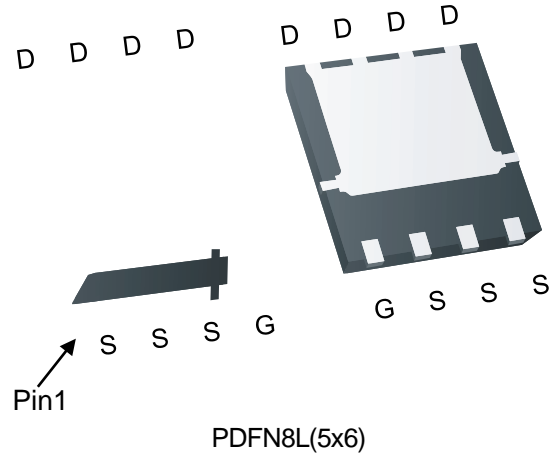


N-Channel Enhancement Mode MOSFET

Feature

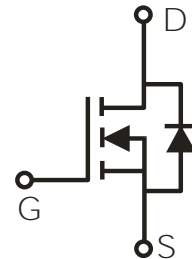
- 40V/145A
R_{DS(ON)} = 2.1 m (typ.) @V_{GS} = 10V
- 100% Avalanche Tested
- 100% DVDS
- Reliable and Rugged
- MSL1 up to 260°C Peak Reflow
- AEC-Q101 Qualified
- 175°C operating temperature
- Halogen Free and Green Devices Available
- (RoHS Compliant)

Pin Description




Applications

- Switching application
- Li-battery protection
- DC-DC
- Motor control



Single N-Channel MOSFET

Ordering and Marking Information

| | |
|---------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------|
|  C2 HYA024N04 XYMXXXXXX | Package Code C2: PDFN8L(5x6) Date Code XYMXXXXXX |
|---------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------|

Note: HUAYI halogen free products contain molding compounds/die attach materials and 100% matte tin plate Termination finish; which are fully compliant with RoHS. HUAYI halogen free products meet or exceed the halogen free requirements of IPC/JEDEC J-STD-020 for MSL classification at halogen free peak reflow temperature. HUAYI defines "Green" to mean halogen free (RoHS compliant) and halogen free (Br or Cl does not exceed 900ppm by weight in homogeneous material and total of Br and Cl does not exceed 1500ppm by weight).

HUAYI reserves the right to make changes, corrections, enhancements, modifications, and improvements to this product and/or to this document at any time without notice.

Absolute Maximum Ratings

| Symbol | Parameter | Rating | Unit | |
|--------------------------------------------------------|---------------------------------------|------------|------|---|
| Common Ratings (Tc=25°C Unless Otherwise Noted) | | | | |
| V _{DSS} | Drain-Source Voltage | 40 | V | |
| V _{GSS} | Gate-Source Voltage | ±20 | V | |
| T _J | Junction Temperature Range | -55 to 175 | °C | |
| T _{STG} | Storage Temperature Range | | °C | |
| I _S | Source Current-Continuous(Body Diode) | Tc=25°C | 145 | A |
| Mounted on Large Heat Sink | | | | |
| I _{DM} | Pulsed Drain Current * | Tc=25°C | 435 | A |
| I _D | Continuous Drain Current | Tc=25°C | 145 | A |
| | | Tc=100°C | 100 | A |

Electrical Characteristics (Cont.) (Tc =25°C Unless Otherwise Noted)

