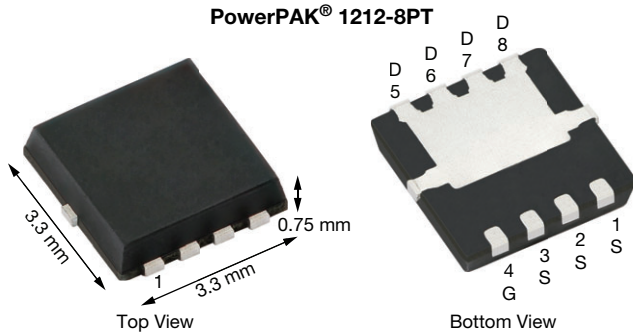


N-Channel 30 V (D-S) MOSFET



FEATURES

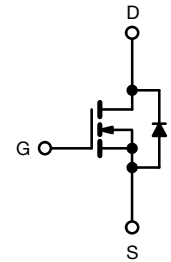
- TrenchFET® Gen IV power MOSFET
- 100 % R_g and UIS tested
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912



RoHS
COMPLIANT
HALOGEN
FREE

APPLICATIONS

- High power density DC/DC
- Synchronous rectification
- VRMs and embedded DC/DC
- Battery protection



N-Channel MOSFET

PRODUCT SUMMARY

| | |
|---|------------------|
| V _{DS} (V) | 30 |
| R _{DS(on)} max. (Ω) at V _{GS} = 10 V | 0.0036 |
| R _{DS(on)} max. (Ω) at V _{GS} = 4.5 V | 0.0050 |
| Q _g typ. (nC) | 11.7 |
| I _D (A) | 104 ^a |
| Configuration | Single |

ORDERING INFORMATION

| | |
|---------------------------------|-------------------|
| Package | PowerPAK 1212-8PT |
| Lead (Pb)-free and halogen-free | SiSA10BDN-T1-GE3 |

ABSOLUTE MAXIMUM RATINGS (T_A = 25 °C, unless otherwise noted)

| PARAMETER | SYMBOL | LIMIT | UNIT | |
|--|-----------------------------------|------------------------|---------------------|---|
| Drain-source voltage | V _{DS} | 30 | V | |
| Gate-source voltage | V _{GS} | +20, -16 | | |
| Continuous drain current (T _J = 150 °C) | I _D | T _C = 25 °C | 104 | A |
| | | T _C = 70 °C | 83 | |
| | | T _A = 25 °C | 26 ^{b, c} | |
| | | T _A = 70 °C | 21 ^{b, c} | |
| Pulsed drain current (t = 100 μs) | I _{DM} | 150 | | |
| Continuous source-drain diode current | I _S | T _C = 25 °C | 57 | |
| | | T _A = 25 °C | 3.4 ^{b, c} | |
| Single pulse avalanche current | I _{AS} | 20 | | |
| Single pulse avalanche energy | E _{AS} | 20 | mJ | |
| Maximum power dissipation | P _D | T _C = 25 °C | 63 | W |
| | | T _C = 70 °C | 40 | |
| | | T _A = 25 °C | 3.8 ^{b, c} | |
| | | T _A = 70 °C | 2.4 ^{b, c} | |
| Operating junction and storage temperature range | T _J , T _{stg} | -55 to +150 | °C | |
| Soldering recommendations (peak temperature) ^{d, e} | | 260 | | |

Notes

- Based on T_C = 25 °C
- Surface mounted on 1" x 1" FR4 board
- t = 10 s
- See solder profile (www.vishay.com/doc?73257). The PowerPAK 1212-8PT is a leadless package. The end of the lead terminal is exposed copper (not plated) as a result of the singulation process in manufacturing. A solder fillet at the exposed copper tip cannot be guaranteed and is not required to ensure adequate bottom side solder interconnection
- Rework conditions: manual soldering with a soldering iron is not recommended for leadless components



| THERMAL RESISTANCE RATINGS | | | | | |
|---|---------------|------------|---------|---------|------|
| PARAMETER | | SMYBOL | TYPICAL | MAXIMUM | UNIT |
| Maximum junction-to-ambient ^{a, b} | $t \leq 10$ s | R_{thJA} | 26 | 33 | °C/W |
| Maximum junction-to-case (drain) | Steady state | R_{thJC} | 1.6 | 2 | |

