

N / P Channel MOSFET

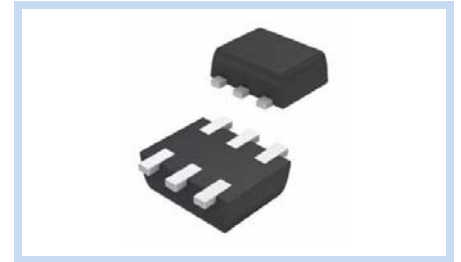
50 / 60V 0.36A / 0.2A SOT-563

MFT5NPA36S563E

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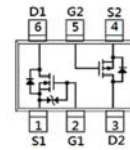
FEATURE

- $R_{DS(ON)} < 1.5\Omega$, $V_{GS}=10V$, $I_D=500mA$
- $R_{DS(ON)} < 2.5\Omega$, $V_{GS}=4.5V$, $I_D=500mA$
- ESD Protected 2KV HBM
- Advanced Trench Process Technology
- Application: Switch Load, PWM Application, etc.



MECHANICAL DATA

- Case: SOT-563 Package
- Terminals: Solderable per MIL-STD-7250, Method 2026

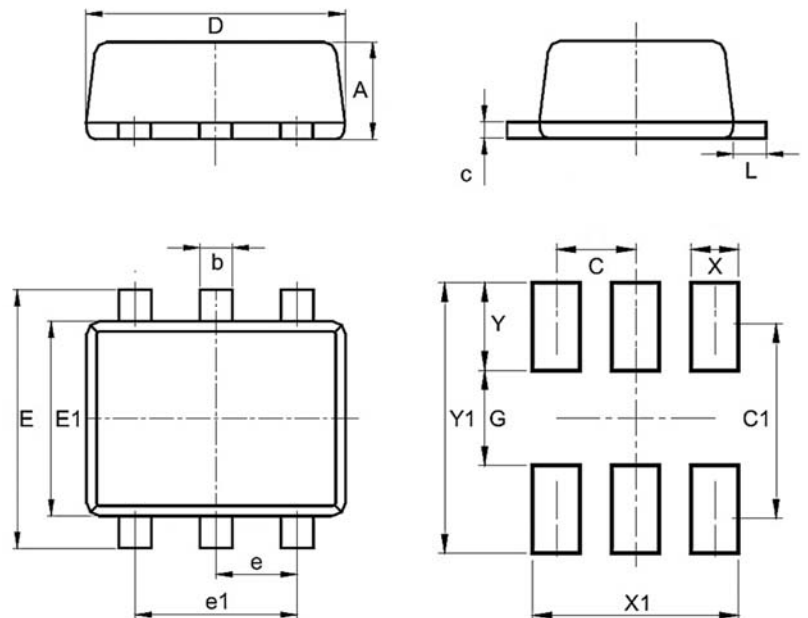


MAXIMUM RATINGS

Parameter		Symbol	N-CH	P-CH	Unit
Drain-Source Voltage		V_{DS}	50	-60	V
Gate-Source Voltage		V_{GS}	± 20	± 20	V
Drain Current – Continuous		I_D	360	-200	mA
Drain Current – Pulsed		I_{DM}	1200	-900	mA
Power Dissipation	$T_A=25^\circ C$	P_D	300		W
	Derate above $25^\circ C$		2.4		mW/ $^\circ C$
Thermal Resistance Junction to Ambient		$R_{\theta JA}$	417		$^\circ C/W$
Operating Junction and Storage Temperature		T_J, T_{STG}	-55 to 150		$^\circ C$

DIMENSIONS

Item	Min (mm)	Max (mm)
A	0.50	0.60
b	0.17	0.27
c	0.07	0.17
D	1.50	1.70
E	1.50	1.70
E1	1.10	1.30
e	0.45	0.55
e1	0.90	1.10
L	0.10	0.30
X	0.34	
X1	1.34	
Y	0.55	
Y1	2.00	
C	0.50	
C1	1.45	
G	0.90	



