FKBA3430

30V Dual Asymmetric N-Channel MOSFETs

Features

- Advanced Trench MOS Technology
- Low $R_{DS(ON)}$
- High Current Capability
- 100% EAS Guaranteed
- Green Device Available

Product Summary

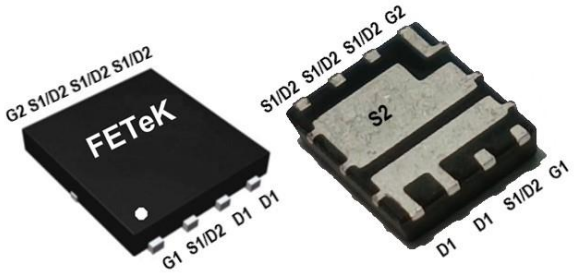
Green

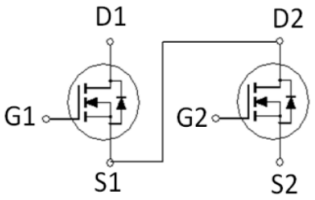
BVDSS	RDSON	ID
30V	3.6mΩ	77A
30V	1.2mΩ	189A

Applications

- Power Management in Desktop Computer.
- DC/DC Converters.
- Isolated DC/DC Converters in Telecom and Industrial.

PRPAK5X6 Pin Configuration





Absolute Maximum Ratings

Symbol	Parameter	Rating		Units
		Die1	Die2	
V_{DS}	Drain-Source Voltage	30	30	V
V_{GS}	Gate-Source Voltage	±20	±20	V
I_D@T_C=25°C	Continuous Drain Current, V_{GS} @ 10V[1]	77	189	A
I_D@T_C=100°C	Continuous Drain Current, V_{GS} @ 10V[1]	48	120	A
I_D@T_A=25°C	Continuous Drain Current, V_{GS} @ 10V[1]	17.7	31	A
I_D@T_A=70°C	Continuous Drain Current, V_{GS} @ 10V[1]	14	25	A
I_{DM}	Pulsed Drain Current[2]	200	400	A
EAS	Single Pulse Avalanche Energy[3]	33.8	130	mJ
I_{AS}	Avalanche Current	26	51	A
P_D@T_C=25°C	Total Power Dissipation[4]	31.3	62.5	W
P_D@T_A=25°C	Total Power Dissipation[4]	1.67	1.67	W
T_{STG}	Storage Temperature Range	-55 to 150	-55 to 150	°C
T_J	Operating Junction Temperature Range	-55 to 150	-55 to 150	°C

Thermal Data

Symbol	Parameter	Typ. D1	Typ. D2	Max. D1	Max. D2	Unit
$R_{\theta JA}$	Thermal Resistance Junction-Ambient [1]	---	---	75	75	°C/W
$R_{\theta JC}$	Thermal Resistance Junction-Case[1]	---	---	4	2	°C/W

Die1 N-Channel Electrical Characteristics (T_J=25 ˚C, unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V , I_D=250uA	30	---	---	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance[2]	V_{GS}=10V , I_D=20A	---	2.7	3.6	mΩ
		V_{GS}=4.5V , I_D=15A	---	4.0	5.5	
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =250uA	1.2	---	2.2	V
I_{DSS}	Drain-Source Leakage Current	V_{DS}=24V , V_{GS}=0V , T_J=25˚C	---	---	1	uA
		V_{DS}=24V , V_{GS}=0V , T_J=55˚C	---	---	5	
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±20V , V_{DS}=0V	---	---	±100	nA
R_g	Gate Resistance	V_{DS}=0V , V_{GS}=0V , f=1MHz	---	1.4	---	Ω
Q_g	Total Gate Charge	V_{DS}=20V , V_{GS}=10V , I_D=20A	---	29	---	nC
Q_{gs}	Gate-Source Charge		---	4.6	---	
Q_{gd}	Gate-Drain Charge		---	6.8	---	
$T_{d(on)}$	Turn-On Delay Time	V_{DD}=15V , V_{GS}=10V , R_G=1Ω, I_D=1A	---	12	---	ns
T_r	Rise Time		---	10.5	---	
$T_{d(off)}$	Turn-Off Delay Time		---	23	---	
T_f	Fall Time		---	19	---	
C_{iss}	Input Capacitance	V_{DS}=15V , V_{GS}=0V , f=1MHz	---	1538	---	pF
C_{oss}	Output Capacitance		---	749	---	
C_{rss}	Reverse Transfer Capacitance		---	120	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current[1,5]	V_G=V_D=0V , Force Current	---	---	77	A
V_{SD}	Diode Forward Voltage[2]	V_{GS}=0V , I_S=1A , T_J=25˚C	---	---	1.2	V

