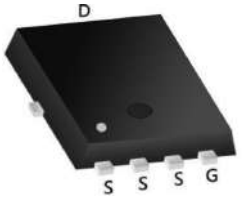
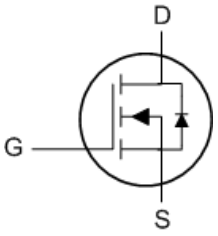
N-Ch 30V Fast Switching MOSFETs

Features:

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

PRPAK5X6 Pin Configuration





Description:

The KWBA3004 is the high cell density trenched N-ch MOSFETs, which provide excellent RDSON and gate charge for most applications.

The KWBA3004 meet the RoHS and Green Product requirement, 100% EAS guaranteed with full function reliability approved.

Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	30	V
V_{GS}	Gate-Source Voltage	±20	V
I_D@T_C=25°C	Continuous Drain Current, V_{GS} @ 10V[1]	58	A
I_D@T_C=100°C	Continuous Drain Current, V_{GS} @ 10V[1]	38	A
I_D@T_A=25°C	Continuous Drain Current, V_{GS} @ 10V[1]	12	A
I_D@T_A=70°C	Continuous Drain Current, V_{GS} @ 10V[1]	9.6	A
I_{DM}	Pulsed Drain Current[2]	115	A
EAS	Single Pulse Avalanche Energy[3]	57.8	mJ
I_{AS}	Avalanche Current	34	A
P_D@T_C=25°C	Total Power Dissipation[4]	46	W
P_D@T_A=25°C	Total Power Dissipation[4]	2	W
T_{STG}	Storage Temperature Range	-55 to 150	°C
T_J	Operating Junction Temperature Range	-55 to 150	°C

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-Ambient [1]	---	62	°C/W
$R_{\theta JC}$	Thermal Resistance Junction-Case[1]	---	2.7	°C/W

Electrical Characteristics (T_J=25 ℃, unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V , I_D=250uA	30	---	---	V
$\triangle BV_{DSS}/\triangle T_J$	BVDSS Temperature Coefficient	Reference to 25℃ , I_D=1mA	---	0.027	---	V/℃
$R_{DS(ON)}$	Static Drain-Source On-Resistance[2]	V_{GS}=10V , I_D=30A	---	6.5	8.5	mΩ
		V_{GS}=4.5V , I_D=15A	---	11	14	
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =250uA	1.2	1.5	2.5	V
$\triangle V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	-5.8	---	mV/℃
I_{DSS}	Drain-Source Leakage Current	V_{DS}=24V , V_{GS}=0V , T_J=25℃	---	---	1	uA
		V_{DS}=24V , V_{GS}=0V , T_J=55℃	---	---	5	
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±20V , V_{DS}=0V	---	---	±100	nA
gfs	Forward Transconductance	V_{DS}=5V , I_D=30A	---	38	---	S
R_g	Gate Resistance	V_{DS}=0V , V_{GS}=0V , f=1MHz	---	1.7	2.9	Ω
Q_g	Total Gate Charge (4.5V)	V_{DS}=15V , V_{GS}=4.5V , I_D=15A	---	12.6	17.6	nC
Q_{gs}	Gate-Source Charge		---	4.2	5.9	
Q_{gd}	Gate-Drain Charge		---	5.1	7.1	
$T_{d(on)}$	Turn-On Delay Time	V_{DD}=15V , V_{GS}=10V , R_G=3.3Ω I_D=15A	---	4.6	9.2	ns
T_r	Rise Time		---	12.2	22	
$T_{d(off)}$	Turn-Off Delay Time		---	26.6	53	
T_f	Fall Time		---	8	16	
C_{iss}	Input Capacitance	V_{DS}=15V , V_{GS}=0V , f=1MHz	---	1317	1844	pF
C_{oss}	Output Capacitance		---	163	228	
C_{rss}	Reverse Transfer Capacitance		---	131	183	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current[1,5]	V_G=V_D=0V , Force Current	---	---	58	A
I_{SM}	Pulsed Source Current[2,5]		---	---	115	A
V_{SD}	Diode Forward Voltage[2]	V_{GS}=0V , I_S=1A , T_J=25℃	---	---	1	V
t_{rr}	Reverse Recovery Time	IF=30A , dI/dt=100A/μs , T_J=25℃	---	9.2	---	nS
Q_{rr}	Reverse Recovery Charge		---	2	---	nC

Note :

1.The data tested by surface mounted on a 1 inch^2 FR-4 board with 2OZ copper.
2.The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%
3.The EAS data shows Max. rating . The test condition is V_{DD}=25V,V_{GS}=10V,L=0.1mH,I_{AS}=34A
4.The power dissipation is limited by 150℃ junction temperature
5.The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation.

