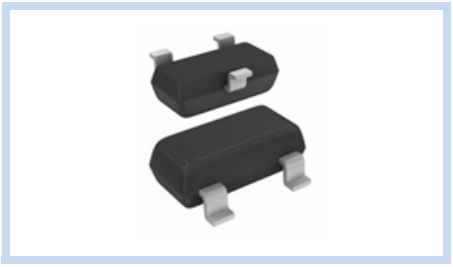
P-Channel MOSFET
20V 4.2A SOT-23

MFT2P4A2S23E

MERITEK

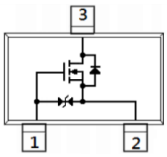
FEATURE

- $R_{DS(ON)}$ =39mΩ, V_{GS} at -4.5V
- Improved dv/dt Capability
- Low Gate Charge
- ESD Protection Gate



MECHANICAL DATA

- Case: SOT-23 package
- Terminal: Solderable per MIL-STD-750, Method 2026



RoHS

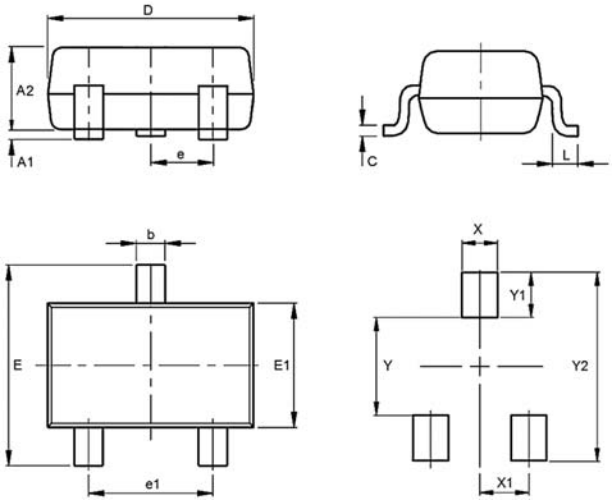
MAXIMUM RATINGS

Parameter		Symbol	Value	Unit
Drain-Source Voltage		V_{DS}	-20	V
Gate-Source Voltage		V_{GS}	±8	V
Drain Current – Continuous	T_A=25°C	I_D	-4.2	A
	T_A=70°C		-3.3	A
Drain Current – Pulsed		I_{DM}	-10.5	A
Power Dissipation	T_A=25°C	P_D	1.00	W
	T_C=70°C		1.56	W
Thermal Resistance Junction to Ambient		$R_{\theta JA}$	125	°C/W
Thermal Resistance Junction to case		$R_{\theta Jc}$	80	°C/W
Operating Junction and Storage Temperature		T_J ,T_{STG}	-55 to 150	°C

Note:
1. T_A=25°C. Exposure to absolute maximum rating conditions for extended periods may remain possibility to affect device reliability
2. The data tested by surface mounted on a 1 inch² FR-4 board with 2oz. copper
3. The data tested by pulsed, pulse width ≤300μs, duty cycle ≤2%
4. Power dissipation is limited by 150°C junction temperature

DIMENSIONS

SOT-23	Min (mm)	Max (mm)
A1	--	0.10
A2	0.79	1.30
b	0.30	0.50
C	0.08	0.20
D	2.70	3.10
e	0.89	1.02
e1	1.78	2.04
E	2.10	2.80
E1	1.20	1.60
L	0.15	--

