

N/P Channel MOSFET

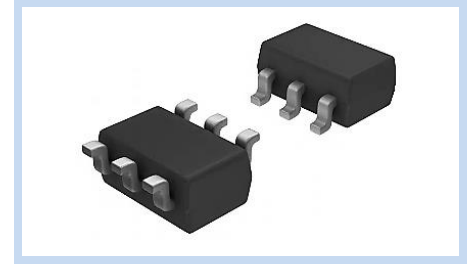
30V 4/-3A 1.25W SOT-23-6L

MFT3NP4A0S236

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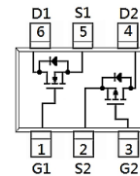
FEATURE

- $R_{DS(ON)} < 32m\Omega$, $V_{GS}=10V$, $I_D=4A$
- $R_{DS(ON)} < 48m\Omega$, $V_{GS}=4.5V$, $I_D=2A$
- High Speed Switching
- Application: Switch Load, PWM Application, etc.



MECHANICAL DATA

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

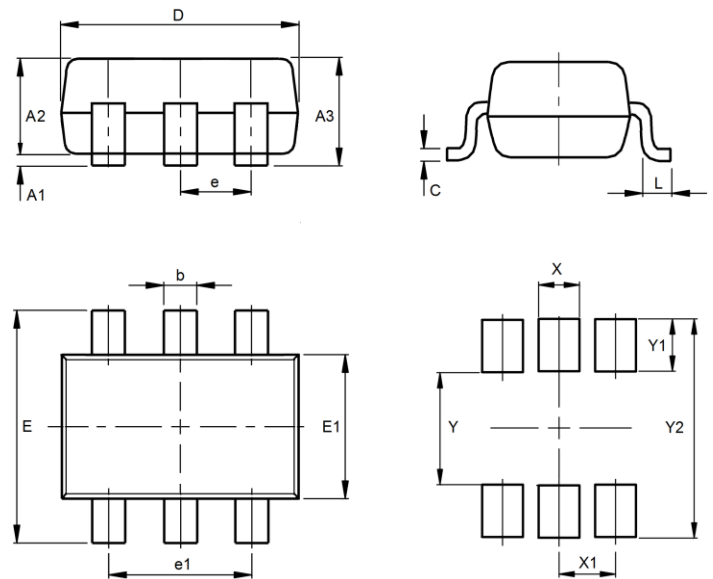


MAXIMUM RATINGS

Parameter		Symbol	N-Ch	P-Ch	Unit
Drain-Source Voltage		V_{DS}	30	-30	V
Gate-Source Voltage		V_{GS}	± 20	± 20	V
Drain Current – Continuous	$T_A = 25^\circ C$	I_D	4	-3	A
	$T_A = 100^\circ C$		2.5	-1.9	
Drain Current – Pulsed		I_{DM}	30	-20	A
Power Dissipation		P_D	1.25	1.25	W
Thermal Resistance Junction to Ambient		$R_{\theta JA}$	100	100	$^\circ C/W$
Operating Junction and Storage Temperature		T_J, T_{STG}	-55~150		$^\circ C$

DIMENSIONS

Item	Min (mm)	Max (mm)
A1	0.00	0.10
A2	1.05	1.15
A3	1.05	1.25
b	0.30	0.50
c	0.10	0.20
D	2.82	3.02
E	2.65	2.95
E1	1.50	1.70
e	0.95	
e1	1.80	2.00
L	0.30	0.60
X	0.80	
X1	0.95	
Y	1.10	
Y1	0.90	
Y2	2.90	



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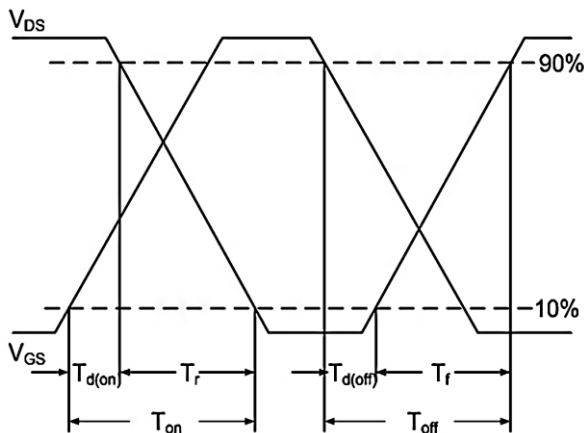
ELECTRICAL CHARACTERISTICS - N-Ch

