

Features

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

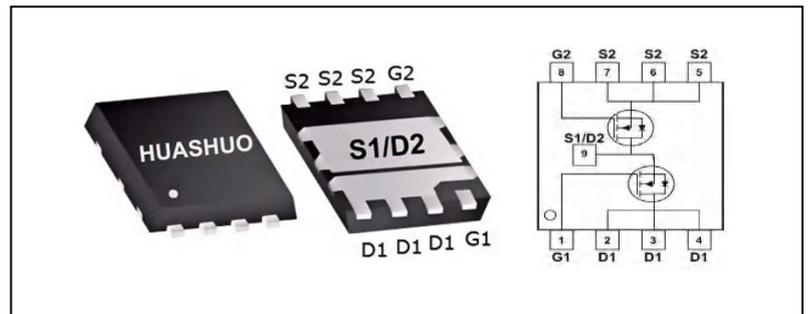
Product Summary

BVDSS	$R_{DS(on)}$, typ	ID
30V	4.5 m Ω	50A
30V	3.2 m Ω	60A

Applications

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

PRPAK5*6 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
$I_D@T_C=25^\circ C$	Continuous Drain Current, $V_{GS} @ 10V^1$	50	60	A
$I_D@T_C=70^\circ C$	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
$P_D@T_C=25^\circ C$	Total Power Dissipation ⁴	21	22	W
T_{STG}	Storage Temperature Range	-55 to 150	-55 to 150	$^\circ C$
T_J	Operating Junction Temperature Range	-55 to 150	-55 to 150	$^\circ C$

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	$^\circ C/W$
$R_{\theta JC}$	Thermal Resistance Junction-Case ¹	4.6	4.4	6	5.8	$^\circ C/W$

30V DUAL Asymmetric N-CH MOSFETs
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	---	4.5	5.3	mΩ
		V _{GS} =4.5V, I _D =10A	---	7.2	9	
V _{GS(th)}	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =250uA	1.0	1.7	2.2	V
I _{DSS}	Drain-Source Leakage Current	V _{DS} =30V, V _{GS} =0V, T _J =25°C	---	---	1	uA
		V _{DS} =30V, V _{GS} =0V, T _J =55°C	---	---	5	
I _{GSS}	Gate-Source Leakage Current	V _{GS} =±20V, V _{DS} =0V	---	---	±100	nA
g _{fs}	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	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 =3.3Ω 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	---	1115	---	pF
C _{oss}	Output Capacitance		---	439	---	
C _{rss}	Reverse Transfer Capacitance		---	56	---	

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°C	---	---	1	V

Note :

1. The data tested by surface mounted on a 1 inch² 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°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 °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	---	3.2	3.8	mΩ
		V _{GS} =4.5V, I _D =15A	---	4.9	6.0	
V _{GS(th)}	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =250uA	---	1.7	---	V
I _{DSS}	Drain-Source Leakage Current	V _{DS} =30V, V _{GS} =0V, T _J =25°C	---	---	1	uA
		V _{DS} =30V, V _{GS} =0V, T _J =55°C	---	---	5	
I _{GSS}	Gate-Source Leakage Current	V _{GS} =±20V, V _{DS} =0V	---	---	±100	nA
g _{fs}	Forward Transconductance	V _{DS} =5V, I _D =20A	---	75	---	S
R _g	Gate Resistance	V _{DS} =0V, V _{GS} =0V, f=1MHz	---	1.65	---	Ω
Q _g	Total Gate Charge (4.5V)	V _{DS} =15V, V _{GS} =4.5V, I _D =20A	---	15	---	nC
Q _{gs}	Gate-Source Charge		---	5.7	---	
Q _{gd}	Gate-Drain Charge		---	3.2	---	
T _{d(on)}	Turn-On Delay Time	V _{DD} =15V, V _{GS} =10V, R _G =3.3Ω I _D =20A	---	7.3	---	ns
T _r	Rise Time		---	20.3	---	
T _{d(off)}	Turn-Off Delay Time		---	21.8	---	
T _f	Fall Time		---	4.5	---	
C _{iss}	Input Capacitance	V _{DS} =15V, V _{GS} =0V, f=1MHz	---	1433	---	pF
C _{oss}	Output Capacitance		---	553	---	
C _{rss}	Reverse Transfer Capacitance		---	72	---	

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°C	---	---	1	V

Note :

- 1.The data tested by surface mounted on a 1 inch² 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°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.



