

N-Ch 80V Fast Switching MOSFETs

Description

The HSBA8024A is the high cell density trenched N-ch MOSFETs, which provide excellent RDSON and gate charge for most of the synchronous rectification applications.

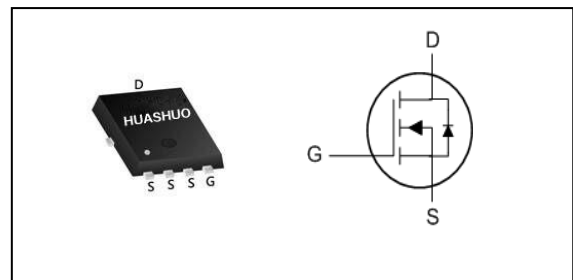
The HSBA8024A meet the RoHS and Halogen-Free compliant product requirement, 100% EAS guaranteed with full function reliability approved.

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

Product Summary

| | | |
|-------------------------|-----|----|
| V _{DS} | 80 | V |
| R _{DS(ON),MAX} | 6.5 | mΩ |
| I _D | 122 | A |

PRPAK5X6 Pin Configuration



Absolute Maximum Ratings

| Symbol | Parameter | Rating | Units |
|---------------------------------------|--|------------|-------|
| V _{DS} | Drain-Source Voltage | 80 | V |
| V _{GS} | Gate-Source Voltage | ±20 | V |
| I _D @T _C =25°C | Continuous Drain Current, V _{GS} @ 10V ^{1,6} | 122 | A |
| I _D @T _C =100°C | Continuous Drain Current, V _{GS} @ 10V ^{1,6} | 78.6 | A |
| I _{DM} | Pulsed Drain Current ² | 300 | A |
| EAS | Single Pulse Avalanche Energy ³ | 246.4 | mJ |
| I _{AS} | Avalanche Current | 70.2 | A |
| P _D @T _C =25°C | Total Power Dissipation ⁴ | 156 | 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 _{θJA} | Thermal Resistance Junction-Ambient ¹ | --- | 62 | °C/W |
| R _{θJC} | Thermal Resistance Junction-Case ¹ | --- | 0.8 | °C/W |



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Electrical Characteristics (T_J=25 °C, unless otherwise noted)

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|---------------------|--|--|------|------|------|------|
| B _{VDS} | Drain-Source Breakdown Voltage | V _{GS} =0V, I _D =250uA | 80 | --- | --- | V |
| R _{DS(ON)} | Static Drain-Source On-Resistance ² | V _{GS} =10V, I _D =30A | --- | --- | 6.5 | mΩ |
| V _{GS(th)} | Gate Threshold Voltage | V _{GS} =V _{DS} , I _D =250uA | 2 | --- | 4 | V |
| I _{DSS} | Drain-Source Leakage Current | V _{DS} =64V, V _{GS} =0V, T _J =25°C | --- | --- | 1 | uA |
| | | V _{DS} =64V, 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 =30A | --- | 50 | --- | S |
| R _g | Gate Resistance | V _{DS} =0V, V _{GS} =0V, f=1MHz | --- | 1.4 | --- | Ω |
| Q _g | Total Gate Charge (10V) | V _{DS} =64V, V _{GS} =10V, I _D =30A | --- | 84 | --- | nC |
| Q _{gs} | Gate-Source Charge | | --- | 28 | --- | |
| Q _{gd} | Gate-Drain Charge | | --- | 29 | --- | |
| T _{d(on)} | Turn-On Delay Time | V _{DD} =40V, V _{GS} =10V, R _G =3.3Ω, I _D =30A | --- | 38 | --- | ns |
| T _r | Rise Time | | --- | 73 | --- | |
| T _{d(off)} | Turn-Off Delay Time | | --- | 51 | --- | |
| T _f | Fall Time | | --- | 26 | --- | |
| C _{iss} | Input Capacitance | V _{DS} =15V, V _{GS} =0V, f=1MHz | --- | 5580 | --- | pF |
| C _{oss} | Output Capacitance | | --- | 571 | --- | |
| C _{rss} | Reverse Transfer Capacitance | | --- | 278 | --- | |

Diode Characteristics

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|-----------------|--|--|------|------|------|------|
| I _S | Continuous Source Current ^{1,5} | V _G =V _D =0V, Force Current | --- | --- | 122 | A |
| V _{SD} | Diode Forward Voltage ² | V _{GS} =0V, I _S =A, T _J =25°C | --- | --- | 1.2 | V |
| t _{rr} | Reverse Recovery Time | I _F =30A, dI/dt=100A/μs, T _J =25°C | --- | 27 | --- | nS |
| Q _{rr} | Reverse Recovery Charge | | --- | 28 | --- | nC |

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}=70.2A
- 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.
- 6.The maximum current rating is package limited.



