

HY1904C2

Single N-Channel Enhancement Mode MOSFET

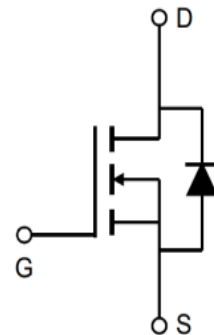
Feature Description

- 40V/65A
 $R_{DS(ON)} = 5.1m \text{ (typ.)}@V_{GS} = 10V$
 $R_{DS(ON)} = 6.2m \text{ (typ.)}@V_{GS} = 4.5V$
- 100% Avalanche Tested
- Reliable and Rugged
- Halogen- Free Devices Available

Pin Description

Applications

- High Frequency Point-of-Load Synchronous Buck Converter
- Power Tool Application
- Networking DC-DC Power System



Ordering and Marking Information

C2
HY1904
YYXXXJWW G

Package Code
C2

Absolute Maximum Ratings

Symbol

Parameter

Rating

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

| Symbol | Parameter | Test Conditions | HY1904 | | | Unit |
|------------------------------------|------------------------------|--|--------|------|-----|------|
| | | | Min | Typ. | Max | |
| Dynamic Characteristics | | | | | | |
| R _G | Gate Resistance | V _{GS} =0V, V _{DS} =0V, F=1MHz | - | 1.5 | - | |
| C _{iss} | Input Capacitance | V _{GS} =0V, V _{DS} =25V, Frequency=1.0MHz | - | 2391 | - | pF |
| C _{oss} | Output Capacitance | | - | 359 | - | |
| C _{rss} | Reverse Transfer Capacitance | | - | 195 | - | |
| t _{d(ON)} | Turn-on Delay Time | V _{DD} =20V, R _G =3.3 Ω, I _{DS} =20A, V _{GS} =10V | - | 13 | - | ns |
| T _r | Turn-on Rise Time | | - | 11 | - | |
| t _{d(OFF)} | Turn-off Delay Time | | - | 41 | - | |
| T _f | Turn-off Fall Time | | - | 14 | - | |
| Gate Charge Characteristics | | | | | | |
| Q _g | Total Gate Charge | V _{DS} =32V, V _{GS} =10V, I _D =20A | - | 56.5 | - | nC |
| Q _{gs} | Gate-Source Charge | | - | 5.1 | - | |
| Q _{gd} | Gate-Drain Charge | | - | 13.5 | - | |

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

Typical Operating Characteristics(Cont.)