| Symbol | Parameter | Test Conditions | HYA024N04NS1 | | | Unit |
|------------------------------------|-----------------------------------------|------------------------------------------------------------------------------------------|--------------|------|-----|------|
| | | | Min | Typ. | Max | |
| Dynamic Characteristics | | | | | | |
| R _G | Gate Resistance | V _{GS} =0V, V _{DS} =0V, F=500KHz | - | 2.2 | - | |
| C _{iss} | Input Capacitance | V _{GS} =0V, V _{DS} =25V, Frequency=500KHz | - | 1882 | - | pF |
| C _{oss} | Output Capacitance | | | | | |
| C _{rss} | Reverse Transfer Capacitance | | | | | |
| t _{d(ON)} | Turn-on Delay Time | V _{DD} =20V, R _G =4 Ω, I _{DS} =20A, V _{GS} =10V | - | 16.3 | - | ns |
| T _r | Turn-on Rise Time | | | | | |
| t _{d(OFF)} | Turn-off Delay Time | | | | | |
| T _f | Turn-off Fall Time | | | | | |
| Gate Charge Characteristics | | | | | | |
| Q _g | Total Gate Charge(V _{GS} =10V) | V _{DS} =32V, I _{DS} =20A | - | 32.7 | - | nC |
| Q _{gs} | Gate-Source Charge | | | | | |
| Q _{gd} | Gate-Drain Charge | | | | | |
| V _{plateau} | Gate plateau voltage | | - | 4.7 | - | V |

