FKBA3496

30V Dual Asymmetric N-Channel MOSFET

Description

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

Applications

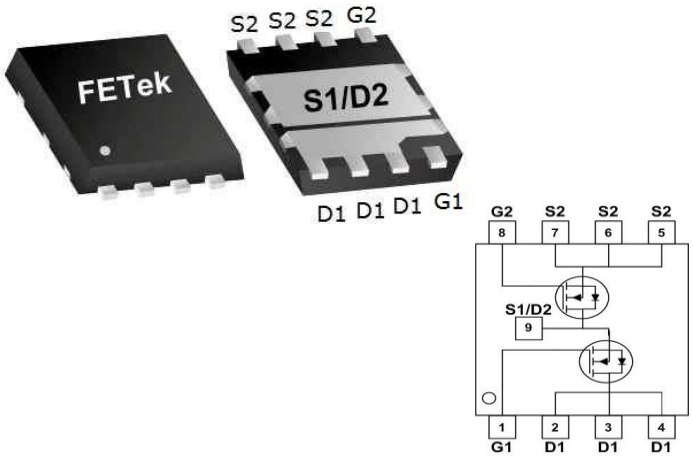
- Power Management in Desktop Computer or DC/DC Converters.
- Isolated DC/DC Converters in Telecom and Industrial.

Product Summary

Green

BVDSS	RDSON	ID
30V	5.2mΩ	50A
30V	3.9mΩ	60A

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℃	Continuous Drain Current, V_{GS} @ 10V[1]	50	60	A
I_D@T_C=100℃	Continuous Drain Current, V_{GS} @ 10V[1]	31	38	A
I_{DM}	Pulsed Drain Current[2]	100	120	A
EAS	Single Pulse Avalanche Energy[3]	61.3	80	mJ
I_{AS}	Avalanche Current	35	40	A
P_D@T_C=25℃	Total Power Dissipation[4]	21	22	W
T_{STG}	Storage Temperature Range	-55 to 150	-55 to 150	℃
T_J	Operating Junction Temperature Range	-55 to 150	-55 to 150	℃

Thermal Data

Symbol	Parameter	Typ. D1	Typ. D2	Max. D1	Max. D2	Unit
$R_{\theta JA}$	Thermal Resistance Junction-Ambient [1]	50	50	65	65	℃/W
$R_{\theta JC}$	Thermal Resistance Junction-Case[1]	4.6	4.4	6	5.8	℃/W

Die1 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	---	4.5	5.2	mΩ
		V_{GS}=4.5V , I_D=15A	---	7.2	9	
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =250uA	1.2	1.7	2.2	V
I_{DSS}	Drain-Source Leakage Current	V_{DS}=30V , V_{GS}=0V , T_J=25℃	---	---	1	uA
		V_{DS}=30V , 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=20A	---	65	---	S
R_g	Gate Resistance	V_{DS}=0V , V_{GS}=0V , f=1MHz	0.8	1.7	2.6	Ω
Q_g	Total Gate Charge (4.5V)	V_{DS}=15V , V_{GS}=10V , I_D=20A	---	9	---	nC
Q_{gs}	Gate-Source Charge		---	2.8	---	
Q_{gd}	Gate-Drain Charge		---	3.6	---	
$T_{d(on)}$	Turn-On Delay Time	V_{DD}=15V , V_{GS}=10V , R_G=3Ω I_D=20A	---	7	---	ns
T_r	Rise Time		---	18.8	---	
$T_{d(off)}$	Turn-Off Delay Time		---	19.5	---	
T_f	Fall Time		---	3.4	---	
C_{iss}	Input Capacitance	V_{DS}=15V , V_{GS}=0V , f=1MHz	---	1113	---	pF
C_{oss}	Output Capacitance		---	436	---	
C_{rss}	Reverse Transfer Capacitance		---	55	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current[1,5]	V_G=V_D=0V , Force Current	---	---	20	A
V_{SD}	Diode Forward Voltage[2]	V_{GS}=0V , I_S=1A , T_J=25℃	---	---	1	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}=35A
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.