N-Channel Typical Characteristics(Die1)

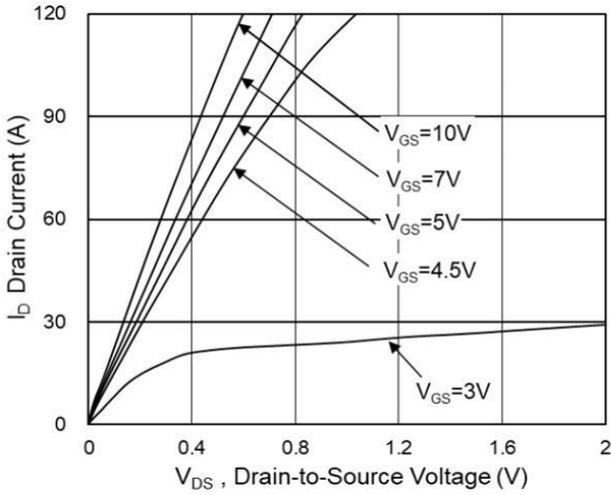


Fig.1 Typical Output Characteristics

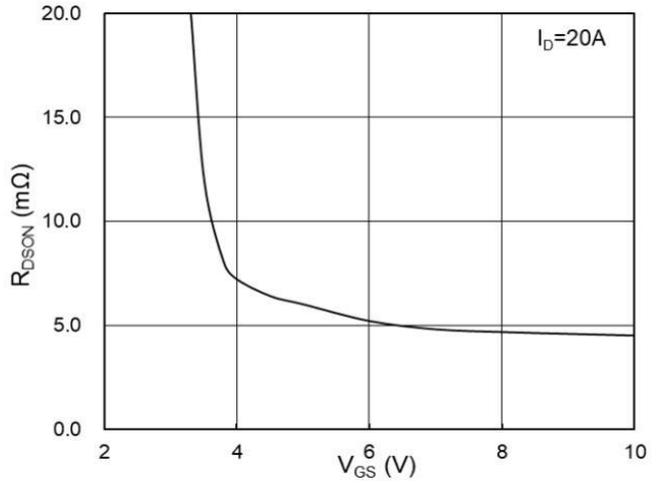


Fig.2 On-Resistance vs. G-S Voltage

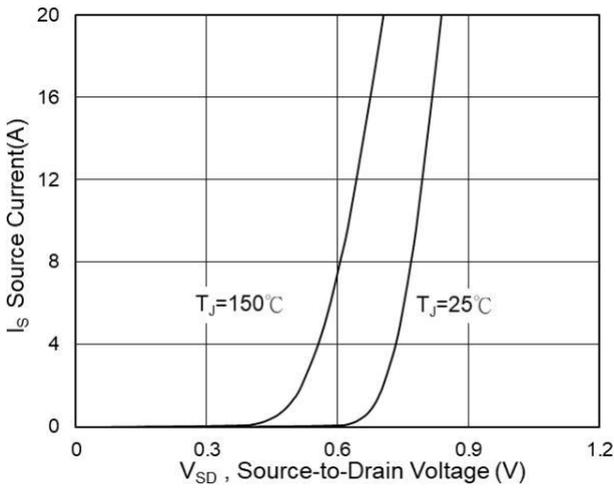


Fig.3 Forward Characteristics of Reverse

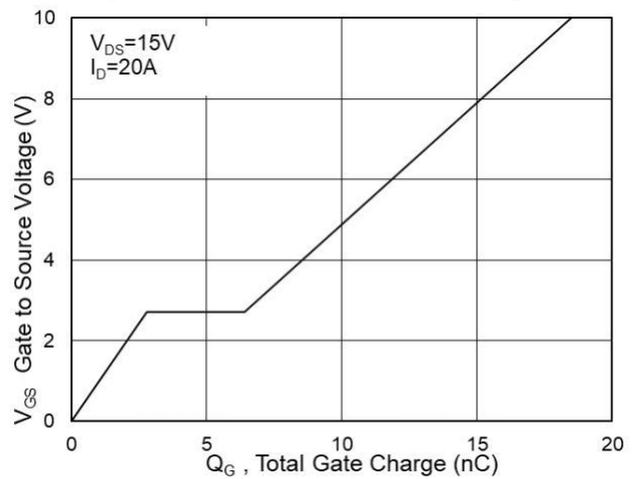