Notes

- a. Surface mounted on 1" x 1" FR4 board
- b. Maximum under steady state conditions is 67 °C/W

| SPECIFICATIONS ($T_J = 25$ °C, unless otherwise noted) | | | | | | |
|---|-------------------------|--|------|--------|-----------|----------|
| PARAMETER | SYMBOL | TEST CONDITIONS | MIN. | TYP. | MAX. | UNIT |
| Static | | | | | | |
| Drain-source breakdown voltage | V_{DS} | $V_{GS} = 0$ V, $I_D = 250$ μ A | 30 | - | - | V |
| Drain-source breakdown voltage ^(c) (transient) | $V_{DS(t)}$ | $V_{GS} = 0$ V, $I_{D(av)} = 70$ A, $t_{transient} \leq 50$ ns | 36 | - | - | |
| V_{DS} temperature coefficient | $\Delta V_{DS}/T_J$ | $I_D = 250$ μ A | - | 18 | - | mV/°C |
| $V_{GS(th)}$ temperature coefficient | $\Delta V_{GS(th)}/T_J$ | | - | -3.8 | - | |
| Gate-source threshold voltage | $V_{GS(th)}$ | $V_{DS} = V_{GS}$, $I_D = 250$ μ A | 1.2 | - | 2.4 | V |
| Gate-source leakage | I_{GSS} | $V_{DS} = 0$ V, $V_{GS} = +20, -16$ V | - | - | ± 100 | nA |
| Zero gate voltage drain current | I_{DSS} | $V_{DS} = 30$ V, $V_{GS} = 0$ V | - | - | 1 | μ A |
| | | $V_{DS} = 30$ V, $V_{GS} = 0$ V, $T_J = 55$ °C | - | - | 10 | |
| On-state drain current ^a | $I_{D(on)}$ | $V_{DS} \geq 5$ V, $V_{GS} = 10$ V | 25 | - | - | A |
| Drain-source on-state resistance ^a | $R_{DS(on)}$ | $V_{GS} = 10$ V, $I_D = 10$ A | - | 0.0023 | 0.0036 | Ω |
| | | $V_{GS} = 4.5$ V, $I_D = 7$ A | - | 0.0035 | 0.0050 | |
| Forward transconductance ^a | g_{fs} | $V_{DS} = 10$ V, $I_D = 20$ A | - | 68 | - | S |
| Dynamic ^b | | | | | | |
| Input capacitance | C_{iss} | $V_{DS} = 15$ V, $V_{GS} = 0$ V, $f = 1$ MHz | - | 1710 | - | pF |
| Output capacitance | C_{oss} | | - | 655 | - | |
| Reverse transfer capacitance | C_{rss} | | - | 68 | - | |
| C_{rss}/C_{iss} ratio | | | - | 0.040 | 0.080 | |
| Total gate charge | Q_g | $V_{DS} = 15$ V, $V_{GS} = 10$ V, $I_D = 10$ A | - | 24.1 | 36.2 | nC |
| Gate-source charge | Q_{gs} | $V_{DS} = 15$ V, $V_{GS} = 4.5$ V, $I_D = 10$ A | - | 11.7 | 17.6 | |
| Gate-drain charge | Q_{gd} | | - | 4.2 | - | |
| Output charge | Q_{oss} | $V_{DS} = 15$ V, $V_{GS} = 0$ V | - | 2.8 | - | |
| Gate resistance | R_g | $f = 1$ MHz | 0.3 | 1.3 | 2.6 | Ω |
| Turn-on delay time | $t_{d(on)}$ | $V_{DD} = 15$ V, $R_L = 1.5$ Ω $I_D \cong 10$ A, $V_{GEN} = 10$ V, $R_g = 1$ Ω | - | 7 | 15 | ns |
| Rise time | t_r | | - | 20 | 40 | |
| Turn-off delay time | $t_{d(off)}$ | | - | 25 | 50 | |
| Fall time | t_f | | - | 10 | 20 | |
| Turn-on delay time | $t_{d(on)}$ | $V_{DD} = 15$ V, $R_L = 1.5$ Ω $I_D \cong 10$ A, $V_{GEN} = 4.5$ V, $R_g = 1$ Ω | - | 17 | 35 | |
| Rise time | t_r | | - | 35 | 70 | |
| Turn-off delay time | $t_{d(off)}$ | | - | 30 | 60 | |
| Fall time | t_f | | - | 15 | 30 | |