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	---	3.2	3.9	mΩ
		V_{GS}=4.5V , I_D=15A	---	4.9	6.1	
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =250uA	1.2	1.7	2.2	V
I_{DSS}	Drain-Source Leakage Current	V_{DS}=30V , V_{GS}=0V , T_J=25℃	---	---	1	uA
		V_{DS}=30V , 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=20A	---	75	---	S
R_g	Gate Resistance	V_{DS}=0V , V_{GS}=0V , f=1MHz	0.7	1.65	2.6	Ω
Q_g	Total Gate Charge (4.5V)	V_{DS}=15V , V_{GS}=4.5V , I_D=20A	---	14.7	---	nC
Q_{gs}	Gate-Source Charge		---	5.8	---	
Q_{gd}	Gate-Drain Charge		---	3.5	---	
$T_{d(on)}$	Turn-On Delay Time	V_{DD}=15V , V_{GS}=10V , R_G=3Ω I_D=20A	---	7.5	---	ns
T_r	Rise Time		---	20.2	---	
$T_{d(off)}$	Turn-Off Delay Time		---	21.6	---	
T_f	Fall Time		---	4.4	---	
C_{iss}	Input Capacitance	V_{DS}=15V , V_{GS}=0V , f=1MHz	---	1476	---	pF
C_{oss}	Output Capacitance		---	556	---	
C_{rss}	Reverse Transfer Capacitance		---	70	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current[1,5]	V_G=V_D=0V , Force Current	---	---	30	A
V_{SD}	Diode Forward Voltage[2]	V_{GS}=0V , I_S=1A , T_J=25℃	---	---	1	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}=40A
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)