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}=26A
4.The power dissipation is limited by 150˚C 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.

Die2 N-Channel 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
$R_{DS(ON)}$	Static Drain-Source On-Resistance[2]	V_{GS}=10V , I_D=20A	---	0.8	1.2	mΩ
		V_{GS}=4.5V , I_D=15A	---	1.2	2.0	
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =250uA	1.2	---	2.2	V
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
R_g	Gate Resistance	V_{DS}=0V , V_{GS}=0V , f=1MHz	---	1.2	---	Ω
Q_g	Total Gate Charge (-10V)	V_{DS}=20V , V_{GS}=10V , I_D=20A	---	82	---	nC
Q_{gs}	Gate-Source Charge		---	13.1	---	
Q_{gd}	Gate-Drain Charge		---	17.6	---	
$T_{d(on)}$	Turn-On Delay Time	V_{DD}=15V , V_{GS}=10V , R_G=1Ω, I_D=1A	---	19	---	ns
T_r	Rise Time		---	14.5	---	
$T_{d(off)}$	Turn-Off Delay Time		---	39	---	
T_f	Fall Time		---	26	---	
C_{iss}	Input Capacitance	V_{DS}=15V , V_{GS}=0V , f=1MHz	---	4887	---	pF
C_{oss}	Output Capacitance		---	2389	---	
C_{rss}	Reverse Transfer Capacitance		---	293	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current[1,5]	V_G=V_D=0V , Force Current	---	---	100	A
V_{SD}	Diode Forward Voltage[2]	V_{GS}=0V , I_S=1A , T_J=25℃	---	---	1.2	V

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}=51A
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.

N-Channel Typical Characteristics (Die1)