Note: *Pulse test, pulse width 300us, duty cycle 2%

Typical Operating Characteristics

Figure 1: Power Dissipation

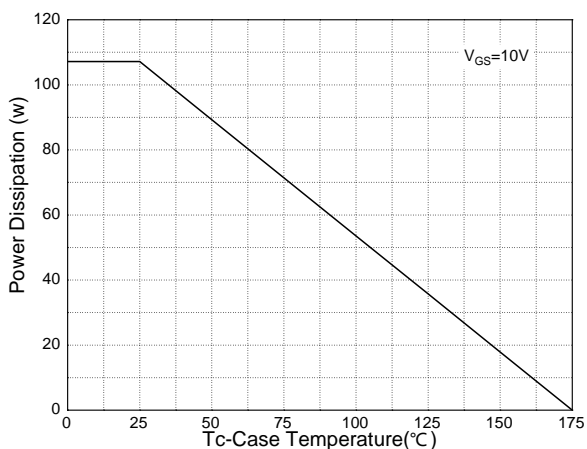


Figure 2: Drain Current

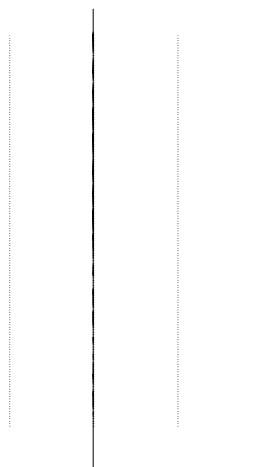


Figure 3: Safe Operation Area

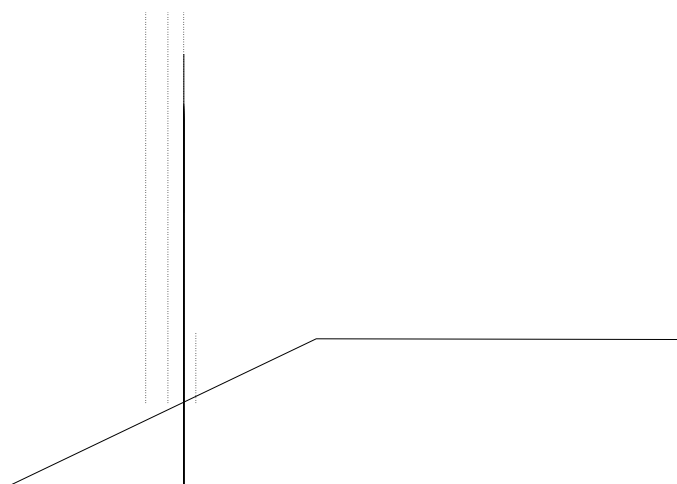


Figure 4: Thermal Transient Impedance



Figure 5: Output Characteristics

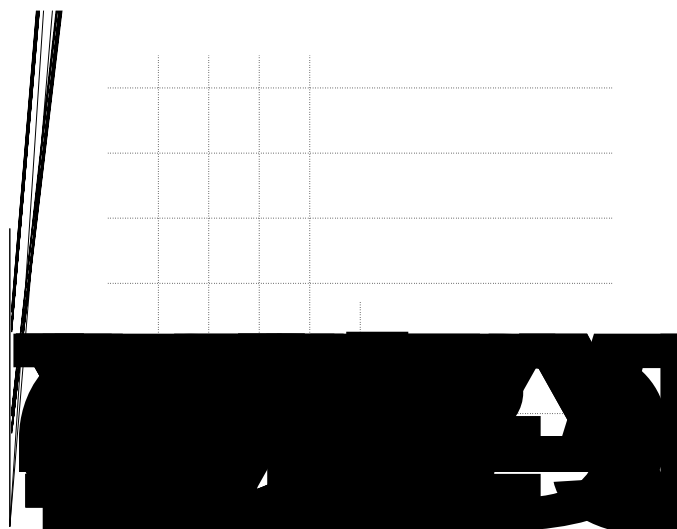
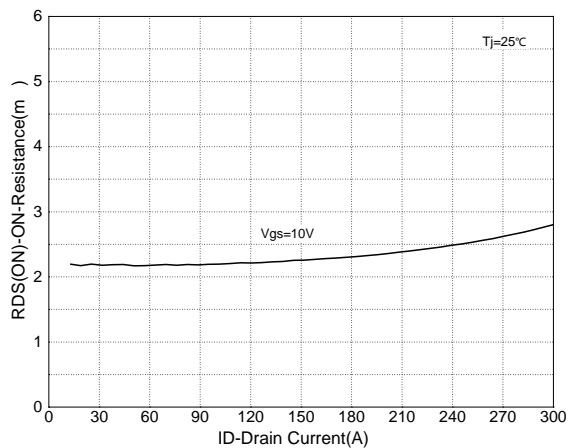


Figure 6: Drain-Source On Resistance



Typical Operating Characteristics(Cont.)

