



New Product

Si1413DH
Vishay Siliconix

P-Channel 20-V (D-S) MOSFET

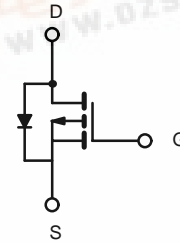
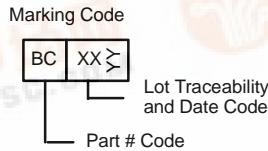
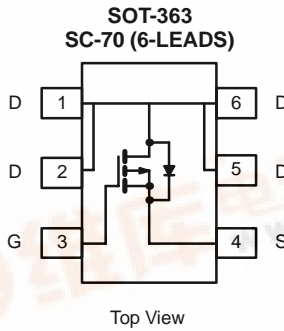
| PRODUCT SUMMARY | | |
|---------------------|----------------------------------|--------------------|
| V _{DS} (V) | r _{DS(on)} (Ω) | I _D (A) |
| -20 | 0.115 @ V _{GS} = -4.5 V | -2.9 |
| | 0.155 @ V _{GS} = -2.5 V | -2.4 |
| | 0.220 @ V _{GS} = -1.8 V | -2.0 |

FEATURES

- TrenchFET® Power MOSFETS: 1.8-V Rated
- Thermally Enhanced SC-70 Package

APPLICATIONS

- Load Switching
- PA Switch
- Level Switch



| ABSOLUTE MAXIMUM RATINGS (T _A = 25°C UNLESS OTHERWISE NOTED) | | | | | |
|---|-----------------------------------|-----------------------|--------------|------|---|
| Parameter | Symbol | 5 secs | Steady State | Unit | |
| Drain-Source Voltage | V _{DS} | -20 | | V | |
| Gate-Source Voltage | V _{GS} | ±8 | | | |
| Continuous Drain Current (T _J = 150°C) ^a | I _D | T _A = 25°C | -2.9 | -2.3 | A |
| | | T _A = 85°C | -2.0 | -1.6 | |
| Pulsed Drain Current | I _{DM} | -8 | | | |
| Continuous Diode Current (Diode Conduction) ^a | I _S | -1.4 | -0.9 | | |
| Maximum Power Dissipation ^a | P _D | T _A = 25°C | 1.56 | 1.0 | W |
| | | T _A = 85°C | 0.81 | 0.52 | |
| Operating Junction and Storage Temperature Range | T _J , T _{stg} | -55 to 150 | | °C | |

| THERMAL RESISTANCE RATINGS | | | | | |
|--|--------------|-------------------|---------|---------|------|
| Parameter | | Symbol | Typical | Maximum | Unit |
| Maximum Junction-to-Ambient ^a | t ≤ 5 sec | R _{thJA} | 60 | 80 | °C/W |
| | Steady State | | 100 | 125 | |
| Maximum Junction-to-Foot (Drain) | Steady State | R _{thJF} | 34 | 45 | |

Notes:
a. Surface Mounted on 1" x 1" FR4 Board.



