

## Features

- Advanced SGT MOS Technology
- 100% EAS Guaranteed
- Green Device Available
- Low Rds(on)
- Super Low Gate Charge
- ESD Protected

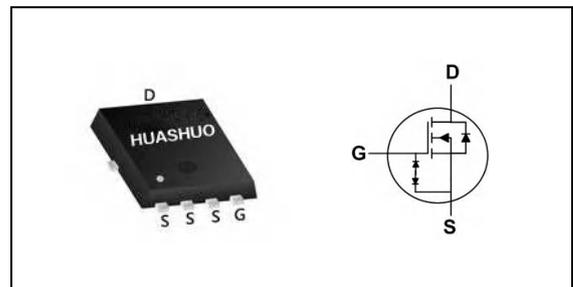
## Applications

- Portable Equipment.
- Battery Powered Systems.
- Hard Switching and High-Speed Circuit.

## Product Summary

$V_{DS}$	100	V
$R_{DS(ON),Typ}$	39	m $\Omega$
$I_D$	20	A

## PRPAK3X3 Pin Configuration



## Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
$V_{DS}$	Drain-Source Voltage	100	V
$V_{GS}$	Gate-Source Voltage	$\pm 20$	V
$I_D@T_C=25^\circ C$	Continuous Drain Current, $V_{GS} @ 10V^1$	20	A
$I_D@T_C=100^\circ C$	Continuous Drain Current, $V_{GS} @ 10V^1$	13.5	A
$I_D@T_A=25^\circ C$	Continuous Drain Current, $V_{GS} @ 10V^1$	9.5	A
$I_D@T_A=100^\circ C$	Continuous Drain Current, $V_{GS} @ 10V^1$	7.0	A
$I_{DM}$	Pulsed Drain Current <sup>2</sup>	39	A
EAS	Single Pulse Avalanche Energy <sup>3</sup>	25	mJ
$I_{AS}$	Avalanche Current	10	A
$P_D@T_C=25^\circ C$	Total Power Dissipation <sup>4</sup>	21	W
$P_D@T_A=25^\circ C$	Total Power Dissipation <sup>4</sup>	1.7	W
$T_{STG}$	Storage Temperature Range	-55 to 150	$^\circ C$
$T_J$	Operating Junction Temperature Range	-55 to 150	$^\circ C$

## Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-ambient <sup>1</sup>	---	75	$^\circ C/W$
$R_{\theta JC}$	Thermal Resistance Junction-Case <sup>1</sup>	---	6	$^\circ C/W$



**Electrical Characteristics (T<sub>J</sub>=25 °C, unless otherwise noted)**

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =250uA	100	---	---	V
R <sub>DS(ON)</sub>	Static Drain-Source On-Resistance <sup>2</sup>	V <sub>GS</sub> =10V, I <sub>D</sub> =7A	---	39	55	mΩ
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>GS</sub> =V <sub>DS</sub> , I <sub>D</sub> =250uA	2.5	3.0	4.0	V
I <sub>DSS</sub>	Drain-Source Leakage Current	V <sub>DS</sub> =80V, V <sub>GS</sub> =0V, T <sub>J</sub> =25°C	---	---	1	uA
		V <sub>DS</sub> =80V, V <sub>GS</sub> =0V, T <sub>J</sub> =55°C	---	---	10	
I <sub>GSS</sub>	Gate-Source Leakage Current	V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V	---	---	±10	uA
R <sub>g</sub>	Gate Resistance	V <sub>DS</sub> =0V, V <sub>GS</sub> =0V, f=1MHz	---	2.7	---	Ω
Q <sub>g</sub>	Total Gate Charge	V <sub>DS</sub> =50V, V <sub>GS</sub> =10V, I <sub>D</sub> =7A	---	7	---	nC
Q <sub>gs</sub>	Gate-Source Charge		---	2	---	
Q <sub>gd</sub>	Gate-Drain Charge		---	2.2	---	
T <sub>d(on)</sub>	Turn-On Delay Time	V <sub>DD</sub> =50V, V <sub>GS</sub> =10V, R <sub>G</sub> =3.3Ω I <sub>D</sub> =7A	---	6	---	ns
T <sub>r</sub>	Rise Time		---	23	---	
T <sub>d(off)</sub>	Turn-Off Delay Time		---	9	---	
T <sub>f</sub>	Fall Time		---	19	---	
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =50V, V <sub>GS</sub> =0V, f=1MHz	---	340	---	pF
C <sub>oss</sub>	Output Capacitance		---	82	---	
C <sub>rss</sub>	Reverse Transfer Capacitance		---	5	---	