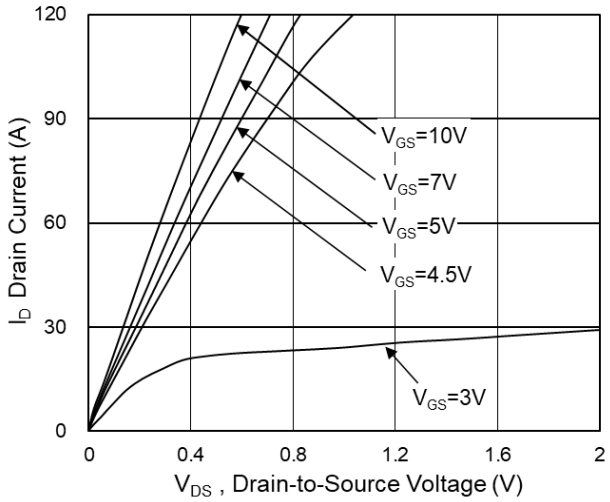


Fig.1 Typical Output Characteristics

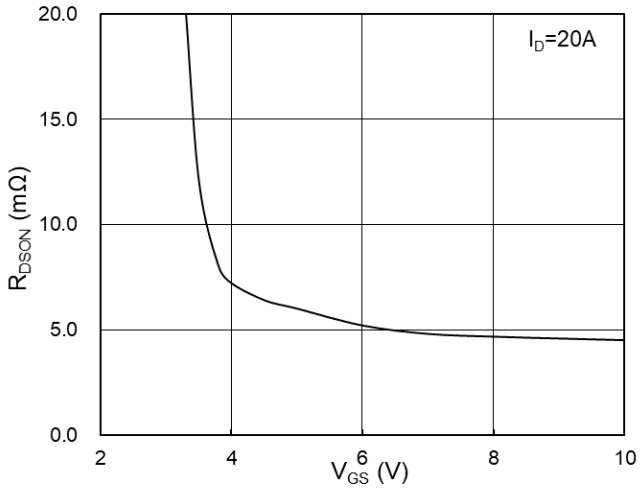


Fig.2 On-Resistance vs G-S Voltage

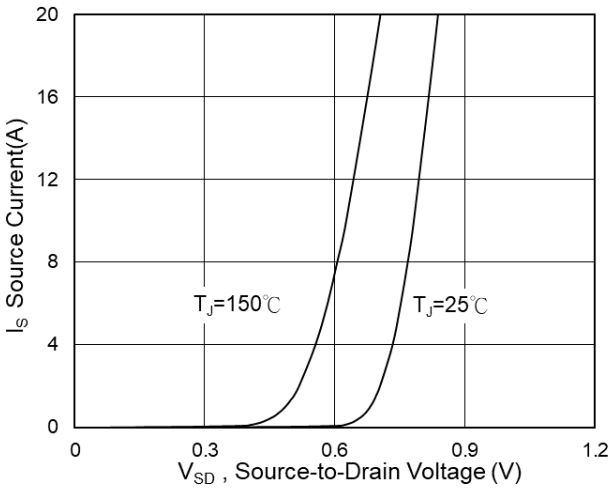


Fig.3 Source Drain Forward Characteristics

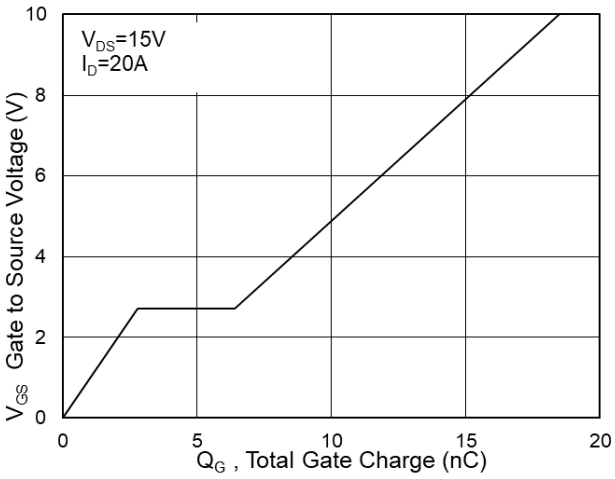


