

# P-Channel MOSFET

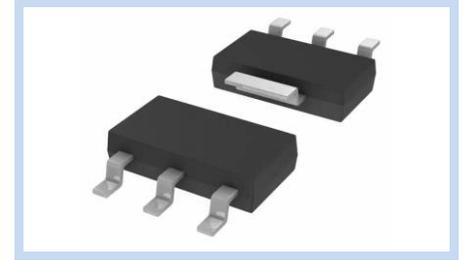
## 60V 3.5A 3W SOT-223

MFT6P3A5S223

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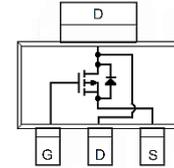
### FEATURE

- $R_{DS(ON)} < 130m\Omega$ ,  $V_{GS} = -10V$ ,  $I_D = -3.1V$
- $R_{DS(ON)} < 170m\Omega$ ,  $V_{GS} = -4.5V$ ,  $I_D = -2.8V$
- High Dense Cell Design for Extremely Low  $R_{DS(ON)}$
- High Power and Current Handling Capability



### MECHANICAL DATA

- Case: SOT-223 Package
- Terminals: Solderable per MIL-STD-750, Method 2026

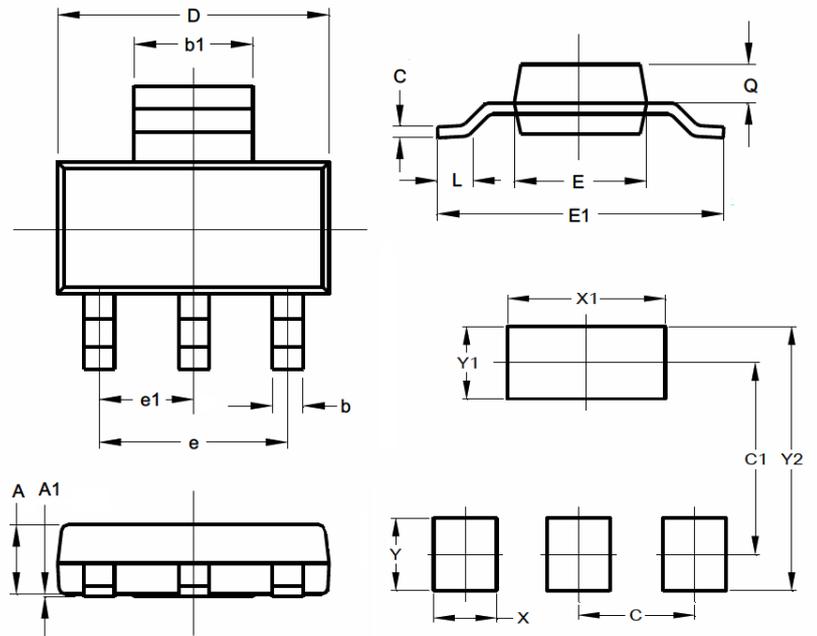


### MAXIMUM RATINGS

Parameter		Symbol	Value	Unit
Drain-Source Voltage		$V_{DS}$	-60	V
Gate-Source Voltage		$V_{GS}$	$\pm 20$	V
Drain Current – Continuous	( $T_C = 25^\circ C$ )	$I_D$	-3.5	A
Drain Current – Pulsed		$I_{DM}$	-14	A
Power Dissipation	( $T_C = 25^\circ C$ )	$P_D$	3	W
Thermal Resistance Junction to Ambient		$R_{\theta JA}$	42	$^\circ C/W$
Operating and Store Temperature Range		$T_J$	-55 to 150	$^\circ C$

### DIMENSIONS

Item	Min. (mm)	Max. (mm)
A	1.50	1.70
A1	0.02	0.10
b	0.67	0.80
b1	2.95	3.20
C	0.24	0.35
D	6.30	6.85
E	3.30	3.80
E1	6.70	7.30
e	4.60	
e1	2.30	
L	0.90	-
Q	0.90	0.94
X	1.20	
X1	3.30	
Y	1.60	
Y1	1.60	
Y2	8.00	
c	2.30	
c1	6.40	



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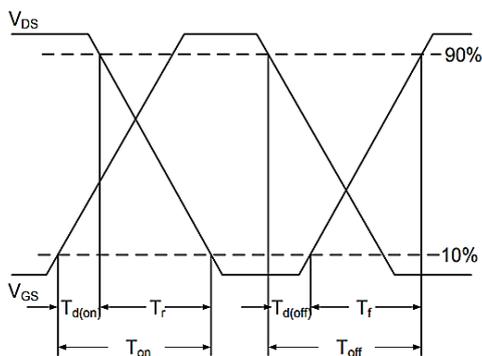
### ELECTRICAL CHARACTERISTICS