Typical Characteristics

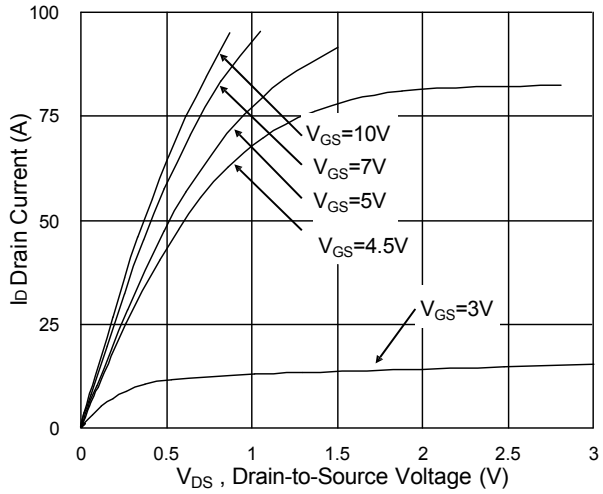


Fig.1 Typical Output Characteristics

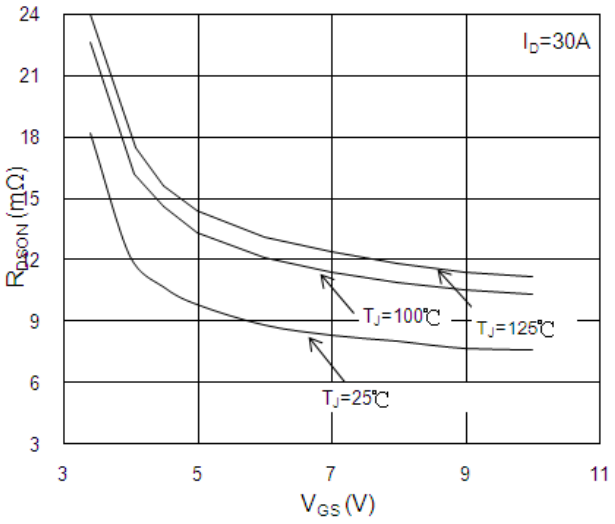


Fig.2 On-Resistance vs. Gate-Source

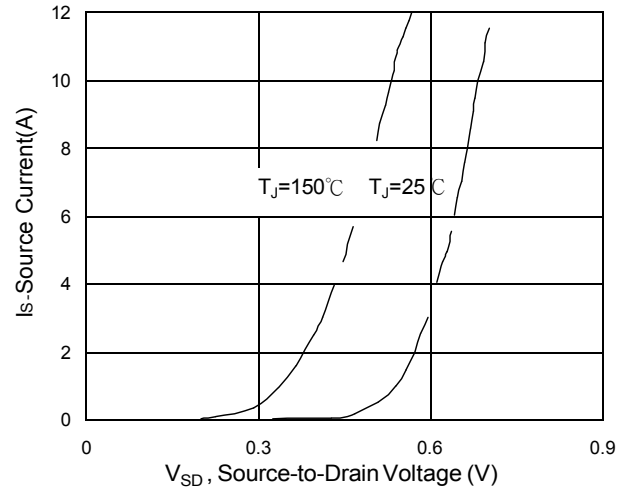


