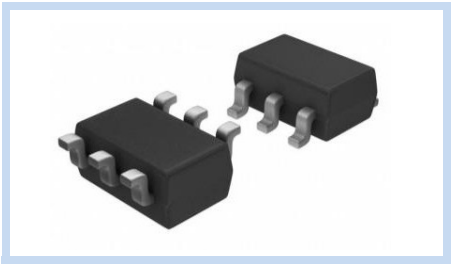
N/P Channel MOSFET
±30V 4.4A SOT-23-6 AEC-Q101

MFT3NP4A4S236A

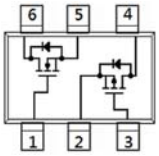
MERITEK

FEATURE



- $R_{DS(ON)}$<48mΩ, V_{GS}=10V, I_D=4.4A
- $R_{DS(ON)}$<70mΩ, V_{GS}=4.5V, I_D=2.8A
- Advanced Trench Process Technology
- Application: Switch Load, PWM Application, etc.
- AEC-Q101 Qualified

MECHANICAL DATA



RoHS

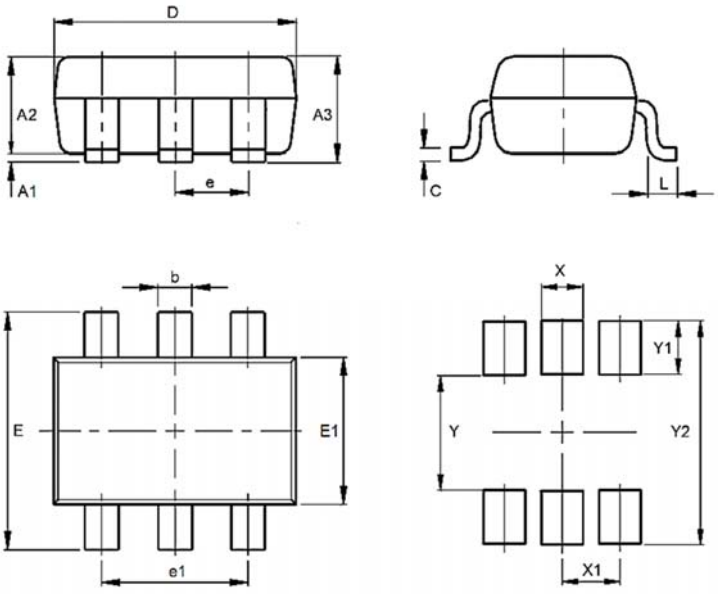
- Case: SOT-23-6L, Molded Plastic
- Terminals: Solderable per MIL-STD-750, Method 2026

MAXIMUM RATINGS

Parameter		Symbol	Value		Unit
Drain-Source Voltage		V_{DS}	30	-30	V
Gate-Source Voltage		V_{GS}	±20	±20	V
Drain Current – Continuous		I_D	4.4	-2.9	A
Drain Current – Pulsed		I_{DM}	17.6	-11.6	A
Power Dissipation	T_A= 25°C	P_D	1.25		W
	Derate above 25°C		10		mW/°C
Thermal Resistance Junction to Ambient		$R_{\theta JA}$	100		°C/W
Operating Junction and Storage Temperature		T_J, T_{STG}	-55 to 150		°C

DIMENSIONS

Item	Min (mm)	Max (mm)
A1	--	0.10
A2	1.00	1.20
A3	1.00	1.30
b	0.30	0.50
c	0.08	0.20
D	2.70	3.10
E	2.60	3.00
E1	1.50	1.70
e	0.95	
e1	1.70	2.10
L	0.20	0.60
X	0.80	
X1	0.95	
Y	1.10	
Y1	0.90	
Y2	2.90	