Fig.4 Gate-Charge Characteristics

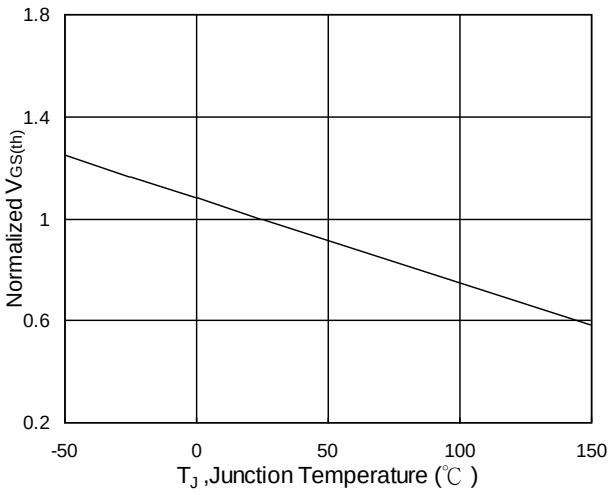


Fig.5 Normalized $V_{GS(th)}$ vs T_J

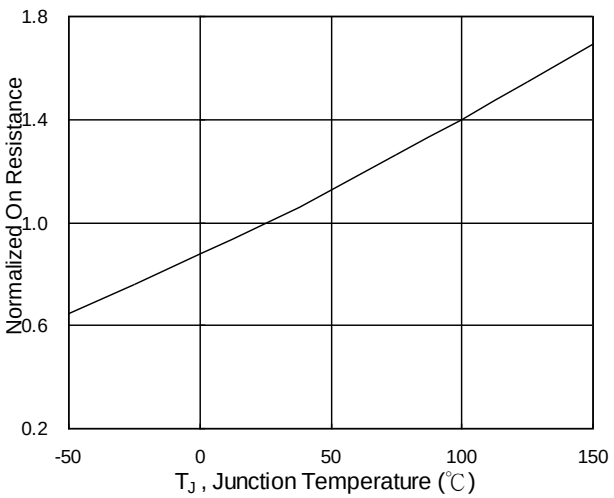


Fig.6 Normalized R_{DSON} vs T_J

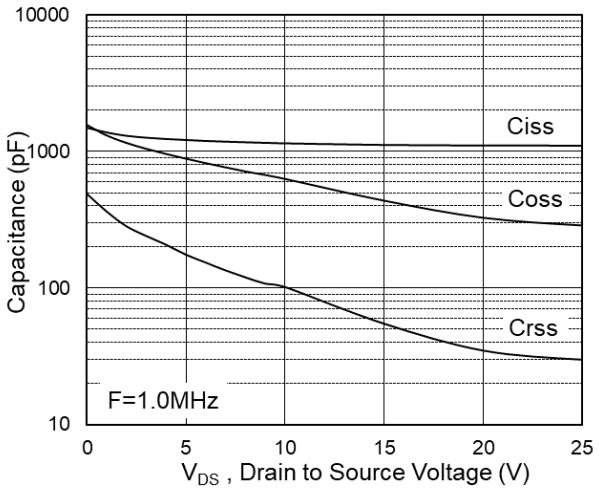


Fig.7 Capacitance

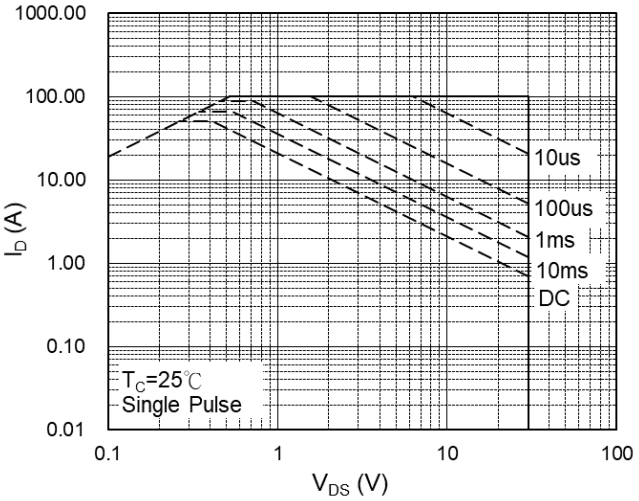


Fig.8 Safe Operating Area