Fig.3 Forward Characteristics of reverse

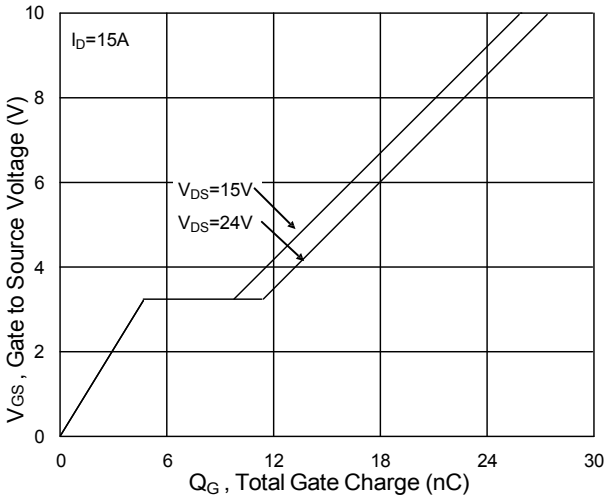


Fig.4 Gate-Charge Characteristics

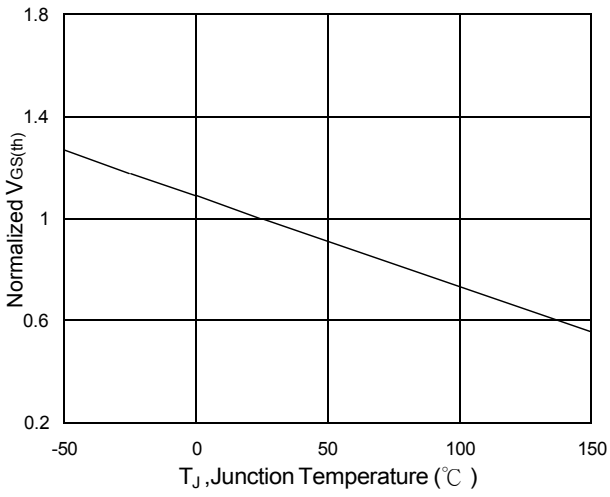
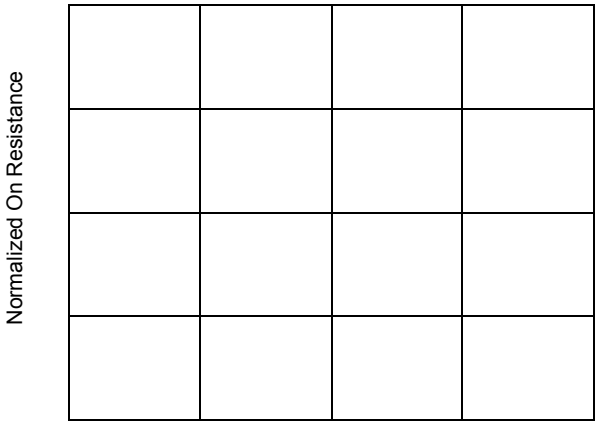