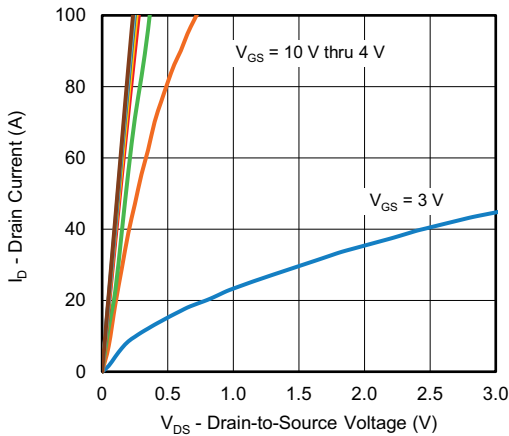
| SPECIFICATIONS ($T_J = 25\text{ }^\circ\text{C}$, unless otherwise noted) | | | | | | |
|--|----------|--|------|------|------|------|
| PARAMETER | SYMBOL | TEST CONDITIONS | MIN. | TYP. | MAX. | UNIT |
| Drain-Source Body Diode Characteristics | | | | | | |
| Continuous source-drain diode current | I_S | $T_C = 25\text{ }^\circ\text{C}$ | - | - | 57 | A |
| Pulse diode forward current ^a | I_{SM} | | - | - | 150 | |
| Body diode voltage | V_{SD} | $I_S = 10\text{ A}$ | - | 0.75 | 1.1 | V |
| Body diode reverse recovery time | t_{rr} | $I_F = 10\text{ A}$, $di/dt = 100\text{ A}/\mu\text{s}$, $T_J = 25\text{ }^\circ\text{C}$ | - | 38 | 70 | ns |
| Body diode reverse recovery charge | Q_{rr} | | - | 36 | 70 | nC |
| Reverse recovery fall time | t_a | | - | 20 | - | ns |
| Reverse recovery rise time | t_b | | - | 18 | - | |

Notes

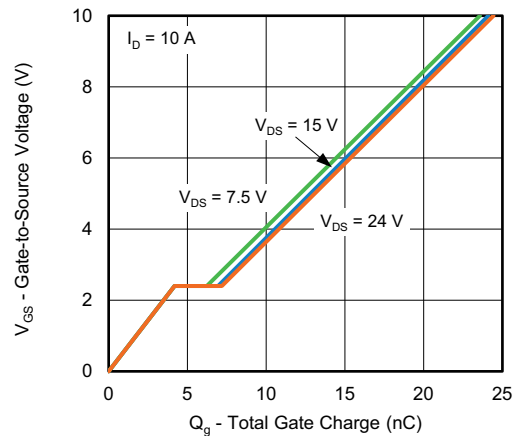
- a. Pulse test: pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$
- b. Guaranteed by design, not subject to production testing
- c. Based on characterization, not subject to production testing

Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

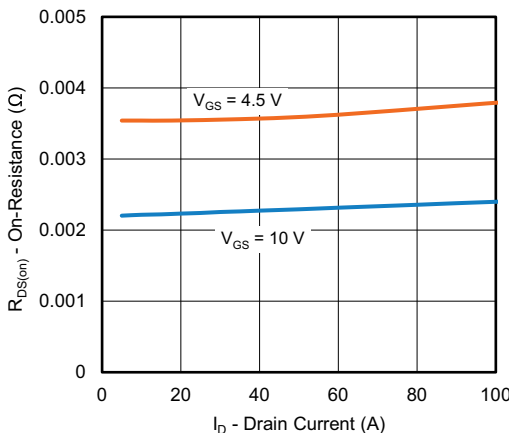
TYPICAL CHARACTERISTICS ($25\text{ }^\circ\text{C}$, unless otherwise noted)