Figure 7: On-Resistance vs. Temperature



Figure 8: Source-Drain Diode Forward

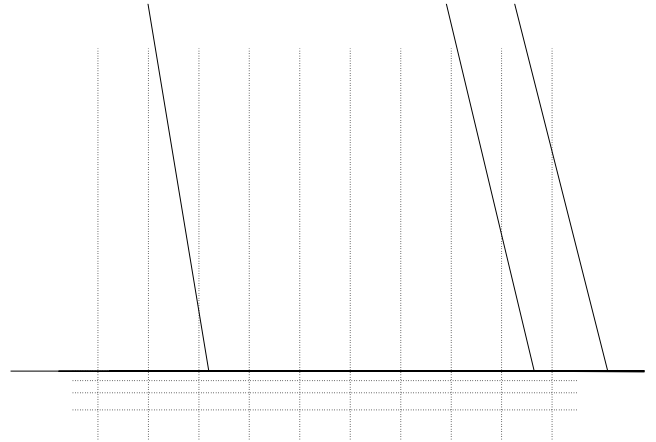


Figure 9: Capacitance Characteristics



Figure 10: Gate Charge Characteristics

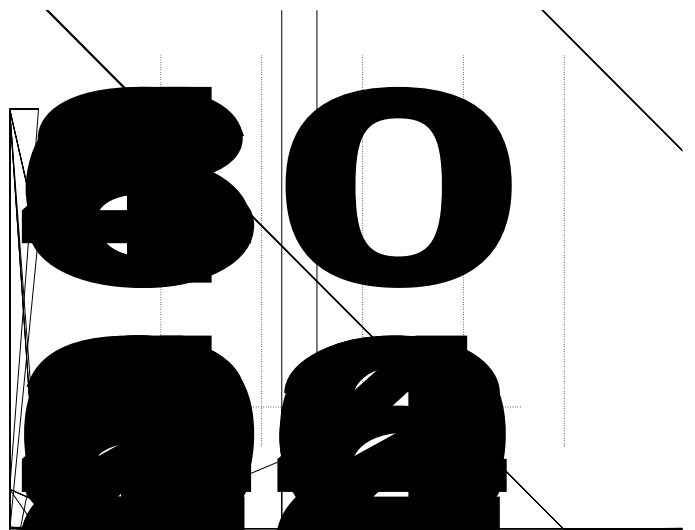


Figure 11: Transfer Characteristics

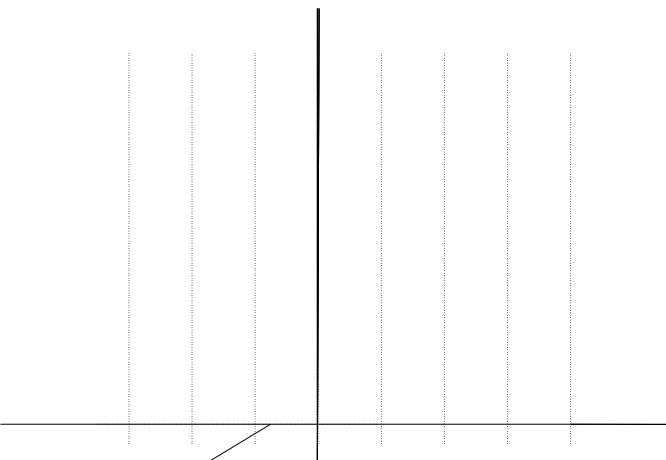
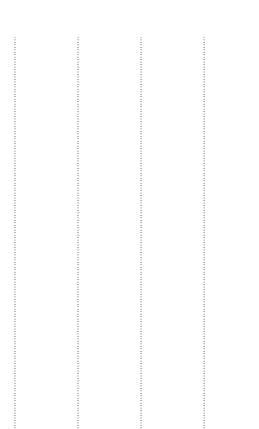


Figure 12: Gate Threshold Voltage



Typical Operating Characteristics(Cont.)