Off Characteristics	Conditions	Symbol	Min	Typ.	Max	Unit
Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	BV_{DSS}	30	--	--	V
Drain-Source Leakage Current	$V_{DS}=30V, V_{GS}=0V$	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	$V_{GS}=10V, I_D=4A$	$R_{DS(ON)}$	--	24	32	m Ω
	$V_{GS}=4.5V, I_D=2A$		--	37	48	
Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=250\mu A$	$V_{GS(th)}$	1.0	1.5	2.2	V
Dynamic Characteristics	Conditions	Symbol	Min	Typ.	Max	Unit
Total Gate Charge	$V_{DS}=15V, V_{GS}=10V, I_D=4A$	Q_g	--	6	--	nC
Gate-Source Charge		Q_{gs}	--	1.25	--	
Gate-Drain Charge		Q_{gd}	--	1.3	--	
Turn-On Delay Time	$V_{DS}=15V, V_{GS}=10V, R_{GEN}=3\Omega, I_D=4A$	$T_{d(on)}$	--	4	--	ns
Rise Time		T_r	--	23	--	
Turn-Off Delay Time		$T_{d(off)}$	--	7	--	
Fall Time		T_f	--	19	--	
Input Capacitance	$V_{DS}=15V, V_{GS}=0V, F=1MHz$	C_{iss}	--	235	--	pF
Output Capacitance		C_{oss}	--	43	--	
Reverse Transfer Capacitance		C_{rss}	--	35	--	
Drain-Source Body Diode	Conditions	Symbol	Min	Typ.	Max	Unit
Diode Forward Current	--	I_S	--	--	4	A
Diode Forward Voltage	$V_{GS}=0V, I_S=4A$	V_{SD}	--	--	1.2	V
Reverse Recovery Time	$I_F=4A, di/dt=100A/\mu s$	t_{rr}	--	17	--	ns
Reverse Recovery Charge		Q_{rr}	--	1.7	--	nC

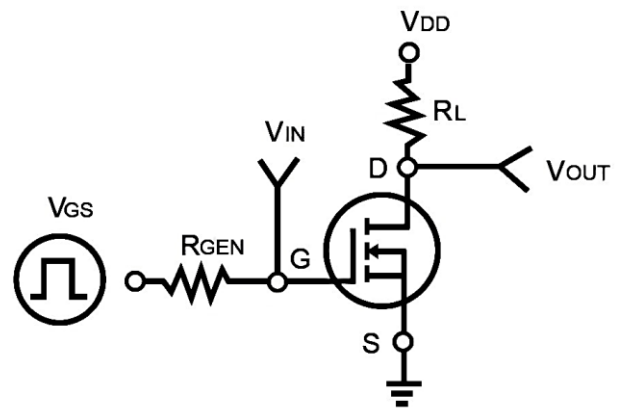
Note:

1. Repetitive Rating: Pulsed width limited by maximum junction temperature.
2. P_D is based on maximum junction temperature, using junction-case thermal resistance.
3. The value of $R_{\theta JA}$ is measured with the device mounted on 1 in² FR-4 board with 2oz. copper, in the still air environment with $T_A=25^\circ C$. The maximum allowed junction temperature of $150^\circ C$. The value in any given application depends on the user's specific board design.
4. $T_J=25^\circ C$, unless otherwise noted.
5. Guaranteed by design, not subject to production testing.