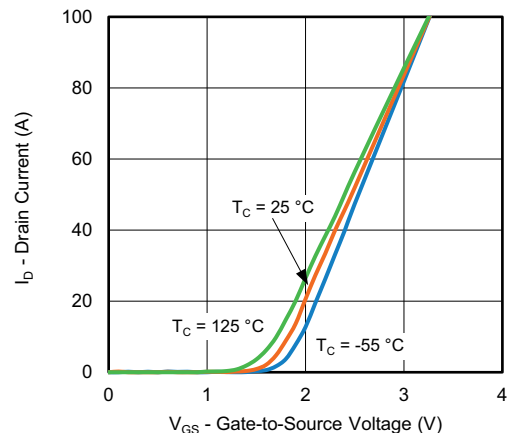
Output Characteristics



Gate Charge



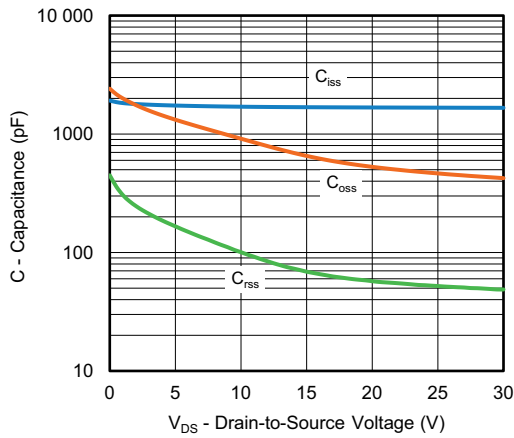
On-Resistance vs. Drain Current



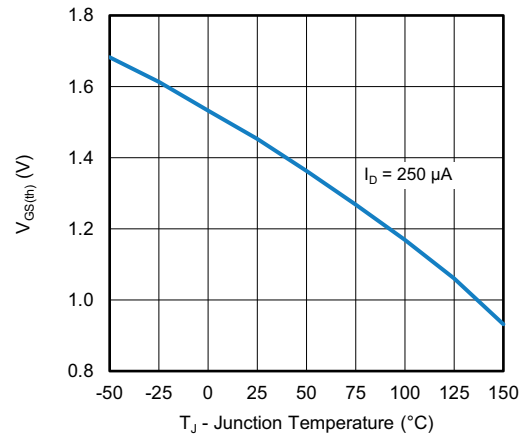
Transfer Characteristics



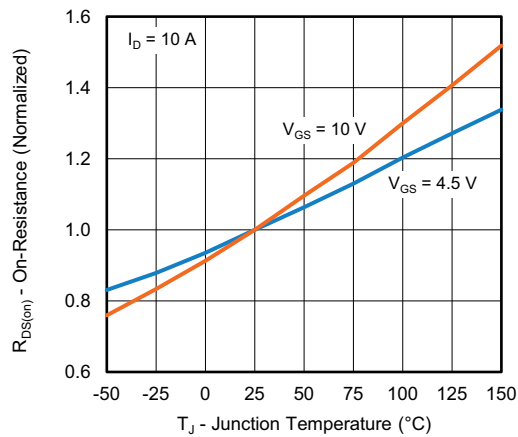
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