Figure 7: On-Resistance vs. Temperature

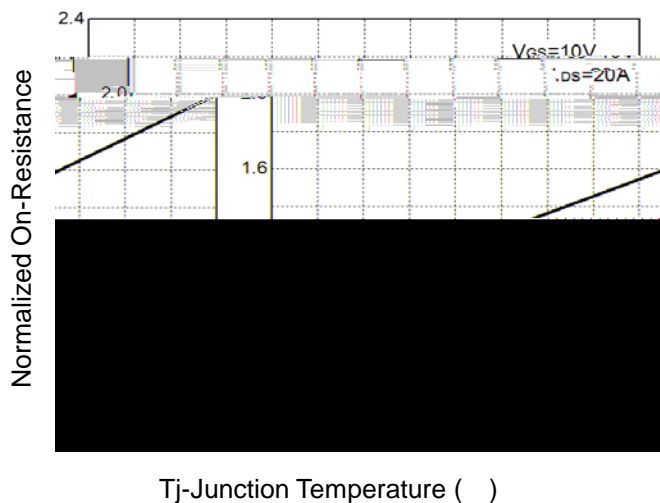


Figure 8: Source-Drain Diode Forward

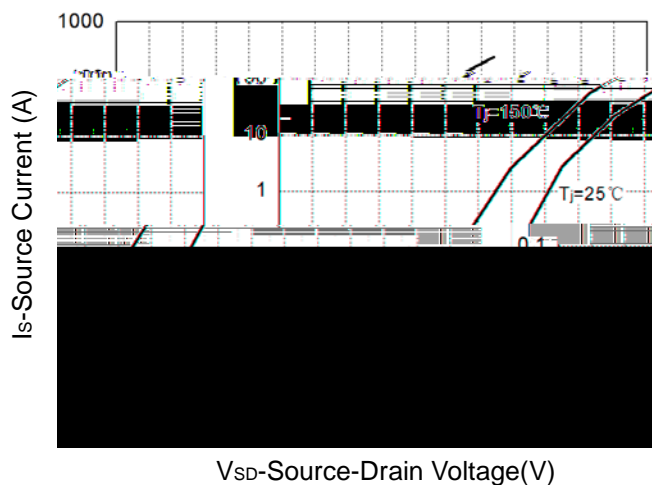


Figure 9: Capacitance Characteristics

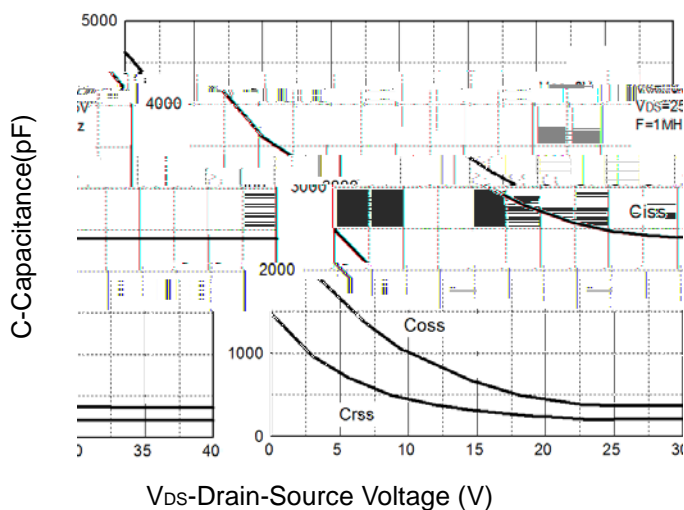
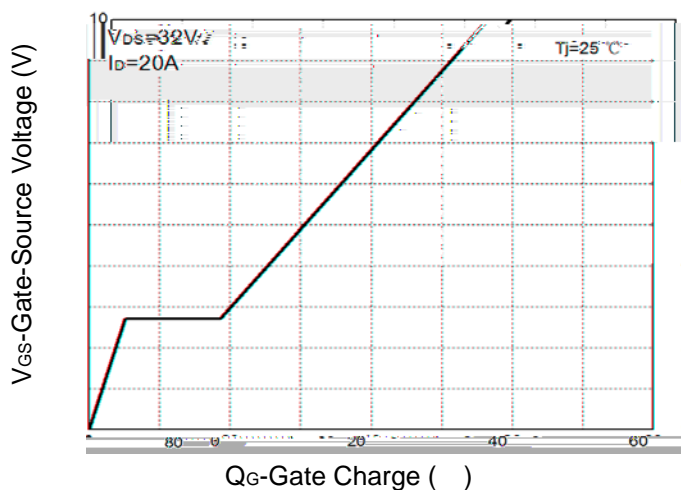


