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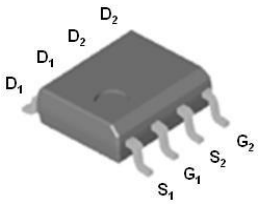
RoHS Compliant

# P1503HV

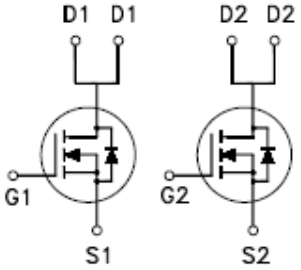
## Dual N-Channel Enhancement Mode MOSFET

### PRODUCT SUMMARY

| $V_{(BR)DSS}$ | $R_{DS(ON)}$ | $I_D$ |
|---|---|---|
| 30V | 15mΩ @$V_{GS}$ = 10V | 9A |




SOP-8




### ABSOLUTE MAXIMUM RATINGS ($T_A$ = 25 °C Unless Otherwise Noted)

| PARAMETERS/TEST CONDITIONS | | SYMBOL | LIMITS | UNITS |
|---|---|---|---|---|
| Drain-Source Voltage | | $V_{DS}$ | 30 | V |
| Gate-Source Voltage | | $V_{GS}$ | ±20 | |
| Continuous Drain Current | $T_A$ = 25 °C | $I_D$ | 9 | A |
| | $T_A$ = 70 °C | | 7 | |
| Pulsed Drain Current[1] | | $I_{DM}$ | 40 | |
| Avalanche Current | | $I_{AS}$ | 24 | |
| Avalanche Energy | L = 0.1mH | $E_{AS}$ | 29 | mJ |
| Power Dissipation | $T_A$ = 25 °C | $P_D$ | 2 | W |
| | $T_A$ = 70 °C | | 1.28 | |
| Operating Junction & Storage Temperature Range | | $T_J$, $T_{STG}$ | -55 to 150 | °C |

### THERMAL RESISTANCE RATINGS

| THERMAL RESISTANCE | SYMBOL | TYPICAL | MAXIMUM | UNITS |
|---|---|---|---|---|
| Junction-to-Ambient | $R_{\theta JA}$ | | 62.5 | °C / W |
| Junction-to-Lead | $R_{\theta JL}$ | | 25 | |

[1]Pulse width limited by maximum junction temperature.

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### ELECTRICAL CHARACTERISTICS ($T_J$ = 25 °C, Unless Otherwise Noted)

| PARAMETER | SYMBOL | TEST CONDITIONS | LIMITS | | | UNIT |
|---|---|---|---|---|---|---|
| | | | MIN | TYP | MAX | |
| **STATIC** | | | | | | |
| Drain-Source Breakdown Voltage | $V_{(BR)DSS}$ | $V_{GS}$ = 0V, $I_D$ = 250μA | 30 | | | V |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS}$ = $V_{GS}$, $I_D$ = 250μA | 1 | 1.8 | 3 | V |
| Gate-Body Leakage | $I_{GSS}$ | $V_{DS}$ = 0V, $V_{GS}$ = ±20V | | | ±100 | nA |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$ = 24V, $V_{GS}$ = 0V | | | 1 | μA |
| | | $V_{DS}$ = 20V, $V_{GS}$ = 0V , $T_J$ = 70 °C | | | 10 | μA |
| On-State Drain Current[1] | $I_{D(ON)}$ | $V_{DS}$ = 5V, $V_{GS}$ = 10V | 40 | | | A |
| Drain-Source On-State Resistance[1] | $R_{DS(ON)}$ | $V_{GS}$ = 4.5V, $I_D$ = 7A | | 15.4 | 23 | mΩ |
| | | $V_{GS}$ = 10V, $I_D$ = 9A | | 10.7 | 15 | mΩ |
| Forward Transconductance[1] | $g_{fs}$ | $V_{DS}$ = 5V, $I_D$ = 9A | | 35 | | S |
| **DYNAMIC** | | | | | | |
| Input Capacitance | $C_{iss}$ | $V_{GS}$ = 0V, $V_{DS}$ = 15V, f = 1MHz | | 880 | | pF |
| Output Capacitance | $C_{oss}$ | | | 230 | | pF |
| Reverse Transfer Capacitance | $C_{rss}$ | | | 121 | | pF |
| Gate Resistance | $R_g$ | $V_{GS}$ = 0V, $V_{DS}$ = 0V, f = 1MHz | | 1.7 | | Ω |
| Total Gate Charge[2] | $Q_{g(VGS=10V)}$ | $V_{DS}$ = 0.5$V_{(BR)DSS}$, $V_{GS}$ = 10V, $I_D$ = 9A | | 16.5 | | nC |
| | $Q_{g(VGS=4.5V)}$ | | | 8 | | nC |
| Gate-Source Charge[2] | $Q_{gs}$ | | | 3 | | nC |
| Gate-Drain Charge[2] | $Q_{gd}$ | | | 4 | | nC |
| Turn-On Delay Time[2] | $t_{d(on)}$ | $V_{DS}$ = 0.5$V_{(BR)DSS}$, $R_L$ = 40Ω, $I_D$ ≅ 9A, $V_{GS}$ = 10V, $R_G$ = 1.5Ω | | 20 | | nS |
| Rise Time[2] | $t_r$ | | | 10 | | nS |
| Turn-Off Delay Time[2] | $t_{d(off)}$ | | | 42 | | nS |
| Fall Time[2] | $t_f$ | | | 14 | | nS |
| **SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS ($T_J$ = 25 °C)** | | | | | | |
| Continuous Current | $I_S$ | | | | 2 | A |
| Forward Voltage[1] | $V_{SD}$ | $I_F$ = 9A, $V_{GS}$ = 0V | | | 1 | V |
| Reverse Recovery Time | $t_{rr}$ | $I_F$ = 9A, $dI_F/dt$ = 100A / μS | | 28 | | nS |
| Reverse Recovery Charge | $Q_{rr}$ | | | 34 | | nC |