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Typical Characteristics

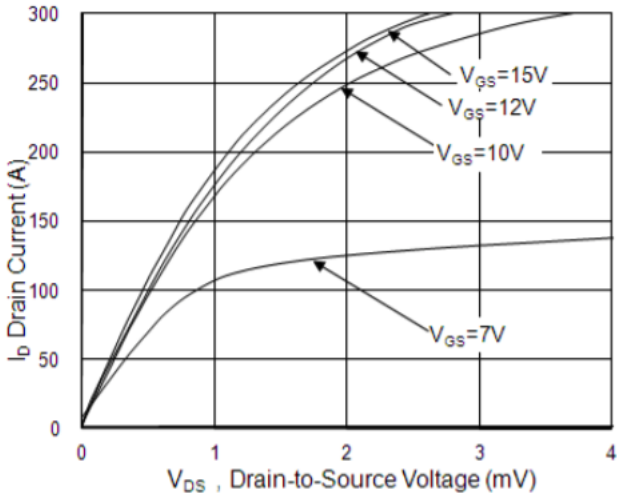


Fig.1 Typical Output Characteristics

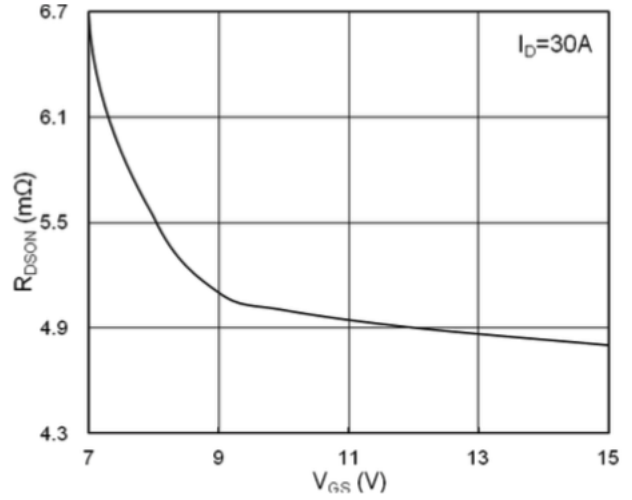


Fig.2 On-Resistance vs G-S Voltage

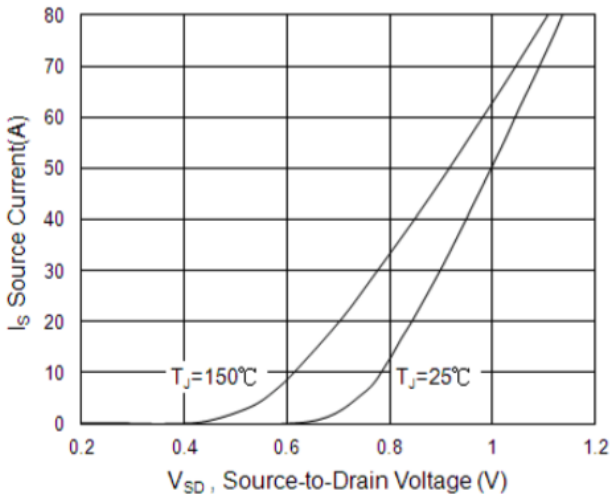


Fig.3 Source Drain Forward Characteristics