Switching Time Waveform



Switching Test Circuit



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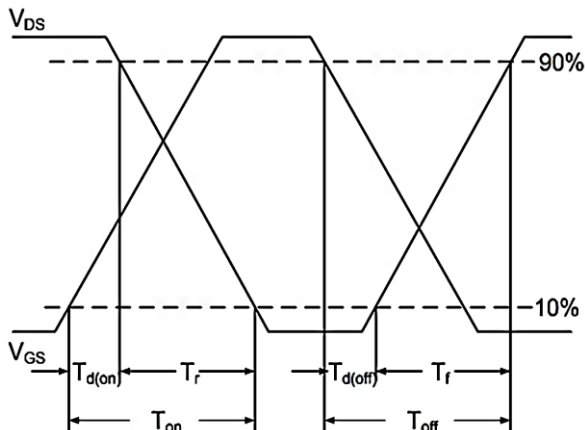
ELECTRICAL CHARACTERISTICS - P-Ch

Off Characteristics	Conditions	Symbol	Min	Typ.	Max	Unit
Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=-250\mu A$	BV_{DSS}	-30	--	--	V
Drain-Source Leakage Current	$V_{DS}=-30V, V_{GS}=0V$	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	$V_{GS}=-10V, I_D=-3A$	$R_{DS(ON)}$	--	48	65	m Ω
	$V_{GS}=-4.5V, I_D=-2A$		--	75	100	
Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=-250\mu A$	$V_{GS(th)}$	-1.0	-1.5	-2.4	V
Dynamic Characteristics	Conditions	Symbol	Min	Typ.	Max	Unit
Total Gate Charge	$V_{DS}=-15V, V_{GS}=-10V, I_D=-3A$	Q_g	--	7	--	nC
Gate-Source Charge		Q_{gs}	--	2	--	
Gate-Drain Charge		Q_{gd}	--	1	--	
Turn-On Delay Time	$V_{DD}=-15V, V_{GS}=-10V, R_{GEN}=3\Omega, I_D=-3A$	$T_{d(on)}$	--	5	--	ns
Rise Time		T_r	--	23	--	
Turn-Off Delay Time		$T_{d(off)}$	--	21	--	
Fall Time		T_f	--	30	--	
Input Capacitance	$V_{DS}=-15V, V_{GS}=0V, F=1MHz$	C_{iss}	--	260	--	pF
Output Capacitance		C_{oss}	--	50	--	
Reverse Transfer Capacitance		C_{rss}	--	40	--	
Drain-Source Body Diode	Conditions	Symbol	Min	Typ.	Max	Unit
Diode Forward Current	--	I_S	--	--	-3	A
Diode Forward Voltage	$V_{GS}=0V, I_S=-3A$	V_{SD}	--	--	-1.2	V
Reverse Recovery Time	$I_F=-3A, di/dt=100A/\mu s$	t_{rr}	--	12	--	ns
Reverse Recovery Charge		Q_{rr}	--	4	--	nC

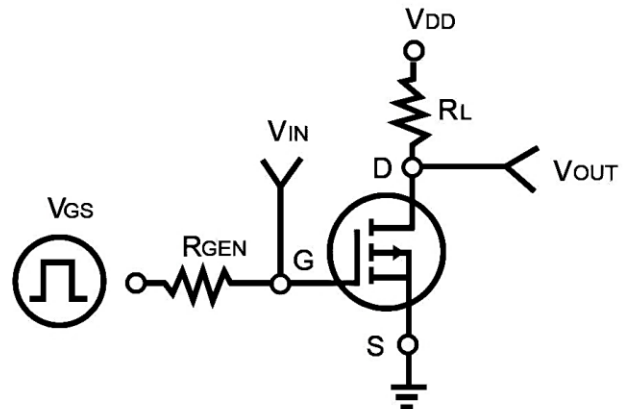
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2. P_D is based on maximum junction temperature, using junction-case thermal resistance.
3. The value of $R_{\theta JA}$ is measured with the device mounted on 1 in² FR-4 board with 2oz. copper, in the still air environment with $T_A=25^\circ C$. The maximum allowed junction temperature of $150^\circ C$. The value in any given application depends on the user's specific board design.
4. $T_J=25^\circ C$, unless otherwise noted.
5. Guaranteed by design, not subject to production testing.