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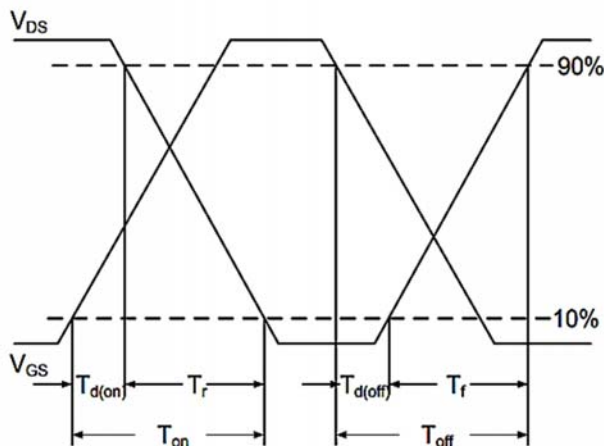
ELECTRICAL CHARACTERISTICS-N-CH

Off Characteristics	Conditions	Symbol	Min	Typ.	Max	Unit
Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	BV_{DSS}	50	-	-	V
Drain-Source Leakage Current	$V_{DS}=50V, V_{GS}=0V$	I_{DSS}	-	-	1	μA
Gate-Source Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$	I_{GSS}	-	-	± 10	μA
On Characteristics	Conditions	Symbol	Min	Typ.	Max	Unit
Static Drain-Source On-Resistance	$V_{GS}=10V, I_D=500mA$	$R_{DS(ON)}$	-	1.26	1.5	Ω
	$V_{GS}=4.5V, I_D=200mA$		-	1.34	2.5	Ω
Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=250\mu A$	$V_{GS(th)}$	0.5	0.9	1	V
Dynamic Characteristics	Conditions	Symbol	Min	Typ.	Max	Unit
Total Gate Charge	$V_{DS}=25V, V_{GS}=4.5V, I_D=500mA$	Q_g	-	0.95	-	nC
Gate-Source Charge		Q_{gs}	-	0.34	-	
Gate-Drain Charge		Q_{gd}	-	0.32	-	
Turn-On Delay Time	$V_{DD}=25V, V_{GS}=10V, R_G=6\Omega, I_D=500mA$	$T_{d(on)}$	-	2.3	-	ns
Rise Time		T_r	-	20	-	
Turn-Off Delay Time		$T_{d(off)}$	-	7	-	
Fall Time		T_f	-	20	-	
Input Capacitance	$V_{DS}=25V, V_{GS}=0V, F=1MHz$	C_{iss}	-	36	-	pF
Output Capacitance		C_{oss}	-	11	-	
Reverse Transfer Capacitance		C_{rss}	-	6.6	-	
Drain-Source Body Diode	Conditions	Symbol	Min	Typ.	Max	Unit
Continuous Source Current	$V_G=V_D=0V$, Force Current	I_S	-	-	360	mA
Diode Forward Voltage	$V_{GS}=0V, I_S=500mA$	V_{SD}	-	0.9	1.5	V

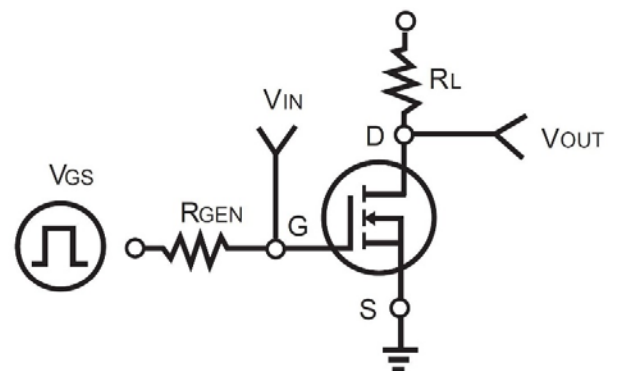
Note:

1. Pulse widths $\leq 300\mu s$, Duty cycles $\leq 2\%$
2. Essentially independent of operating temperature typical characteristics
3. Maximum current rating is package limited
4. $R_{\theta JA}$ is the sum of the junction-to-case and case-to-ambient thermal resistance where the case thermal reference is defined as the solder mounting surface of the drain pins. Mounted on a 1 inch² with 2oz square pad of copper.
5. Guaranteed by design, not subject to production testing.