Off Characteristics	Conditions	Symbol	Min	Typ.	Max	Unit
Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=-250\mu A$	$BV_{DSS}$	-60	--	--	V
Zero Gate Voltage Drain Current	$V_{DS}=-60V, V_{GS}=0V$	$I_{DSS}$	--	--	-1	$\mu A$
Gate Body Leakage Current, Forward	$V_{GS}=20, V_{DS}=0V$	$I_{GSSF}$	--	--	100	nA
Gate Body Leakage Current, Reverse	$V_{GS}=-20V, V_{DS}=0V$	$I_{GSSR}$	--	--	-100	nA
On Characteristics	Conditions	Symbol	Min	Typ.	Max	Unit
Static Drain-Source On-Resistance	$V_{GS}=-10V, I_D=-3.1A$	$R_{DS(ON)}$	--	108	130	m $\Omega$
	$V_{GS}=-4.5V, I_D=-2.8A$		--	140	170	m $\Omega$
Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=-250\mu A$	$V_{GS(th)}$	-1	-	-3	V
Dynamic Characteristics	Conditions	Symbol	Min	Typ.	Max	Unit
Total Gate Charge	$V_{DS}=-30V, V_{GS}=-10V, I_D=-3.5A$	$Q_g$	--	10.8	14.3	nC
Gate-Source Charge		$Q_{gs}$	--	2.6	--	
Gate-Drain Charge		$Q_{gd}$	--	1.4	--	
Turn-On Delay Time	$V_{DD}=-30V, I_D=-1A, V_{GS}=-10V, R_{GEN}=6\Omega$	$T_{d(on)}$	--	13	26	nS
Rise Time		$T_r$	--	5	10	
Turn-Off Delay Time		$T_{d(off)}$	--	39	78	
Fall Time		$T_f$	--	13	26	
Input Capacitance		$C_{iss}$	--	880	--	
Output Capacitance	$C_{oss}$	--	80	--		
Reverse Transfer Capacitance	$C_{rss}$	--	75	--		
Forward Transconductance	$V_{DS}=-10V, I_D=-3.5A$	$g_{FS}$	--	7	--	S
Drain-Source Body Diode	Conditions	Symbol	Min	Typ.	Max	Unit
Drain-Source Diode Forward Current	--	$I_S$	--	--	-3.5	A
Drain-Source Diode Forward Voltage	$V_{GS}=0V, I_S=-1.3A$	$V_{SD}$	--	--	1.2	V

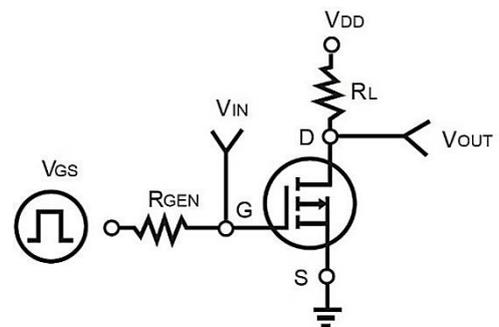
Note:

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board,  $t < 10$  sec.
3. Pulse Test : Pulse Width  $< 300\mu s$ , Duty Cycle  $< 2\%$ .
4. Guaranteed by design, not subject to production testing.
5.  $T_c = 25^\circ C$  unless otherwise noted

Switching Time Waveform

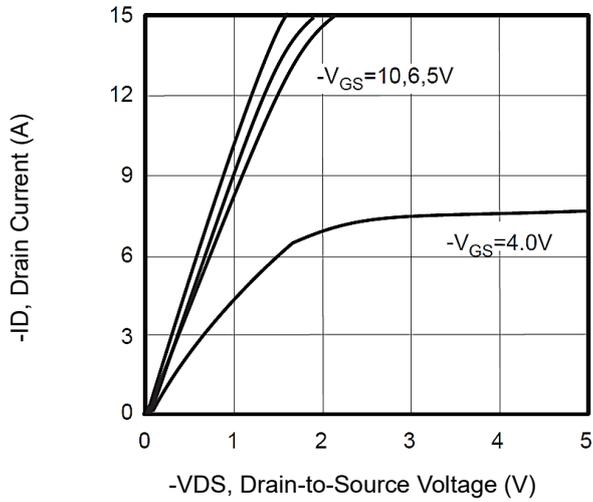


Switching Test Circuit

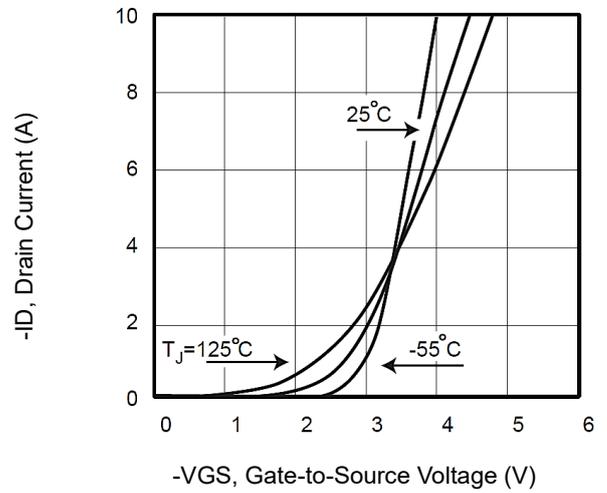


**CHARACTERISTIC CURVES**

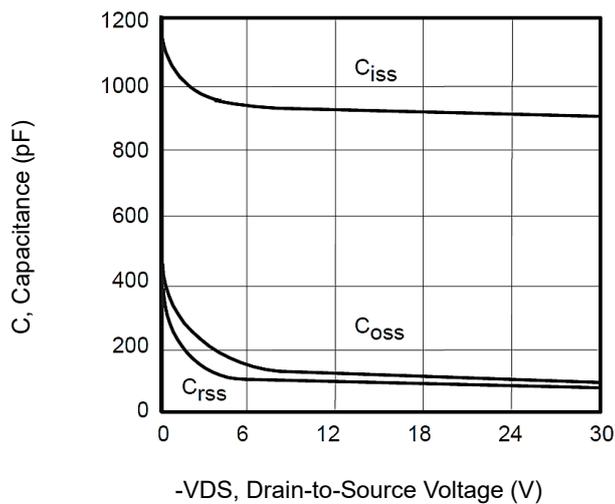
**Drain Current vs.  $V_{DS}$**



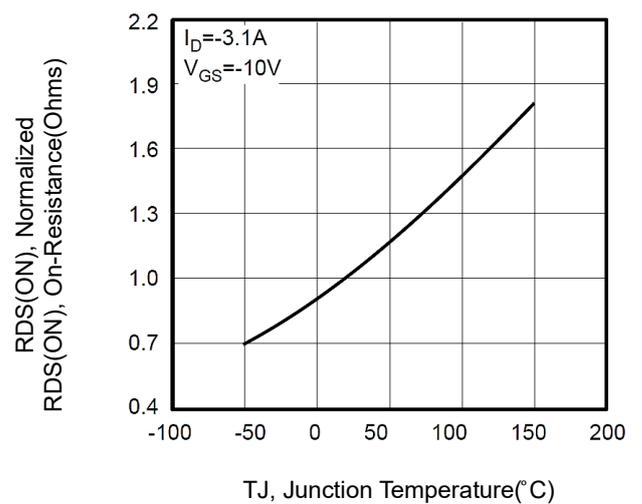
**Drain Current vs.  $V_{GS}$**



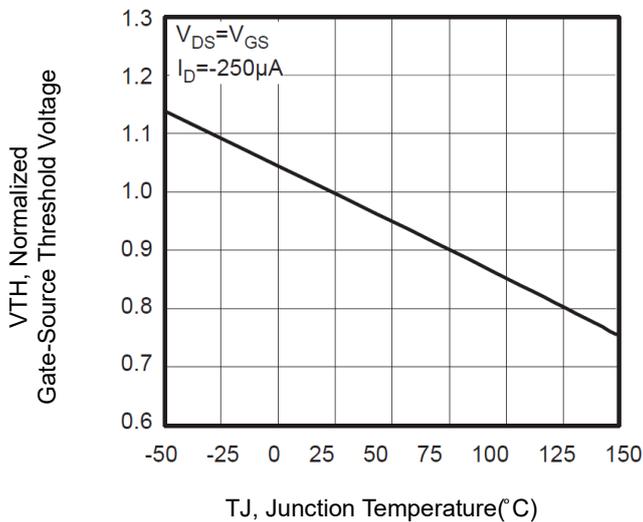
**Capacitance pF vs.  $V_{DS}$**



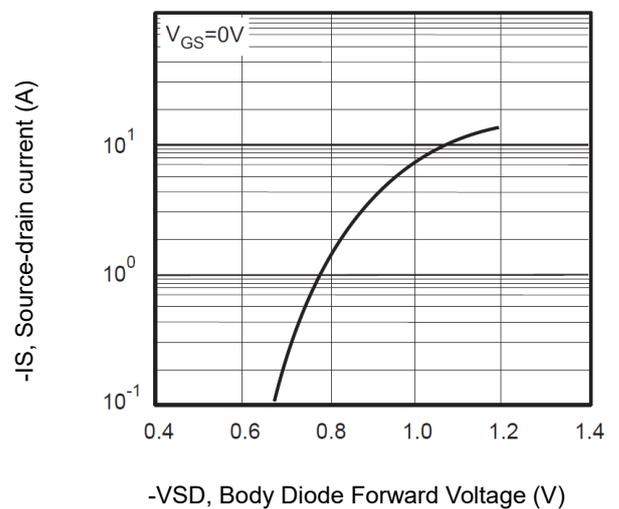
**On Resistance vs.  $T_J$**



**Gate Threshold Variation vs.  $T_J$**



**Source-Drain Current vs.  $V_{SD}$**



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### CHARACTERISTICS CURVES