Switching Time Waveform

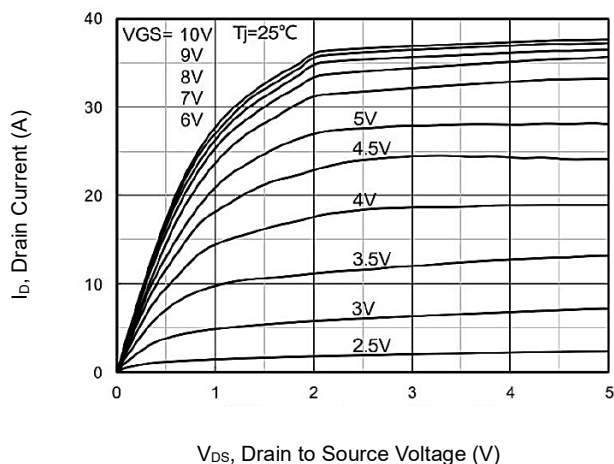


Switching Test Circuit

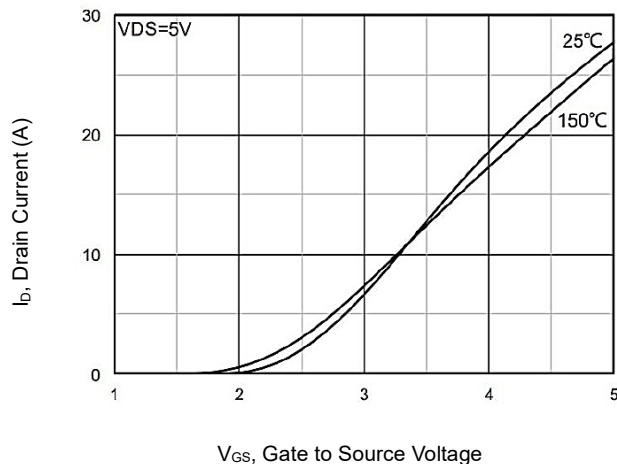


CHARACTERISTIC CURVES - N-Ch

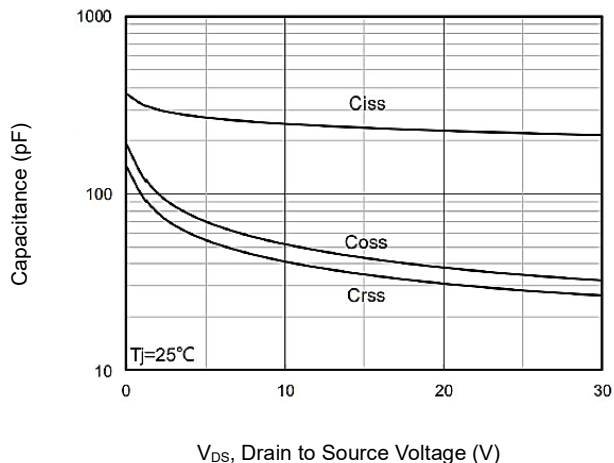
On-Region Characteristics



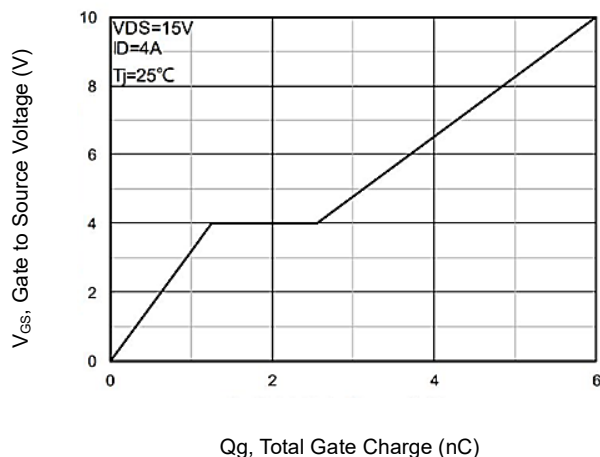
Transfer Characteristics



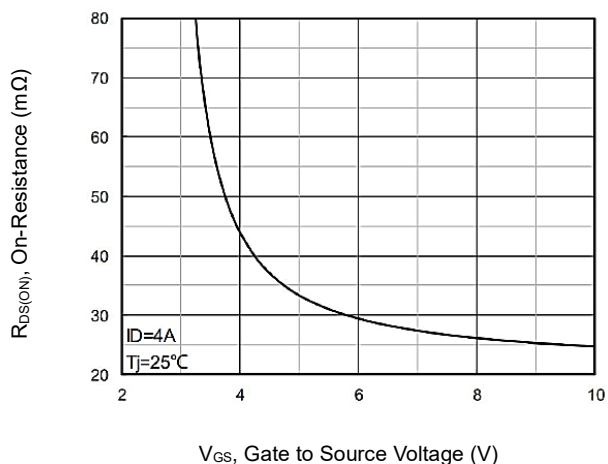
Capacitance vs. Drain-Source Voltage



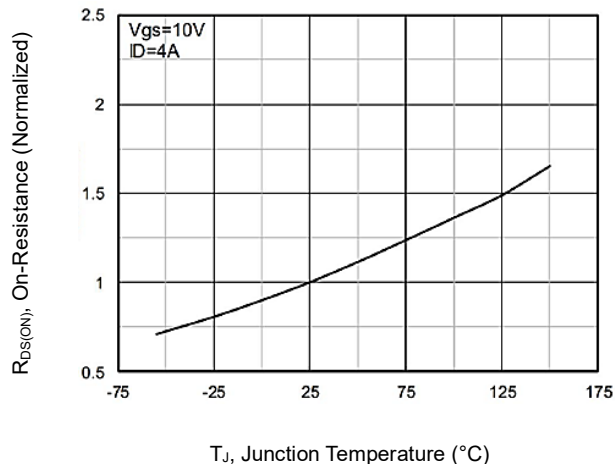