Figure 13: Drain-Source Breakdown

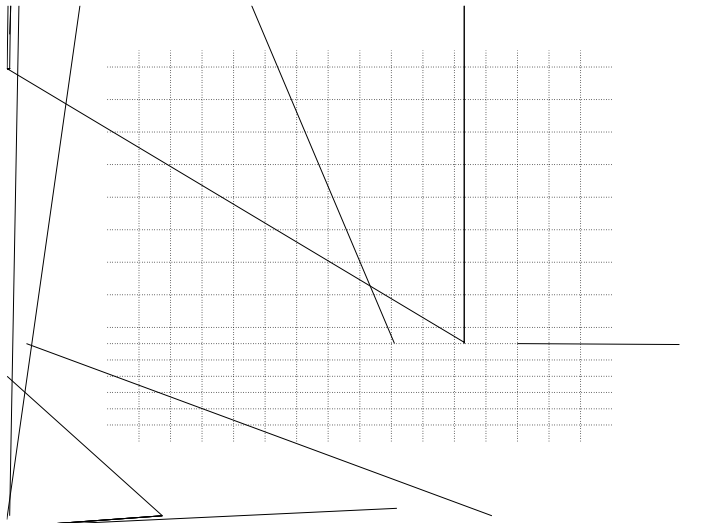


Figure 14: R_{dson} vs. Gate Voltage

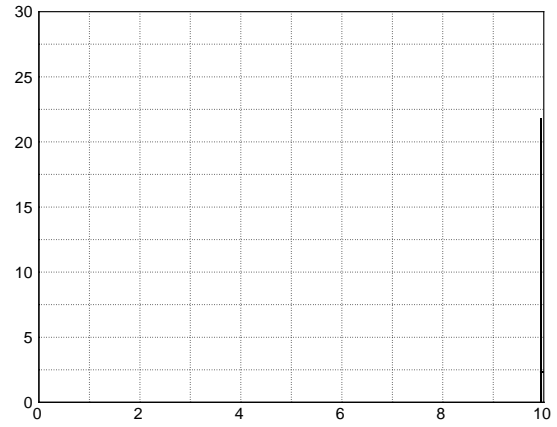
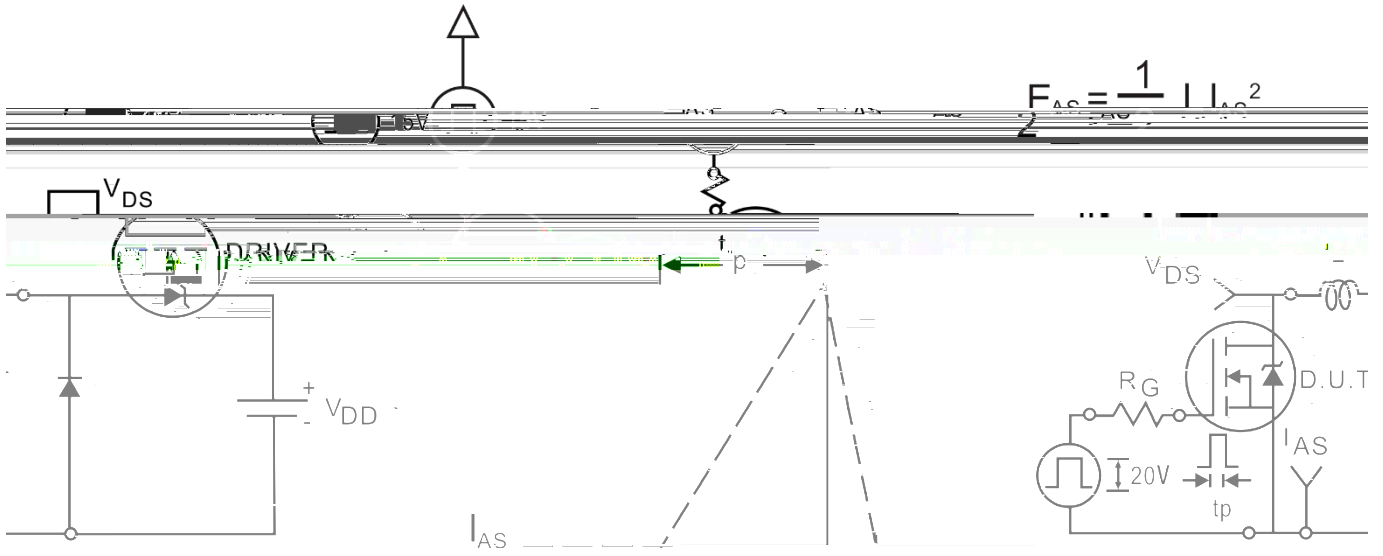


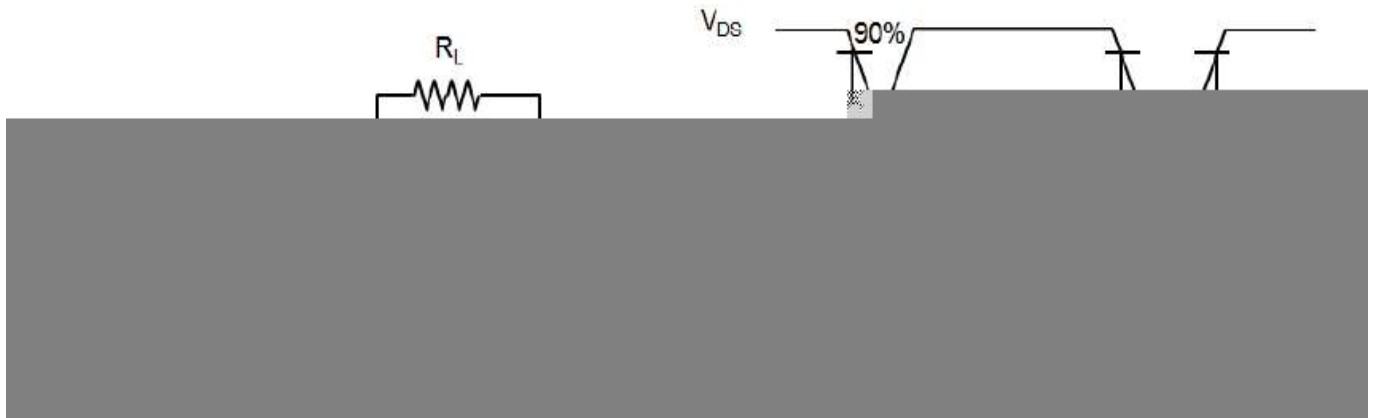
Figure 15: Output Characteristics (125°C)