Switching Time Waveform



Switching Test Circuit



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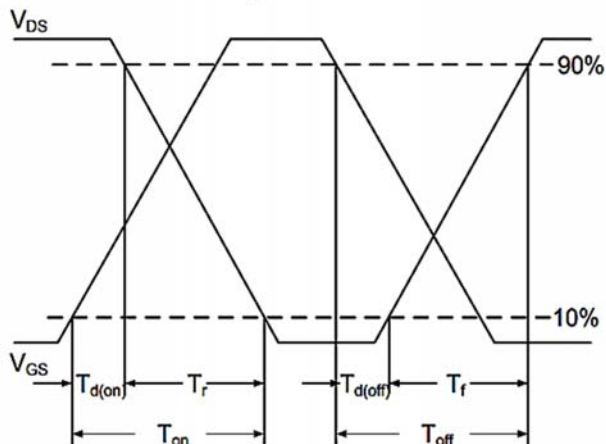
ELECTRICAL CHARACTERISTICS-P-CH

Off Characteristics	Conditions	Symbol	Min	Typ.	Max	Unit
Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=-250\mu A$	BV_{DSS}	-60	-	-	V
Drain-Source Leakage Current	$V_{DS}=-48V, V_{GS}=0V$	I_{DSS}	-	-	-1	μA
Gate-Source Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$	I_{GSS}	-	-	± 100	nA
On Characteristics	Conditions	Symbol	Min	Typ.	Max	Unit
Static Drain-Source On-Resistance	$V_{GS}=-10V, I_D=-500mA$	$R_{DS(ON)}$	-	2.6	6	Ω
	$V_{GS}=-4.5V, I_D=-200mA$		-	2.9	7	Ω
Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=-250\mu A$	$V_{GS(th)}$	-1	-1.5	-2.5	V
Dynamic Characteristics	Conditions	Symbol	Min	Typ.	Max	Unit
Total Gate Charge	$V_{DS}=-25V, V_{GS}=-4.5V, I_D=-100mA$	Q_g	-	1.1	-	nC
Gate-Source Charge		Q_{gs}	-	0.3	-	
Gate-Drain Charge		Q_{gd}	-	0.2	-	
Turn-On Delay Time	$V_{DD}=-25V, V_{GS}=-10V, R_G=6\Omega, I_D=-100mA$	$T_{d(on)}$	-	4.8	-	ns
Rise Time		T_r	-	19	-	
Turn-Off Delay Time		$T_{d(off)}$	-	52	-	
Fall Time		T_f	-	32	-	
Input Capacitance	$V_{DS}=-25V, V_{GS}=0V, F=1MHz$	C_{iss}	-	51	-	pF
Output Capacitance		C_{oss}	-	15	-	
Reverse Transfer Capacitance		C_{rss}	-	2.2	-	
Drain-Source Body Diode	Conditions	Symbol	Min	Typ.	Max	Unit
Continuous Source Current	$V_G=V_D=0V$, Force Current	I_S	-	-	-200	mA
Diode Forward Voltage	$V_{GS}=0V, I_S=-500mA$	V_{SD}	-	-0.9	-1.5	V

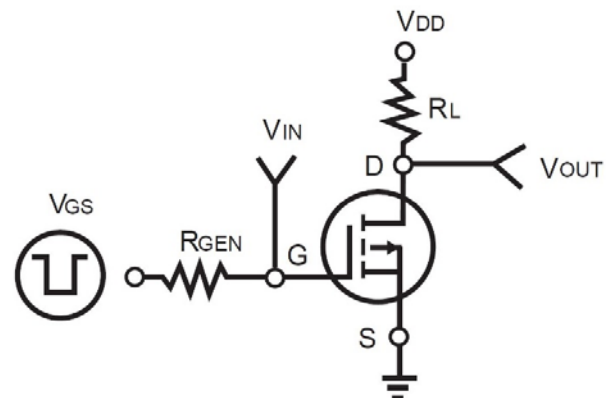
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Switching Time Waveform