Gate Charge Characteristics



On-Resistance vs. Gate-Source Voltage



On-Resistance variation with Junction Temperature



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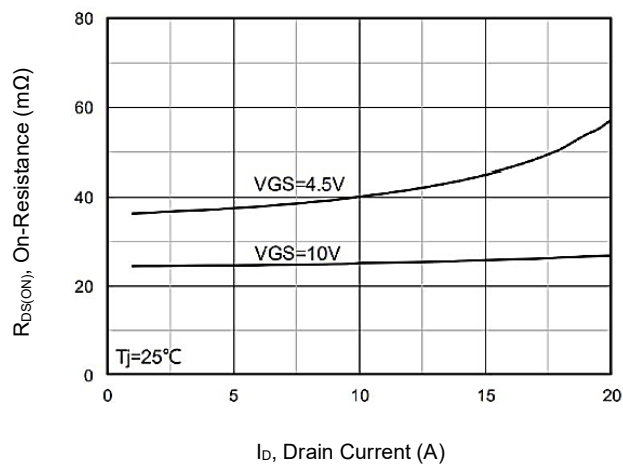
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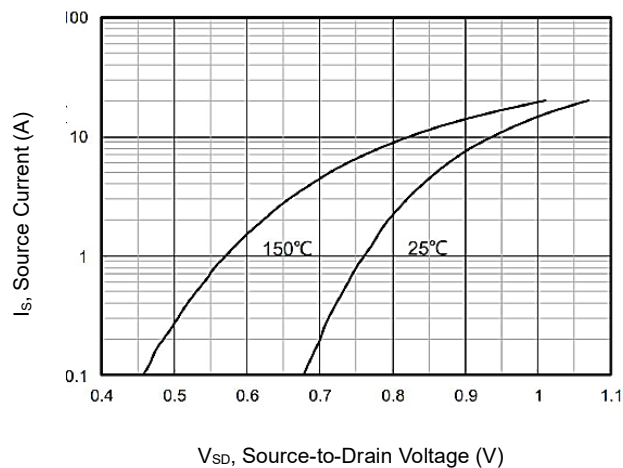
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CHARACTERISTIC CURVES - N-Ch