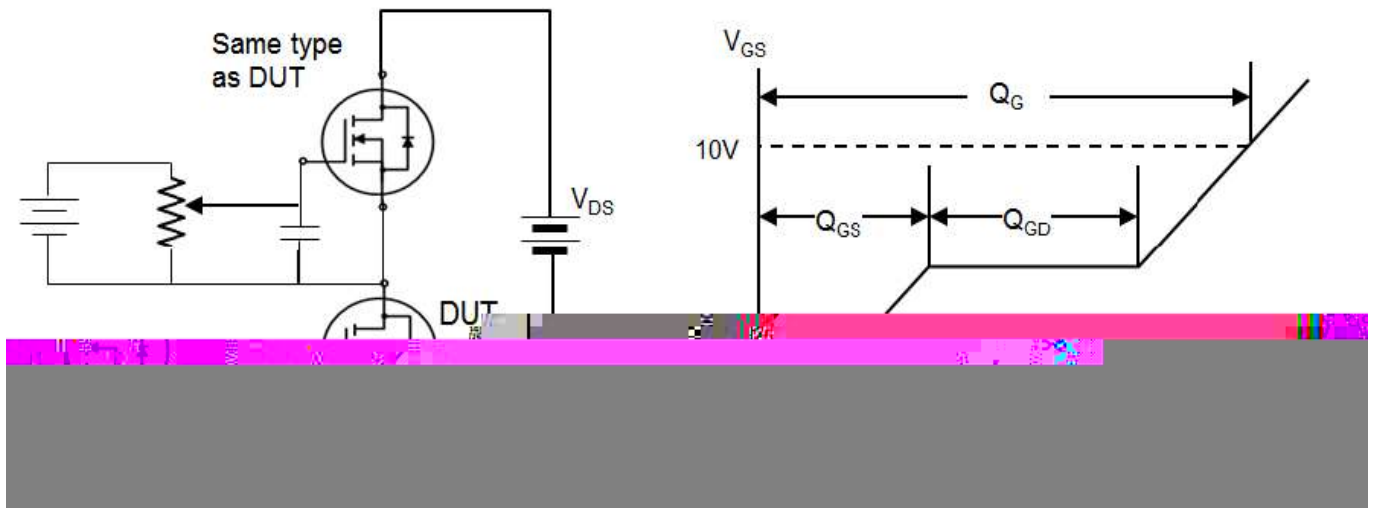
Avalanche Test Circuit



Switching Time Test Circuit



Gate Charge Test Circuit



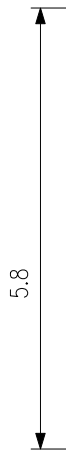
Device Per Unit

| Package Type | Unit | Quantity |
|--------------|------|----------|
| PDFN8L(5x6) | Reel | 5000 |

Package Information

PDFN8L(5x6)

(unit:mm)



Classification Profile

Classification Reflow Profiles

| Profile Feature | Sn-Pb Eutectic Assembly | Pb-Free Assembly |
|-----------------|-------------------------|------------------|
| | Preheat & Soak | |

Temperature min (T510.7 15.6 reW*nem

Table 1. SnPb Eutectic Process – Classification Temperatures (Tc)

350

| Package Thickness | Volume mm³ <350 | Volume mm³ ≥350 |
|------------------------------|------------------------------------------|---------------------------------------|
|------------------------------|------------------------------------------|---------------------------------------|