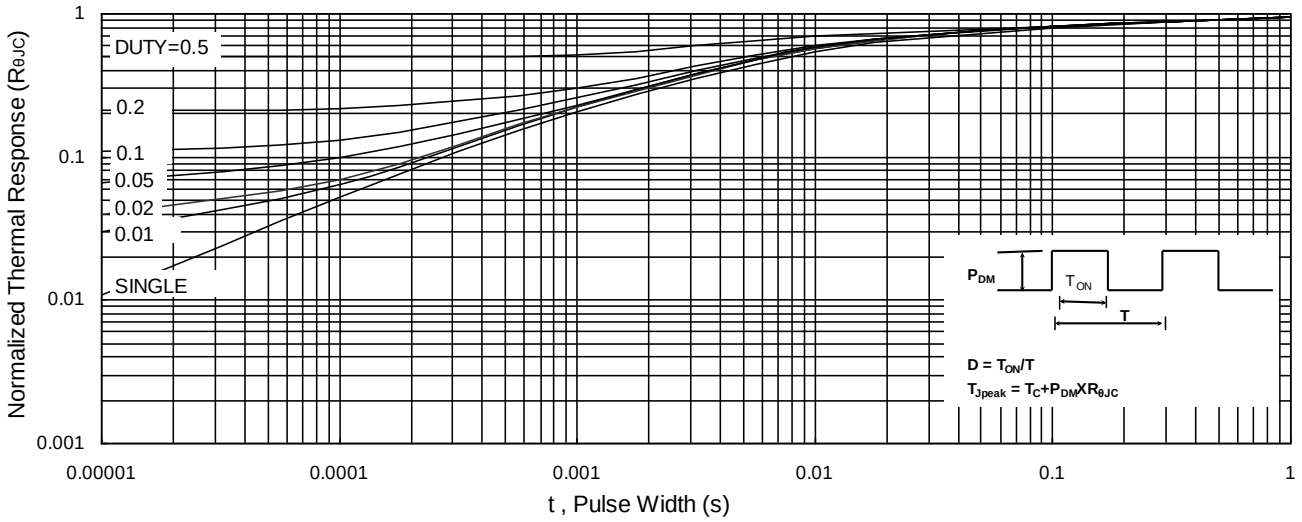


Fig.9 Normalized Maximum Transient Thermal Impedance

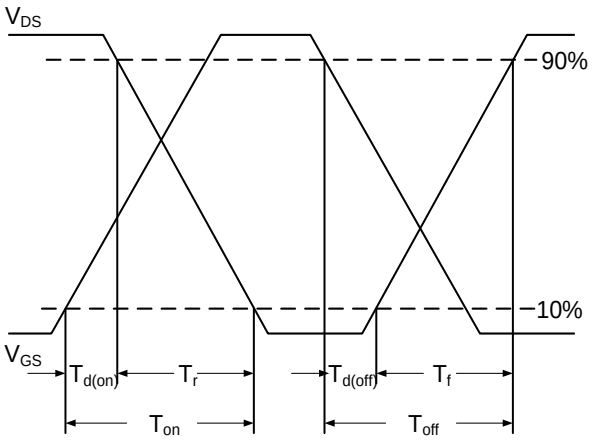


Fig.10 Switching Time Waveform

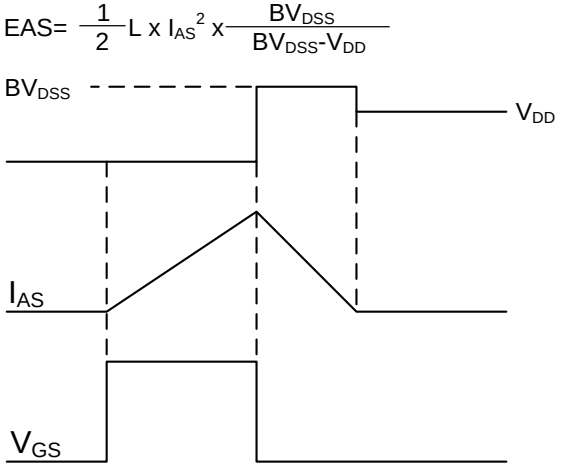


Fig.11 Unclamped Inductive Switching Waveform

N-Channel Typical Characteristics (Die2)