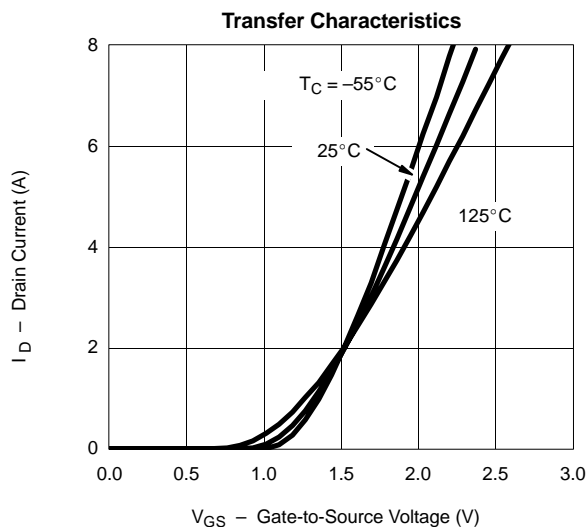
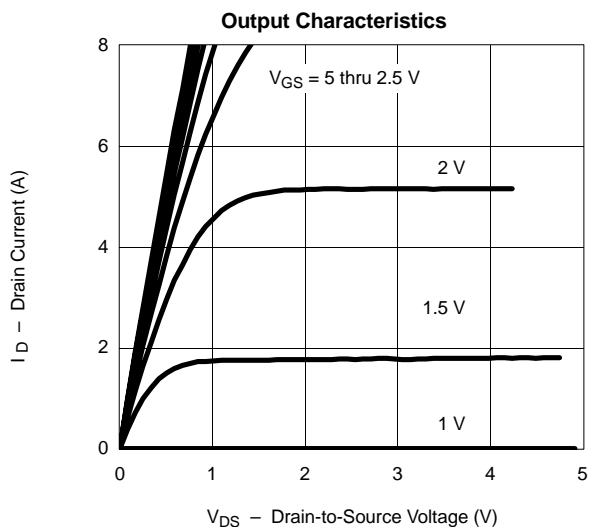
SPECIFICATIONS (T_J = 25 °C UNLESS OTHERWISE NOTED)

| Parameter | Symbol | Test Condition | Min | Typ | Max | Unit |
|---|---------------------|--|-------|-------|-------|------|
| Static | | | | | | |
| Gate Threshold Voltage | V _{GS(th)} | V _{DS} = V _{GS} , I _D = -100 μA | -0.45 | | 0.8 | V |
| Gate-Body Leakage | I _{GSS} | V _{DS} = 0 V, V _{GS} = ±8 V | | | ±100 | nA |
| Zero Gate Voltage Drain Current | I _{DSS} | V _{DS} = -16 V, V _{GS} = 0 V | | | -1 | μA |
| | | V _{DS} = -16 V, V _{GS} = 0 V, T _J = 85 °C | | | -5 | |
| On-State Drain Current ^a | I _{D(on)} | V _{DS} = -5 V, V _{GS} = -4.5 V | -4 | | | A |
| Drain-Source On-State Resistance ^a | r _{DS(on)} | V _{GS} = -4.5 V, I _D = -2.9 A | | 0.095 | 0.115 | Ω |
| | | V _{GS} = -2.5 V, I _D = -2.4 A | | 0.125 | 0.155 | |
| | | V _{GS} = -1.8 V, I _D = -1.0 A | | 0.180 | 0.220 | |
| Forward Transconductance ^a | g _{fs} | V _{DS} = -10 V, I _D = -2.9 A | | 6 | | S |
| Diode Forward Voltage ^a | V _{SD} | I _S = -1.4 A, V _{GS} = 0 V | | -0.80 | -1.1 | V |
| Dynamic^b | | | | | | |
| Total Gate Charge | Q _g | V _{DS} = -10 V, V _{GS} = -4.5 V, I _D = -2.9 A | | 6 | 8.5 | nC |
| Gate-Source Charge | Q _{gs} | | | 1.2 | | |
| Gate-Drain Charge | Q _{gd} | | | 1.2 | | |
| Turn-On Delay Time | t _{d(on)} | V _{DD} = -10 V, R _L = 10 Ω I _D ≅ -1 A, V _{GEN} = -4.5 V, R _G = 6 Ω | | 13 | 20 | ns |
| Rise Time | t _r | | | 32 | 50 | |
| Turn-Off Delay Time | t _{d(off)} | | | 34 | 50 | |
| Fall Time | t _f | | | 42 | 65 | |

Notes

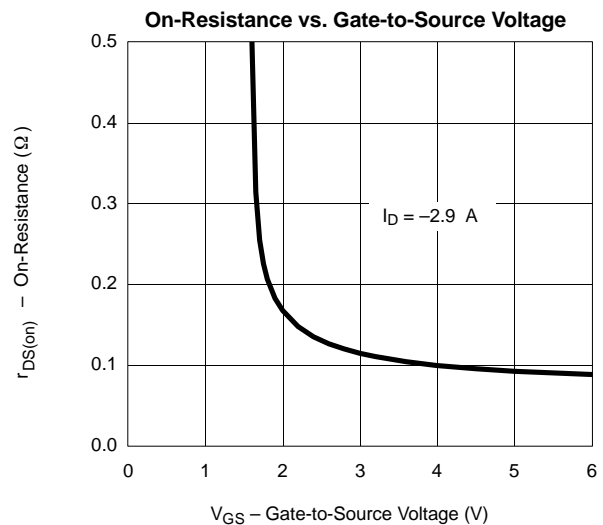
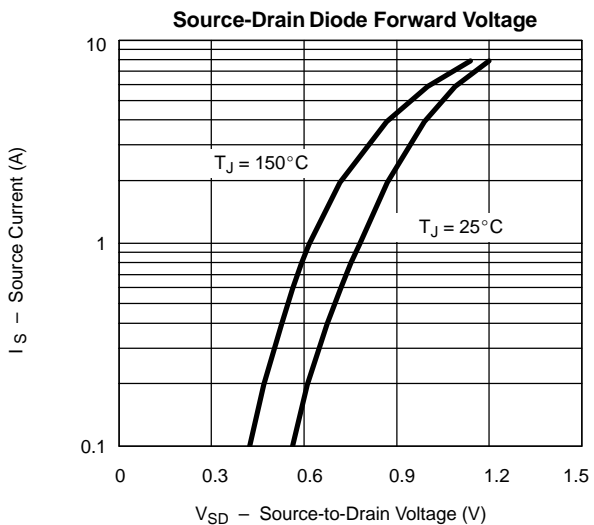
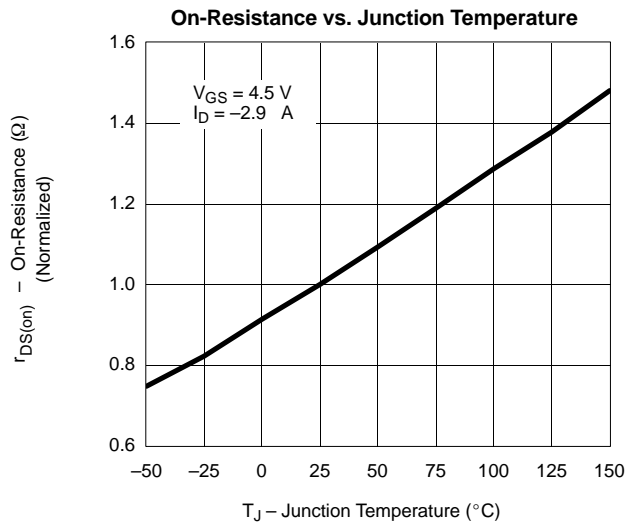
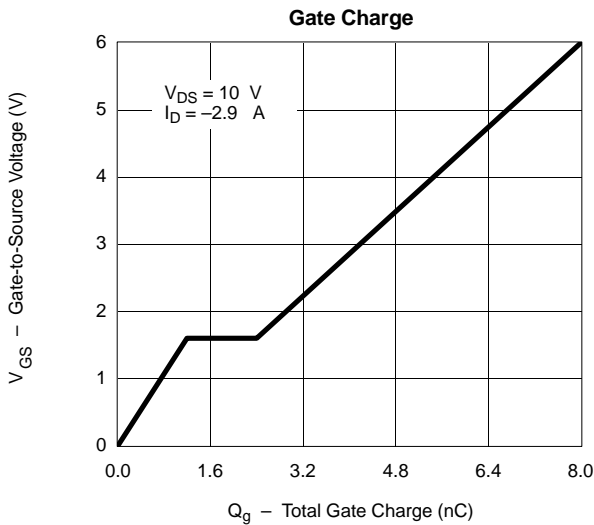
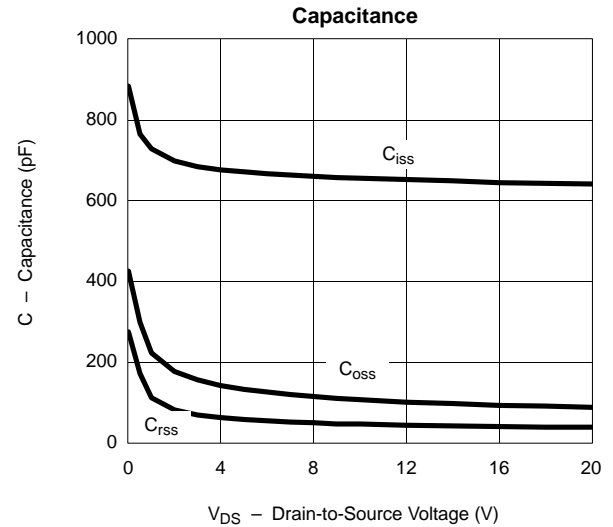
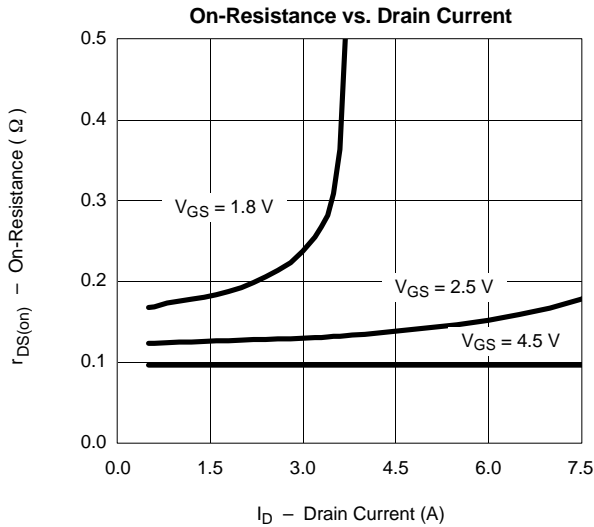
- a. Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2%.
- b. Guaranteed by design, not subject to production testing.

TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)





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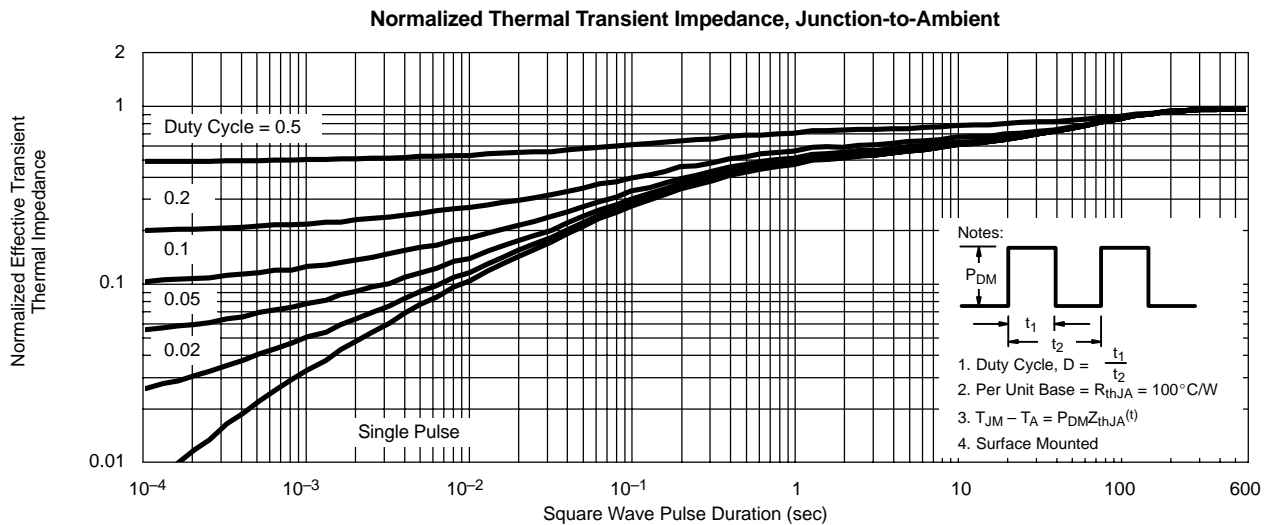
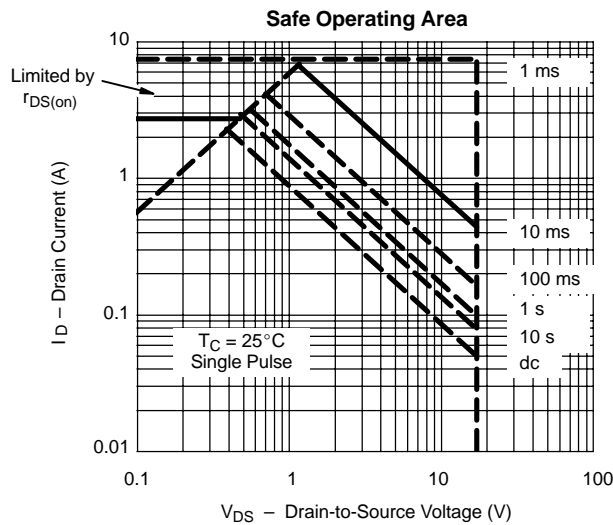
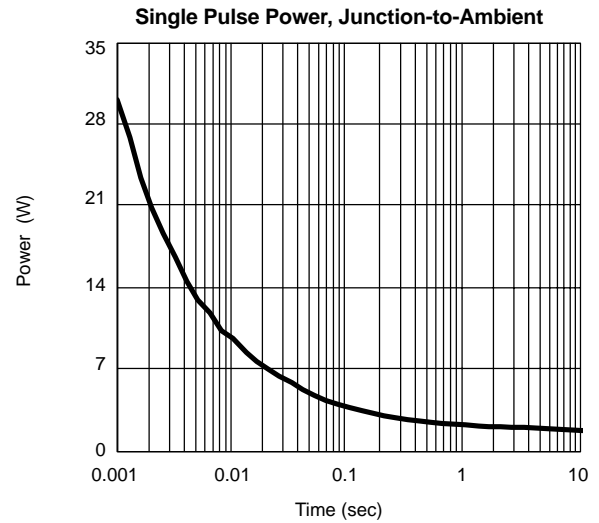
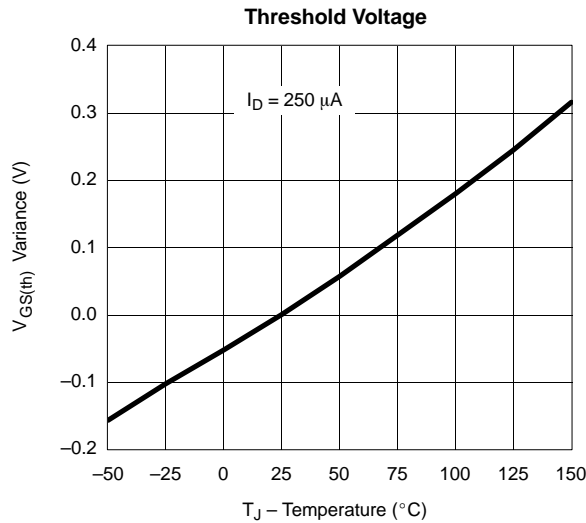
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