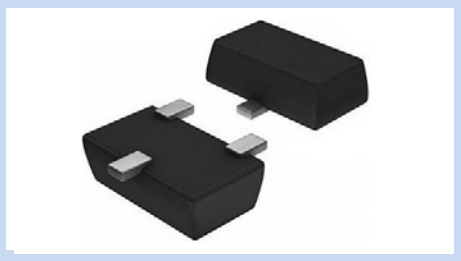
N-Channel MOSFET
20V 500mA 300mW SOT-523 ESD

MFT2NA50S523E

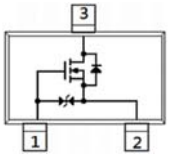
MERITEK

FEATURE



- $R_{DS(ON)}$<400mΩ, V_{GS}=4.5V, I_D=500mA
- $R_{DS(ON)}$<650mΩ, V_{GS}=2.5V, I_D=200mA
- $R_{DS(ON)}$<800mΩ, V_{GS}=1.8V, I_D=100mA
- Advanced Trench Process Technology
- ESD Protected
- Low Voltage Drive (1.2V)

MECHANICAL DATA



RoHS

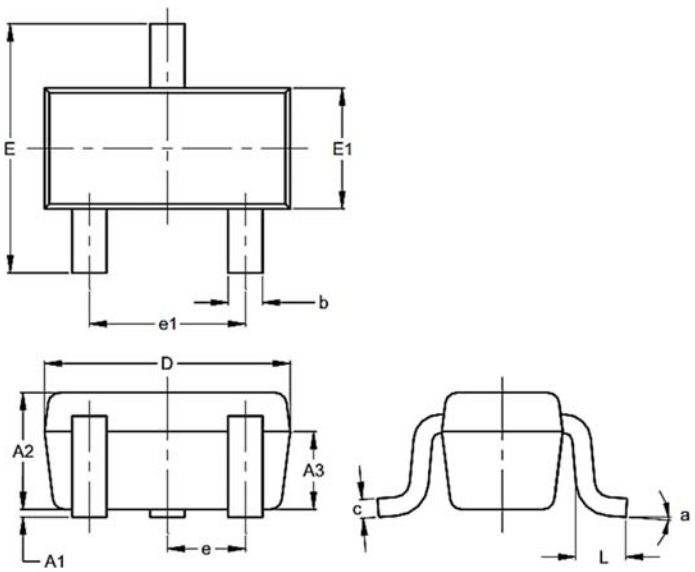
- Case Package: SOT-523
- Terminals: Solderable per MIL-STD-750, Method 2026

MAXIMUM RATINGS

Parameter		Symbol	Value	Unit
Drain-Source Voltage		V_{DS}	20	V
Gate-Source Voltage		V_{GS}	±10	V
Drain Current – Continuous		I_D	500	mA
Drain Current – Pulsed		I_{DM}	1000	mA
Power Dissipation	(T_C=25°C)	P_D	300	mW
	Derate above 25°C		2.4	mW/°C
Thermal Resistance Junction to Ambient		$R_{\theta JA}$	417	°C/W
Operating Junction and Storage Temperature		T_J,T_{STG}	-55 to 150	°C

DIMENSIONS

Item	Min (mm)	Max (mm)
A1	-	0.10
A2	0.60	0.80
A3	0.45	0.65
b	0.15	0.30
C	0.10	0.20
D	1.50	1.70
E	1.45	1.75
E1	0.75	0.85
e	0.50 BSC	
e1	0.90	1.10
L	0.20	0.40
a	0°	8°

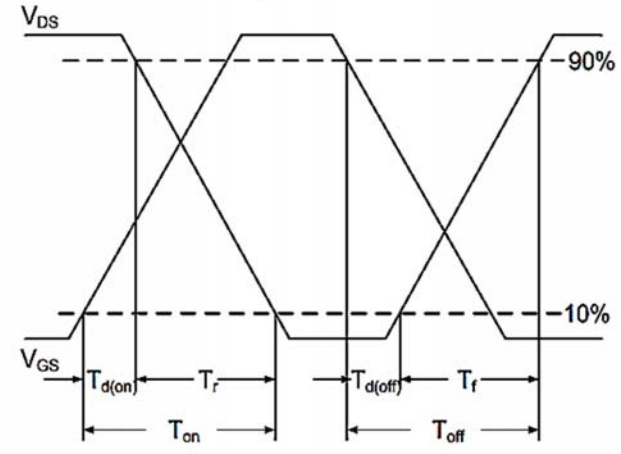


ELECTRICAL CHARACTERISTICS

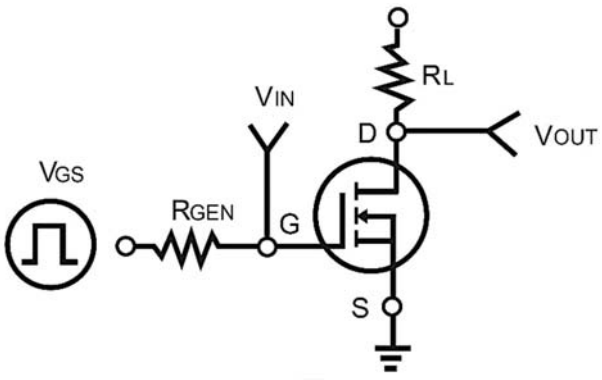
Off Characteristics	Conditions	Symbol	Min	Typ.	Max	Unit
Drain-Source Breakdown Voltage	V_{GS}=0V, I_D=250μA	BV_{DSS}	20	--	--	V
Drain-Source Leakage Current	V_{DS}=16V, V_{GS}=0V	I_{DSS}	--	--	1	μA
Gate-Source Leakage Current	V_{GS}=±8V, V_{DS}=0V	I_{GSS}	--	±0.5	±10	μA
On Characteristics	**Conditions**	**Symbol**	**Min**	**Typ.**	**Max**	**Unit**
Static Drain-Source On-Resistance	V_{GS}=4.5V, I_D=0.5A	$R_{DS(ON)}$	--	310	400	mΩ
	V_{GS}=2.5V, I_D=0.2A		--	360	650	
	V_{GS}=1.8V, I_D=0.1A		--	430	800	
	V_{GS}=1.5V, I_D=0.05A		--	510	1200	
	V_{GS}=1.2V, I_D=0.02A		--	710	3000	
Gate Threshold Voltage	V_{GS}=V_{DS}, I_D=250μA	$V_{GS(th)}$	0.3	0.64	0.9	V
Dynamic Characteristics	**Conditions**	**Symbol**	**Min**	**Typ.**	**Max**	**Unit**
Total Gate Charge	V_{DS}=10V, V_{GS}=4.5V, I_D=0.5A	Q_g	--	1.4	--	nC
Gate-Source Charge		Q_{gs}	--	0.22	--	
Gate-Drain Charge		Q_{gd}	--	0.21	--	
Turn-On Delay Time	V_{DD}=10V, V_{GS}=4.0V, R_G=10Ω I_D=0.150A	$T_{d(on)}$	--	2.8	--	ns
Rise Time		T_r	--	20	--	
Turn-Off Delay Time		$T_{d(off)}$	--	23	--	
Fall Time		T_f	--	23	--	
Input Capacitance	V_{DS}=10V, V_{GS}=0V, F=1MHz	C_{iss}	--	67	--	pF
Output Capacitance		C_{oss}	--	19	--	
Reverse Transfer Capacitance		C_{rss}	--	6	--	
Drain-Source Body Diode	**Conditions**	**Symbol**	**Min**	**Typ.**	**Max**	**Unit**
Continuous Source Current	-	I_S	--	--	500	mA
Diode Forward Voltage	V_{GS}=0V, I_S=0.5A	V_{SD}	--	0.87	1	V

Note:
1. T_A=25°C unless otherwise noted.
2. $R_{\Theta JA}$ is the sum of the junction-to-case and case-to-ambient thermal resistance where the case temral reference is defined as the solder mounting surface of the drain pins mounted on a 1 inch FR-4 with 2oz. square pad of copper.
3. The data tested by pulsed, pulse width ≤ 300μs, duty cycle ≤2%.
4. The maximum current rating is package limited.
5. Essentially independent of operating temperature.

Switching Time Waveform

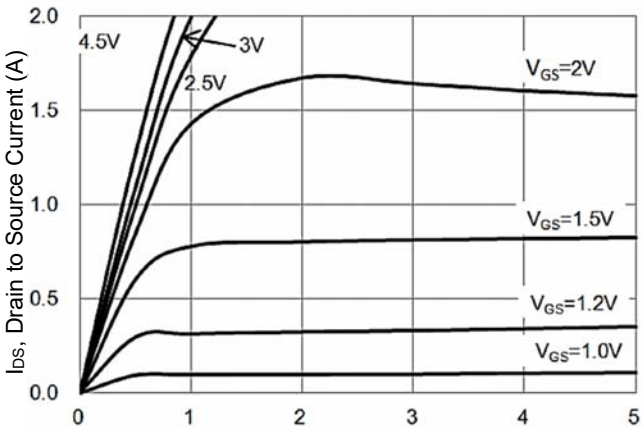


Switching Test Circuit



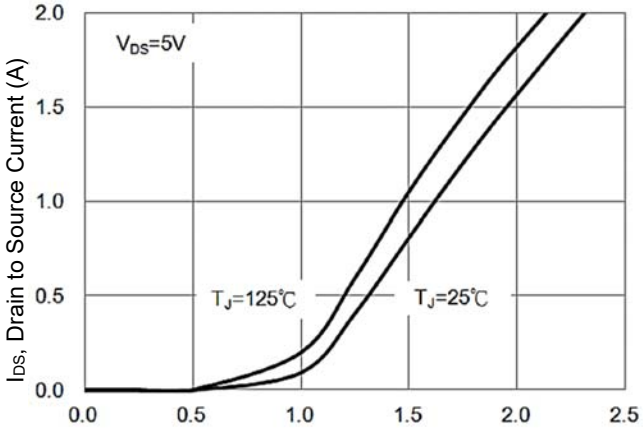
CHARACTERISTICS CURVES

On-Region Characteristics



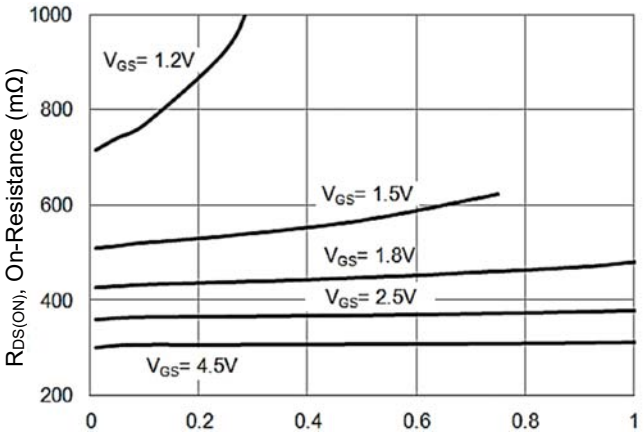
V_{DS}, Drain to Source Voltage (V)

Transfer Characteristics



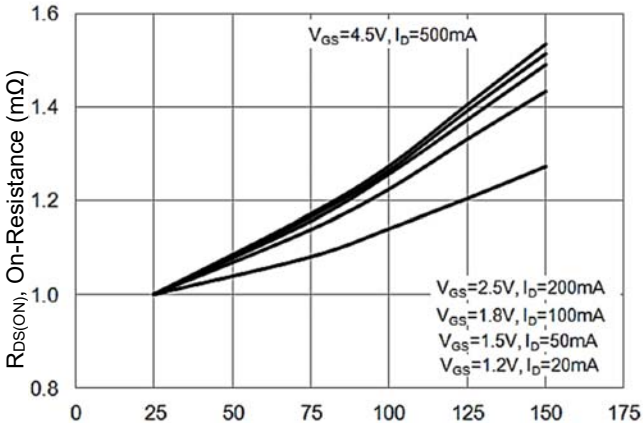
V_{GS}, Gate to Source Voltage (V)

On-Resistance vs. Drain Current



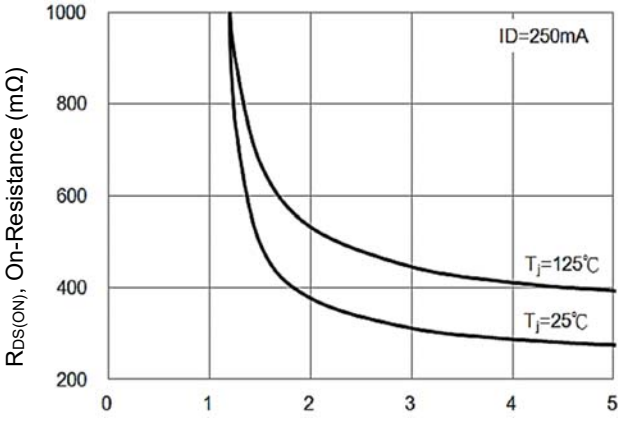
I_{DS}, Drain to Source Current (A)

On-Resistance vs. Junction Temperature



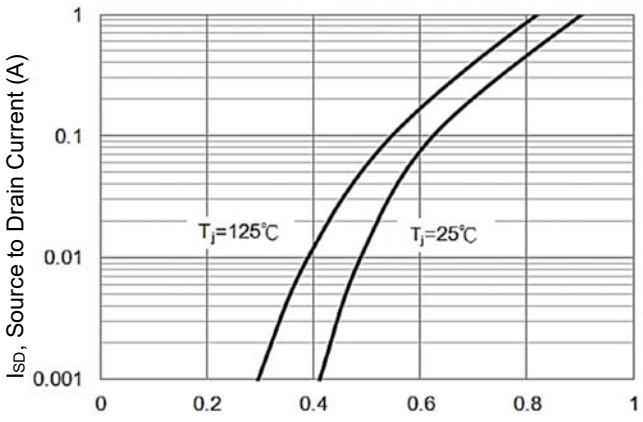
Temperature (°C)

On-Resistance Variation with VGS



V_{GS}, Gate to Source Voltage (V)

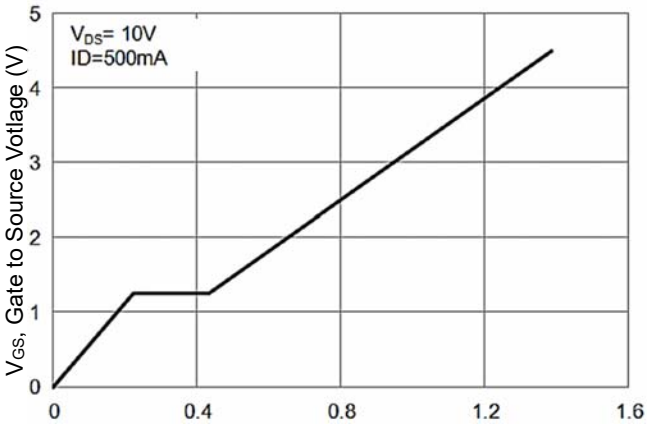
Body Diode Characteristics



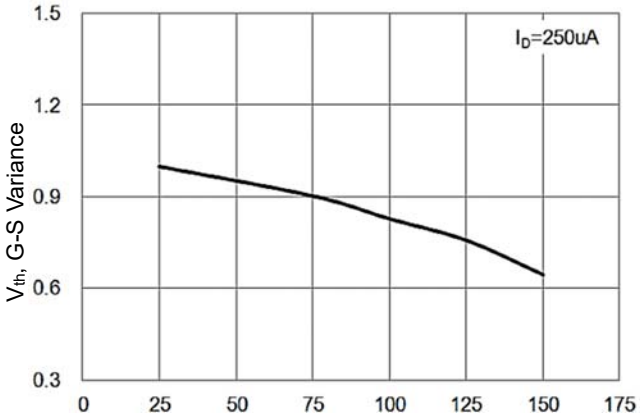
V_{SD}, Source to Drain Voltage (V)

CHARACTERISTIC CURVES

Gate-Charge Characteristics



Threshold Voltage Variation with Temperature



Capacitance vs. Drain-Source Voltage