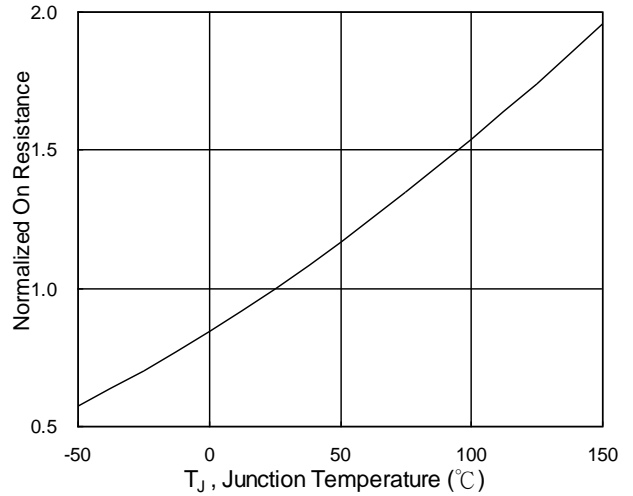
**Fig.3 Forward Characteristics of Reverse**



**Fig.4 Gate-Charge Characteristics**



**Fig.5 Normalized  $V_{GS(th)}$  vs.  $T_J$**



**Fig.6 Normalized  $R_{DS(on)}$  vs.  $T_J$**

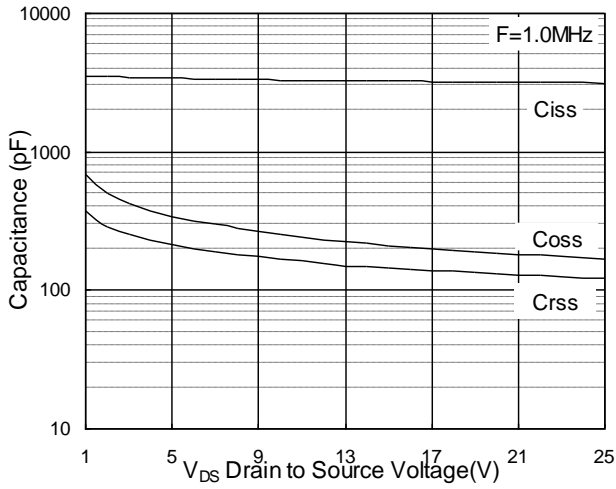


Fig.7 Capacitance

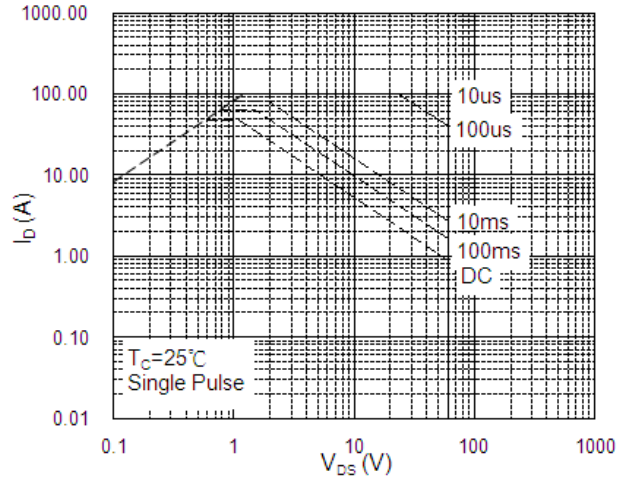


Fig.8 Safe Operating Area

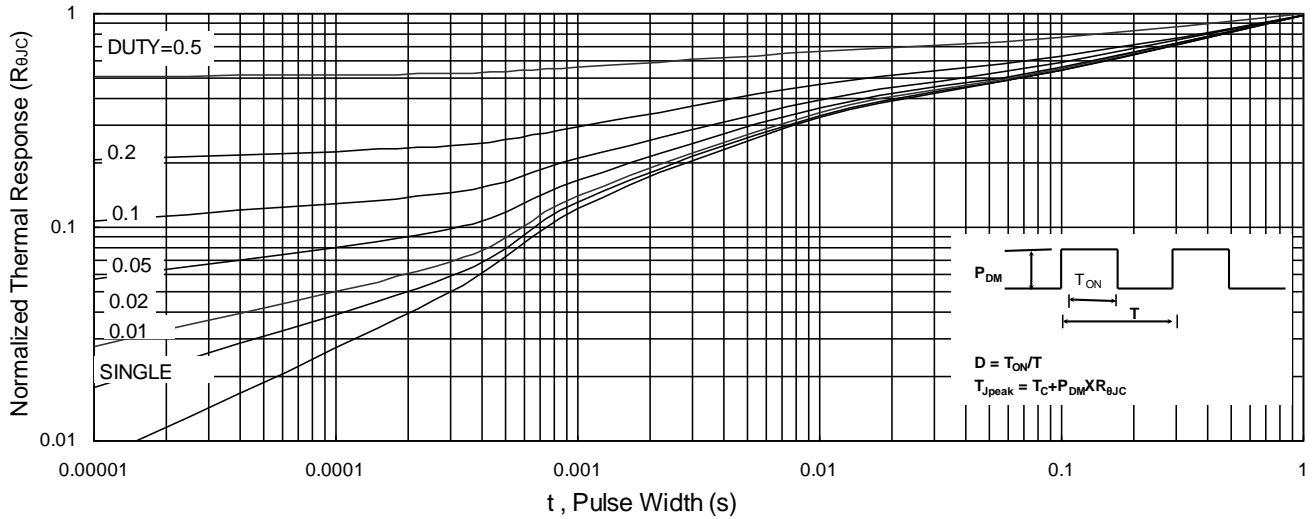


Fig.9 Normalized Maximum Transient Thermal Impedance

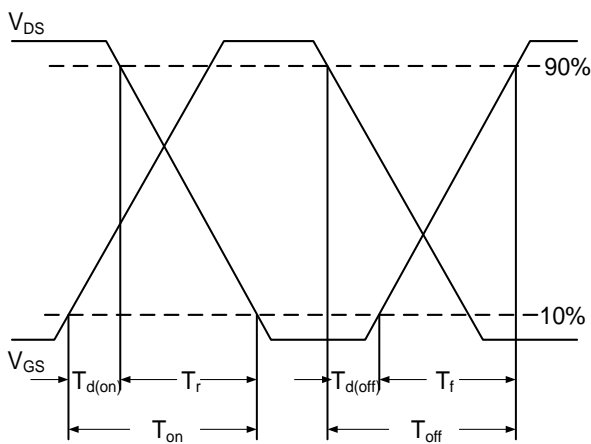


Fig.10 Switching Time Waveform

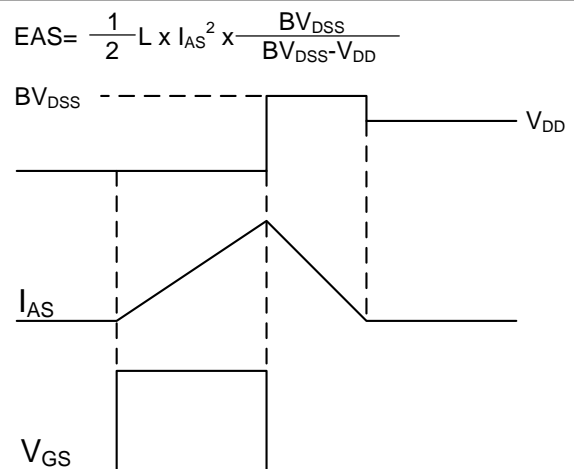


Fig.11 Unclamped Inductive Switching Waveform