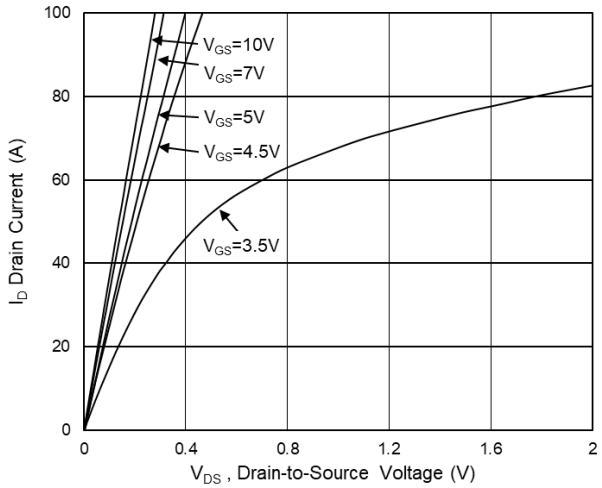


Fig.1 Typical Output Characteristics

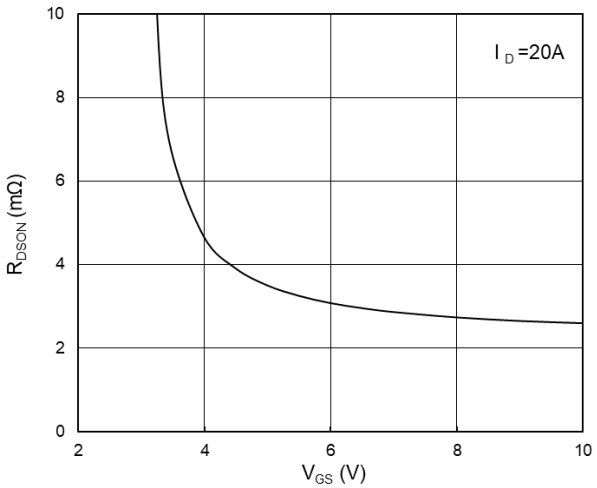


Fig.2 On-Resistance vs G-S Voltage

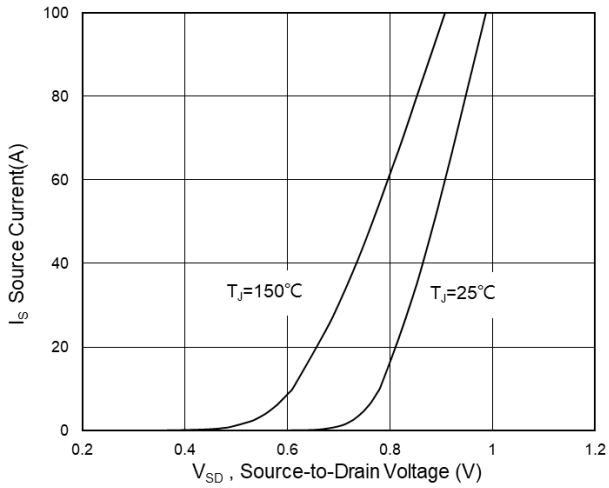


Fig.3 Source Drain Forward Characteristics

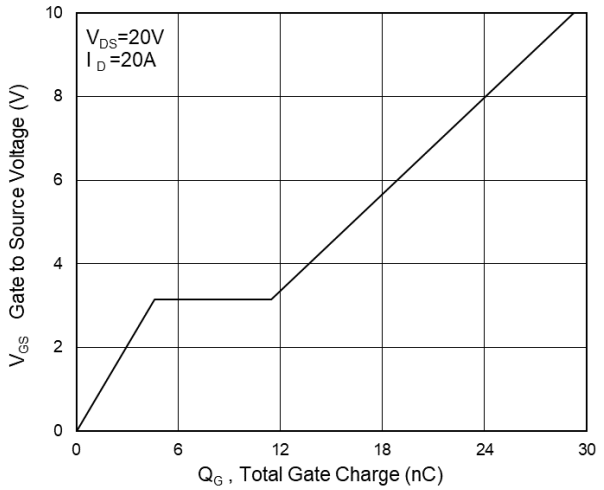


Fig.4 Gate-Charge Characteristics