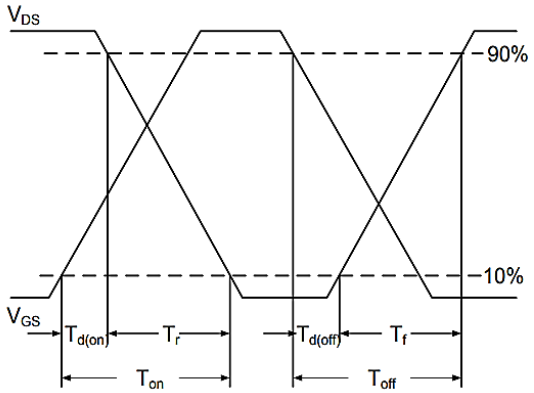


ELECTRICAL CHARACTERISTICS

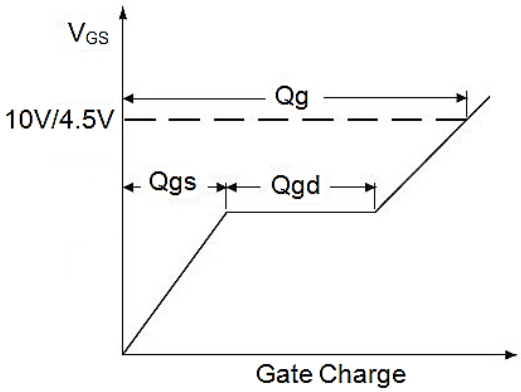
Off Characteristics	Conditions	Symbol	Min	Typ.	Max	Unit
Drain-Source Breakdown Voltage	V_{GS}=0V, I_D=-250μA	$V_{(BR)DSS}$	-20	--	--	V
Gate-Source Leakage Current	V_{GS}=±8V, V_{DS}=0V	I_{GSS}	--	--	±10	μA
Drain-Source Leakage Current	V_{DS}=-16V, V_{GS}=0V	I_{DSS}	--	--	-1	μA
Forward Transconductance	V_{DS}=-5V, I_d=-4A	g_{fs}	--	11	--	S
Off Characteristics	**Conditions**	**Symbol**	**Min**	**Typ.**	**Max**	**Unit**
Drain-Source On-Resistance	V_{GS}=-4.5V, I_D=-4.0A	$R_{DS(ON)}$	--	32	39	mΩ
	V_{GS}=-2.5V, I_D=-4.0A		--	39	51	
	V_{GS}=-1.8V, I_D=-2.0A		--	50	64	
Gate Threshold Voltage	V_{GS}=V_{DS}, I_D=-250μA	$V_{GS(th)}$	-0.30	-0.55	-0.90	V
Dynamic Characteristics	**Conditions**	**Symbol**	**Min**	**Typ.**	**Max**	**Unit**
Total Gate Charge	V_{DS}=-10V, V_{GS}=-2.5V, I_D=-4A	Q_g	--	5.1	--	nC
	V_{DS}=-10V, V_{GS}=-4.5V, I_D=-4A			6.8		
Gate-Source Charge		Q_{gs}	--	1.9	--	
Gate-Drain Charge		Q_{gd}	--	2.2	--	
Turn-On Delay Time	V_{DS}=-10V, V_{GS}=-4.5V, R_G=3Ω I_D=-4A	$T_{d(on)}$	--	10	--	ns
Rise Time		T_r	--	30	--	
Turn-Off Delay Time		$T_{d(off)}$	--	55	--	
Fall Time		T_f	--	15	--	
Input Capacitance	V_{DS}=-10V, V_{GS}=0V, F=1MHz	C_{iss}	--	1029	--	pF
Output Capacitance		C_{oss}	--	102	--	
Reverse Transfer Capacitance		C_{rss}	--	79	--	
Drain-Source Body Diode	**Conditions**	**Symbol**	**Min**	**Typ.**	**Max**	**Unit**
Diode Forward Voltage	V_{GS}=0V, I_S=-1A	V_{SD}	--	-0.85	-1.10	V

Note:
1. Guaranteed by design, not tested in mass production

Switching Time Waveform

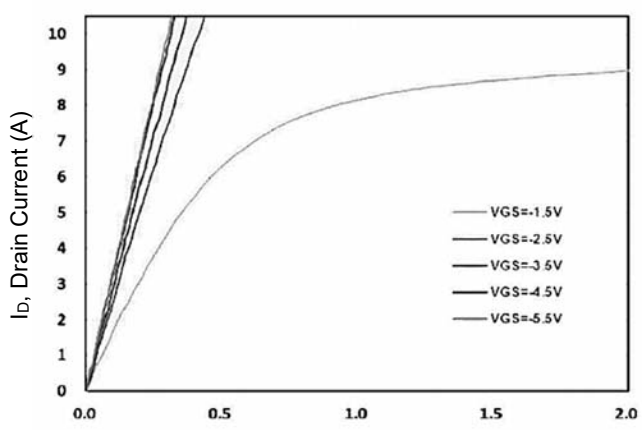


Gate Charge Waveform



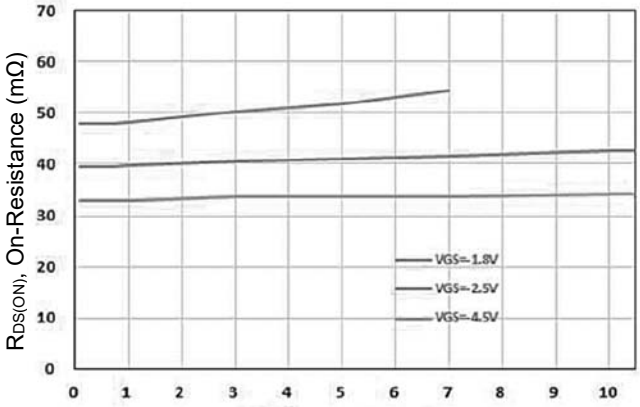
CHARACTERISTIC CURVE

Output Characteristics



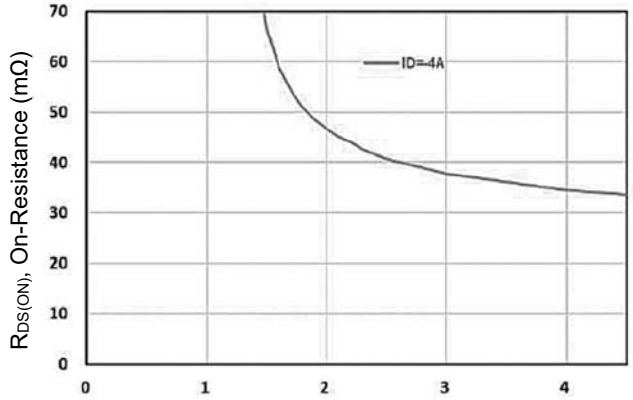
-V_{DS}, Drain-to-Source Voltage (V)

On-Resistance vs. I_D



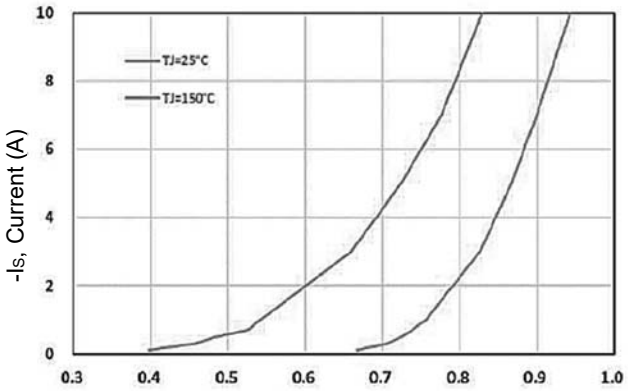
-I_D, Drain Current (A)

On-Resistance vs. V_{GS}



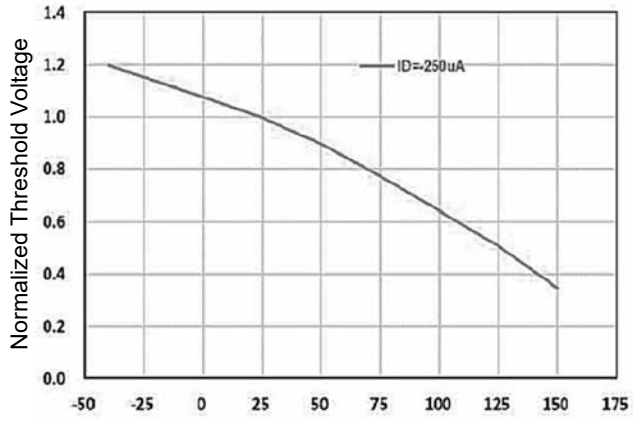
-V_{GS}, Gate Source Voltage (V)

Source-Drain Diode



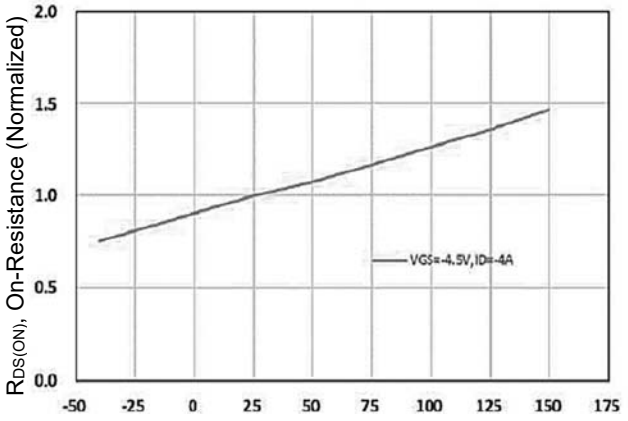
-V_{SD}, Source-to-Drain Voltage (V)

Threshold Voltage Variation with Temperature



T_J, Junction Temperature (°C)

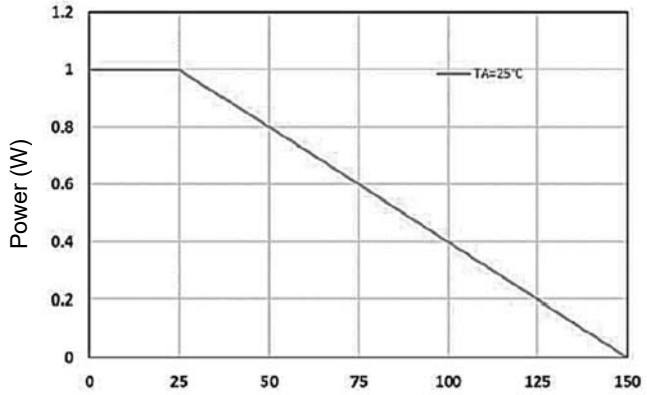
Source-Drain Diode Foward



T_J, Junction Temperature (°C)

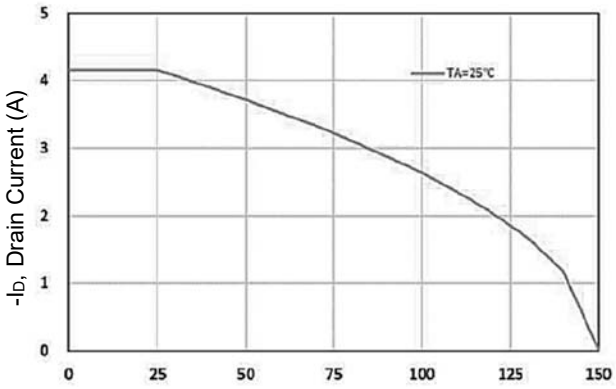
CHARACTERISTIC CURVES (continue)

Power Dissipation



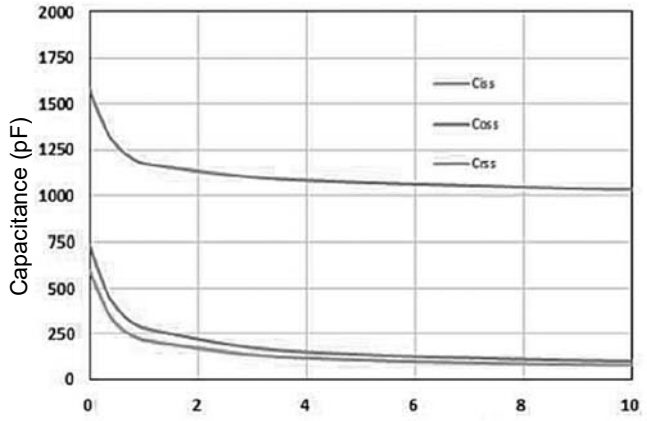
T_J, Junction Temperature (°C)

Drain Current



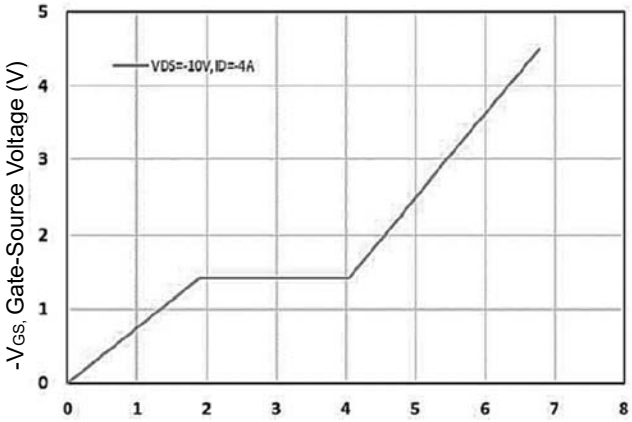
T_J, Junction Temperature (°C)

Capacitance vs. Drain Source Voltage



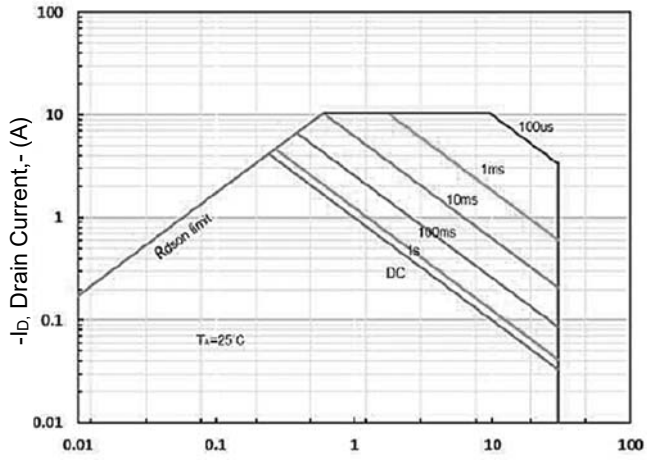
$-V_{DS}$, Drain-to-Source Voltage (V)

Gate Charge Characteristics



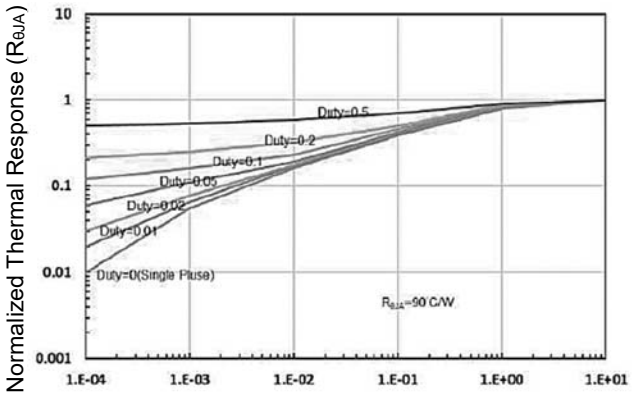
Q_g, Total Gate Charge (nC)

Maximum Safe Operating Area



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

Normalized Transient Thermal Impedance



t, Pulse Width (s)