Fig.4 Gate-Charge Characteristics

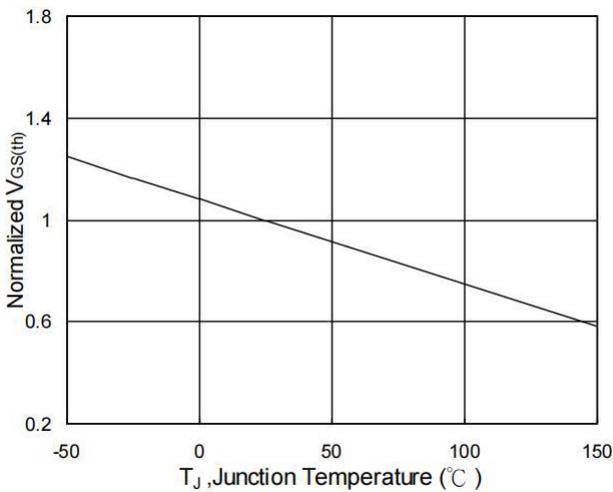


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

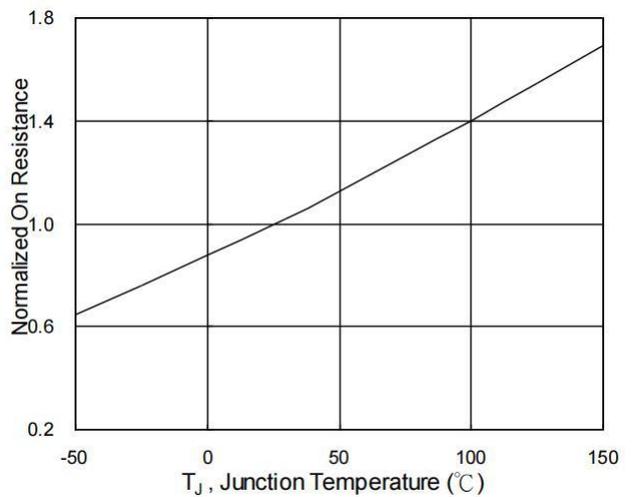


Fig.6 Normalized $R_{DS(on)}$ vs. T_J

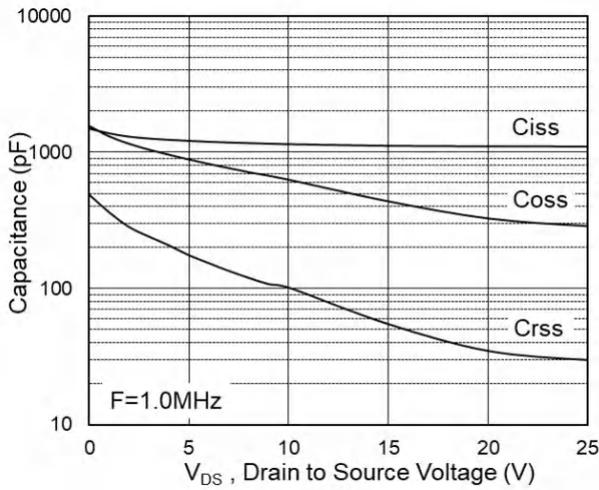


Fig.7 Capacitance

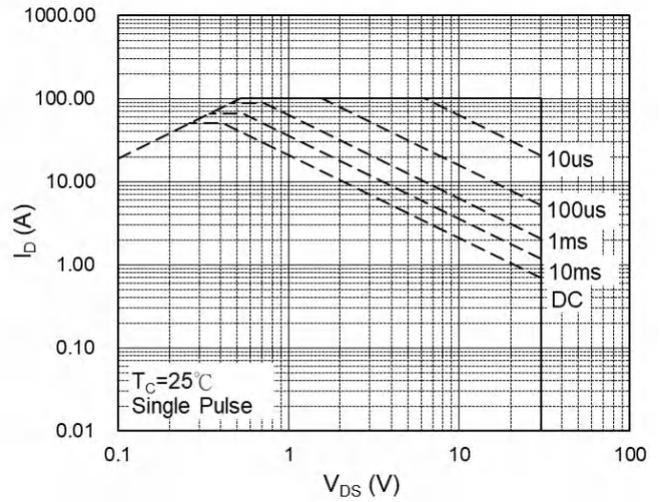