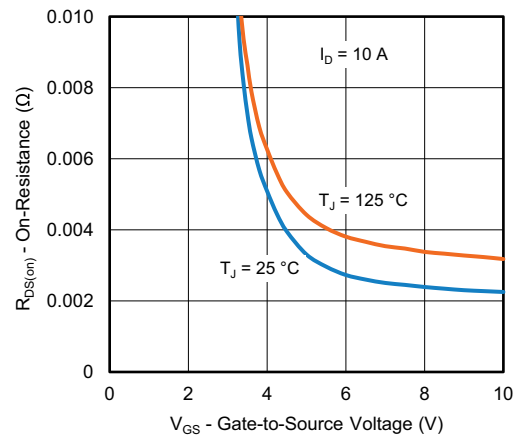
Capacitance



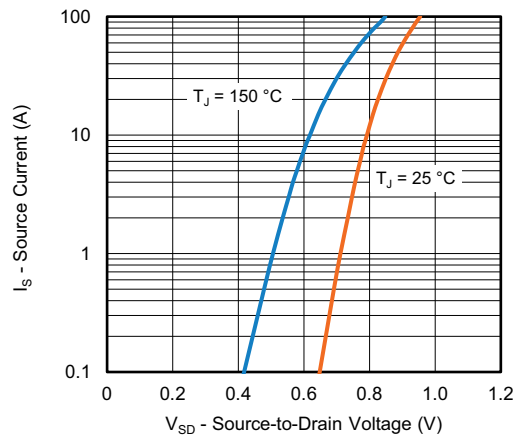
Threshold Voltage



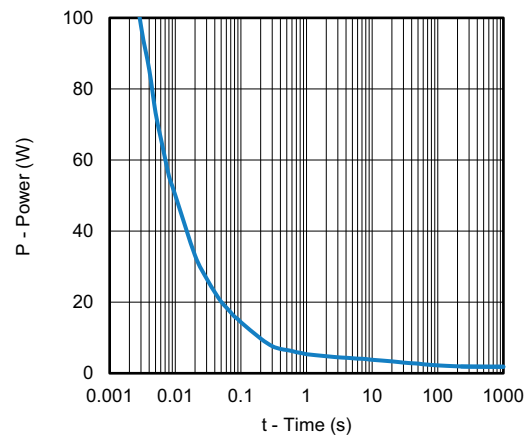
On-Resistance vs. Junction Temperature



On-Resistance vs. Gate-to-Source Voltage



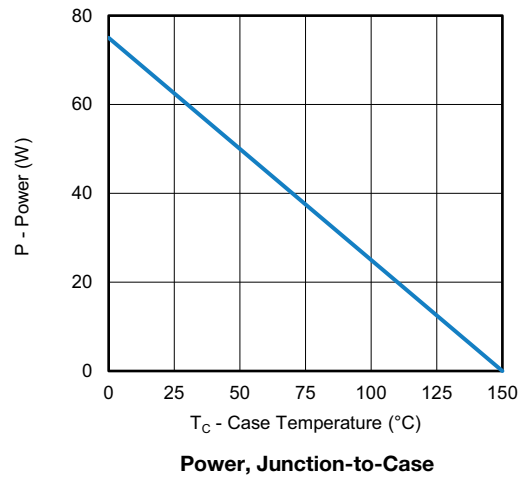
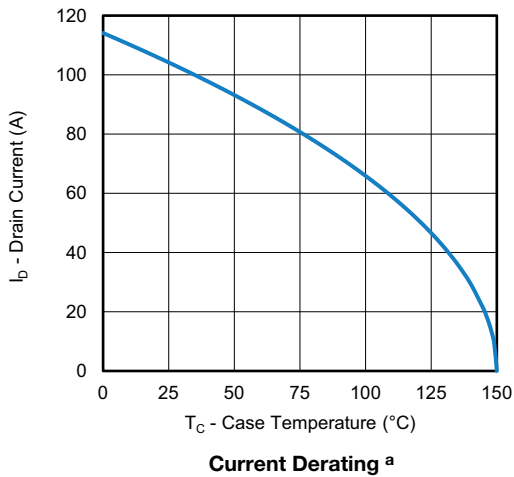
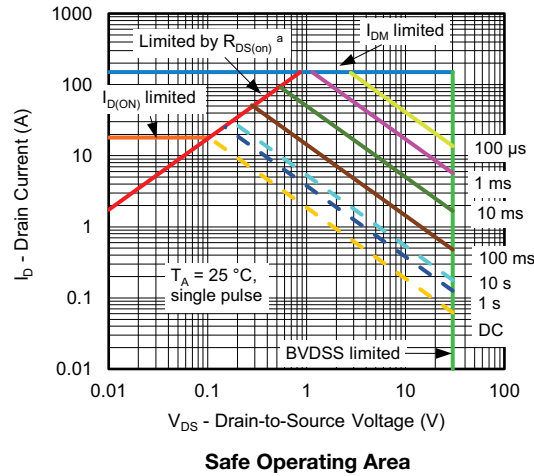
Source-Drain Diode Forward Voltage