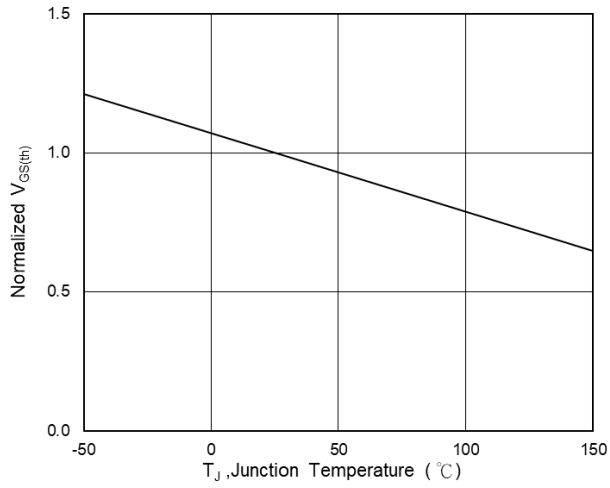


Fig.5 Normalized $V_{GS(th)}$ vs T_J

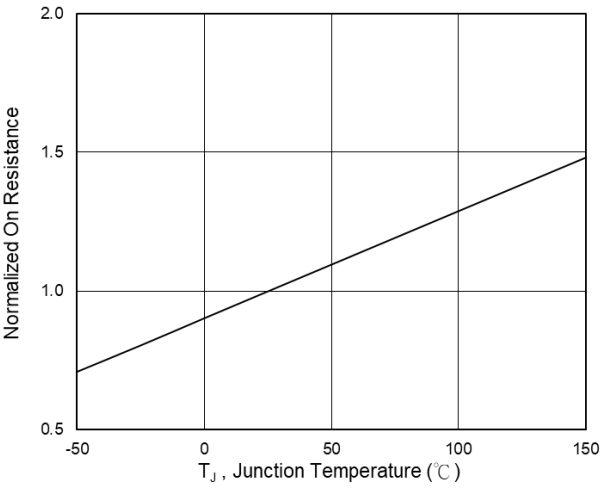


Fig.6 Normalized R_{DSON} vs T_J

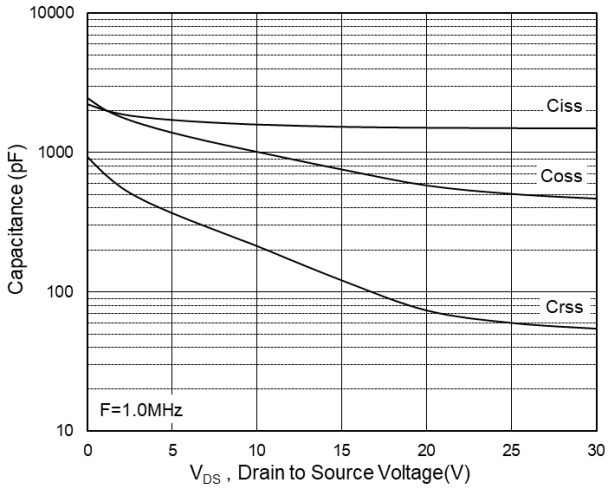


Fig.7 Capacitance

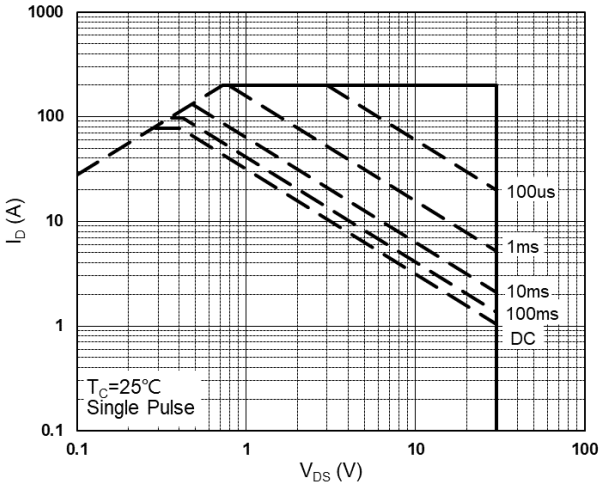


Fig.8 Safe Operating Area

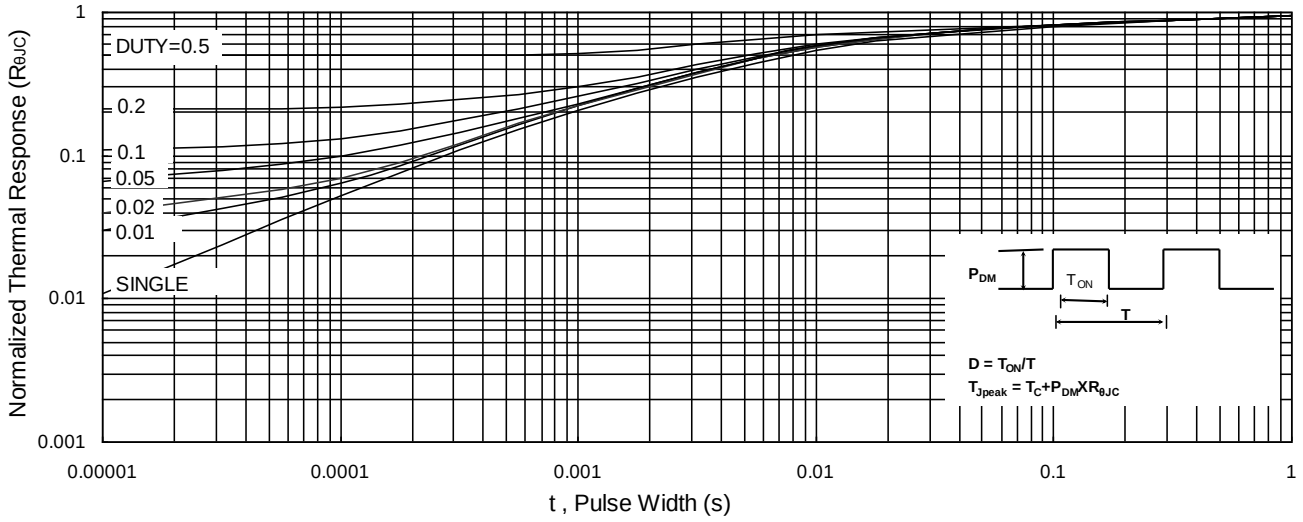