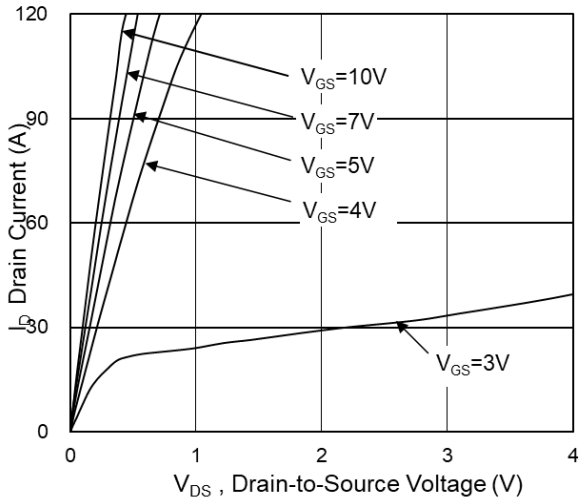


Fig.1 Typical Output Characteristics

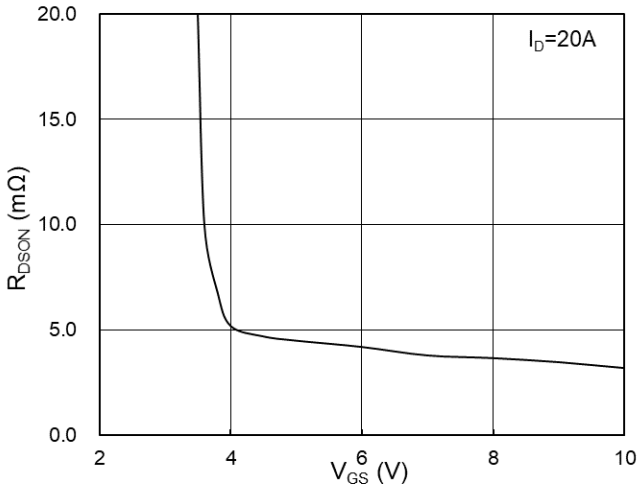


Fig.2 On-Resistance vs G-S Voltage

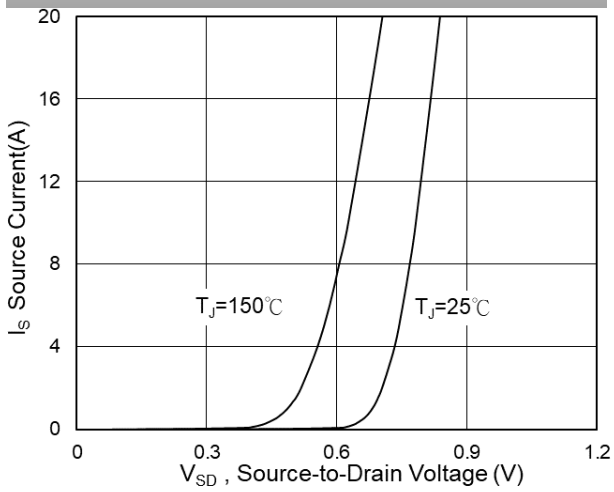


Fig.3 Source Drain Forward Characteristics

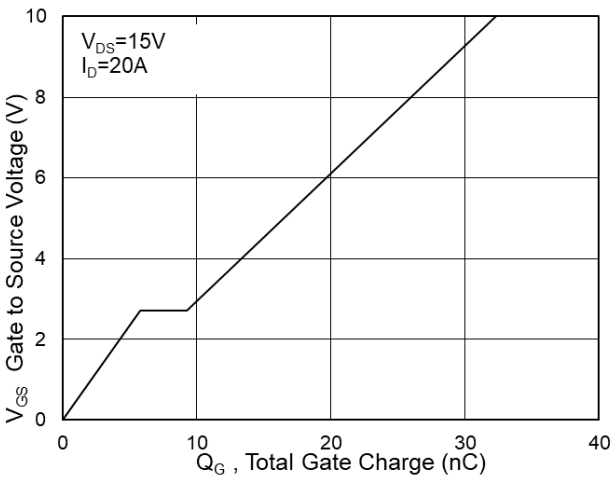