Fig.8 Safe Operating Area

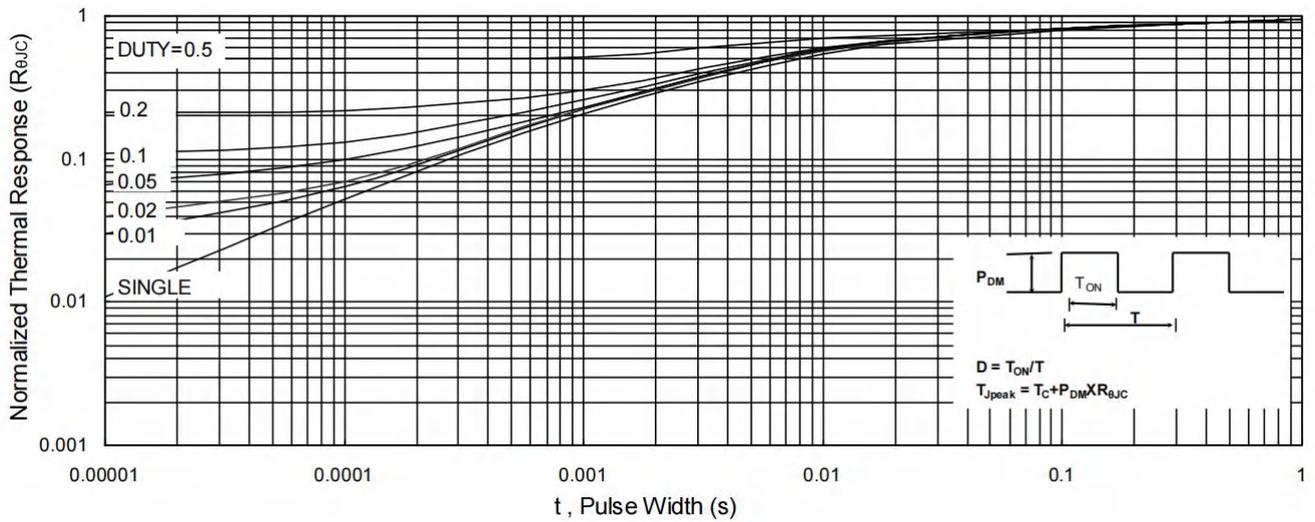


Fig.9 Normalized Maximum Transient Thermal Impedance

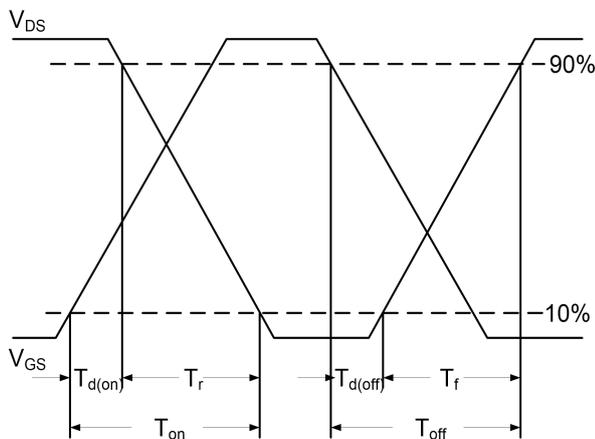


Fig.10 Switching Time Waveform

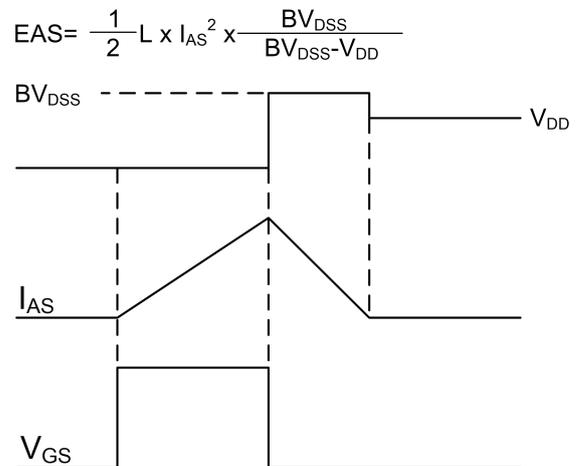


Fig.11 Unclamped Inductive Switching Wave



N-Channel Typical Characteristics(Die2)