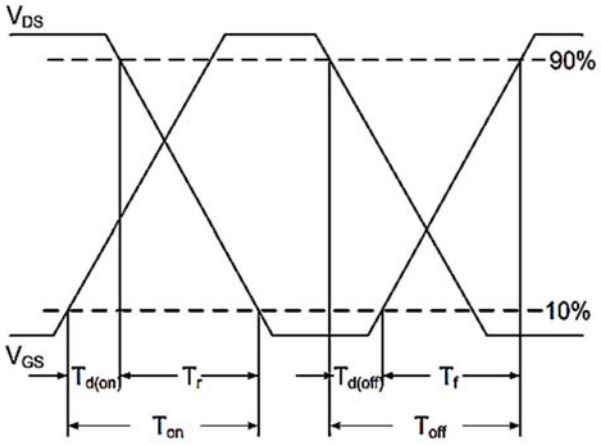


ELECTRICAL CHARACTERISTICS -N-CH

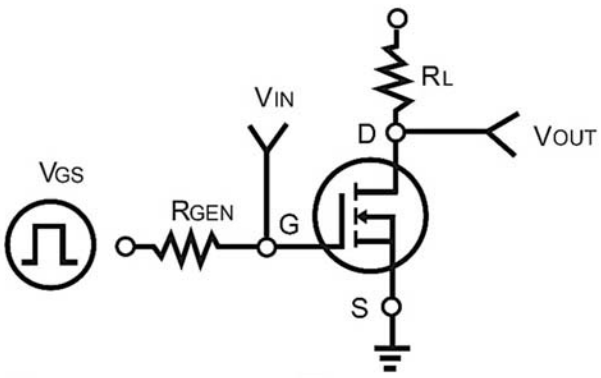
Off Characteristics	Conditions	Symbol	Min	Typ.	Max	Unit
Drain-Source Breakdown Voltage	V_{GS}=0V , I_D=250uA	BV_{DSS}	30	--	--	V
Drain-Source Leakage Current	V_{DS}=30V, V_{GS}=0V,	I_{DSS}	--	--	1	uA
Gate-Source Leakage Current	V_{GS}=±20V, V_{DS}=0V	I_{GSS}	--	--	±100	nA
On Characteristics	**Conditions**	**Symbol**	**Min**	**Typ.**	**Max**	**Unit**
Static Drain-Source On-Resistance	V_{GS}=10V, I_D=4.4A	$R_{DS(ON)}$	--	36	48	mΩ
	V_{GS}=4.5V, I_D=2.8A		--	52	70	mΩ
Gate Threshold Voltage	V_{GS}=V_{DS} , I_D=250uA	$V_{GS(th)}$	1.0	1.37	2.1	V
Dynamic Characteristics	**Conditions**	**Symbol**	**Min**	**Typ.**	**Max**	**Unit**
Total Gate Charge	V_{DS}=15V, V_{GS}=10V, I_D=4.4A	Q_g	--	5.8	--	nC
Gate-Source Charge		Q_{gs}	--	1	--	
Gate-Drain Charge		Q_{gd}	--	1	--	
Turn-On Delay Time	V_{DD}=15V, V_{GS}=10V, R_G=6Ω I_D=4.4A	$T_{d(on)}$	--	3	--	ns
Rise Time		T_r	--	39	--	
Turn-Off Delay Time		$T_{d(off)}$	--	23	--	
Fall Time		T_f	--	28	--	
Input Capacitance	V_{DS}=15V , V_{GS}=0V , F=1MHz	C_{iss}	--	235	--	pF
Output Capacitance		C_{oss}	--	36	--	
Reverse Transfer Capacitance		C_{rss}	--	24	--	
Drain-Source Body Diode	**Conditions**	**Symbol**	**Min**	**Typ.**	**Max**	**Unit**
Continuous Source Current	V_G=V_D=0V , Force Current	I_S	--	--	1.5	A
Diode Forward Voltage	V_{GS}=0V , I_S=1A , T_J=25°C	V_{SD}	--	0.8	1.2	V

Note:
1. Repetitive Rating: Pulsed width limited by maximum junction temperature.
2. The data tested by pulsed, pulse width ≤ 300us, duty cycle ≤2%.
3. Essentially independent of operating temperature.
4. T_J=25°C, unless otherwise noted.