Fig.4 Gate-Charge Characteristics

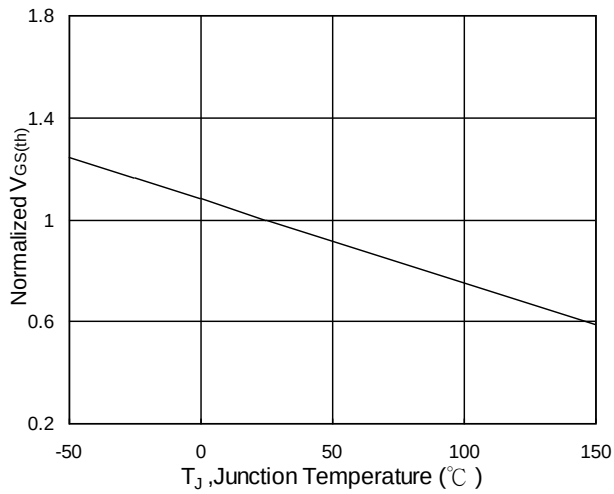


Fig.5 Normalized $V_{GS(th)}$ vs T_J

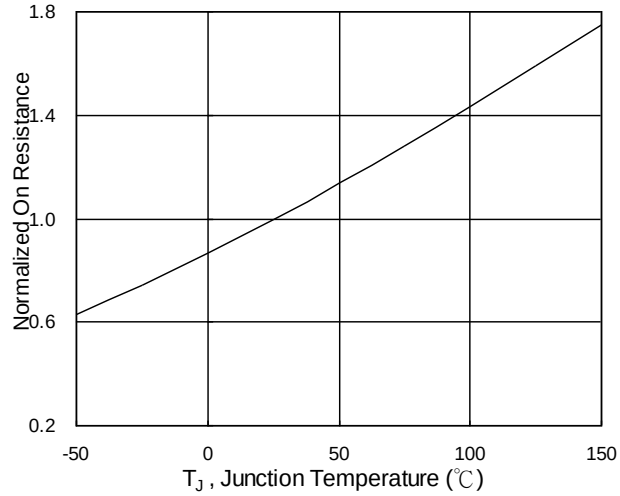


Fig.6 Normalized R_{DSON} vs T_J

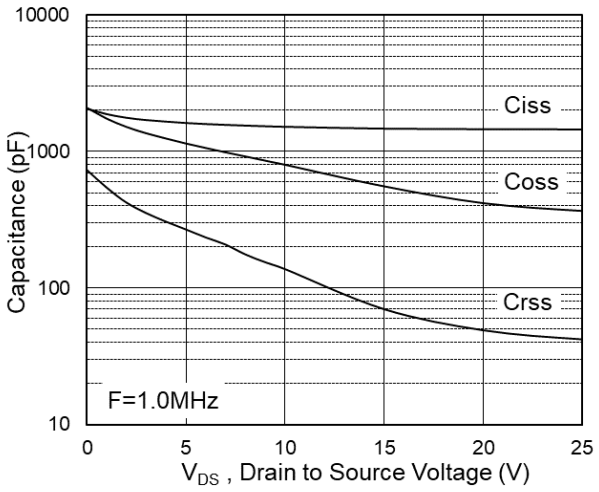


Fig.7 Capacitance

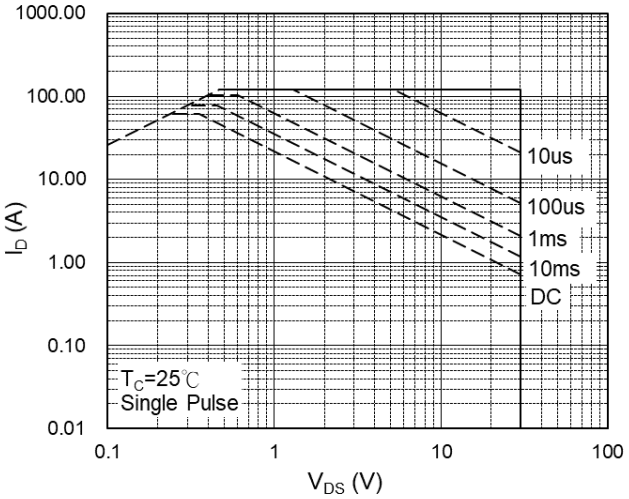