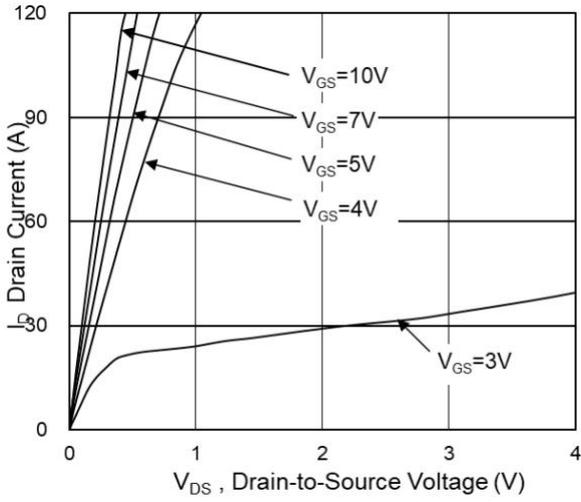


Fig.1 Typical Output Characteristics

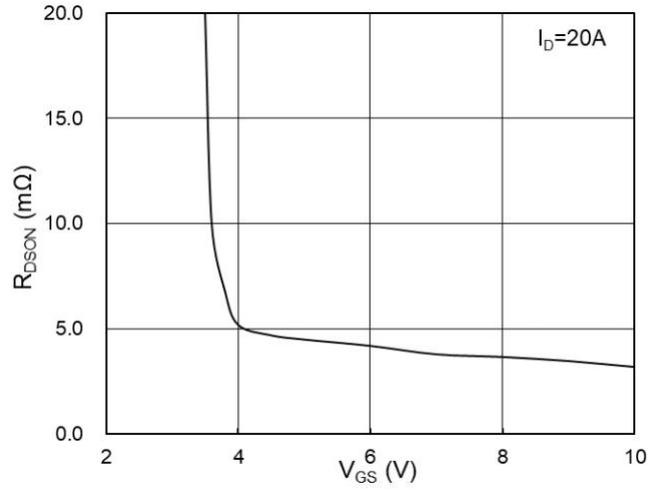


Fig.2 On-Resistance v.s Gate-Source

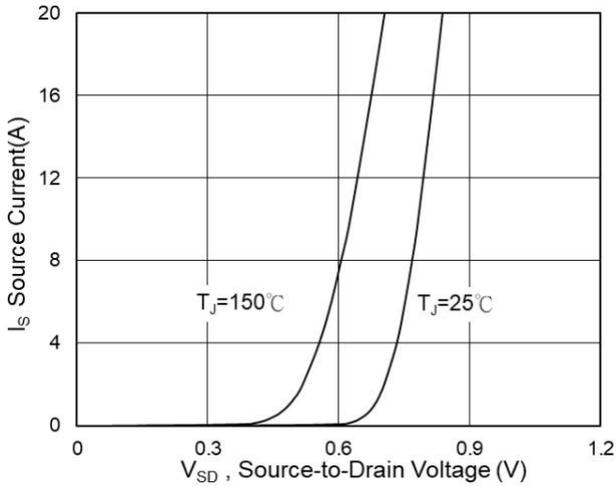


Fig.3 Forward Characteristics of Reverse

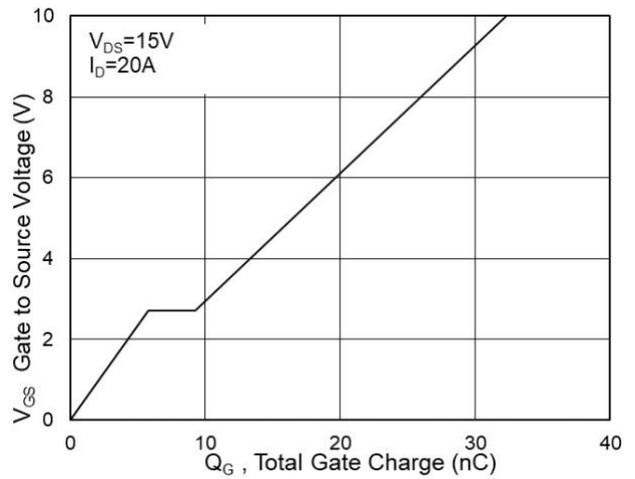


Fig.4 Gate-Charge Characteristics

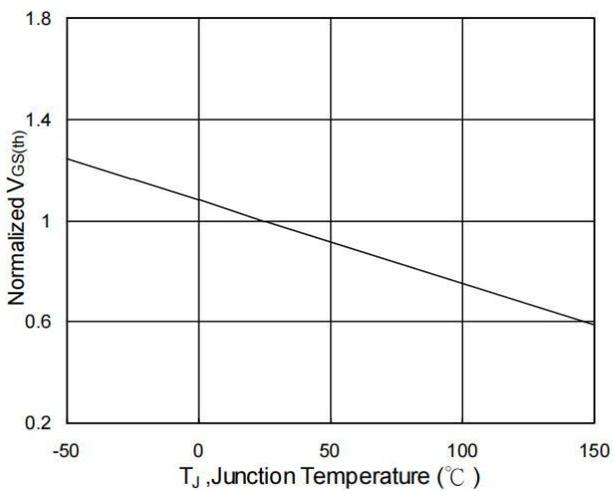


Fig.5 Normalized $V_{GS(th)}$ v.s T_J