Fig.9 Normalized Maximum Transient Thermal Impedance

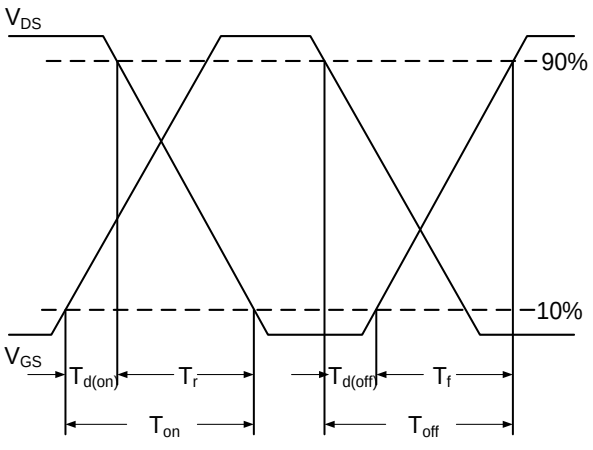


Fig.10 Switching Time Waveform

$$EAS = \frac{1}{2} L \times I_{AS}^2 \times \frac{BV_{DSS}}{BV_{DSS}-V_{DD}}$$

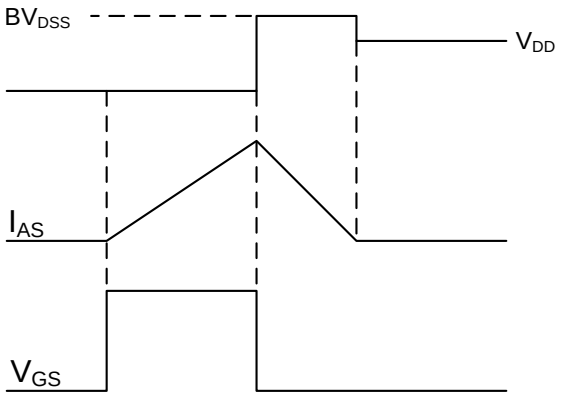


Fig.11 Unclamped Inductive Waveform

N-Channel Typical Characteristics (Die2)