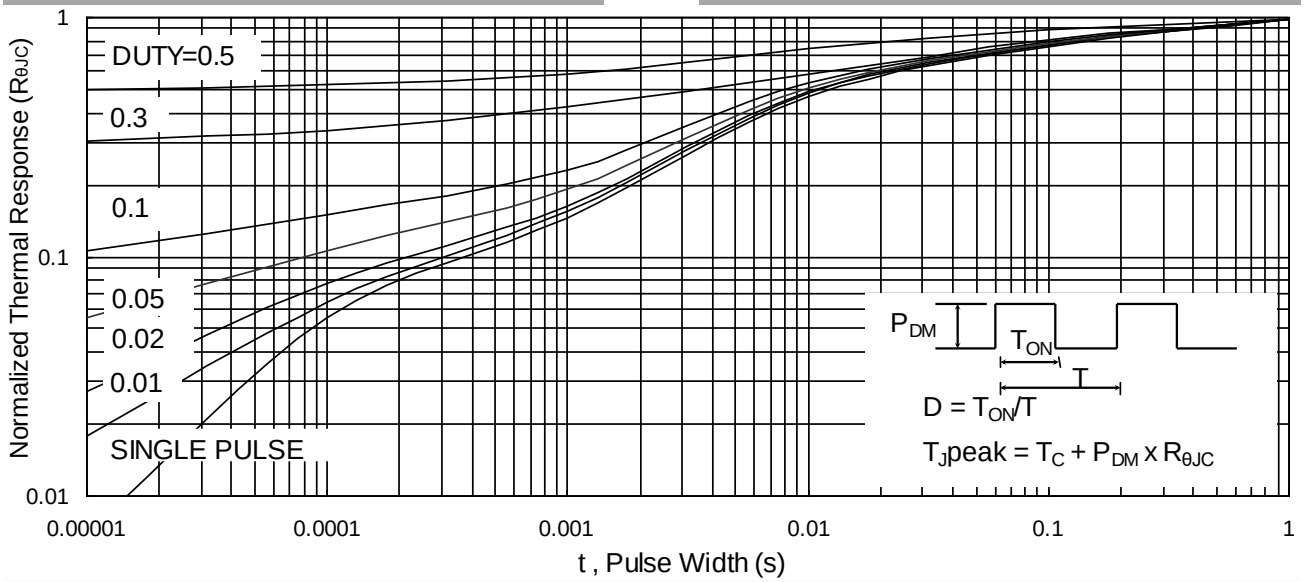


Fig.8 Safe Operating Area



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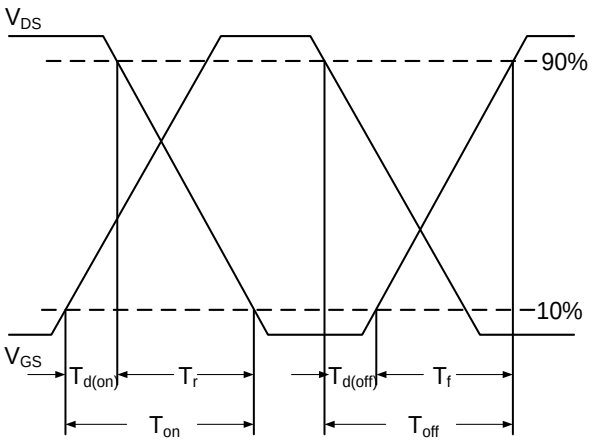

Fig.10 Switching Time Waveform

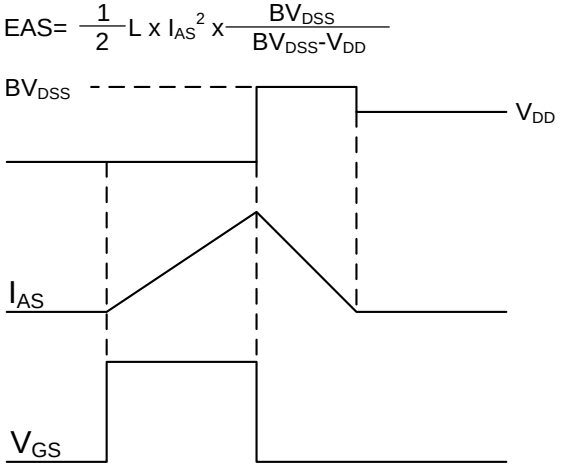

Fig.11 Unclamped Inductive Switching Wave