[1]Pulse test : Pulse Width ≤ 300 μsec, Duty Cycle ≤ 2%.

[2]Independent of operating temperature.

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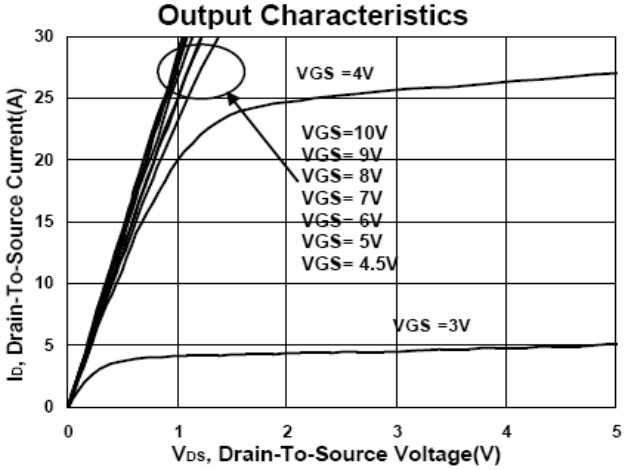
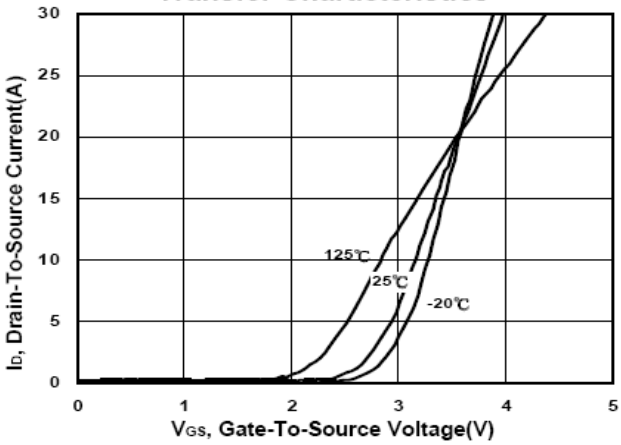
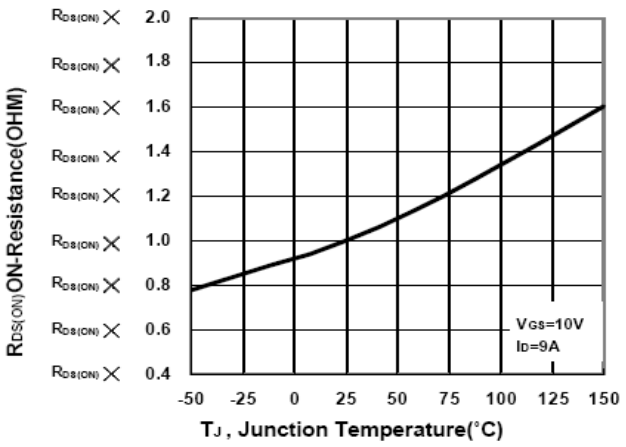
### Output Characteristics



