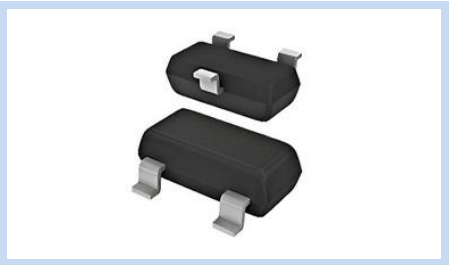
N-Channel MOSFET
30V 5.6A SOT-23 AEC-Q101

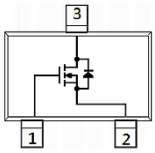
MFT3N5A6S23A

MERITEK

FEATURE



- $R_{DS(ON)}$=24mΩ at V_{GS}=10V
- $R_{DS(ON)}$=43mΩ at V_{GS}=4.5V
- High Density Cell Design for Low $R_{DS(ON)}$
- High Switching Speed
- AEC-Q101 Compliance
- Application: Load Switch, Battery Protections, Power Management



RoHS

MECHANICAL DATA

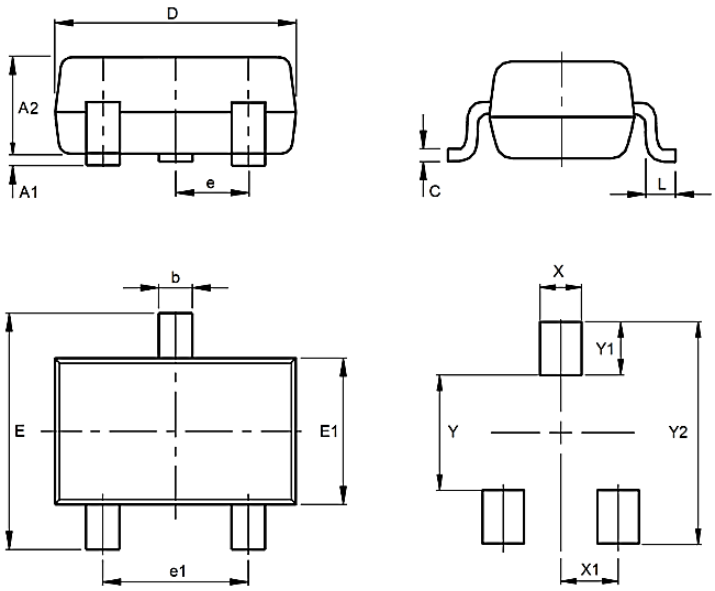
- Case: SOT-23 Package, Molding Epoxy
- Terminals: Solderable per MIL-STD-750, Method 2026

MAXIMUM RATINGS

Parameter		Symbol	Value	Unit
Drain-Source Voltage		V_{DS}	30	V
Gate-Source Voltage		V_{GS}	±20	V
Drain Current – Continuous	T_A=25°C	I_D	5.6	A
	T_A=100°C		3.5	
Drain Current – Pulsed		I_{DM}	40	A
Power Dissipation		P_D	1	W
Thermal Resistance from Junction to Ambient		$R_{\theta JA}$	120	°C / W
Operating Junction Temperature		T_J	150	°C
Storage Temperature Range		T_{stg}	-55 to 150	°C

DIMENSIONS

Item	Min (mm)	Max (mm)
A1	0.00	0.10
A2	0.90	1.05
b	0.30	0.50
c	0.08	0.20
D	2.80	3.00
e	0.95 TYP	
e1	1.80	2.00
E	2.25	2.55
E1	1.20	1.40
L	0.30	0.50
X	0.80	
X1	0.95	
Y	1.40	
Y1	1.00	
Y2	3.40	