Switching Time Waveform



Switching Test Circuit

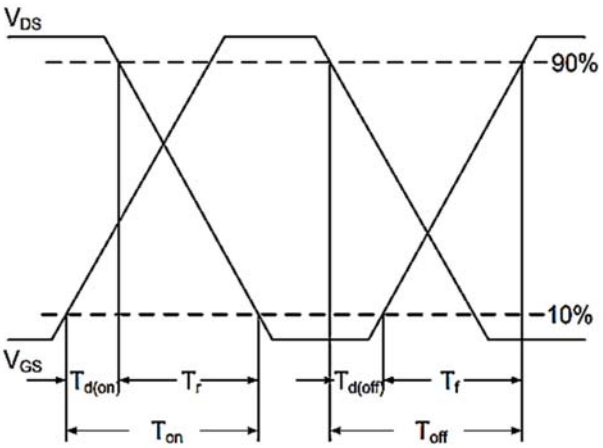


ELECTRICAL CHARACTERISTICS -P-CH

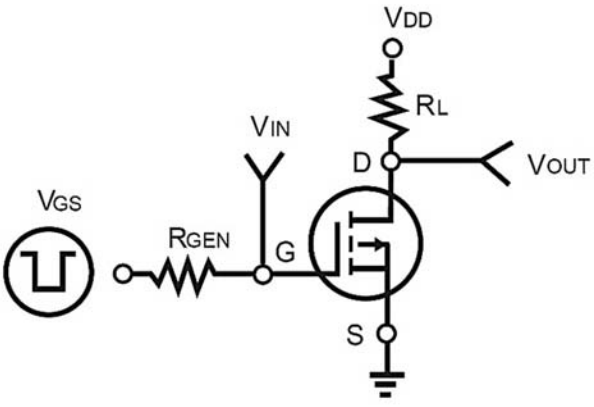
Off Characteristics	Conditions	Symbol	Min	Typ.	Max	Unit
Drain-Source Breakdown Voltage	V_{GS}=0V , I_D=-250uA	BV_{DSS}	-30	--	--	V
Drain-Source Leakage Current	V_{DS}=-30V , V_{GS}=0V	I_{DSS}	--	--	-1	uA
Gate-Source Leakage Current	V_{GS}=±20V , V_{DS}=0V	I_{GSS}	--	--	±100	nA
On Characteristics	**Conditions**	**Symbol**	**Min**	**Typ.**	**Max**	**Unit**
Static Drain-Source On-Resistance	V_{GS}=-10V, I_D=-2.9A	$R_{DS(ON)}$	--	94	110	mΩ
	V_{GS}=-4.5V, I_D=-1.9A		--	120	150	mΩ
Gate Threshold Voltage	V_{GS}=V_{DS}, I_D=-250uA	$V_{GS(th)}$	-1	-1.3	-2.1	V
Dynamic Characteristics	**Conditions**	**Symbol**	**Min**	**Typ.**	**Max**	**Unit**
Total Gate Charge	V_{DS}=-15V , V_{GS}=-10V , I_D=-2.9A	Q_g	--	9.8	--	nC
Gate-Source Charge		Q_{gs}	--	1.5	--	
Gate-Drain Charge		Q_{gd}	--	2.2	--	
Turn-On Delay Time	V_{DD}=-15V , V_{GS}=-10V , R_G=6Ω I_D=-2.9A	$T_{d(on)}$	--	5	--	ns
Rise Time		T_r	--	30	--	
Turn-Off Delay Time		$T_{d(off)}$	--	25	--	
Fall Time		T_f	--	8	--	
Input Capacitance	V_{DS}=-15V , V_{GS}=0V , F=1MHz	C_{iss}	--	396	--	pF
Output Capacitance		C_{oss}	--	47	--	
Reverse Transfer Capacitance		C_{rss}	--	36	--	
Drain-Source Body Diode	**Conditions**	**Symbol**	**Min**	**Typ.**	**Max**	**Unit**
Continuous Source Current	V_G=V_D=0V , Force Current	I_S	--	--	-1.5	A
Diode Forward Voltage	V_{GS}=0V , I_S=-1A	V_{SD}	--	-0.85	-1.2	V

Note:
1. Repetitive Rating: Pulsed width limited by maximum junction temperature.
2. The data tested by pulsed, pulse width ≤ 300us, duty cycle ≤2%.
3. Essentially independent of operating temperature.
4. T_J=25°C, unless otherwise noted.

Switching Time Waveform

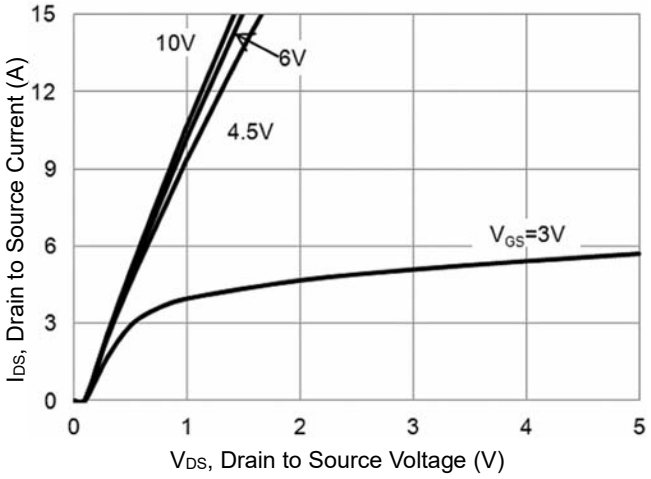


Switching Test Circuit

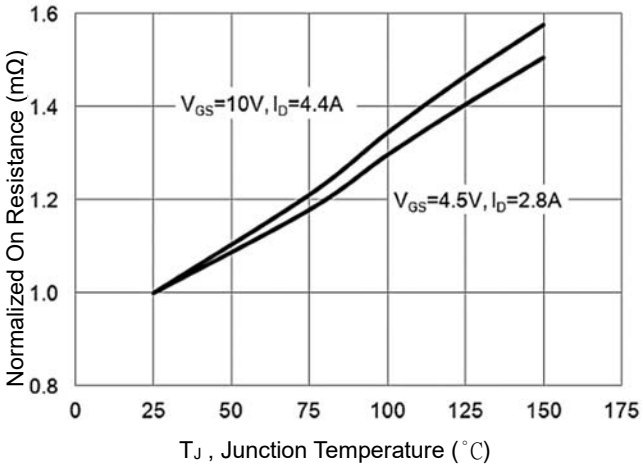


N-CH CHARACTERISTIC CURVES

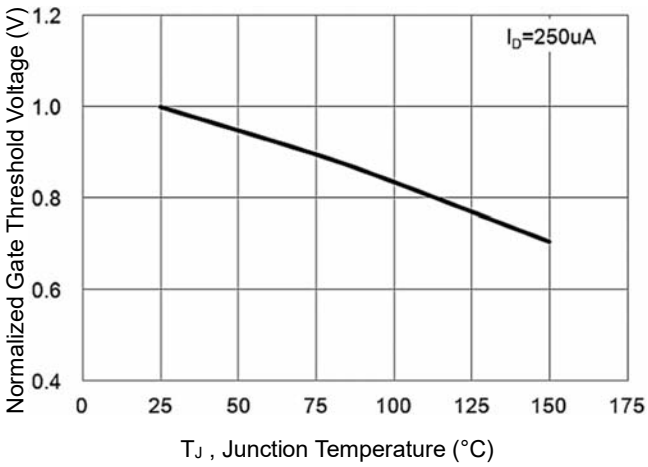
On-Region Characteristics



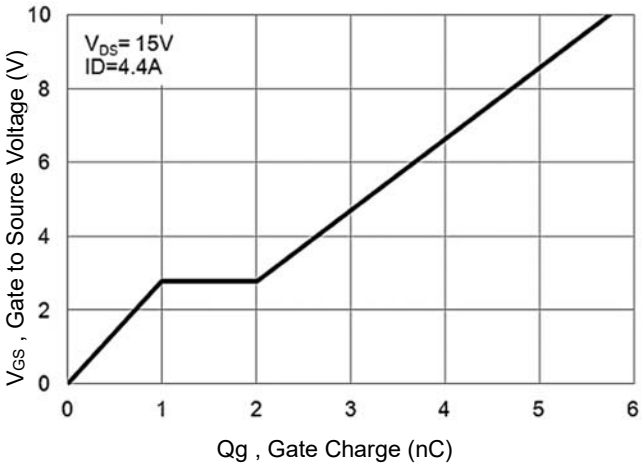
Normalized $R_{DS(ON)}$ vs. T_J



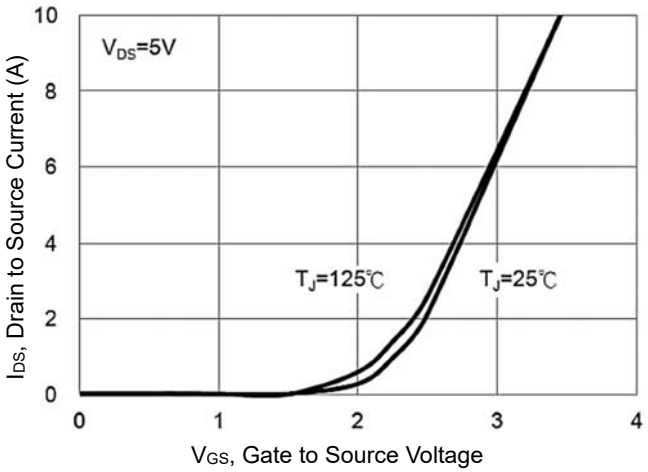
Normalized V_{th} vs. T_J



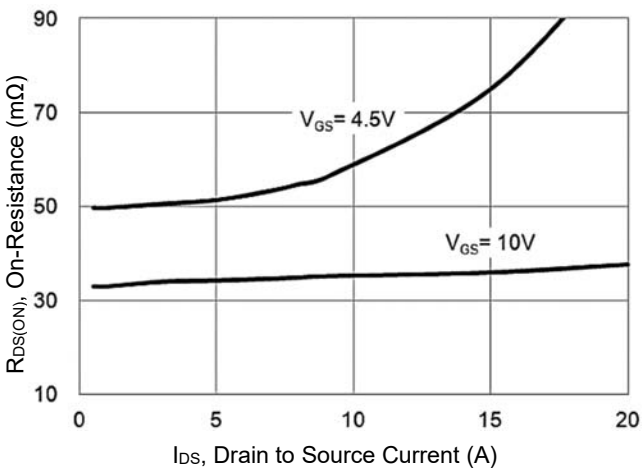
Gate Charge Waveform



Transfer Characteristics

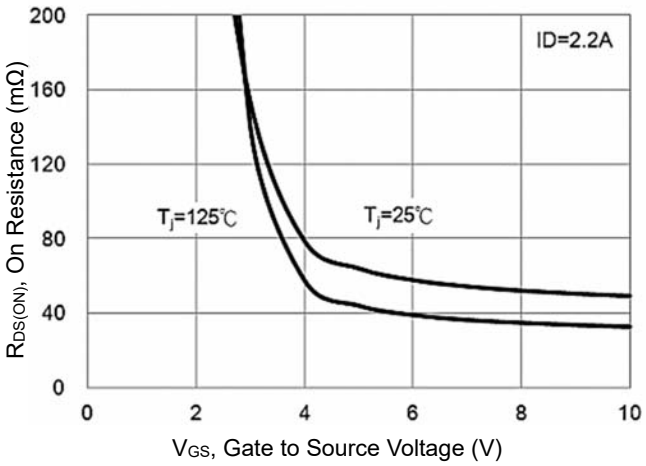


On-Resistance vs. Drain Current

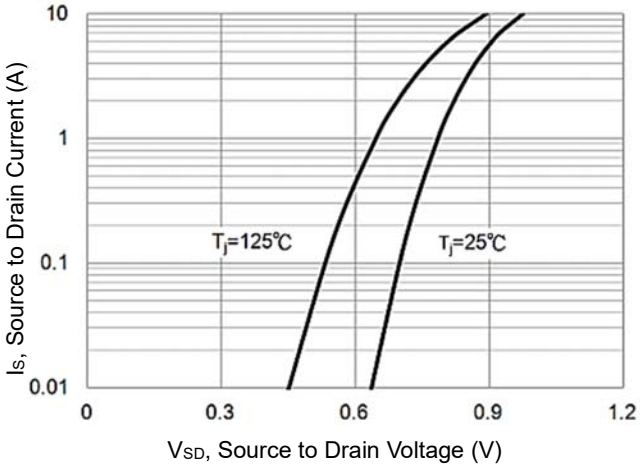


N-CH CHARACTERISTIC CURVES

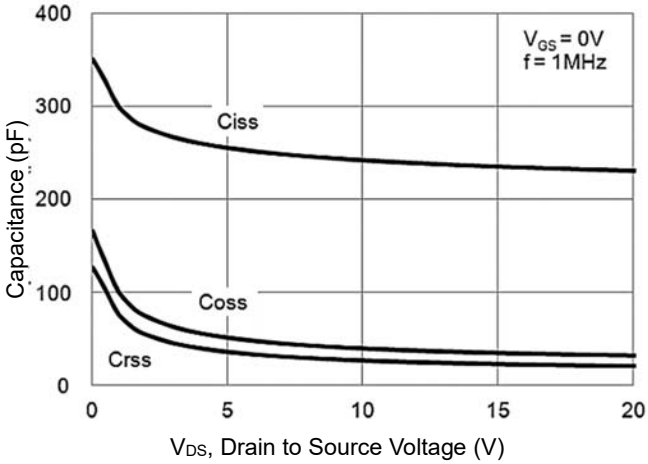
On-Resistance Variation with VGS



Body Diode

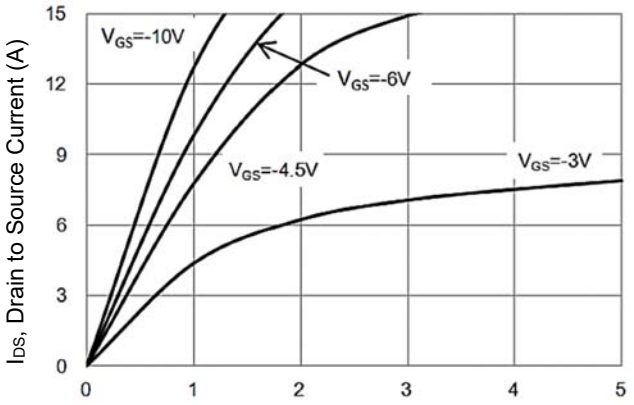


Capacitance vs. Drain-Source Voltage

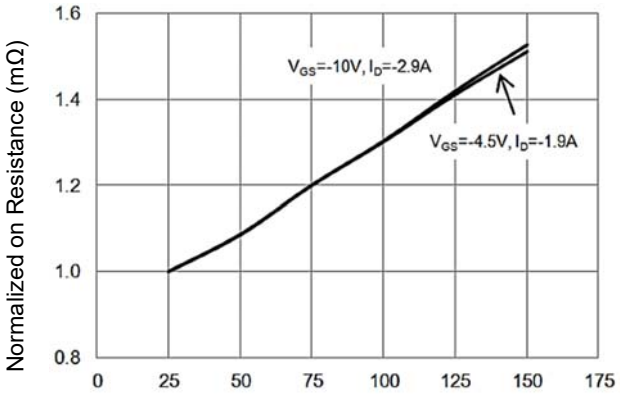


P-CH CHARACTERISTIC CURVES

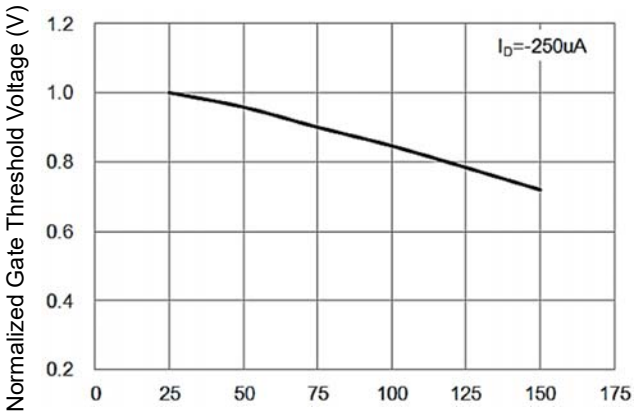
On-Region Characteristics



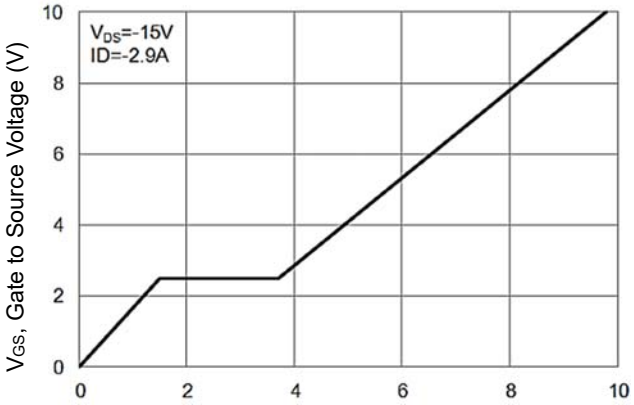
Normalized $R_{DS(ON)}$ vs. T_J



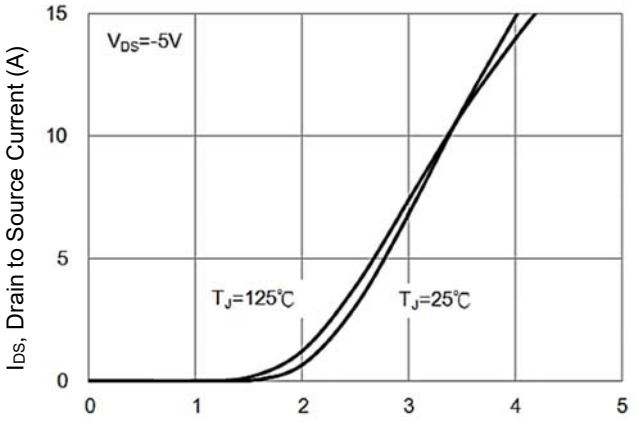
Normalized V_{th} vs. T_J



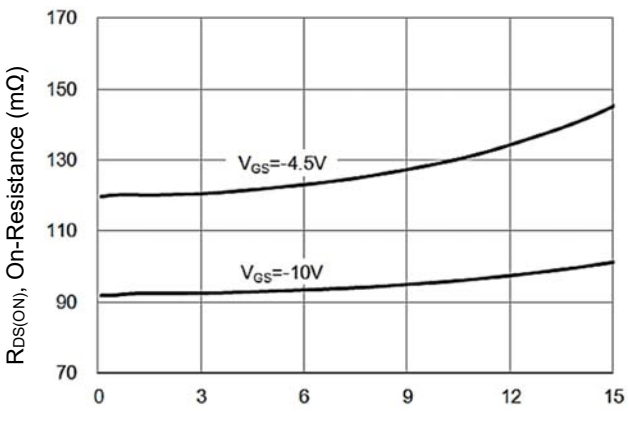
Gate Charge Waveform



Transfer Characteristics

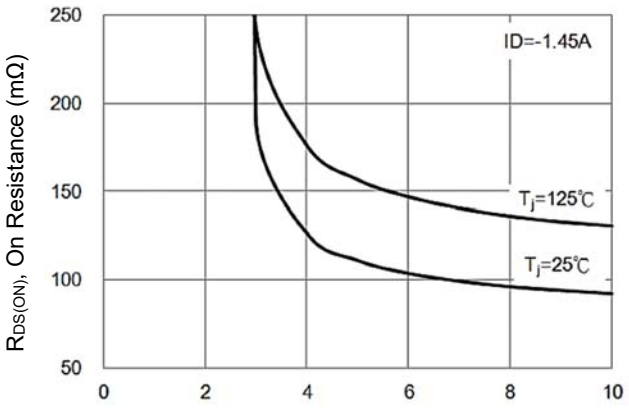


On-Resistance vs. Drain Current



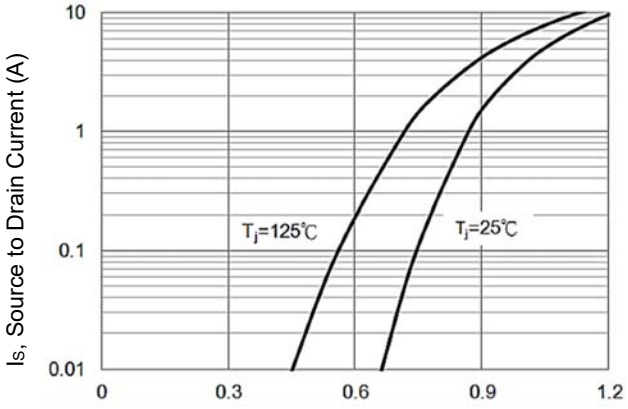
P-CH CHARACTERISTIC CURVES

On-Resistance Variation with VGS



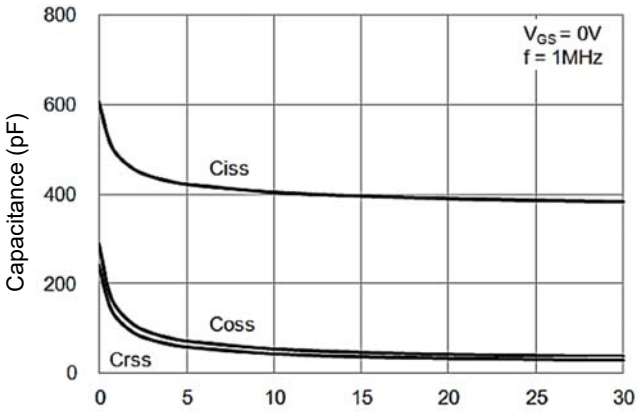
VGS, Gate to Source Voltage (V)

Body Diode



VSD, Source to Drain Voltage (V)

Capacitance vs. Drain-Source Voltage



VDS, Drain to Source Voltage (V)