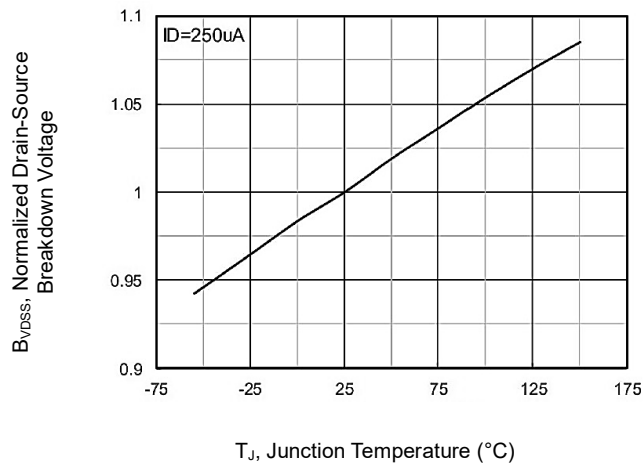
On-Resistance vs. Drain Current



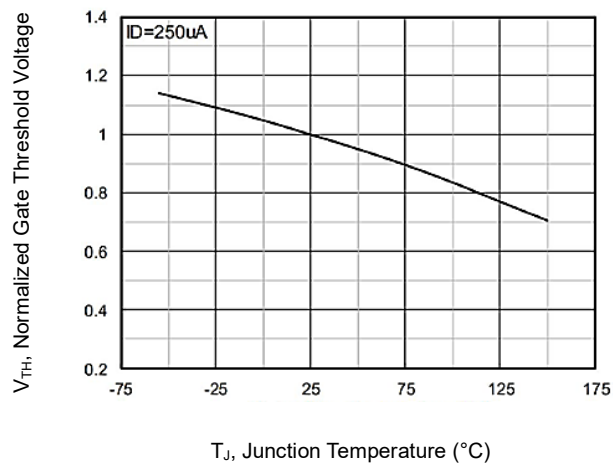
Body Diode Characteristics



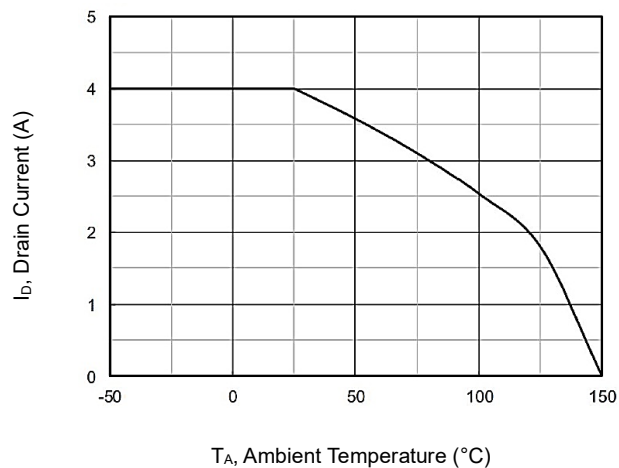
Breakdown Voltage Variation with Temperature



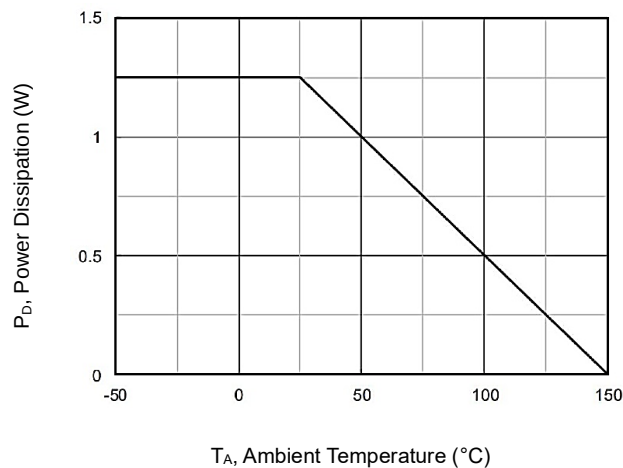
Threshold Voltage Variance with Temperature