Fig.5 Normalized $V_{GS(th)}$ vs. T_J



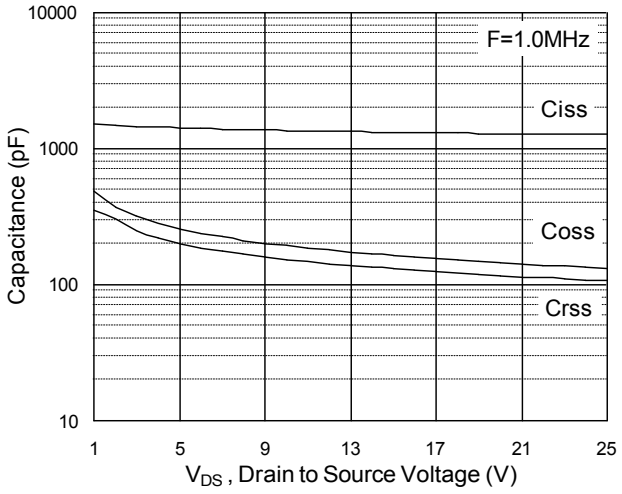


Fig.7 Capacitance

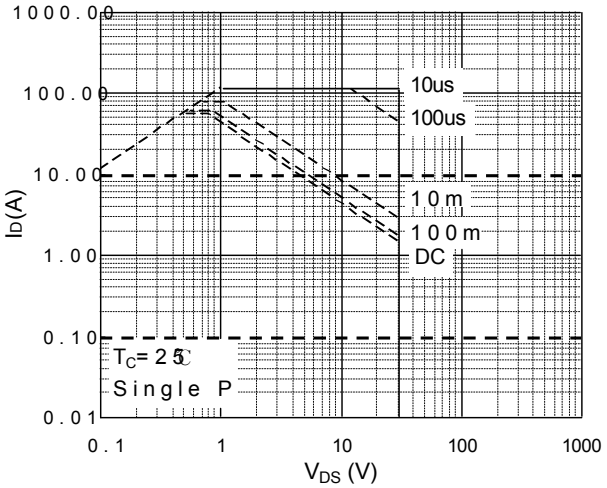


Fig.8 Safe Operating Area

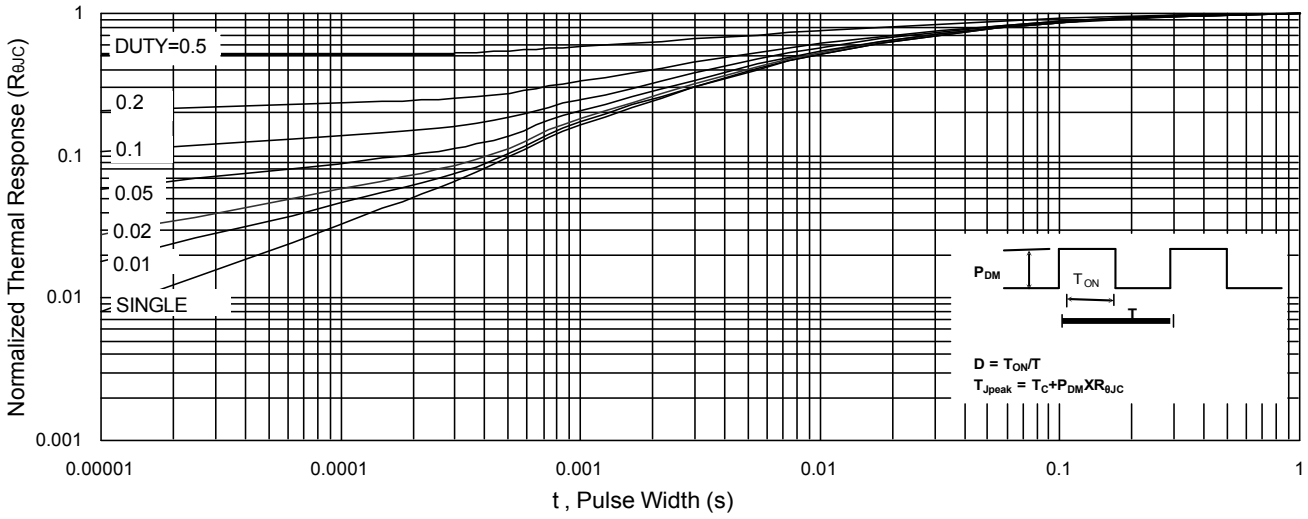


Fig.9 Normalized Maximum Transient Thermal Impedance

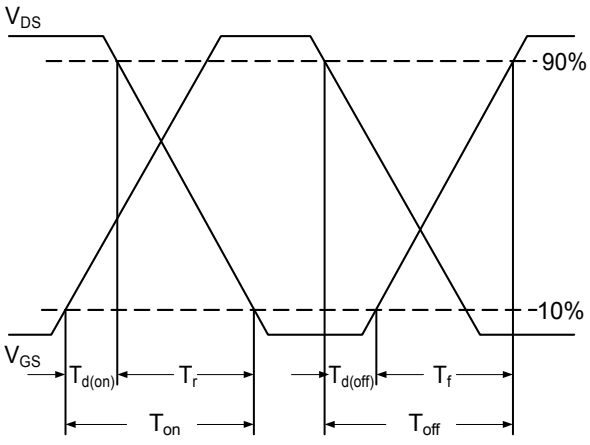


Fig.10 Switching Time Waveform

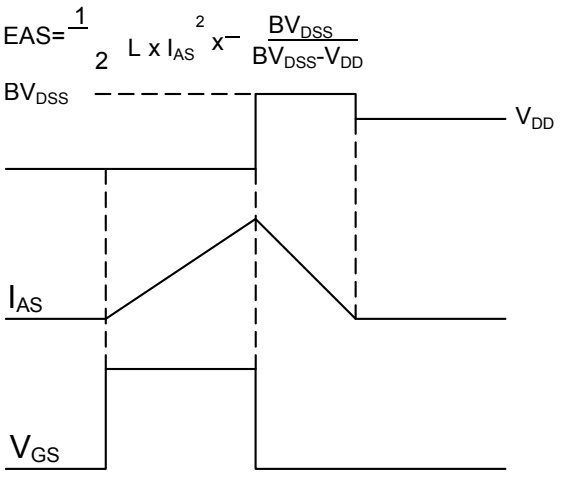
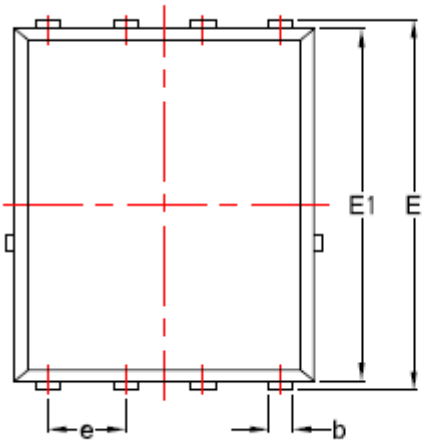
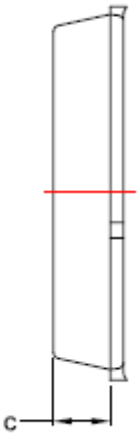
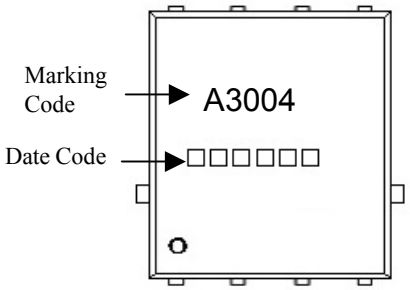


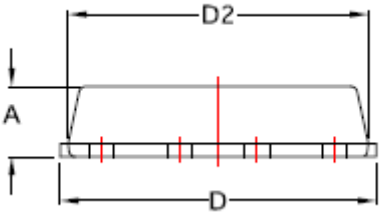