Single Pulse Power, Junction-to-Ambient



TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)

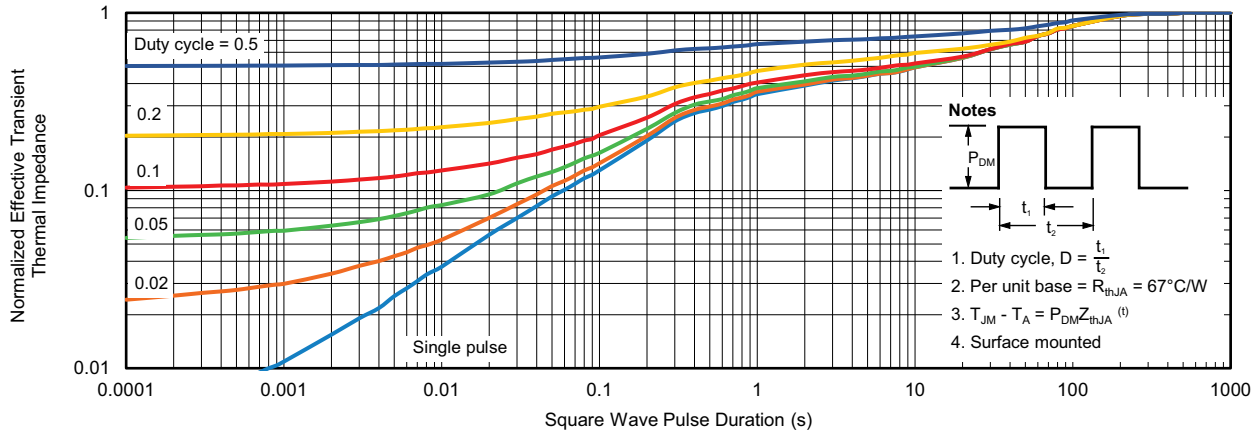


Note

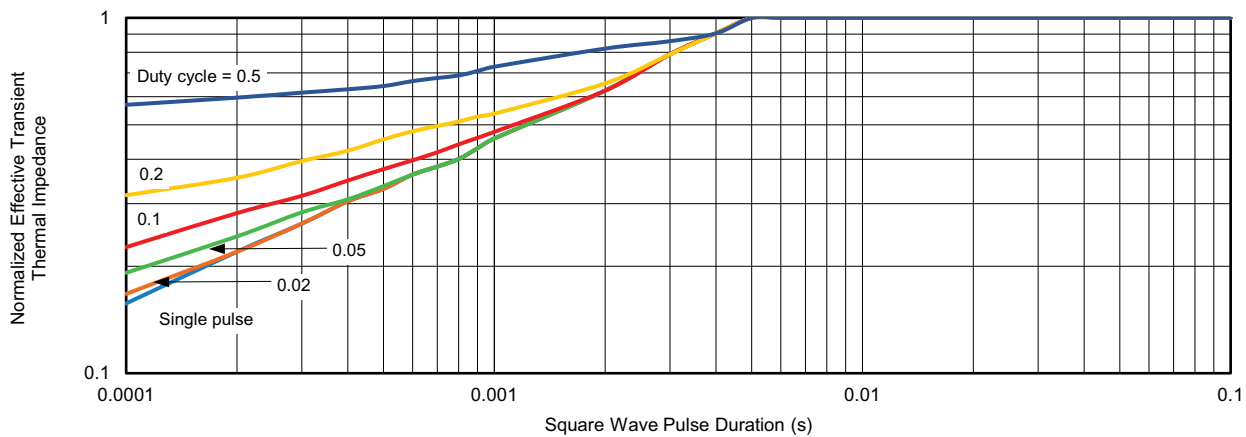
a. The power dissipation P_D is based on $T_J \text{ max.} = 150\text{ }^\circ\text{C}$, using junction-to-case thermal resistance, and is more useful in settling the upper dissipation limit for cases where additional heatsinking is used. It is used to determine the current rating, when this rating falls below the package limit



TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



Normalized Thermal Transient Impedance, Junction-to-Ambient



Normalized Thermal Transient Impedance, Junction-to-Case

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