P-Channel MOSFET
20V 0.5A 0.5W SOT-23 ESD

MFT2PA5S23E

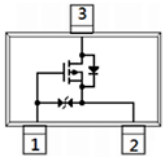
MERITEK

FEATURE

- $R_{DS(ON)}$<1.2Ω, V_{GS}=-4.5V
- $R_{DS(ON)}$ <1.5Ω, V_{GS}=-2.5V
- Advanced Trench Process technology
- Application: Switch Load, PWN Application, etc
- ESD Protected

MECHANICAL DATA

- Case: SOT-23 Package
- Terminals: Solderable per MIL-STD-750, Method 2026



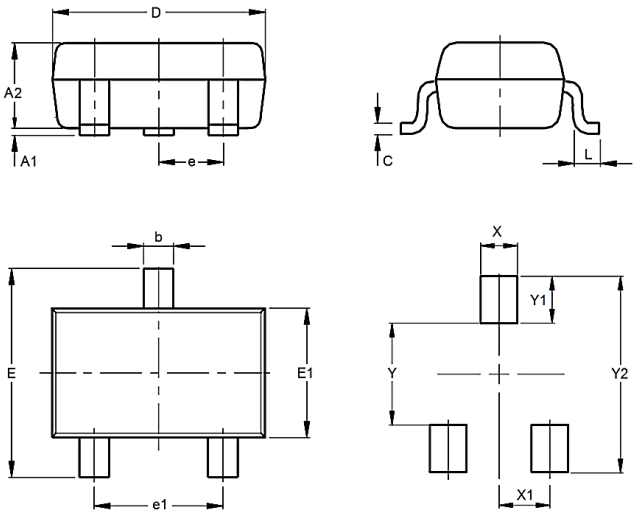
RoHS

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	-0.5	A
Drain Current – Pulsed		I_{DM}	-1.0	A
Power Dissipation	T_A=25°C	P_D	0.5	W
	Derate above 25°C		4	mW / °C
Thermal Resistance, Junction to Ambient		$R_{\theta JA}$	250	°C / W
Operating Junction and Storage Temperature Range		T_J, T_{stg}	-55 to 150	°C

DIMENSIONS

Item	Min (mm)	Max (mm)
A1	0.00	0.10
A2	0.80	1.10
b	0.35	0.50
c	0.08	0.20
D	2.80	3.04
e	0.90	1.00
e1	1.80	2.00
E	2.20	2.60
E1	1.20	1.40
L	0.15	--
X	0.80	--
X1	0.95	
Y	1.10	
Y1	0.90	--
Y2	2.90	

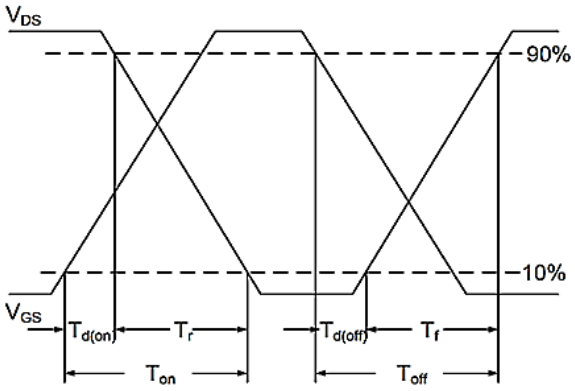


ELECTRICAL CHARACTERISTICS

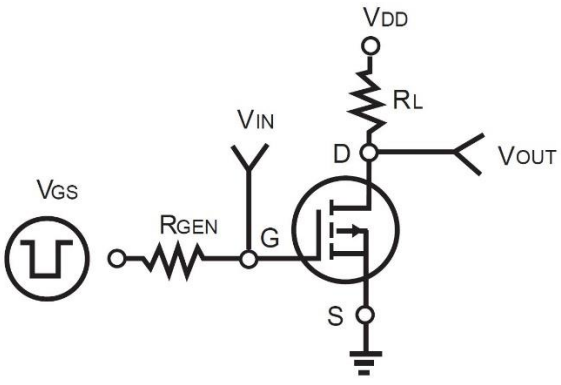
Off Characteristics	Conditions	Symbol	Min	Typ.	Max	Unit
Drain-Source Breakdown Voltage	V_{GS}=0V, I_D= -250μA	BV_{DSS}	-20	--	--	V
Gate Threshold Voltage	V_{GS}=V_{DS}, I_D= -250μA	$V_{GS(th)}$	-0.3	-0.59	-1.0	V
Gate Leakage Current	V_{DS}=0V, V_{GS}=±8V	I_{GSS}	--	±2	±10	μA
Zero Gate Voltage Drain Current	V_{DS}= -16V, V_{GS}=0V	I_{DSS}	--	-0.01	-1	μA
On Characteristics	**Conditions**	**Symbol**	**Min**	**Typ.**	**Max**	**Unit**
Static Drain-Source On-Resistance	V_{GS}= -4.5V, I_D= -500mA	$R_{DS(ON)}$	--	0.85	1.2	Ω
	V_{GS}= -2.5V, I_D= -200mA		--	0.98	1.5	
	V_{GS}=-1.8V, I_D=-100mA		--	1.15	2.2	
	V_{GS}= -1.5V, I_D= -50mA			1.33	3.6	
	V_{GS}=-1.2V, I_D=-10mA			1.5	6.0	
Dynamic Characteristics	**Conditions**	**Symbol**	**--**	**Typ.**	**Max**	**Unit**
Input Capacitance	V_{DS}=-10V, V_{GS}=0V, F=1.0MHz	C_{iss}	--	38	--	pF
Output Capacitance		C_{oss}	--	15	--	
Reverse Transfer Capacitance		C_{rss}	--	9	--	
Turn-On Delay Time	V_{DD} =-10V, I_D ≡-0.5A, V_{GS} =-4.5V, R_G= 6Ω	$T_{d(on)}$	--	7.2	--	nS
Rise Time		T_r	--	21	--	
Turn-Off Delay Time		$T_{d(off)}$	--	85	--	
Fall Time		T_f	--	116	--	
Total Gate Charge	V_{DS}=-10V, V_{GS}=-4.5V, I_D≡-0.5A	Q_g	--	1.4	--	nC
Gate-Source Charge		Q_{gs}	--	0.19	--	
Gate-Drain Charge		Q_{gd}	--	0.2	--	
Drain-Source Body Diode	**Conditions**	**Symbol**	**Min**	**Typ.**	**Max**	**Unit**
Diode Forward Voltage	I_S= -0.5A,V_{GS}=0V	V_{SD}	--	-0.93	-1.3	V
Maximum Continuous Drain-Source Forward Current	---	I_S	--	--	-0.5	A

Note:
1. Pulse width<300μs, Duty cycle<2%.
2. $R_{\Theta JA}$ 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-inch FR-4 with 2oz square pad of copper.
3. Guaranteed by design, not subject to production testing.
4. The maximum current rating is package limited.
5. Essential independent of operating temperature typical characteristics

Switching Time Waveform

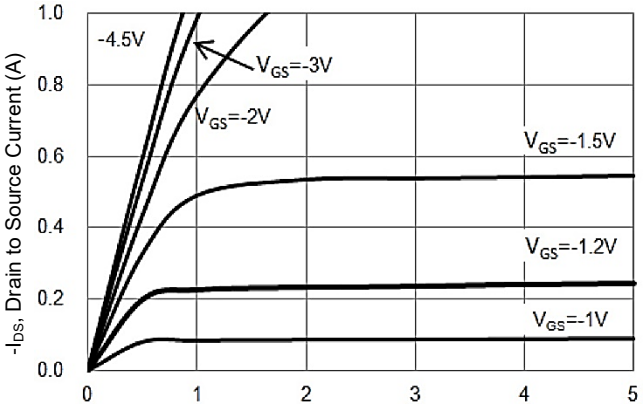


Switching Test Circuit

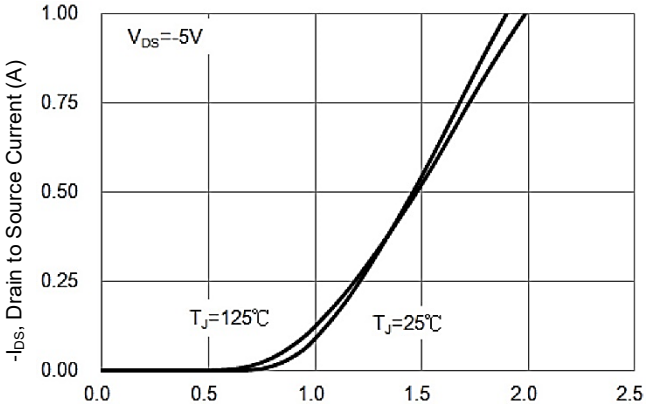


CHARACTERISTIC CURVES

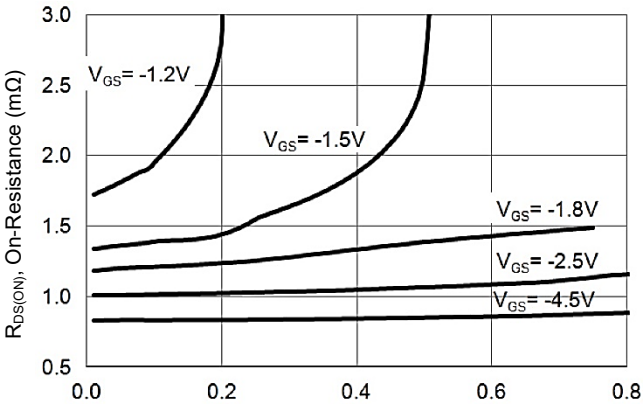
On Region Characteristics



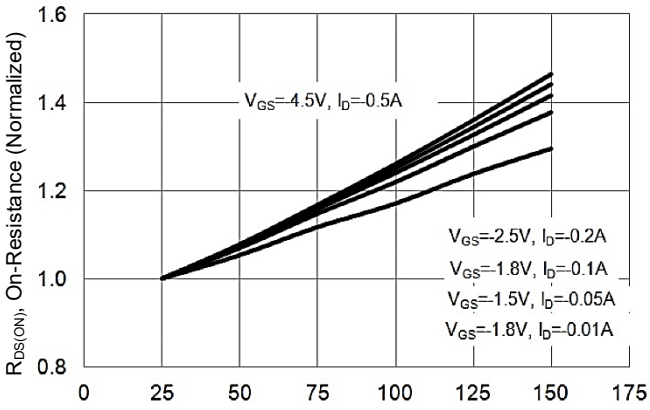
Transfer Characteristics



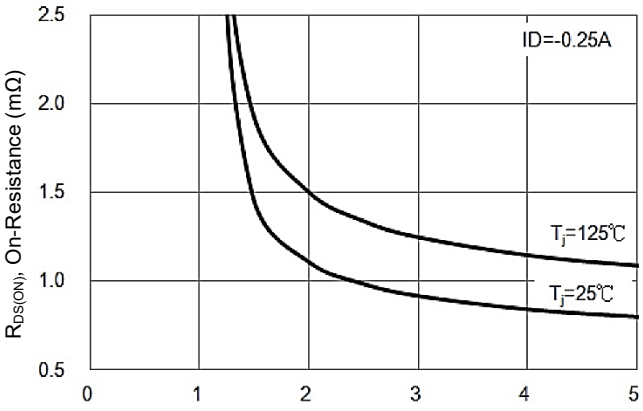
On-Resistance vs. Drain Current



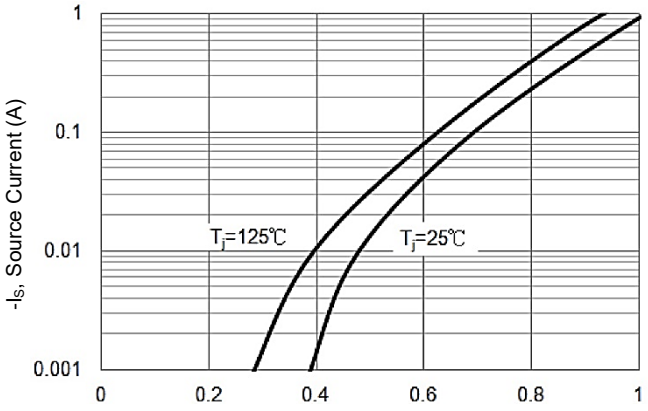
On-Resistance vs. Junction Temperature



On-Resistance Variation with V_{GS}

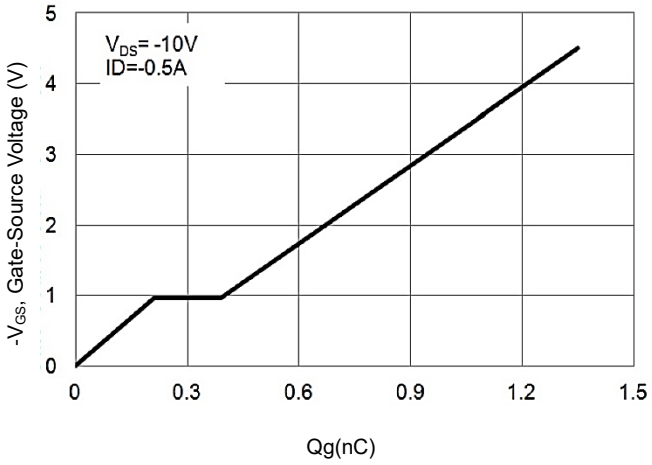


Body Diode Characteristics

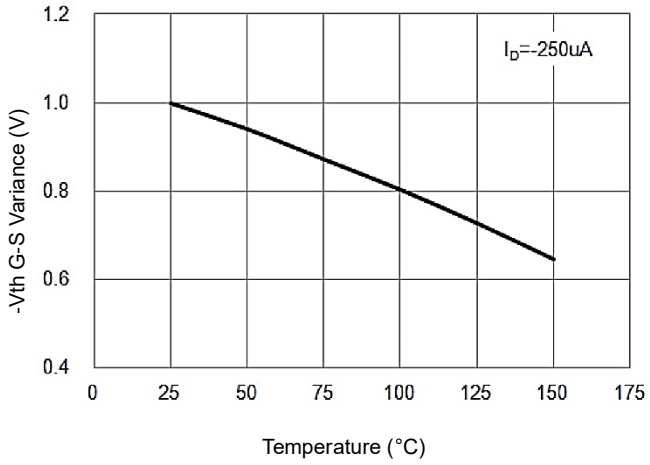


CHARACTERISTIC CURVES

Gate Charge Characteristics



Threshold Voltage Variance vs. Temperature



Capacitance vs. Drain-Source Voltage