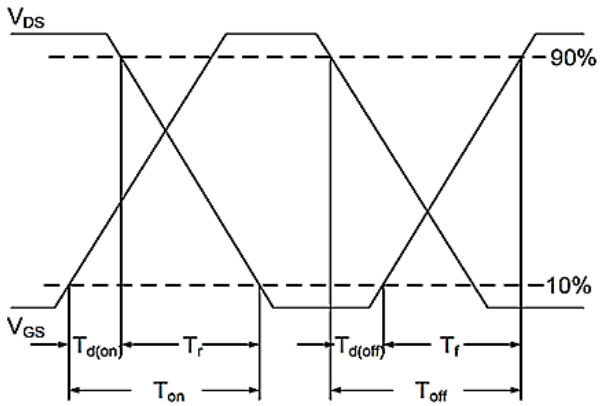


ELECTRICAL CHARACTERISTICS

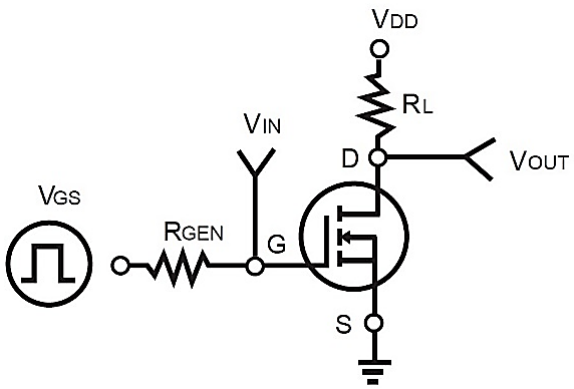
Off Characteristics	Conditions	Symbol	Min	Typ.	Max	Unit
Drain-Source Breakdown Voltage	V_{GS}=0V, I_D= 250μA	BV_{DSS}	30	--	--	V
Gate Threshold Voltage	V_{GS}=V_{DS}, I_D= 250μA	$V_{GS(th)}$	1.0	1.6	2.2	V
Gate Leakage Current	V_{DS}=0V, V_{GS}=±20V	I_{GSS}	--	--	±100	nA
Zero Gate Voltage Drain Current	V_{DS}= 30V, V_{GS}=0V	I_{DSS}	--	--	1	μA
On Characteristics	**Conditions**	**Symbol**	**Min**	**Typ.**	**Max**	**Unit**
Static Drain-Source On-Resistance	V_{GS}= 10V, I_D= 5.6A	$R_{DS(ON)}$	--	18	24	mΩ
	V_{GS}= 4.5V, I_D= 5.0A		--	33	43	
Dynamic Characteristics	**Conditions**	**Symbol**	**--**	**Typ.**	**Max**	**Unit**
Total Gate Charge	V_{DS}=10V, V_{DS}=30V, I_D ≡5.6A	Q_g	--	8.3	--	nC
Gate-Source Charge		Q_{gs}	--	1.5	--	
Gate-Drain Charge		Q_{gd}	--	2.5	--	
Input Capacitance	V_{DS}=15V, V_{GS}=0V, F=1.0MHz	C_{iss}	--	390	--	pF
Output Capacitance		C_{oss}	--	70	--	
Reverse Transfer Capacitance		C_{rss}	--	55	--	
Turn-On Delay Time	V_{DD}=30V, I_D ≡2A, V_{GS} =10V, R_G= 3Ω	$T_{d(on)}$	--	5	--	nS
Rise Time		T_r	--	31	--	
Turn-Off Delay Time		$T_{d(off)}$	--	13	--	
Fall Time		T_f	--	3	--	
Gate Resistance	F=1.0MHz	R_g	--	3.5	--	Ω
Drain-Source Body Diode	**Conditions**	**Symbol**	**Min**	**Typ.**	**Max**	**Unit**
Diode Forward Current	-	I_S	--	--	5.6	A
Diode Forward Voltage	I_S= 5.6A, V_{GS}=0V	V_{SD}	--	--	1.2	V
Reverse Recovery Time	I_F= 5.6A, di/dt=175A/μs	T_{rr}	--	9	--	nS
Reverse Recovery Charge		Q_{rr}	--	6	--	nC

Note:
1. T_A = 25°C, unless otherwise noted.
2. Repetitive rating; pulse width limited by max. junction temperature
3. Pd is based on max. junction temperature, using junction-case thermal resistance
4. The value of $R_{\theta JA}$ is measured with the device mounted on 1in^2 FR-4 board with 2oz. Copper, in the still air environment with T_A= 25℃.The maximum allowed junction temperature of 150°C. The value in any given application depends on the user's specific board design.

Switching Time Waveform

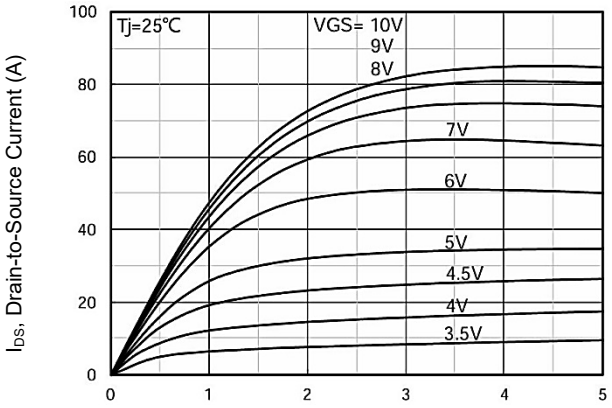


Switching Test Circuit

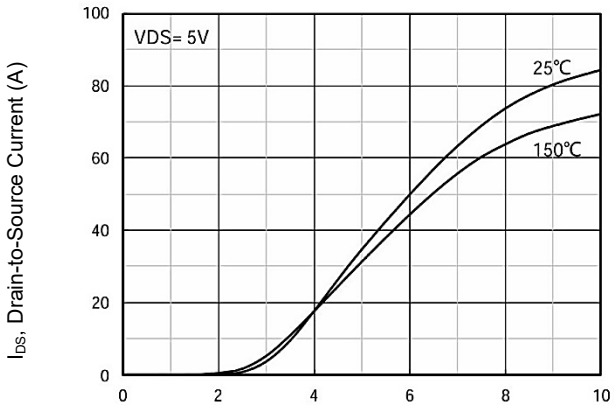


CHARACTERISTIC CURVES

Output Characteristics

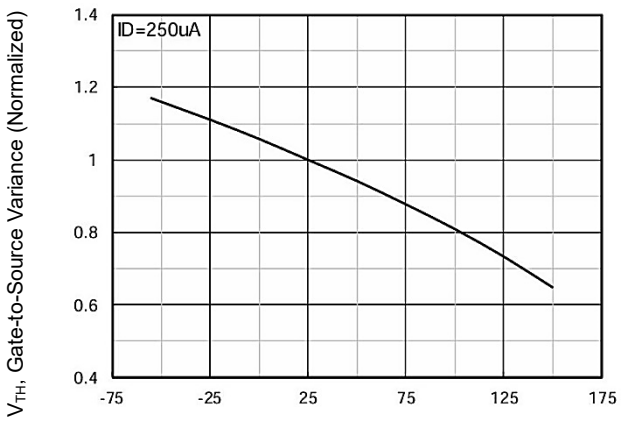


Transfer Characteristics

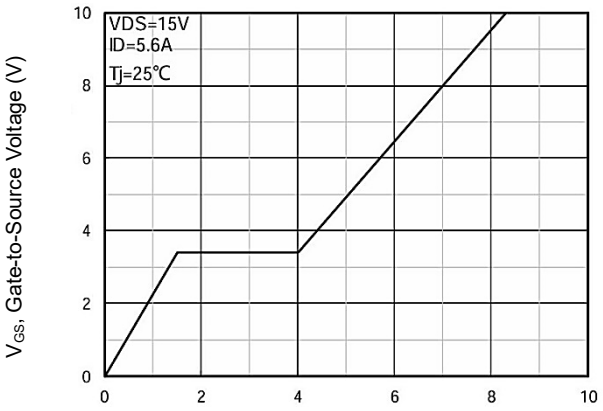


Breakdown Voltage vs. Temperature

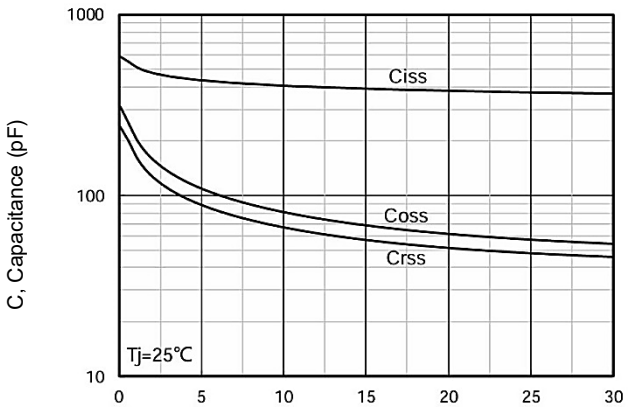
Threshold Voltage Variation with Temperature



Gate Charge

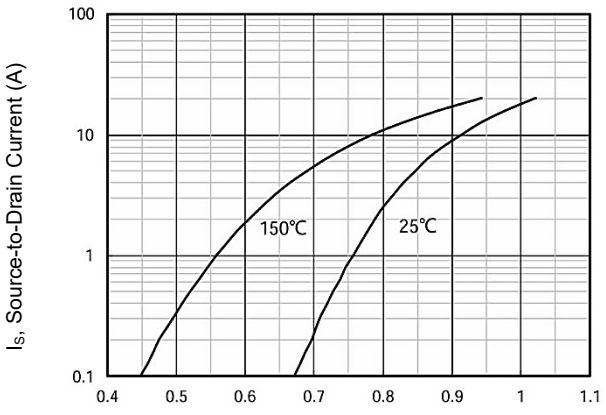


Capacitance

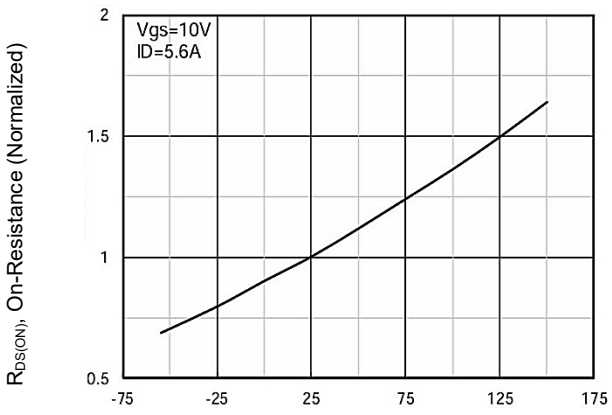


CHARACTERISTIC CURVES

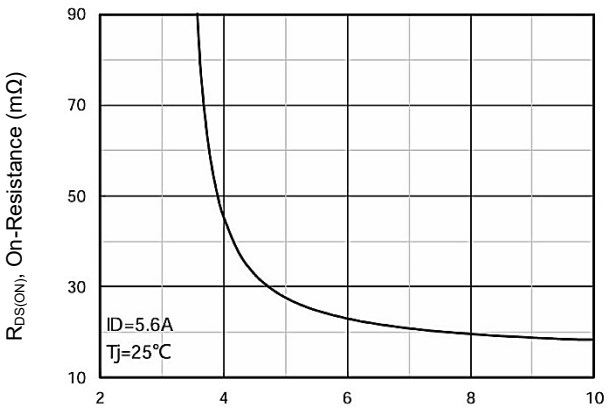
Body Diode Forward Voltage



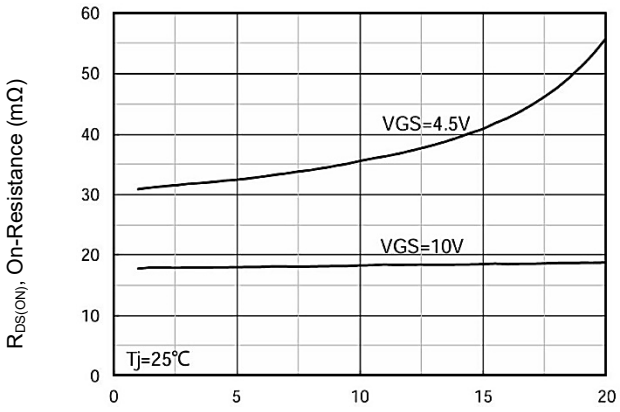
On-Resistance vs. Temperature



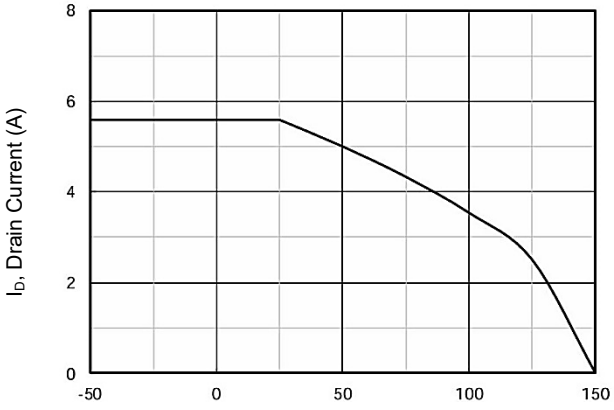
On-Resistance vs. Gate-to-Source Voltage



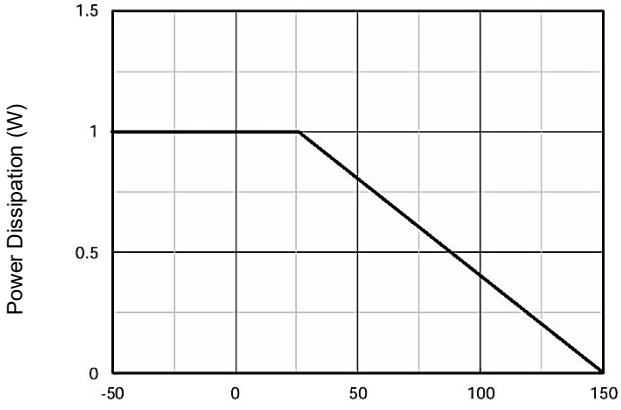
On-Resistance vs. Drain Current



Current Dissipation

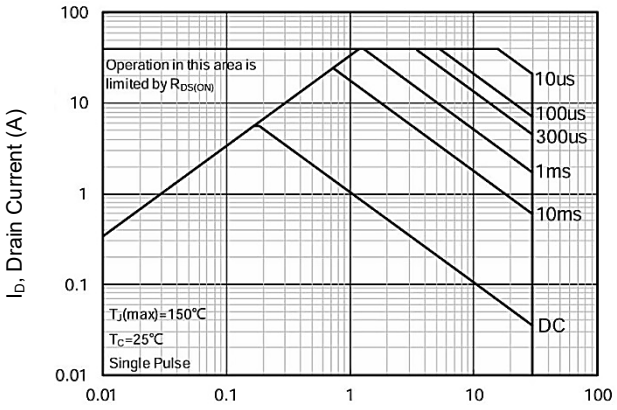


Power Dissipation



CHARACTERISTIC CURVES

Maximum Safe Operating Area



Maximum Transient Thermal Impedance