**Diode Characteristics**

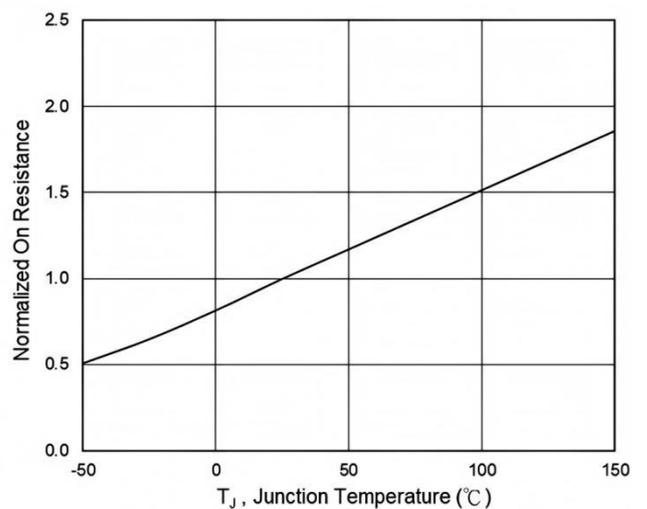
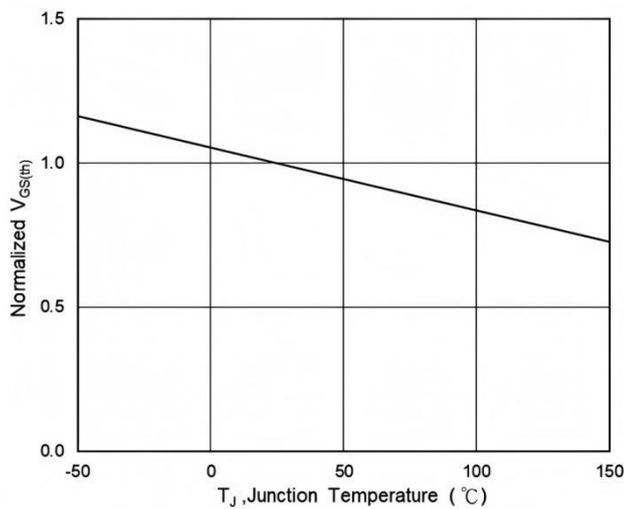
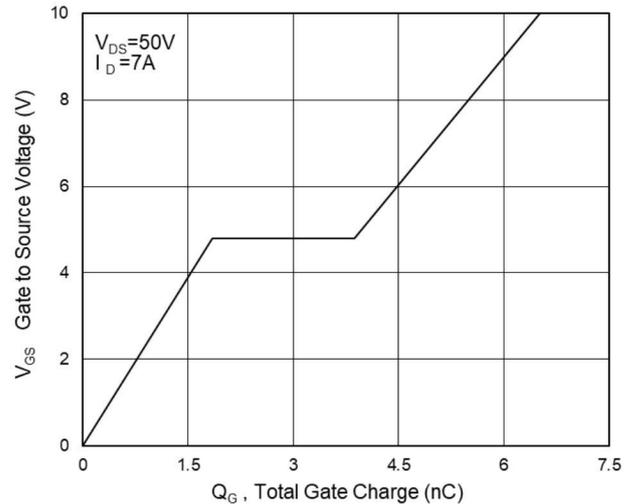
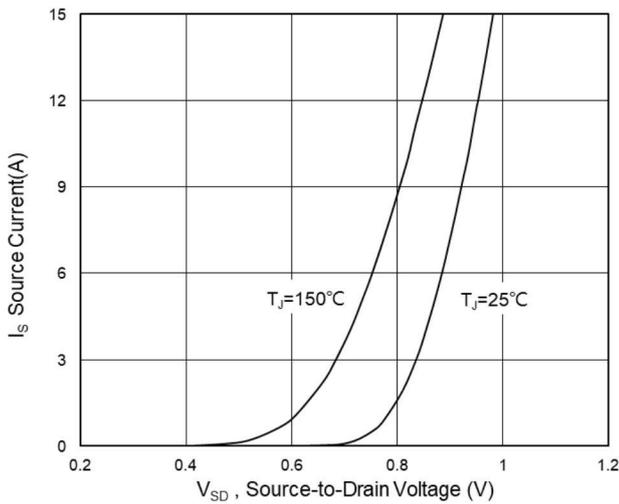
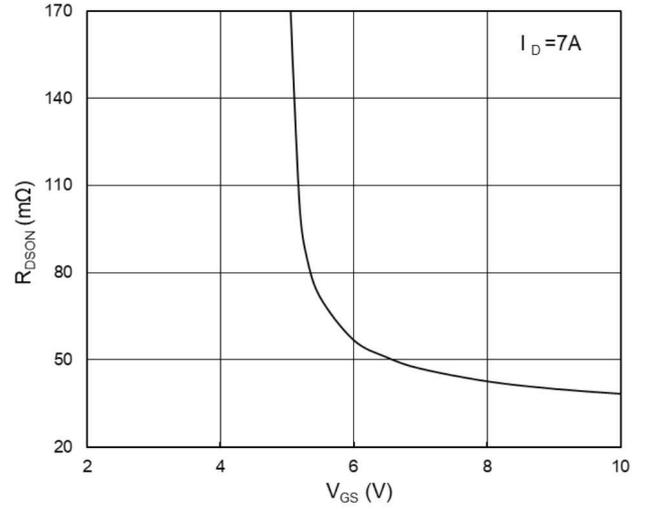
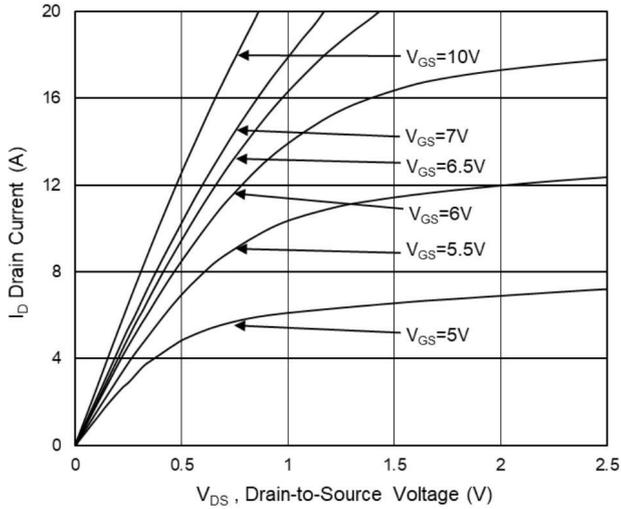
Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I <sub>S</sub>	Continuous Source Current <sup>1,5</sup>	V <sub>G</sub> =V <sub>D</sub> =0V, Force Current	---	---	20	A
V <sub>SD</sub>	Diode Forward Voltage <sup>2</sup>	V <sub>GS</sub> =0V, I <sub>S</sub> =1A, T <sub>J</sub> =25°C	---	---	1.2	V
t <sub>rr</sub>	Reverse Recovery Time	I <sub>F</sub> =7A, di/dt=100A/μs	---	30	---	nS
Q <sub>rr</sub>	Reverse Recovery Charge	T <sub>J</sub> =25°C	---	30	---	nC