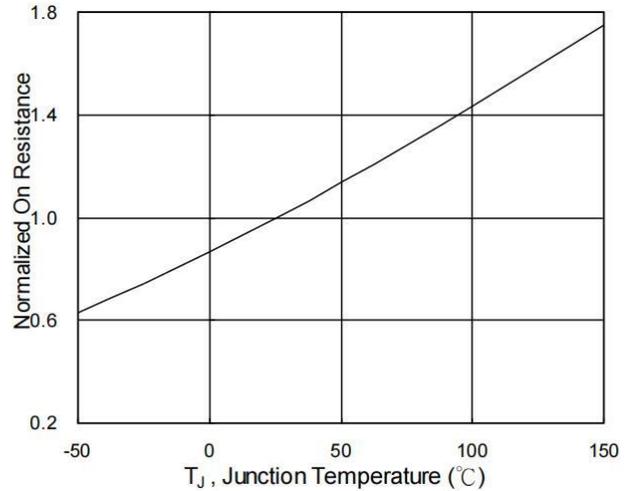


Fig.6 Normalized $R_{DS(on)}$ v.s T_J

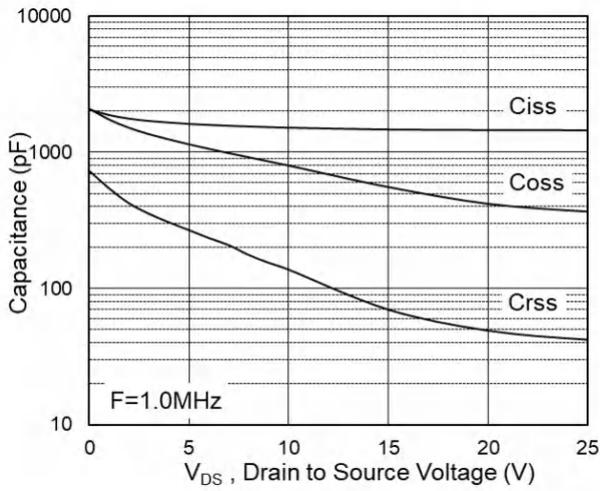


Fig.7 Capacitance

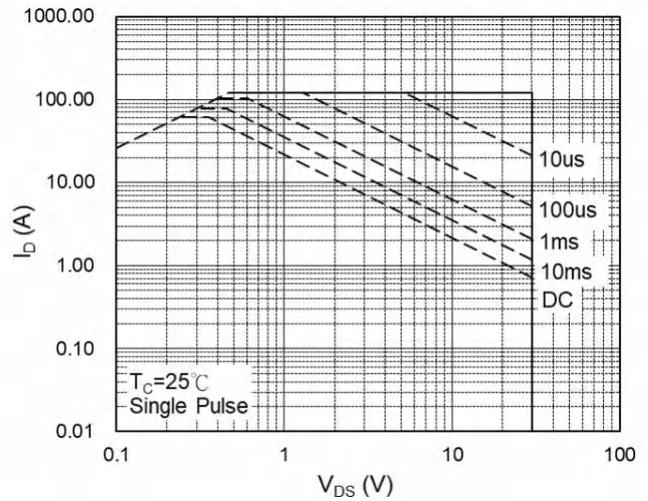


Fig.8 Safe Operating Area

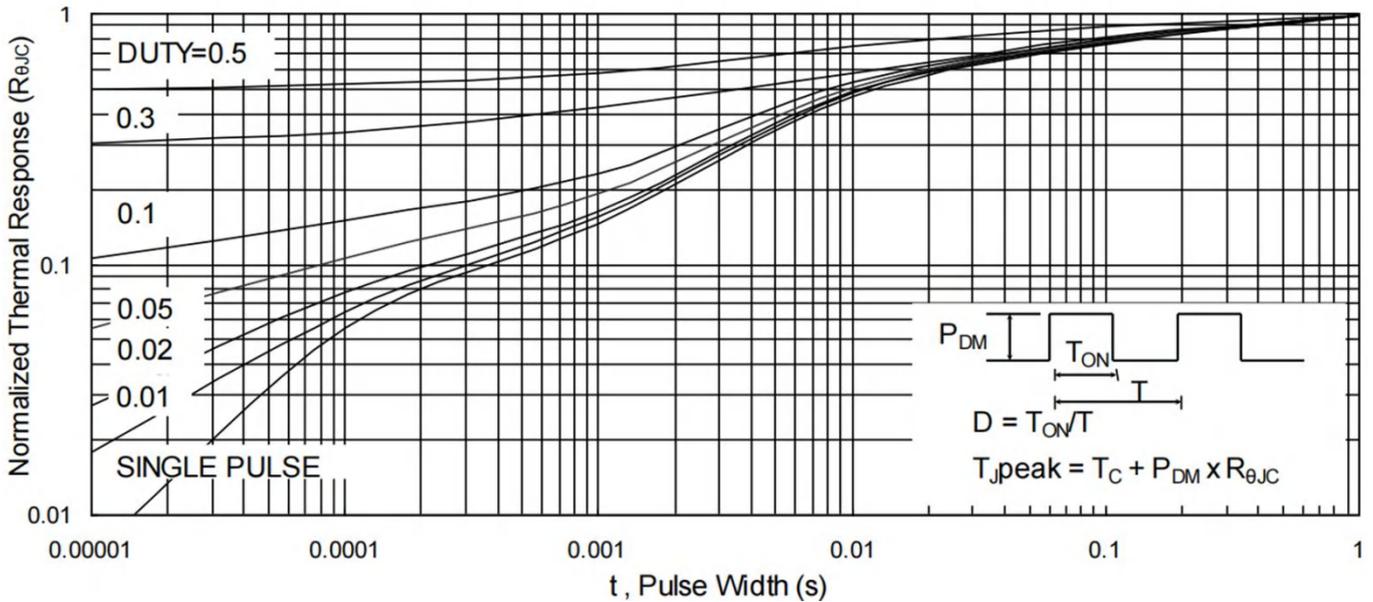


Fig.9 Normalized Maximum Transient Thermal Impedance

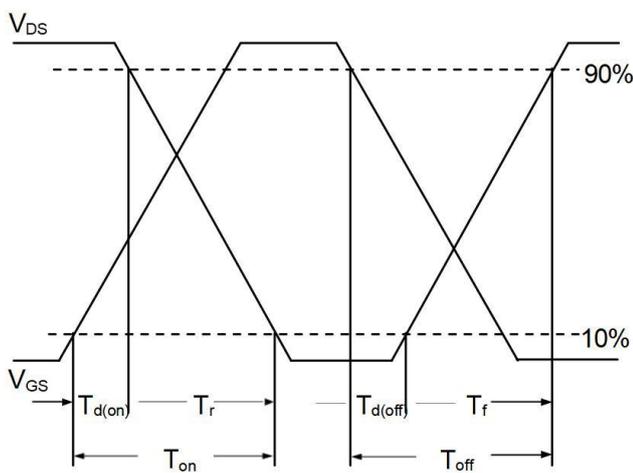


Fig.10 Switching Time Waveform

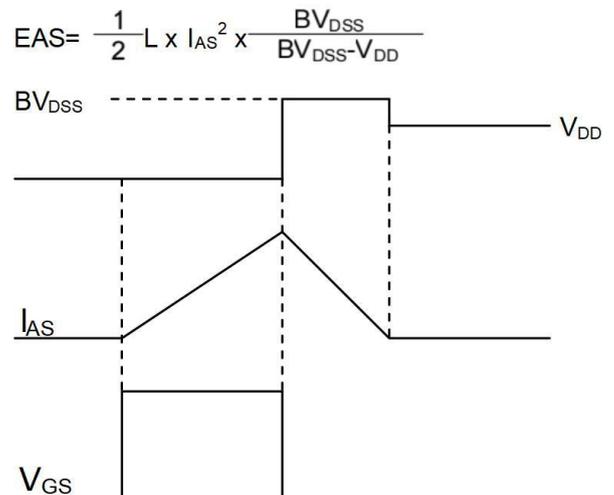


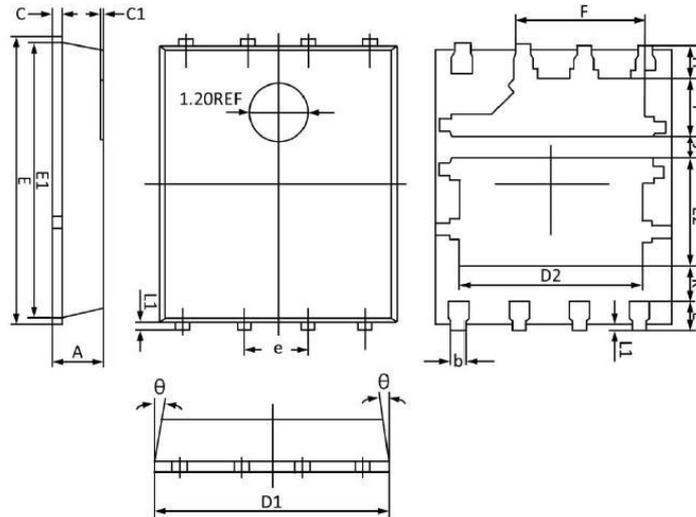
Fig.11 Unclamped Inductive Waveform



Ordering Information

Part Number	Package code	Packaging
HSBA3496	PRPAK5*6	3000/Tape&Reel

PRPAK5*6 Dual Asymmetric Package Outline



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.900	1.100	0.036	0.043
b	0.330	0.510	0.013	0.020
C	0.200	0.300	0.008	0.011
C1	0.040 REF		0.040 REF	
D1	4.800	5.000	0.189	0.196
D2	3.610	3.960	0.143	0.155
E	5.900	6.100	0.233	0.240
E1	5.700	5.800	0.225	0.228
E2	2.020	2.420	0.080	0.095
e	1.270BSC		1.270BSC	
F	2.550	2.900	0.101	0.114
H	0.610	0.810	0.025	0.031
I	1.100	1.300	0.044	0.051
J	0.400	0.600	0.016	0.023
K	0.500	-	0.020	-
L	0.510	0.710	0.020	0.027
L1	0.060	0.200	0.003	0.007
θ	0°	12°	0°	12°

HSBA3496 Marking:

