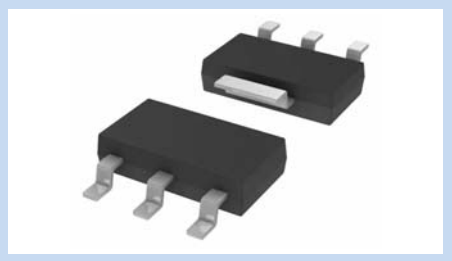
N-Channel MOSFET
600V 0.9A 15W SOT-223

MFT60NA90S223

MERITEK

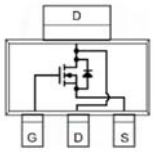
FEATURE

- $R_{DS(ON)}$ <9.5Ω, V_{GS}=10V, I_D=0.2A
- 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



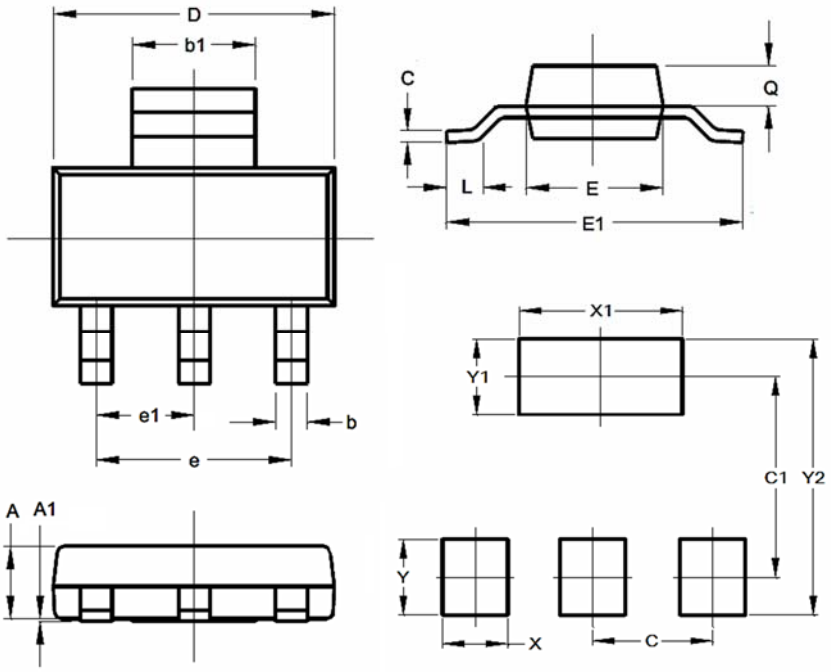
RoHS

MAXIMUM RATINGS

Parameter		Symbol	Value	Unit
Drain-Source Voltage		V_{DS}	600	V
Gate-Source Voltage		V_{GS}	±30	V
Drain Current	T_C=25°C	I_D	0.9	A
	T_C=100°C		0.57	
Drain Current	T_A=25°C		0.4	
	T_A=100°C		0.25	
Drain Current – Pulsed		I_{DM}	1.6	A
Single – Pulsed Avalanche Current		I_{AS}	1	A
Single – Pulsed Avalanche Energy		E_{AS}	5	mJ
Maximum Power Dissipation	T_C=25°C	P_D	15	W
	T_C=100°C		6	
Maximum Power Dissipation	T_A=25°C		3.1	
	T_A=100°C		1.2	
Thermal Resistance Junction to Ambient		$R_{\theta JA}$	40	°C/W
Thermal Resistance Junction to Ambient		$R_{\theta JC}$	8.2	°C/W
Operating and Store Temperature Range		T_J, T_{STG}	-55 to 150	°C

DIMENSIONS

Item	Min (mm)	Max (mm)
A	1.50	1.80
A1	0.02	0.10
b	0.60	0.80
b1	2.90	3.10
C	0.23	0.35
D	6.30	6.70
E	3.30	3.70
E1	6.70	7.30
e	4.60	
e1	2.30	
L	0.75	-
Q	0.84	0.94
X	1.50	
X1	3.80	
Y	2.00	
Y1	2.00	
Y2	8.30	
c	2.30	
c1	6.30	

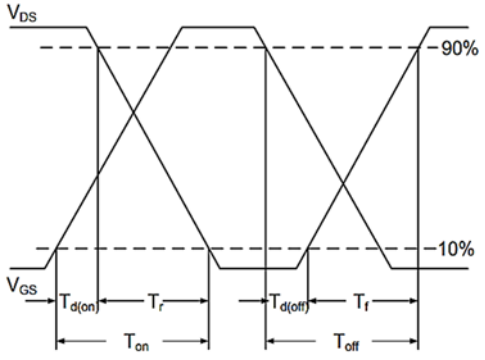


ELECTRICAL CHARACTERISTICS

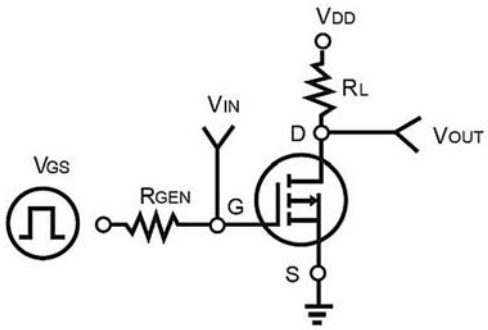
Off Characteristics	Conditions	Symbol	Min	Typ.	Max	Unit
Drain-Source Breakdown Voltage	V_{GS}=0V, I_D= -250uA	V_{DSS}	600	--	--	V
Zero Gate Voltage Drain Current	V_{DS}= 600V, V_{GS}=0V	I_{DSS}	--	--	1	uA
	V_{DS}= 480V, V_{GS}=0V		--	--	10	uA
Gate Body Leakage Current	V_{GS}=±30, V_{DS}=0V , T_J=125°C	I_{GSS}	--	--	±100	nA
On Characteristics	**Conditions**	**Symbol**	**Min**	**Typ.**	**Max**	**Unit**
Static Drain-Source On-Resistance	V_{GS}=10V, I_D= 0.2A	$R_{DS(ON)}$	--	7.4	9.5	Ω
Gate Threshold Voltage	V_{GS}=V_{DS}, I_D= 250uA	$V_{GS(th)}$	2.0	--	4.0	V
Dynamic Characteristics	**Conditions**	**Symbol**	**Min**	**Typ.**	**Max**	**Unit**
Total Gate Charge	V_{GS}= 10V, V_{DS}= 480V, I_D= 1A	Q_g	--	5.0	--	nC
Gate-Source Charge		Q_{gs}	--	2.4	--	nC
Gate-Drain Charge		Q_{gd}	--	0.9	--	nC
Turn-On Delay Time	V_{DD}= 300V, V_{GS}= 10V, I_D= 1A, R_{GS}=25Ω	$T_{d(on)}$	--	5.6	--	nS
Rise Time		T_r	--	7.8	--	nS
Turn-Off Delay Time		$T_{d(off)}$	--	11.6	--	nS
Fall Time		T_f	--	12.6	--	nS
Input Capacitance	V_{DS}= 25V, V_{GS}=0V F=1.0MHz	C_{iss}	--	135	--	pF
Output Capacitance		C_{oss}	--	24.3	--	pF
Reverse Transfer Capacitance		C_{rss}	--	10.7	--	pF
Forward Transconductance	V_{DS}= 15V, I_D= -0.2A	g_{FS}	--	6.8	--	S
Drain-Souse Body Diode	**Conditions**	**Symbol**	**Min**	**Typ.**	**Max**	**Unit**
Drain-Source Diode Forward Current	--	I_S	--	--	0.4	A
Drain-Source Diode Forward Voltage	V_{GS}=0V, I_S= 0.4A	V_{SD}	--	0.67	1.5	V

Note:
1. Repetitive Rating: Pulsed width limited by maximum junction temperature.
2. Surface mounted on 1 in² copper pad of FR-4 board, 120°C/W when mounted on minimum copper pad.
3. Pulse Test: Pulse Width < 300μs, Duty Cycle < 2%.
4. Guaranteed by design, not subject to production testing.
5. Tc = 25 C unless otherwise noted

Switching Time Waveform

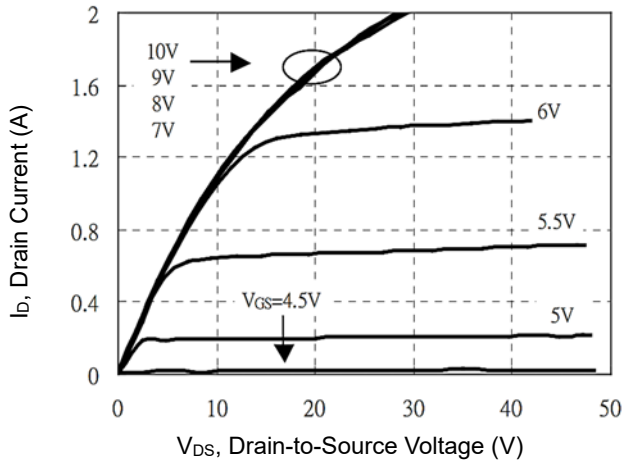


Switching Test Circuit

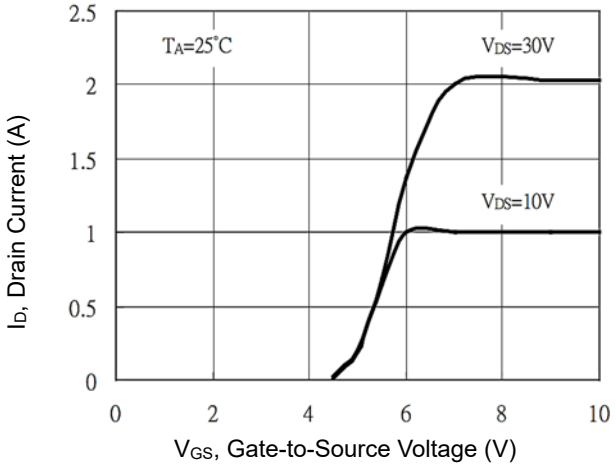


CHARACTERISTIC CURVES

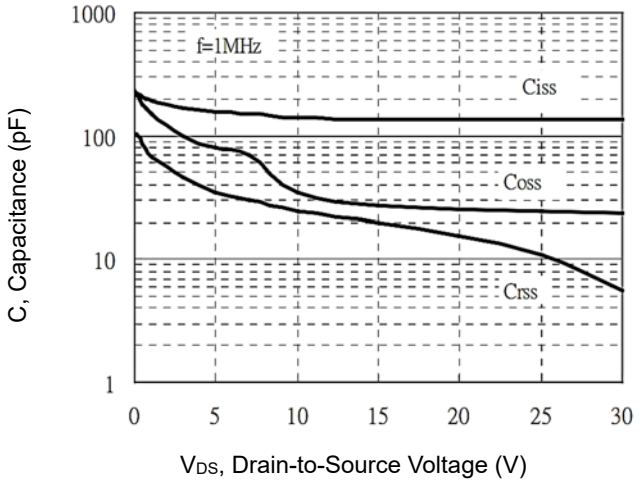
Drain Current vs. V_{DS}



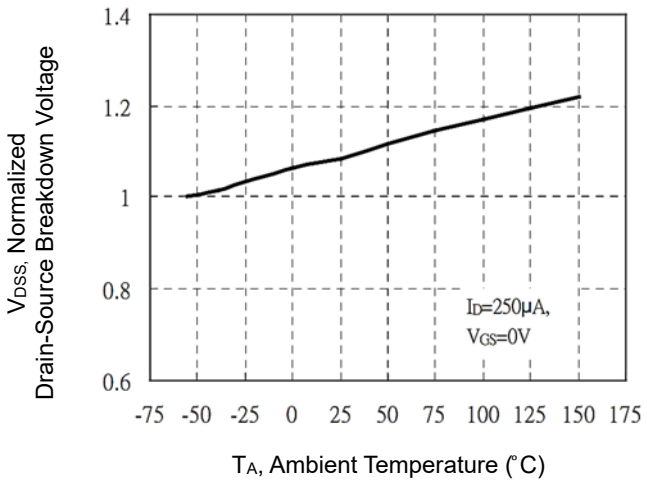
Drain Current vs. V_{GS}



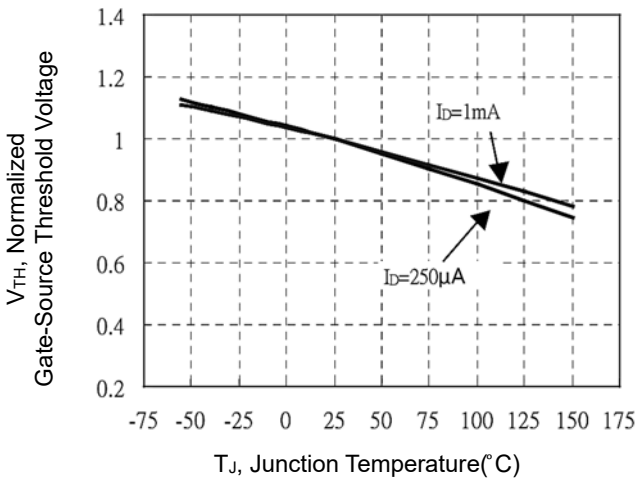
Capacitance pF vs. V_{DS}



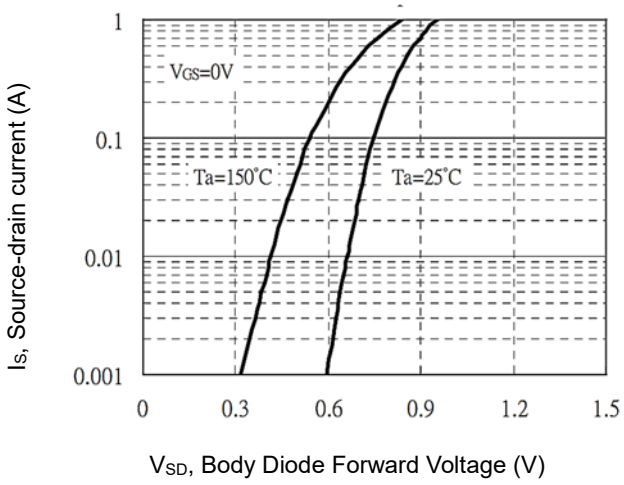
Breakdown Voltage vs. Ambient Temperature



Gate Threshold Variation vs. T_J

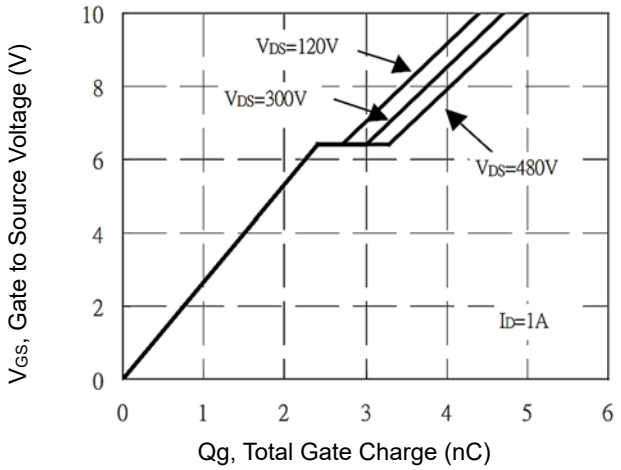


Source-Drain Current vs. V_{SD}

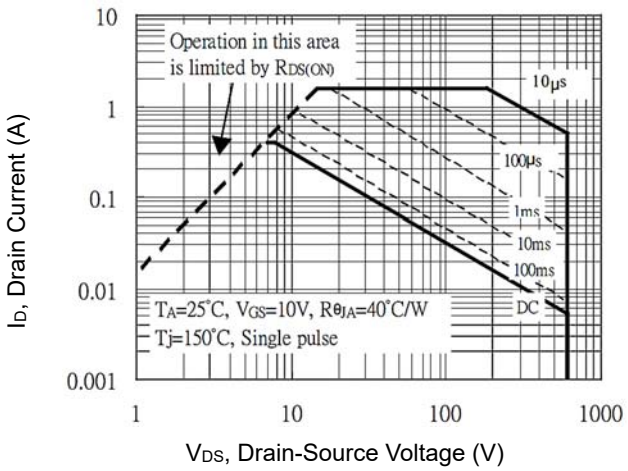


CHARACTERISTICS CURVES

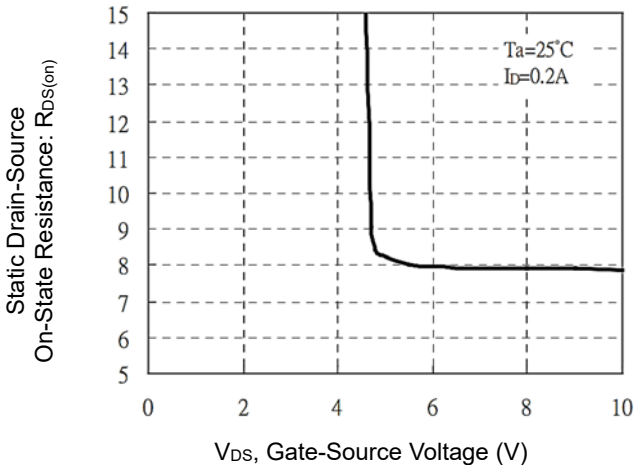
Gate to Source Voltage vs. Q_g



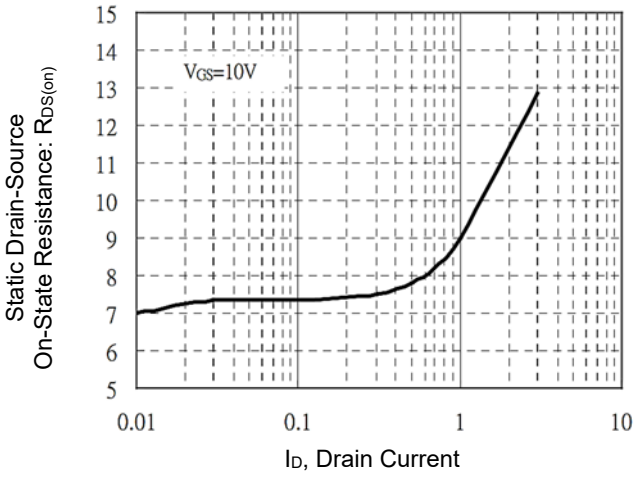
Maximum Safe Operating Area



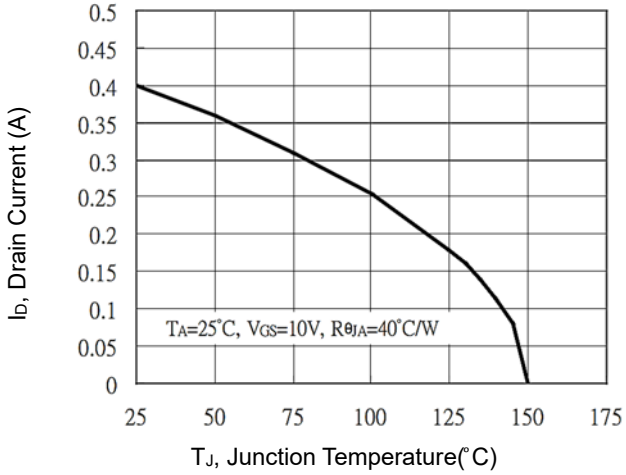
On Resistance vs V_{GS} Gate Source Voltage



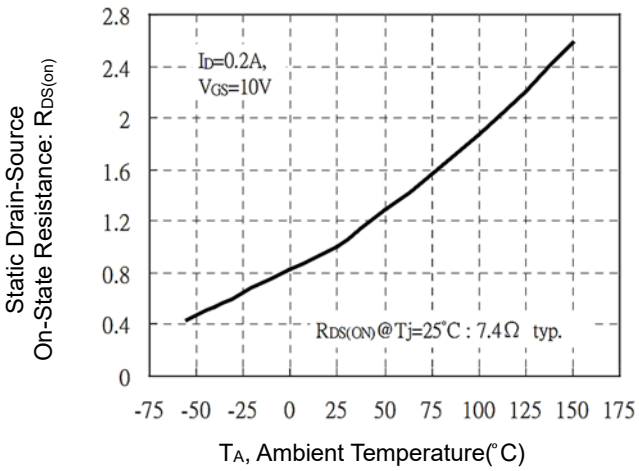
On Resistance vs I_D, Drain Current



I_D, Drain Current vs. T_J



On Resistance vs Ambient Temperature



CHARACTERISTICS CURVES

Maximum Transient Thermal Impedance