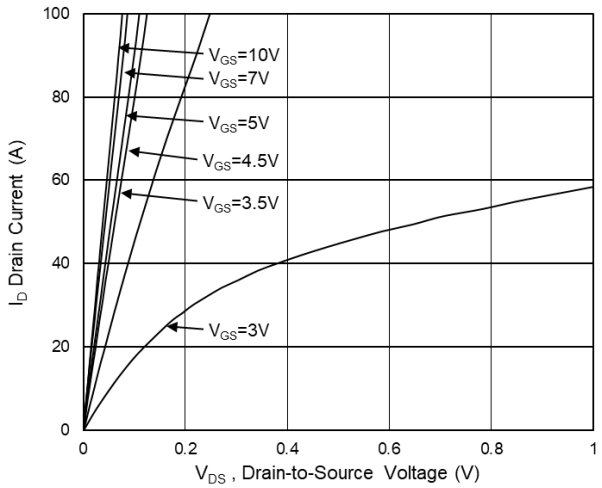


Fig.1 Typical Output Characteristics

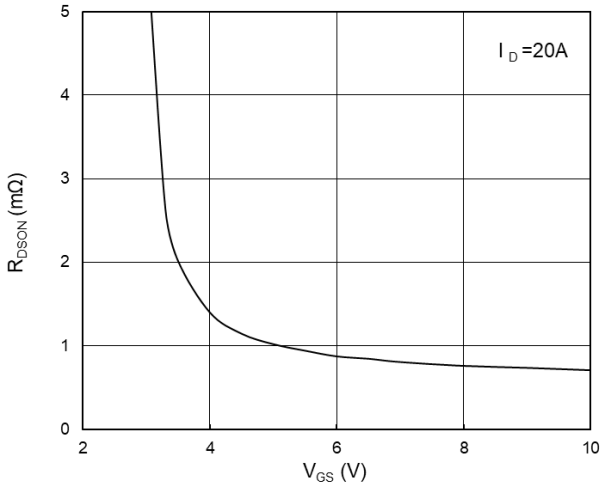


Fig.2 On-Resistance vs G-S Voltage

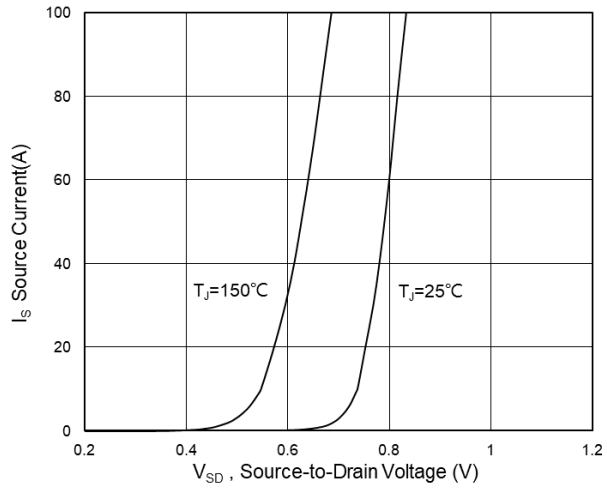


Fig.3 Source Drain Forward Characteristics

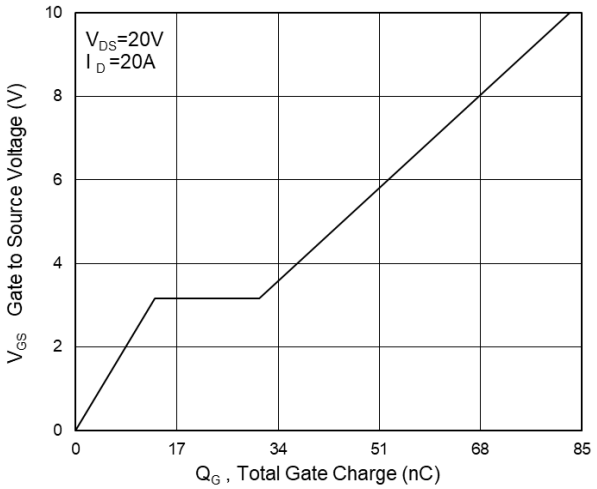