Figure 10: Gate Charge Characteristics



Avalanche Test Circuit and Waveforms

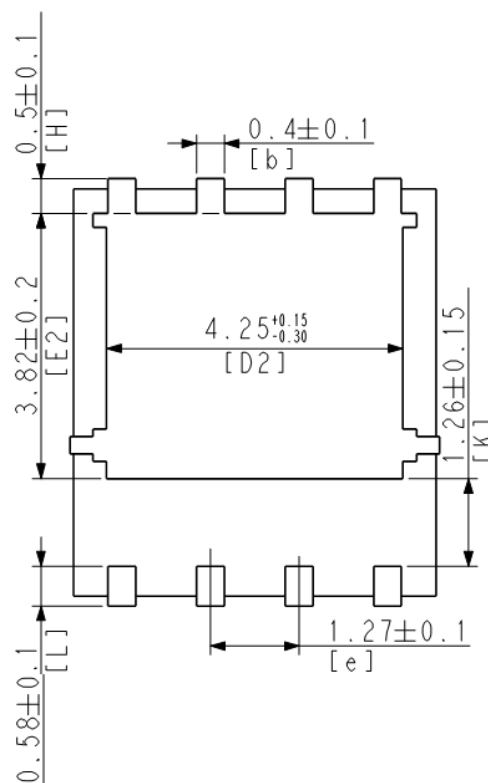
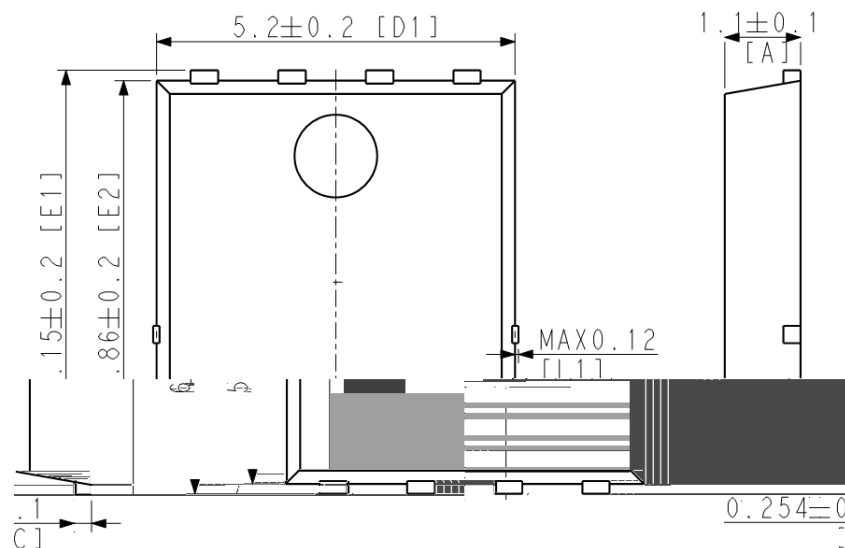
Switching Time Test Circuit and Waveforms

Device Per Unit

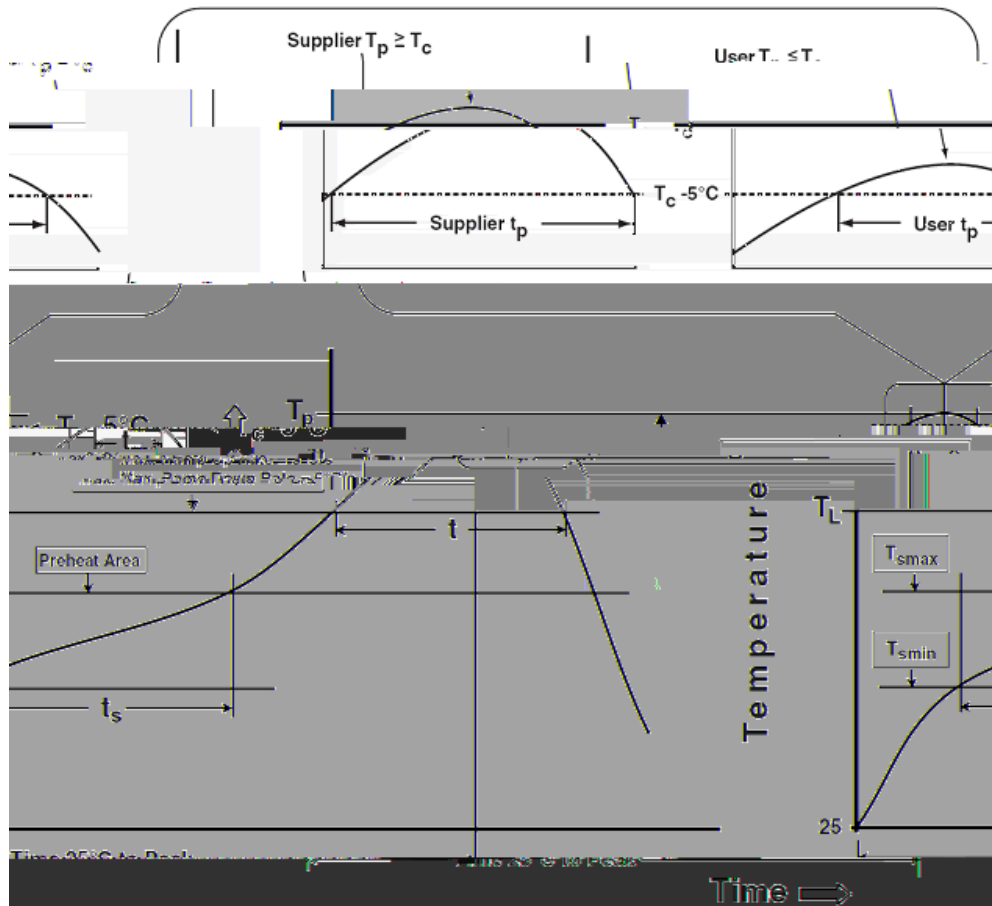
| Package Type | Unit | Quantity |
|--------------|------|----------|
| | Reel | 5000 |