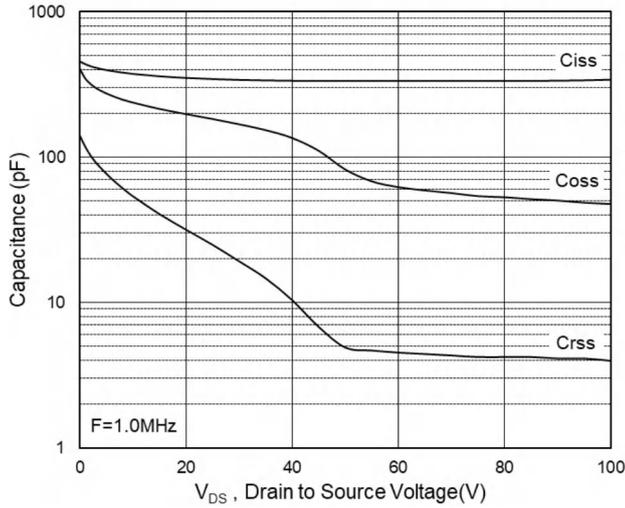
Note :

- 1.The data tested by surface mounted on a 1 inch<sup>2</sup> 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<sub>DD</sub>=25V,V<sub>GS</sub>=10V,L=0.1mH,I<sub>AS</sub>=10A
- 4.The power dissipation is limited by 150°C junction temperature
- 5.The data is theoretically the same as I<sub>D</sub> and I<sub>DM</sub> , in real applications , should be limited by total power dissipation.