Fig.4 Gate-Charge Characteristics

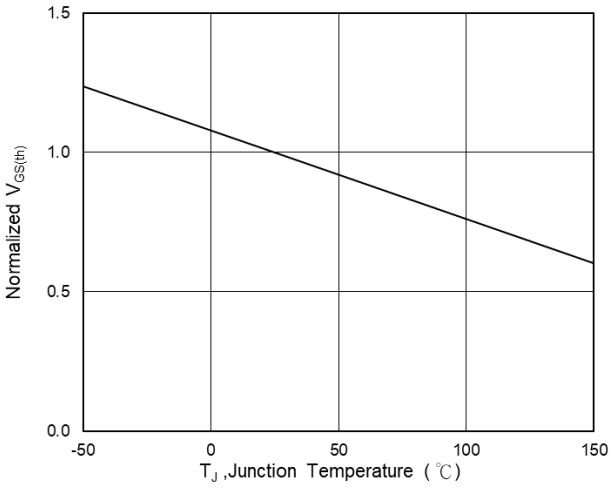


Fig.5 Normalized $V_{GS(th)}$ vs T_J

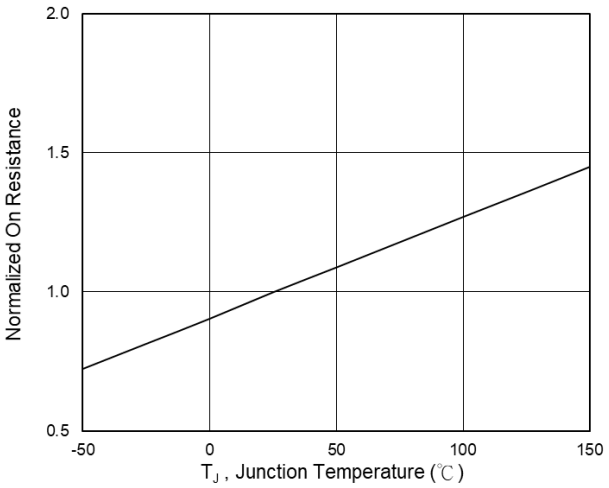


Fig.6 Normalized R_{DSON} vs T_J

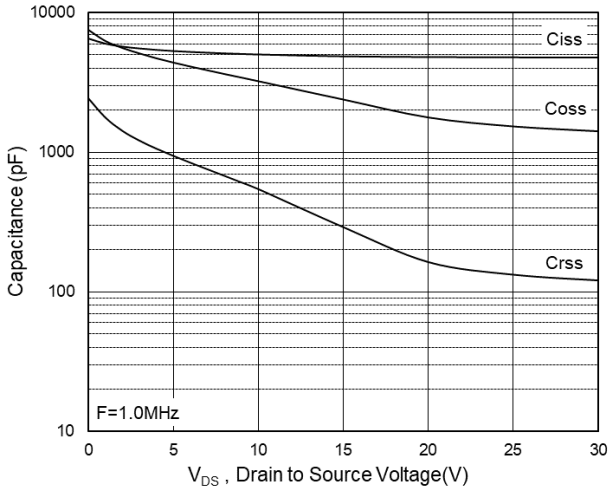
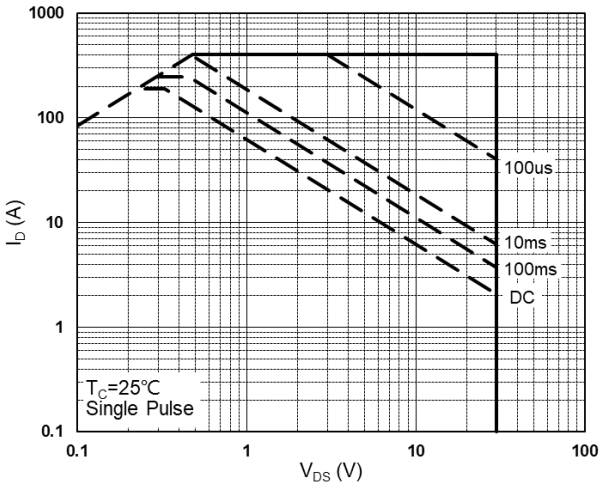