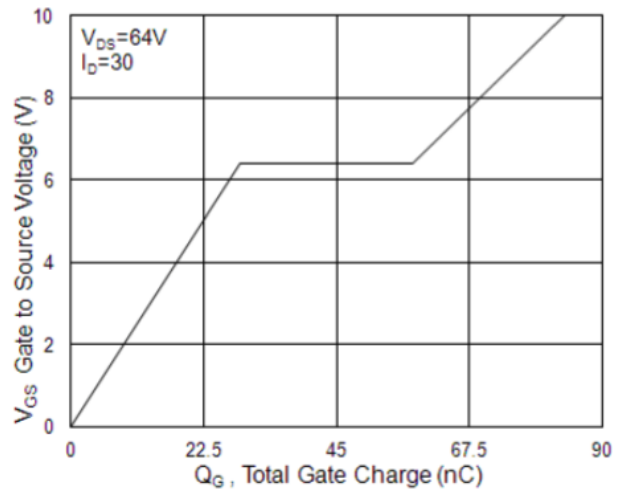


Fig.4 Gate-Charge Characteristics

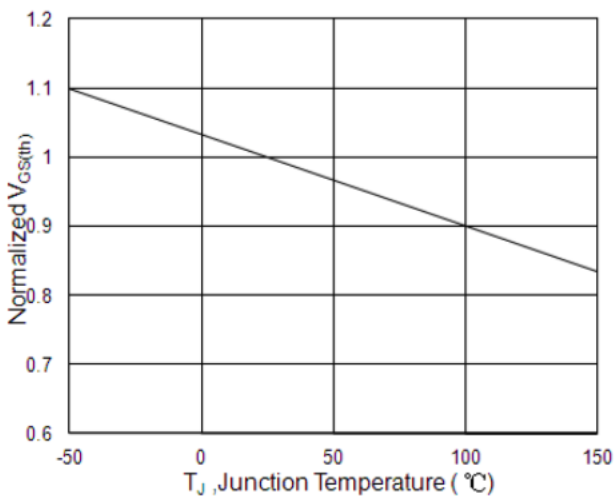


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

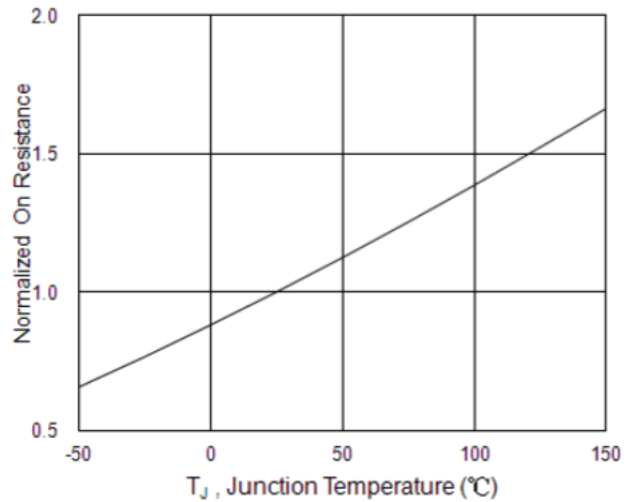


Fig.6 Normalized $R_{DS(on)}$ vs. T_J



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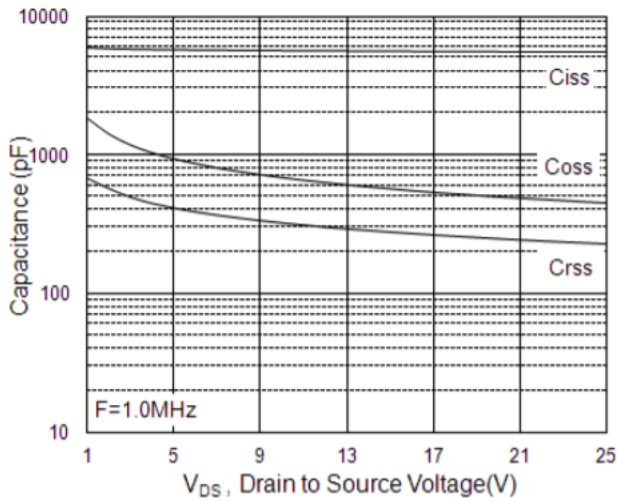


Fig.7 Capacitance

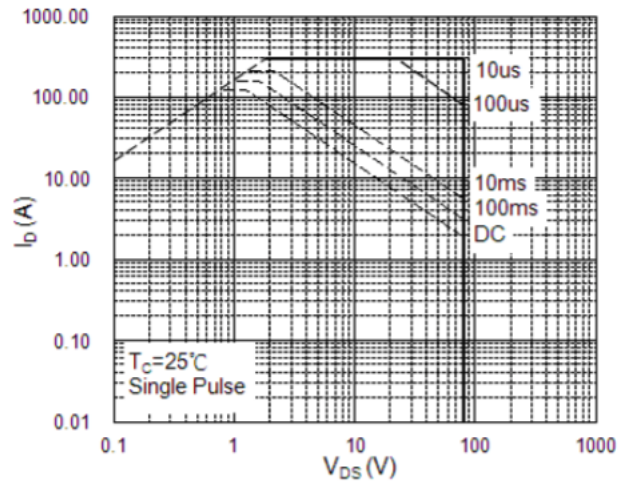


Fig.8 Safe Operating Area

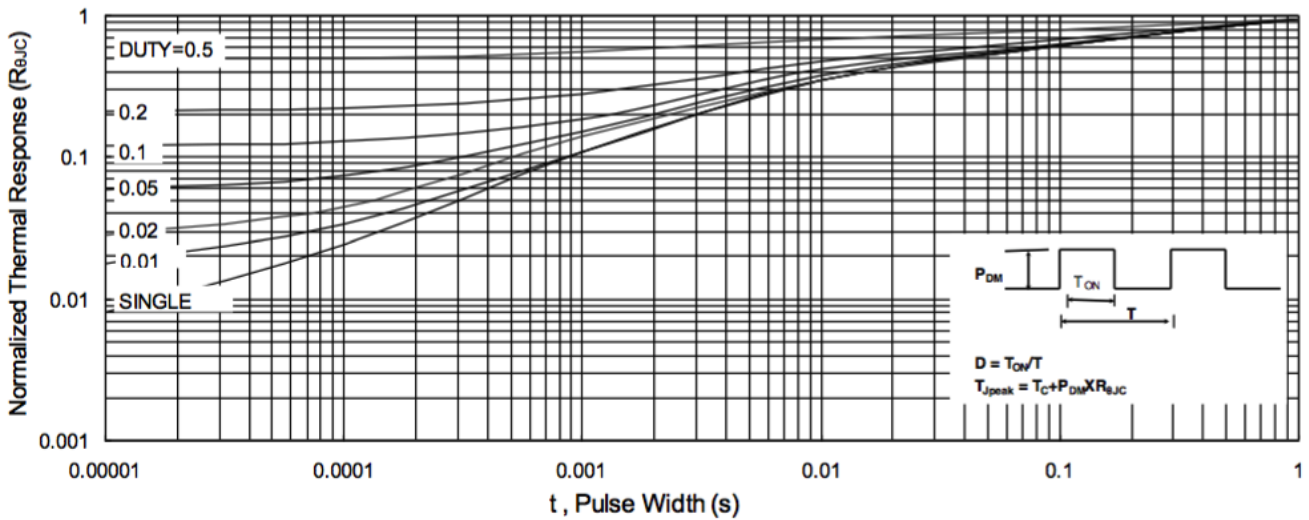


Fig.9 Normalized Maximum Transient Thermal Impedance

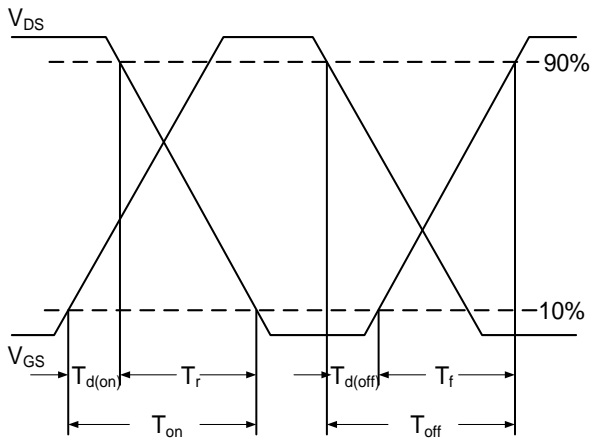


Fig.10 Switching Time Waveform

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

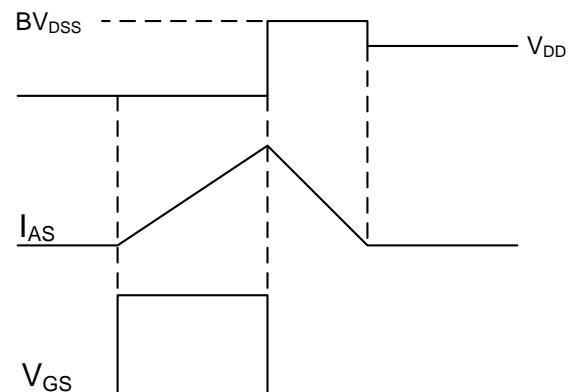
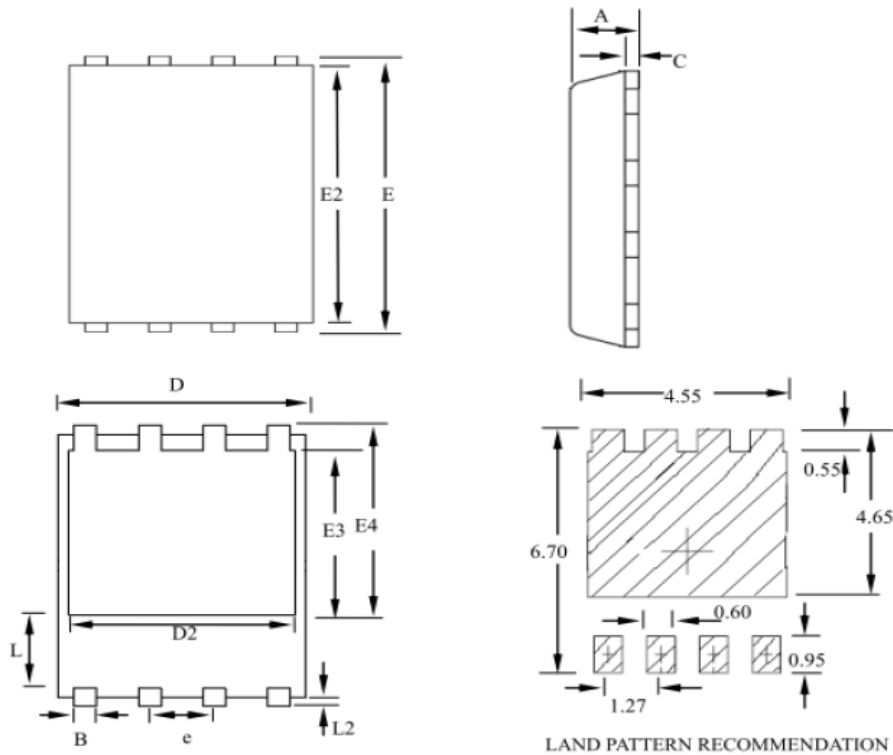


Fig.11 Unclamped Inductive Switching Waveform

Ordering Information

| Part Number | Package code | Packaging |
|-------------|--------------|----------------|
| HSBA8024A | PRPAK5*6 | 3000/Tape&Reel |



| SYMBOLS | MILLIMETERS | | | INCHES | | |
|---------|-------------|------|------|--------|-------|-------|
| | MIN | NOM | MAX | MIN | NOM | MAX |
| A | 0.80 | -- | 1.20 | 0.031 | -- | 0.047 |
| B | 0.30 | -- | 0.51 | 0.012 | -- | 0.020 |
| C | 0.15 | -- | 0.35 | 0.006 | -- | 0.014 |
| D | 4.80 | -- | 5.30 | 0.189 | -- | 0.209 |
| D2 | 3.61 | -- | 4.35 | 0.142 | -- | 0.171 |
| E | 5.90 | -- | 6.35 | 0.232 | -- | 0.250 |
| E2 | 5.42 | -- | 5.90 | 0.213 | -- | 0.232 |
| E3 | 3.23 | -- | 3.90 | 0.127 | -- | 0.154 |
| E4 | 3.69 | -- | 4.55 | 0.145 | -- | 0.179 |
| L | 0.61 | -- | 1.80 | 0.024 | -- | 0.071 |
| L2 | 0.05 | -- | 0.36 | 0.002 | -- | 0.014 |
| e | -- | 1.27 | -- | -- | 0.050 | -- |