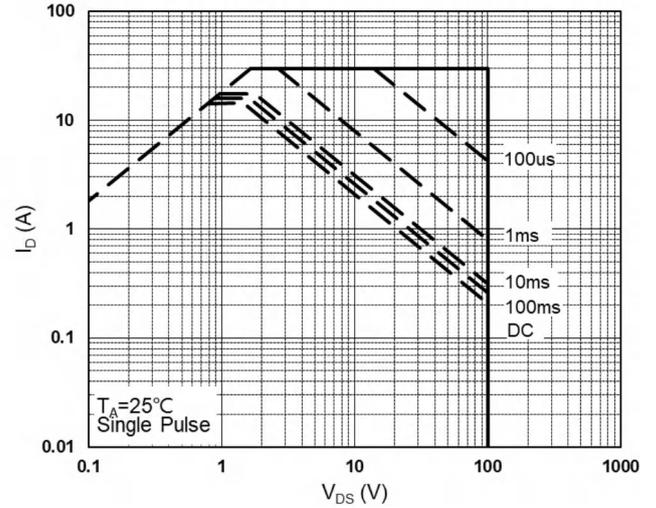


### Typical Characteristics

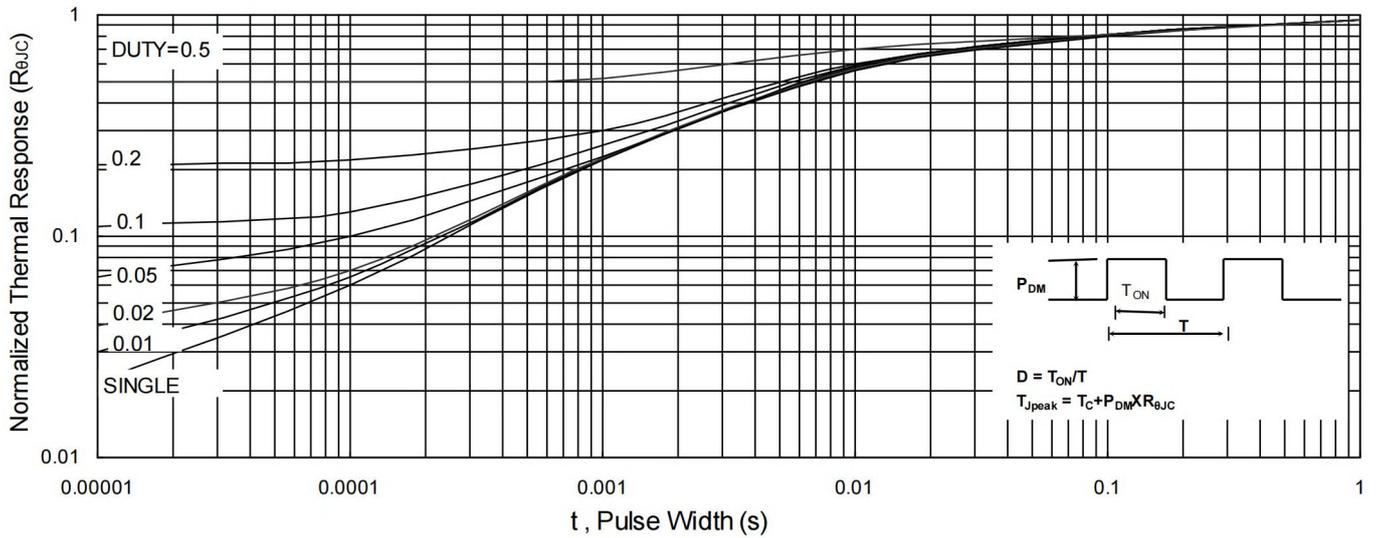




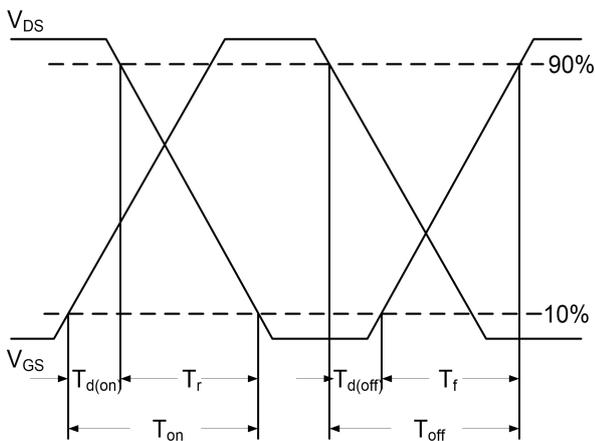
**Fig.7 Capacitance**



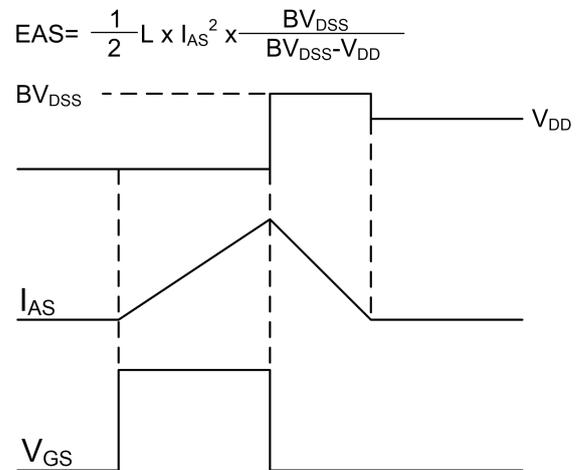
**Fig.8 Safe Operating Area**



**Fig.9 Normalized Maximum Transient Thermal Impedance**



**Fig.10 Switching Time Waveform**

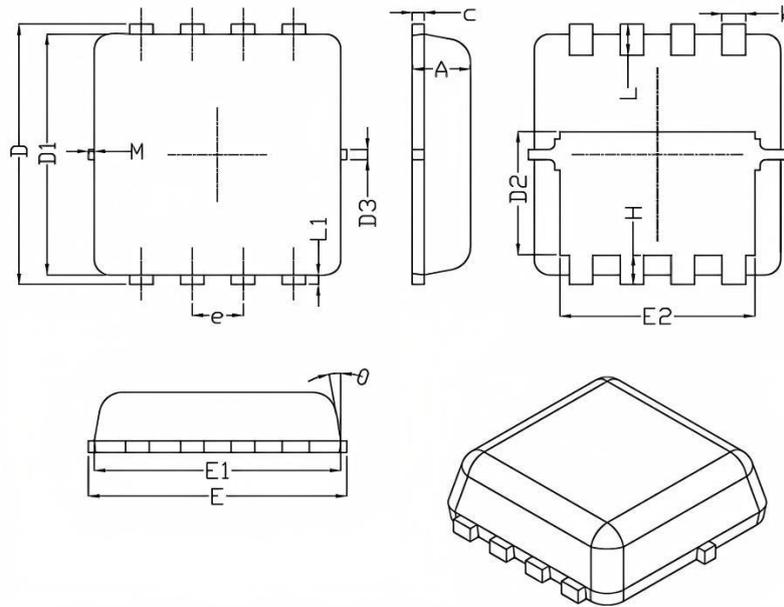


**Fig.11 Unclamped Inductive Switching Waveform**

## Ordering Information

<b>Part Number</b>	<b>Package code</b>	<b>Packaging</b>
<b>HSBB0010E</b>	<b>PRPAK3*3</b>	<b>3000/Tape&amp;Reel</b>

### PRPAK3\*3(E) Single Package Outline



Symbol	Dimensions In Millimeters		
	Min.	Nom.	Max.
A	0.70	0.75	0.80
b	0.25	0.30	0.35
C	0.10	0.15	0.25
D	3.25	3.35	3.45
D1	3.00	3.10	3.20
D2	1.48	1.58	1.68
D3	-	0.13	-
E	3.15	3.30	3.45
E1	3.00	3.15	3.20
E2	2.39	2.49	2.59
e	0.65BSC		
H	0.30	0.39	0.50
L	0.30	0.40	0.50
L1	-	0.13	-
M	*	*	0.15
θ		10°	12°

## HSBB0010E Marking:

