

P-Channel MOSFET

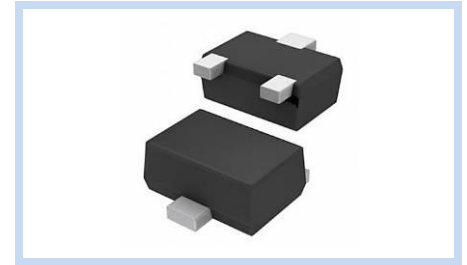
20V 420mA 150mW SOT-723 ESD

MFT2PA42S723E

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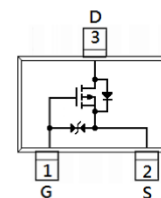
FEATURE

- $R_{DS(ON)} < 600m\Omega$, $V_{GS} = -4.5V$, $I_D = -300mA$
- $R_{DS(ON)} < 850m\Omega$, $V_{GS} = -2.5V$, $I_D = -200mA$
- $R_{DS(ON)} < 1200m\Omega$, $V_{GS} = -1.8V$, $I_D = -100mA$
- $R_{DS(ON)} < 1600m\Omega$, $V_{GS} = -1.5V$, $I_D = -50mA$
- $R_{DS(ON)} < 3000m\Omega$, $V_{GS} = -1.2V$, $I_D = -20mA$
- Advanced Trench Process Technology
- ESD Protected
- Application: Switch Load, PWM Application, etc.



MECHANICAL DATA

- Case: SOT-723 Package
- Terminals: Solderable per MIL-STD-750, Method 2026

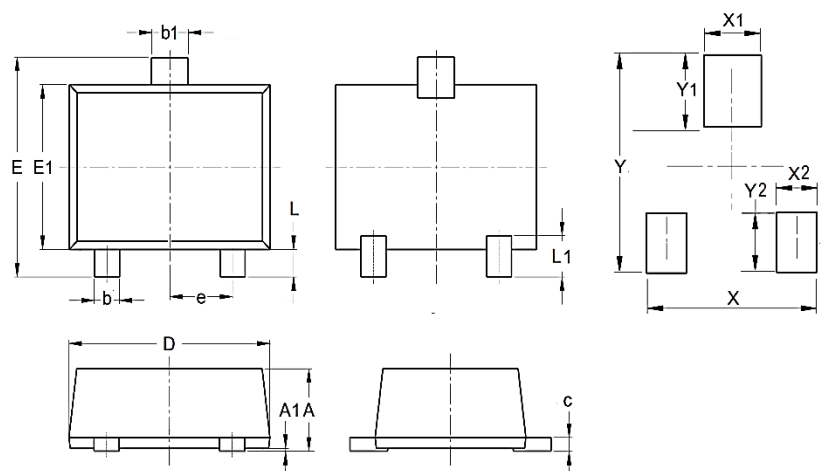


MAXIMUM RATINGS

| Parameter | Symbol | Value | Unit | |
|--|-----------------|---------------------------|--------------|----------------|
| Drain-Source Voltage | V_{DS} | -20 | V | |
| Gate-Source Voltage | V_{GS} | ± 8 | V | |
| Drain Current – Continuous | I_D | -420 | mA | |
| Drain Current – Pulsed | I_{DM} | -1000 | mA | |
| Power Dissipation | P_D | $T_A = 25^\circ C$ | 150 | mW |
| | | Derate above $25^\circ C$ | 1.2 | mW/ $^\circ C$ |
| Operating Junction and Storage Temperature Range | T_J, T_{stg} | -55 to 150 | $^\circ C$ | |
| Thermal Resistance, Junction to Ambient | $R_{\theta JA}$ | 833 | $^\circ C/W$ | |

DIMENSIONS

| SOT-723 | Min (mm) | Max (mm) |
|---------|----------|----------|
| A | 0.43 | 0.50 |
| A1 | 0.00 | 0.05 |
| b | 0.17 | 0.27 |
| b1 | 0.27 | 0.37 |
| c | 0.08 | 0.15 |
| D | 1.15 | 1.25 |
| E | 1.15 | 1.25 |
| E1 | 0.75 | 0.85 |
| e | 0.58 | 0.63 |
| L | 0.30 | 0.50 |
| L1 | 0.30 | |
| X | 1.12 | |
| X1 | 0.42 | |
| X2 | 0.32 | |
| Y | 1.30 | |
| Y1 | 0.30 | |
| Y2 | 0.30 | |



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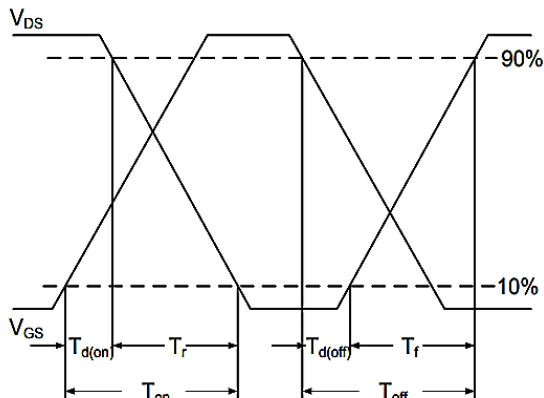
ELECTRICAL CHARACTERISTICS

| Off Characteristics | Conditions | Symbol | Min | Typ. | Max | Unit |
|-----------------------------------|---|--------------|------|-------|----------|------------|
| Drain-Source Breakdown Voltage | $V_{GS}=0V, I_D=-250\mu A$ | BV_{DSS} | -20 | -- | -- | V |
| Gate-Source Leakage Current | $V_{DS}=0V, V_{GS}=\pm 8V$ | I_{GSS} | -- | -- | ± 10 | μA |
| Zero Gate Voltage Drain Current | $V_{DS}=-20V, V_{GS}=0V$ | I_{DSS} | -- | -- | -1 | μA |
| On Characteristics | Conditions | Symbol | Min | Typ. | Max | Unit |
| Static Drain-Source On-Resistance | $V_{GS}=-4.5V, I_D=-300mA$ | $R_{DS(ON)}$ | -- | 420 | 600 | m Ω |
| | $V_{GS}=-2.5V, I_D=-200mA$ | | -- | 540 | 850 | |
| | $V_{GS}=-1.8V, I_D=-100mA$ | | -- | 685 | 1200 | |
| | $V_{GS}=-1.5V, I_D=-50mA$ | | -- | 855 | 1600 | |
| | $V_{GS}=-1.2V, I_D=-20mA$ | | -- | 1540 | 3000 | |
| Gate Threshold Voltage | $V_{GS}=V_{DS}, I_D=-250\mu A$ | $V_{GS(th)}$ | -0.3 | -0.64 | -1.0 | V |
| Dynamic Characteristics | Conditions | Symbol | Min | Typ. | Max | Unit |
| Input Capacitance | $V_{DS}=-10V, V_{GS}=0V, F=1.0MHz$ | C_{iss} | -- | 57.5 | -- | pF |
| Output Capacitance | | C_{oss} | -- | 14.2 | -- | |
| Reverse Transfer Capacitance | | C_{rss} | -- | 0.18 | -- | |
| Turn-On Delay Time | $V_{DS}=-16V, I_D=-0.3A, V_{GS}=-4.5V, R_G=3.3\Omega$ | $T_{d(on)}$ | -- | 6 | -- | ns |
| Rise Time | | T_r | -- | 23 | -- | |
| Turn-Off Delay Time | | $T_{d(off)}$ | -- | 1576 | -- | |
| Fall Time | | T_f | -- | 752 | -- | |
| Total Gate Charge | | Q_g | -- | 1.2 | -- | |
| Gate-Source Charge | Q_{gs} | -- | 0.1 | -- | | |
| Gate-Drain Charge | Q_{gd} | -- | 0.2 | -- | | |
| Gate Resistance | $F=1.0MHz$ | R_G | -- | 3.7 | -- | Ω |
| Drain-Source Body Diode | Conditions | Symbol | Min | Typ. | Max | Unit |
| Diode Forward Current | -- | I_S | -- | -- | -180 | mA |
| Diode Forward Voltage | $I_S=-0.3A, V_{GS}=0V$ | V_{SD} | -- | -0.85 | -1.0 | V |

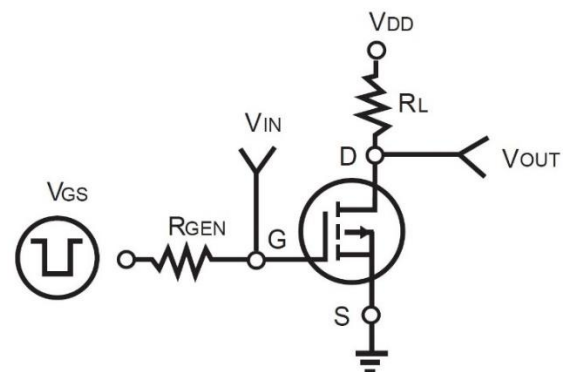
Notes:

- $T_A = 25^\circ C$ unless otherwise noted.
- Pulse width < 300 μs , Duty cycle < 2%.
- Repetitive rating, pulse width limited by junction temperature $T_J(MAX)=150^\circ C$. Ratings are based on low frequency and duty cycles to keep initial $T_J=25^\circ C$.
- $R_{\theta JA}$ is the sum of the junction-to-case and case-to-ambient thermal resistance where the case thermal reference is defined as the solder mounting surface of the drain pins mounted on a 1 inch² with 2oz. square pad of copper.
- The maximum current rating is package limited.
- Guaranteed by design, not subject to production testing.

Switching Time Waveform

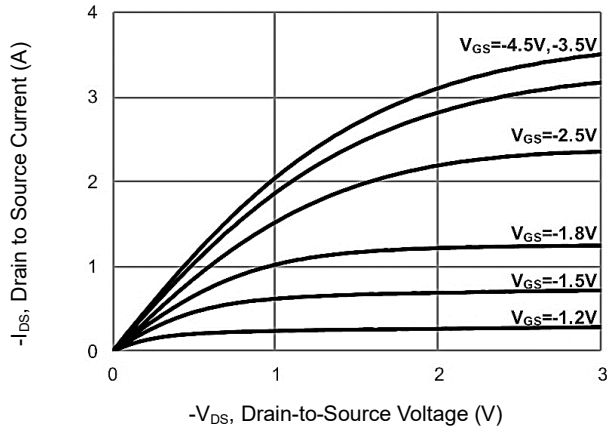


Switching Test Circuit

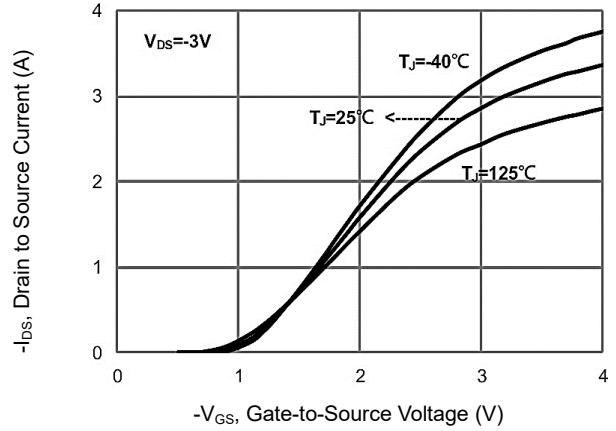


CHARACTERISTIC CURVES

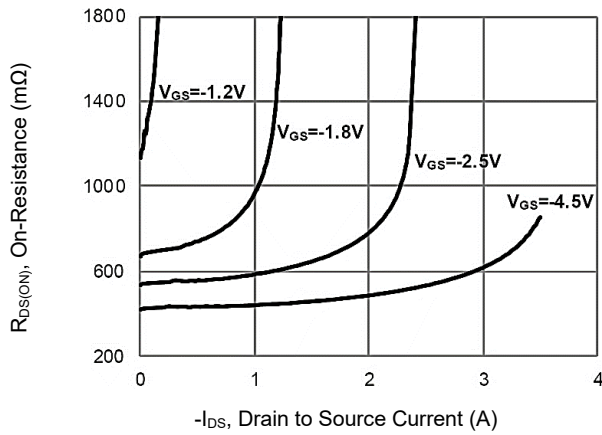
On Region Characteristics



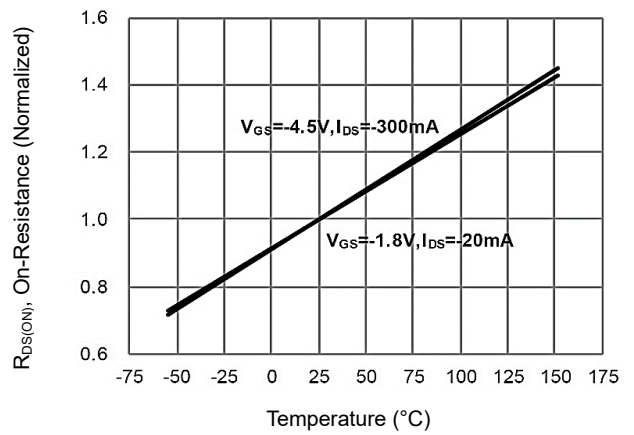
Transfer Characteristics



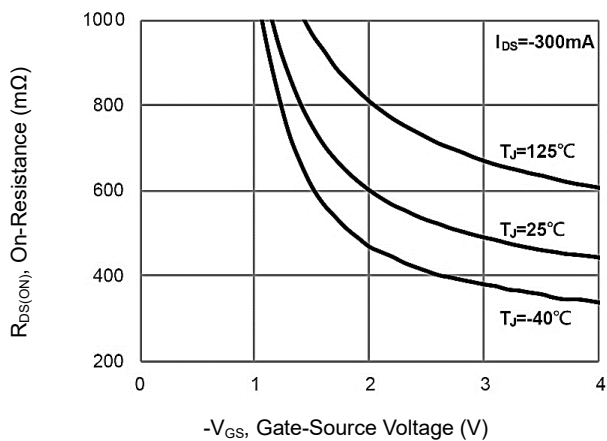
On-Resistance vs. Drain Current



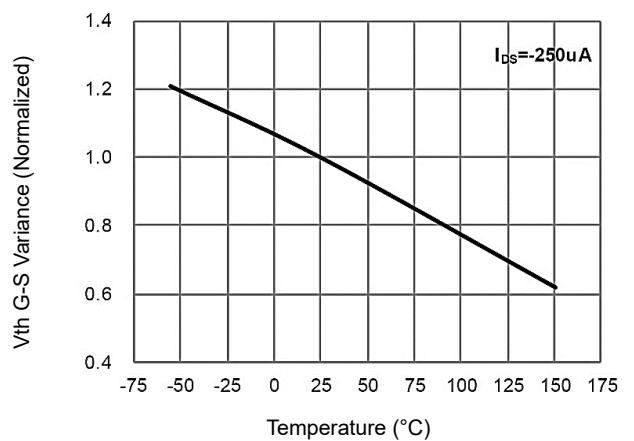
On-Resistance vs. Junction Temperature



On-Resistance Variation with V_{GS}



Threshold Voltage Variance vs. Temperature



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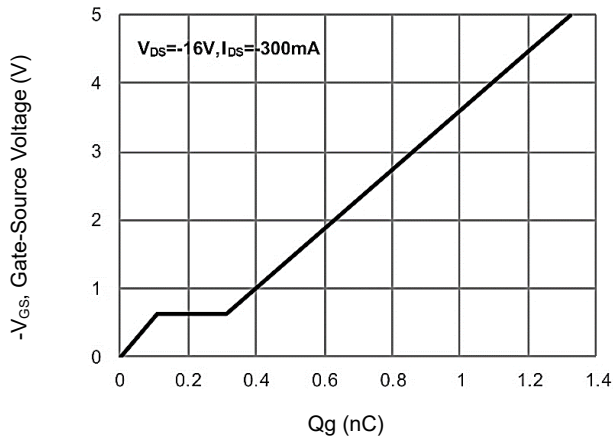
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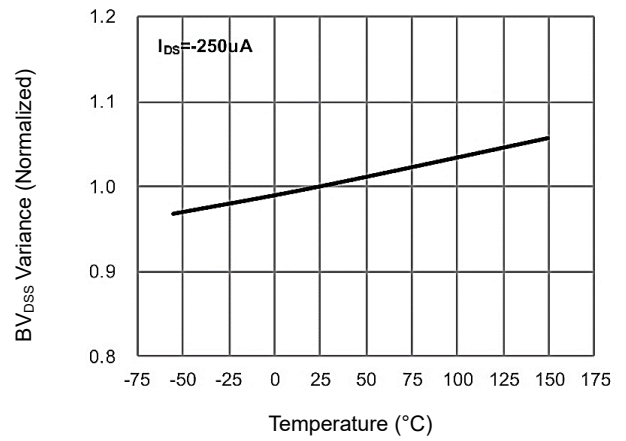
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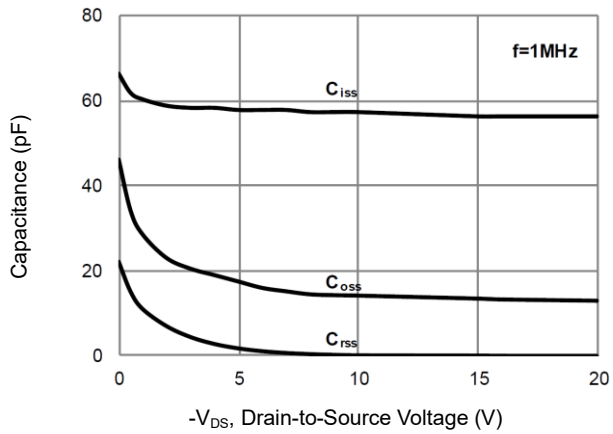
Gate Charge Characteristics



Breakdown Voltage Variation vs Temperature



Capacitance vs. Drain-Source Voltage



Body Diode Characteristics