Fig.7 Capacitance



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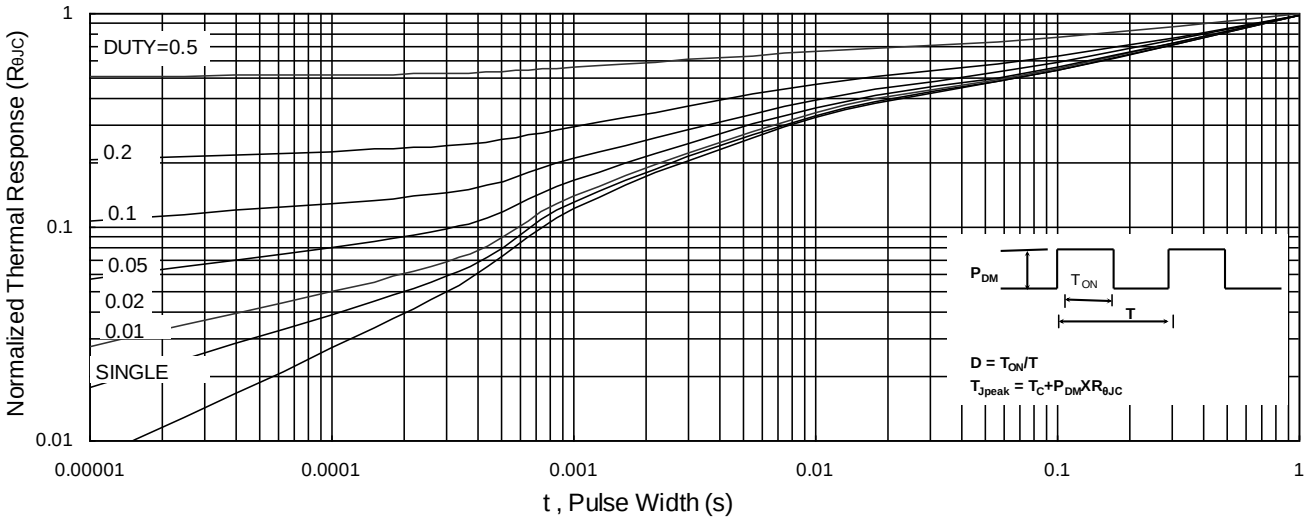

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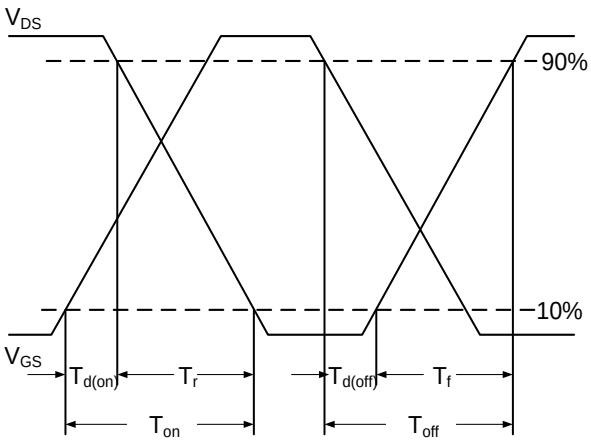

Fig.10 Switching Time Waveform

$$EAS = \frac{1}{2} L \times I_{AS}^2 \times \frac{BV_{DSS}}{BV_{DSS}-V_{DD}}$$

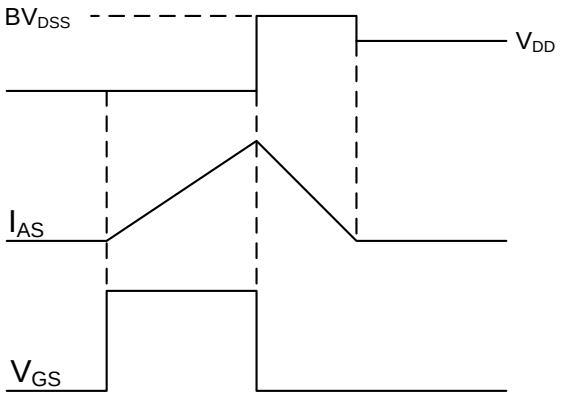

Fig.11 Unclamped Inductive Waveform