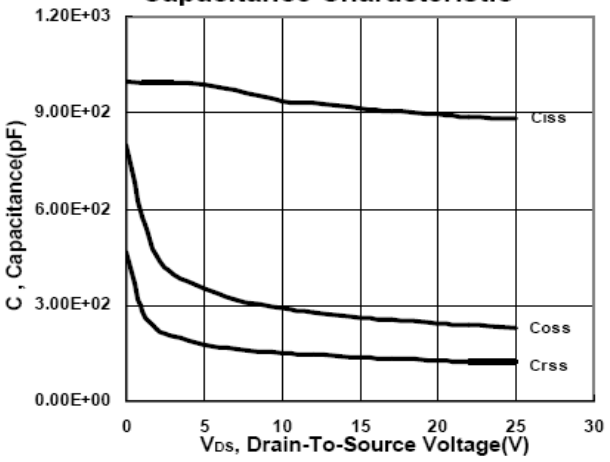

### Transfer Characteristics



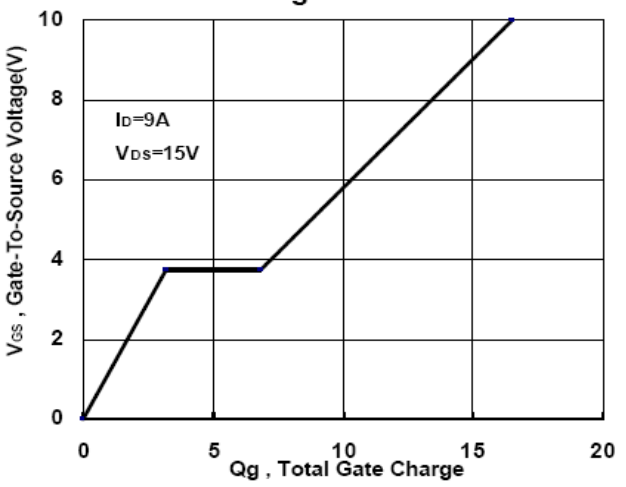

### On-Resistance VS Temperature



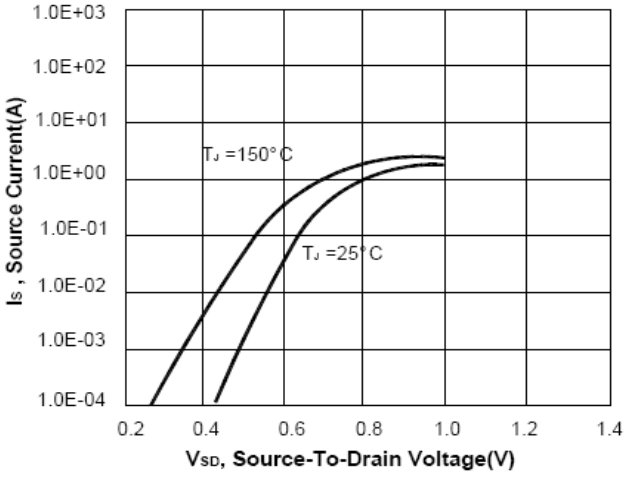

### Capacitance Characteristic




### Gate charge Characteristics




### Source-Drain Diode Forward Voltage



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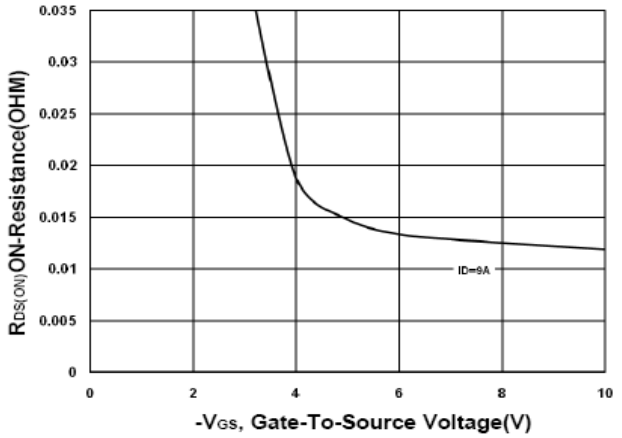
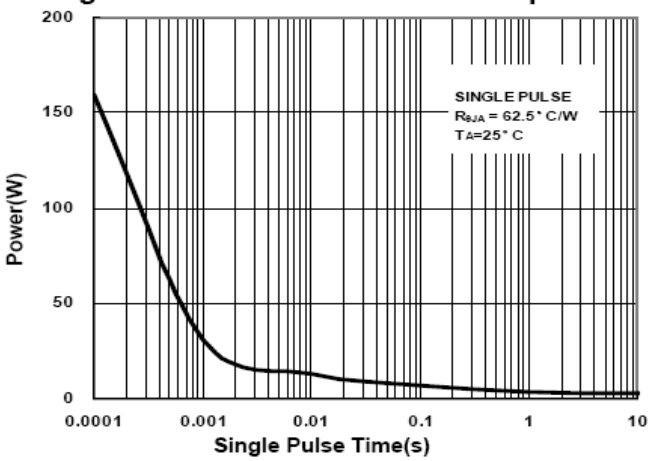
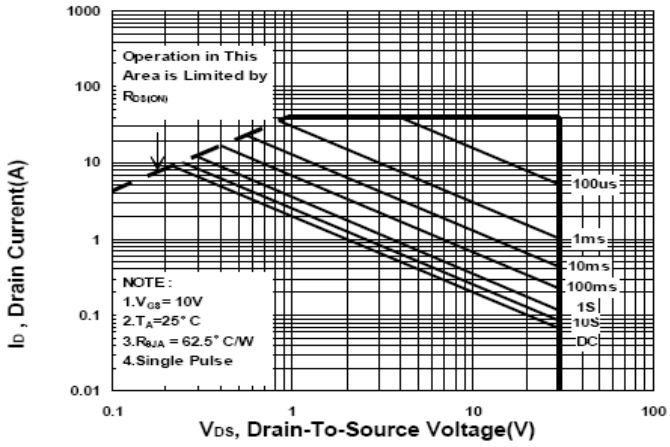
### On-Resistance VS Gate-To-Source



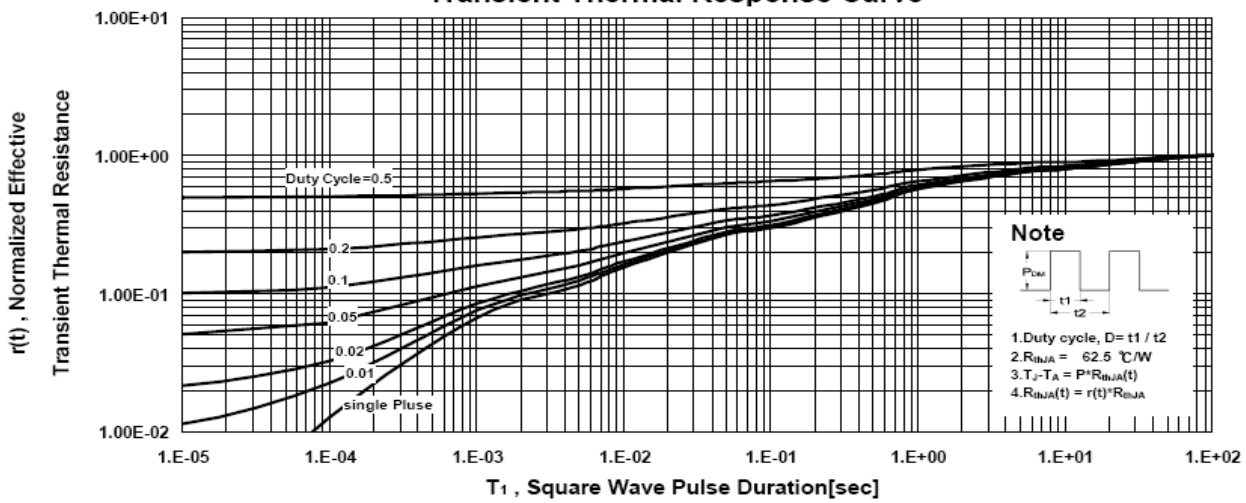

### Single Pulse Maximum Power Dissipation




### Safe Operating Area




### Transient Thermal Response Curve



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### Package Dimension

**SOP-8 MECHANICAL DATA**

| Dimension | mm | | | Dimension | mm | | |
|---|---|---|---|---|---|---|---|
| | Min. | Typ. | Max. | | Min. | Typ. | Max. |
| A | 4.8 | 4.9 | 5.0 | H | 0.4 | 0.6 | 0.93 |
| B | 3.8 | 3.9 | 4.0 | I | 0.19 | 0.21 | 0.25 |
| C | 5.79 | 6.0 | 6.2 | J | 0.25 | 0.375 | 0.5 |
| D | 0.33 | 0.4 | 0.51 | K | 0° | 3° | 18° |
| E | 1.25 | 1.27 | 1.29 | | | | |
| F | 1.1 | 1.3 | 1.65 | | | | |
| G | 0.05 | 0.15 | 0.25 | | | | |