Switching Test Circuit



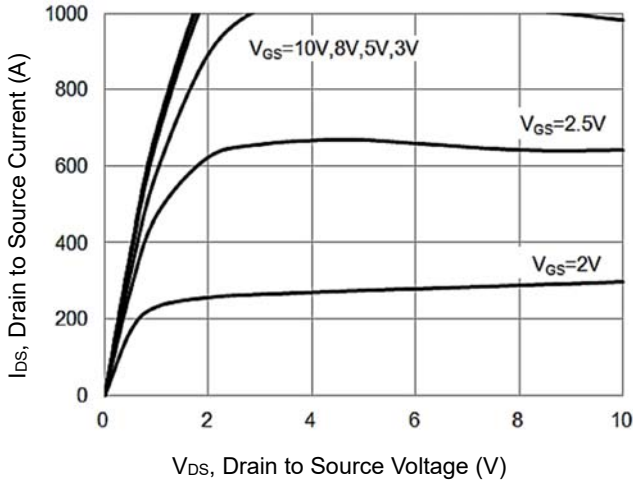
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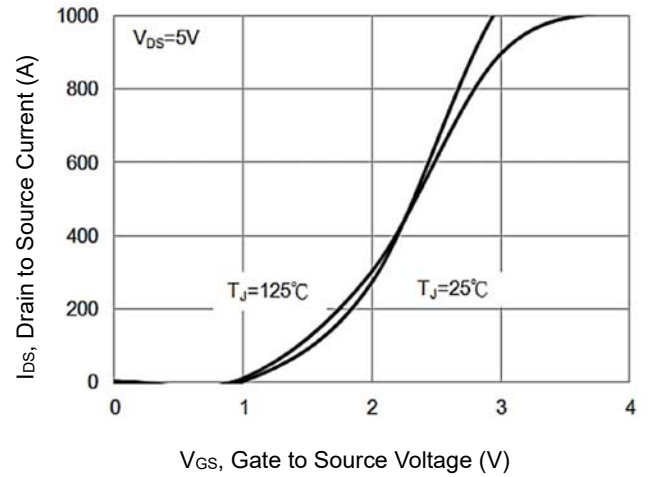
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CHARACTERISTIC CURVES-N-CH

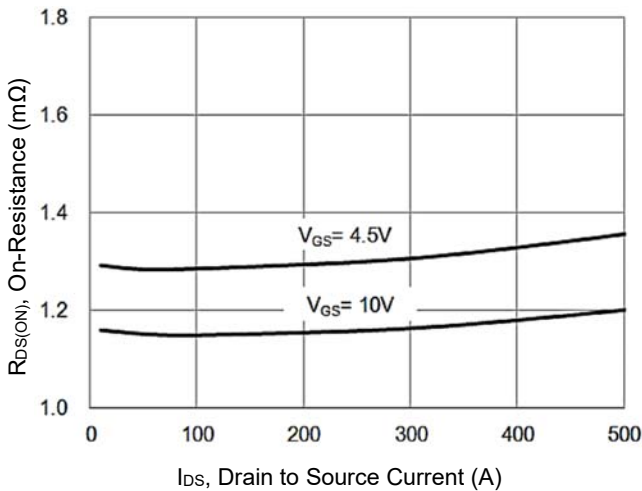
On-Region Characteristics



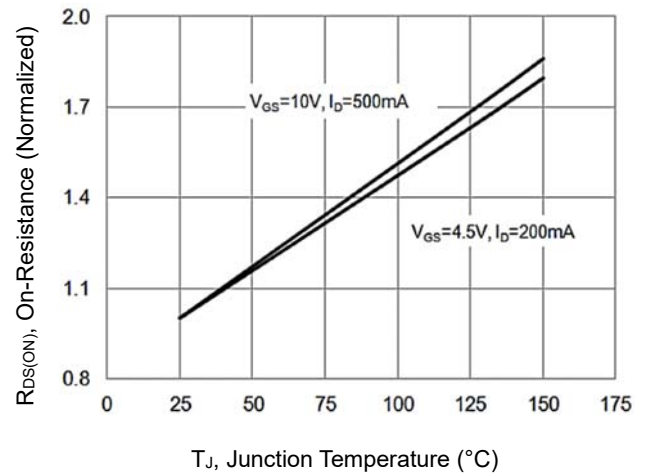
Transfer Characteristics



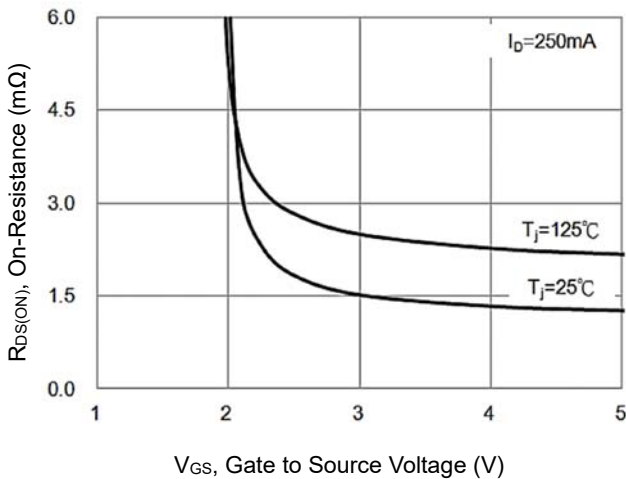
On-Resistance vs. Drain Current



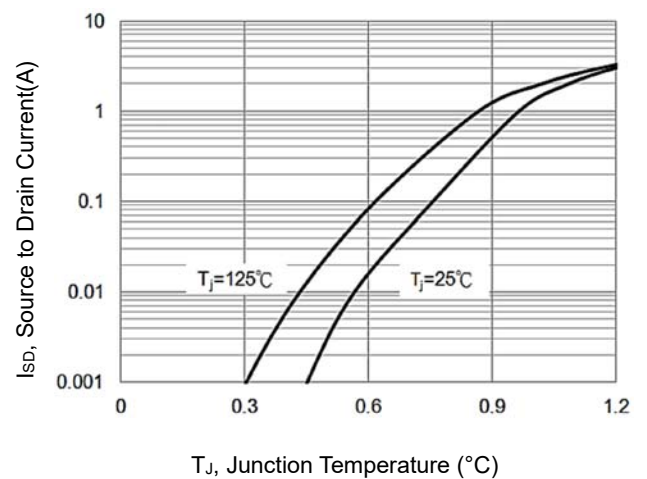
On-Resistance vs. Junction Temperature



On-Resistance Variation with V_{GS}



Bode Diode Characteristics



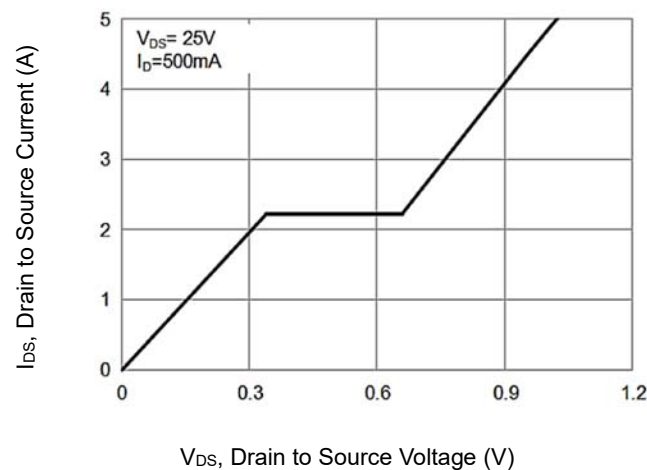
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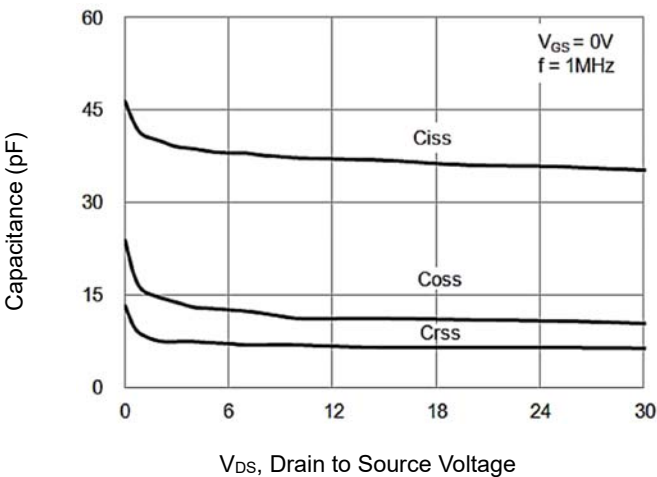
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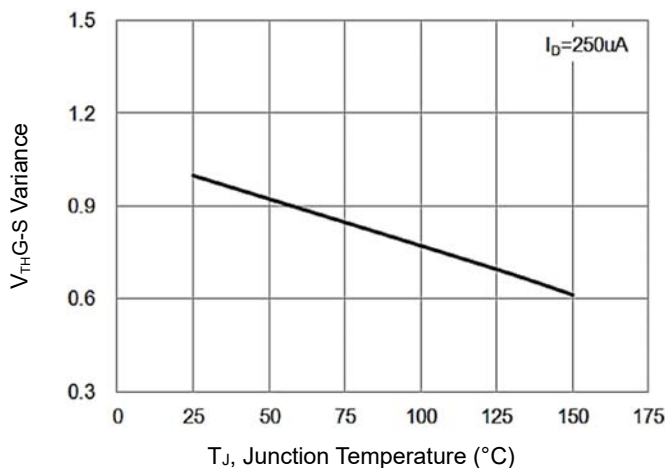
Gate-Charge Characteristics



Capacitance vs. Drain to Source Voltage



Threshold Voltage Variation with Temperature



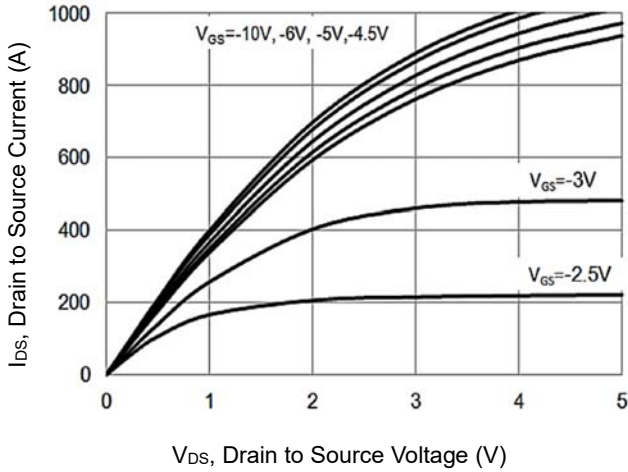
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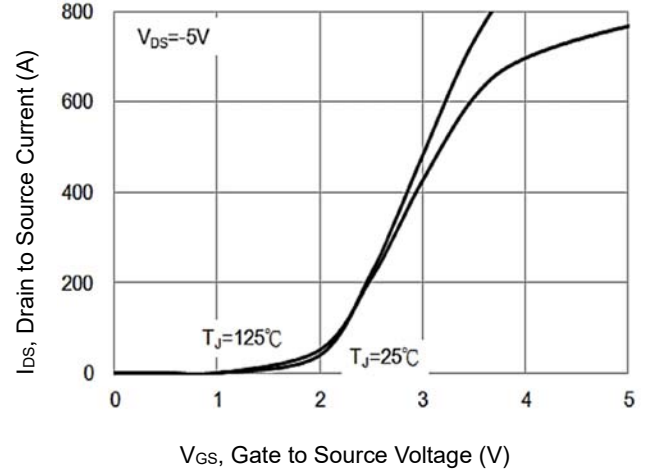
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CHARACTERISTIC CURVES-P-CH

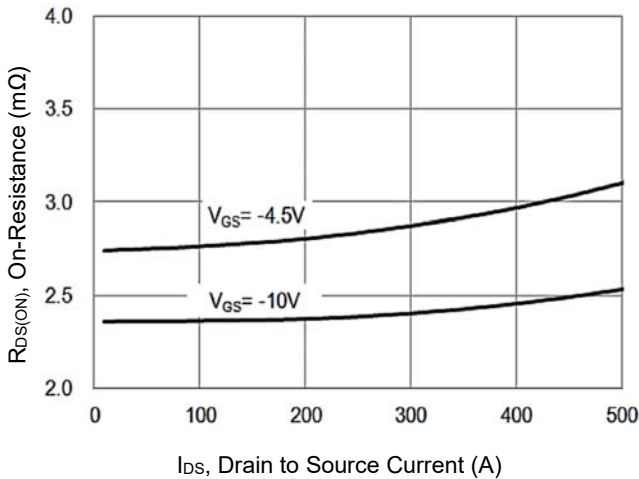
On-Region Characteristics



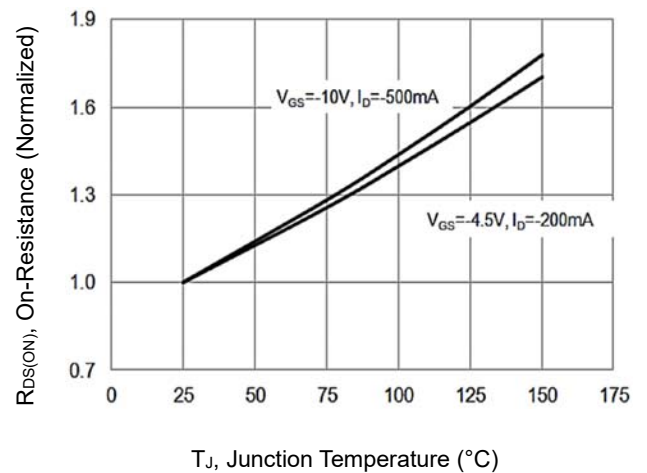
Transfer Characteristics



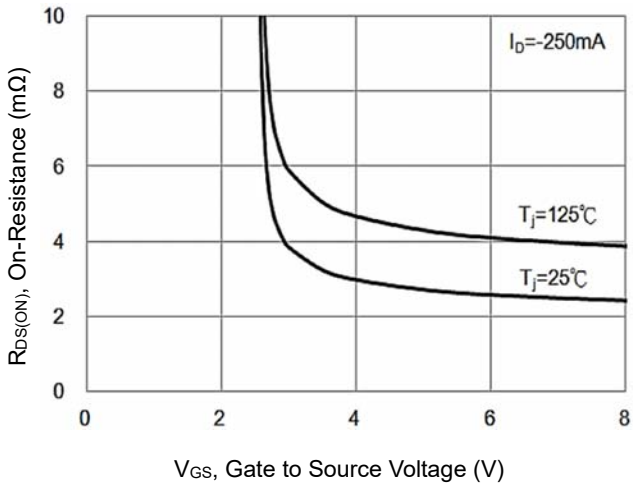
On-Resistance vs. Drain Current



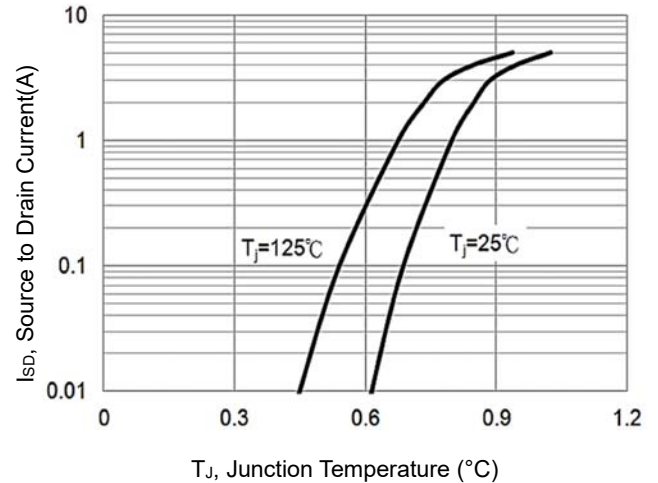
On-Resistance vs. Junction Temperature



On-Resistance Variation with Vgs

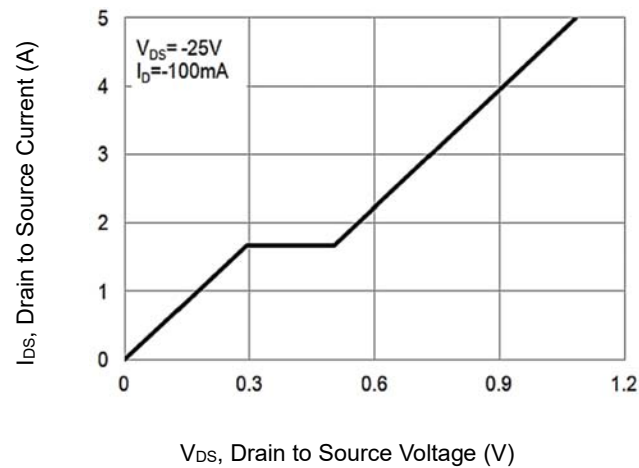


Bode Diode Characteristics

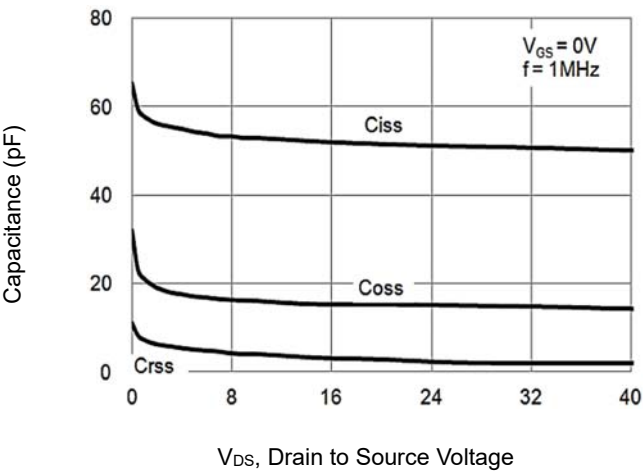


CHARACTERISTIC CURVES-P-CH

Gate-Charge Characteristics



Capacitance vs. Drain to Source Voltage



Threshold Voltage Variation with Temperature