Fig.17 Unclamped Inductive Switching Waveform

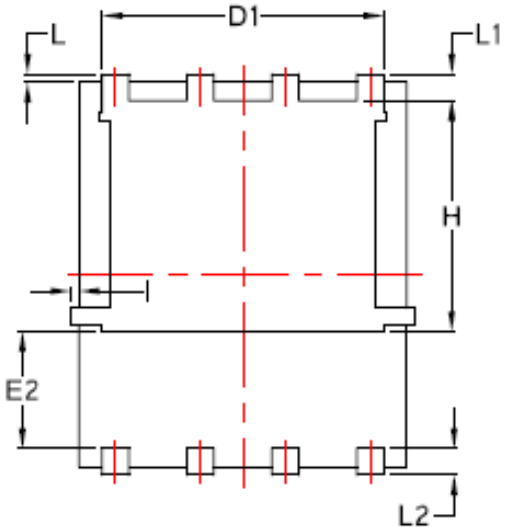
PRPAK5*6 Package Outline











	SYMBOL	COMMON			
		MM		INCH	
		MIN.	MAX.	MIN.	MAX.
	A	1.03	1.17	0.0406	0.0461
	b	0.34	0.48	0.0134	0.0189
	c	0.824	0.970	0.0324	0.0382
3	D	4.80	5.40	0.1890	0.2126
	D1	4.11	4.31	0.1618	0.1697
3	D2	4.80	5.00	0.1890	0.1969
	E	5.95	6.15	0.2343	0.2421
	E1	5.65	5.85	0.2224	0.2303
	E2	1.60	—	0.0630	—
	e	1.27 BSC		0.05 BSC	
3	L	0.05	0.25	0.0020	0.0098
	L1	0.38	0.50	0.0150	0.0197
	L2	0.38	0.50	0.0150	0.0197
4	H	3.30	3.50	0.1299	0.1378
	l	—	0.18	—	0.0070