Package Information

PDFN5x6-8L



Classification Profile



Classification Reflow Profiles

| Profile Feature | Sn-Pb Eutectic Assembly | Pb-Free Assembly |
|---|------------------------------------|------------------------------------|
| Preheat & Soak | | |
| Temperature min (T_{smin}) | 100 °C | 150 °C |
| Temperature max (T_{smax}) | 150 °C | 200 °C |
| Time (T_{smin} to T_{smax}) (t_s) | 60-120 seconds | 60-120 seconds |
| Average ramp-up rate (T_{smax} to T_P) | 3 °C/second max. | 3°C/second max. |
| Liquidous temperature (T_L) | 183 °C | 217 °C |
| Time at liquidous (t_L) | 60-150 seconds | 60-150 seconds |
| Peak package body Temperature (T_P)* | See Classification Temp in table 1 | See Classification Temp in table 2 |
| Time (t_P)** within 5°C of the specified classification temperature (T_c) | 20** seconds | 30** seconds |
| Average ramp-down rate (T_P to T_{smax}) | 6 °C/second max. | 6 °C/second max. |
| Time 25°C to peak temperature | 6 minutes max. | 8 minutes max. |

*Tolerance for peak profile Temperature (T_P) is defined as a supplier minimum and a user maximum.

** Tolerance for time at peak profile temperature (t_P) is defined as a supplier minimum and a user maximum.

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

| Package Thickness | Volume mm <350 | Volume mm 350 |
|-------------------|----------------|---------------|
| 2.5 mm | 235 °C | 220 °C |
| 2.5 mm | 220 °C | 220 °C |

Table 2.Pb-free Process – Classification Temperatures (Tc)

| Package Thickness | Volume mm <350 | Volume mm 350-2000 | Volume mm 2000 |
|-------------------|----------------|--------------------|----------------|
| <1.6 mm | 260 °C | 260 °C | 260 °C |
| 1.6 mm – 2.5 mm | 260 °C | 250 °C | 245 °C |
| 2.5 mm | 250 °C | 245 °C | 245 °C |

Reliability Test Program

| Test item | Method | Description |
|---------------|---------------|--|
| SOLDERABILITY | JESD-22, B102 | 5 Sec, 245 |
| HTRB | JESD-22, A108 | 168 Hrs /500 Hrs /1000 Hrs, Bias @ 150 |
| PCT | JESD-22, A102 | 96 Hrs, 100%RH, 2atm, 121 |
| TCT | JESD-22, A104 | 500 Cycles, -55 ~150 |

Customer Service

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