Maximum Drain Current vs. Temperature

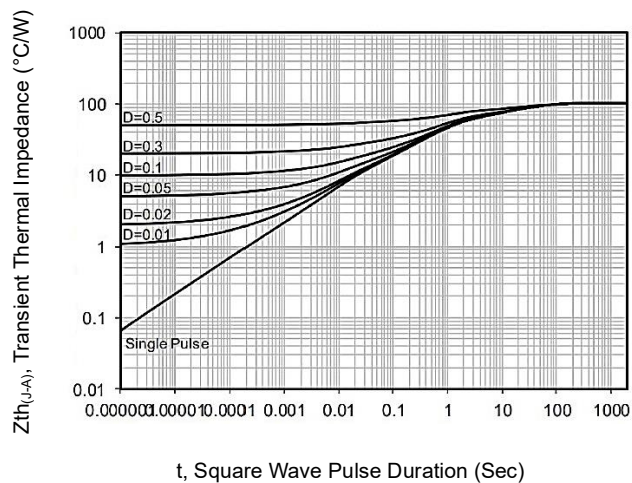


Power Dissipation

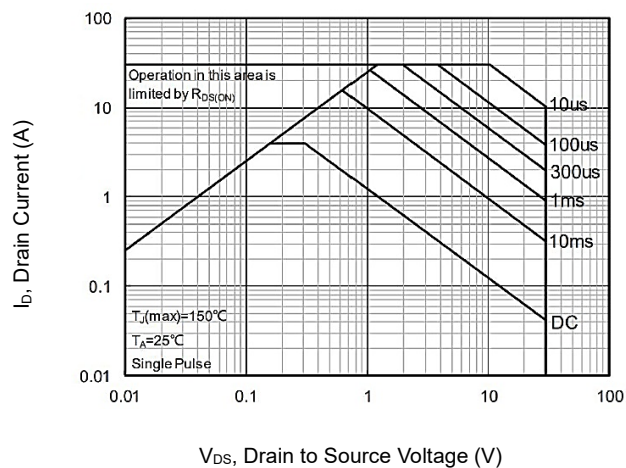


CHARACTERISTIC CURVES - N-Ch

Maximum Transient Thermal Impedance Curve



Maximum Safe Operating Area



N/P Channel MOSFET

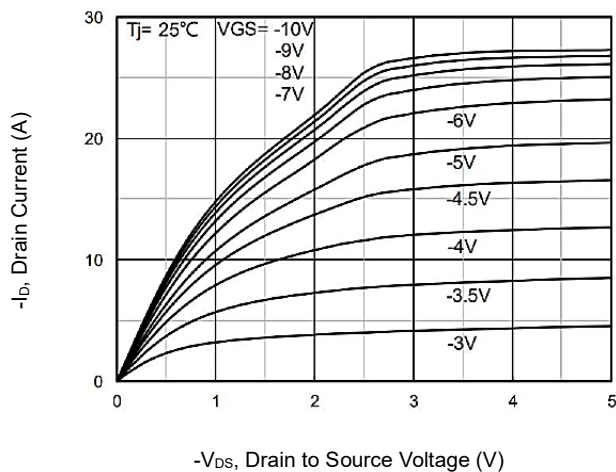
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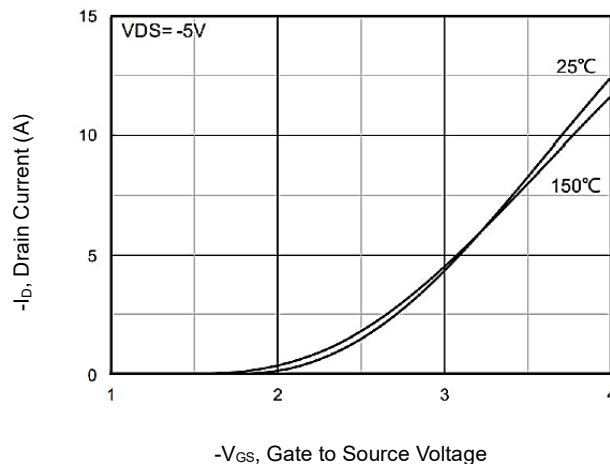
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CHARACTERISTIC CURVES - P-Ch

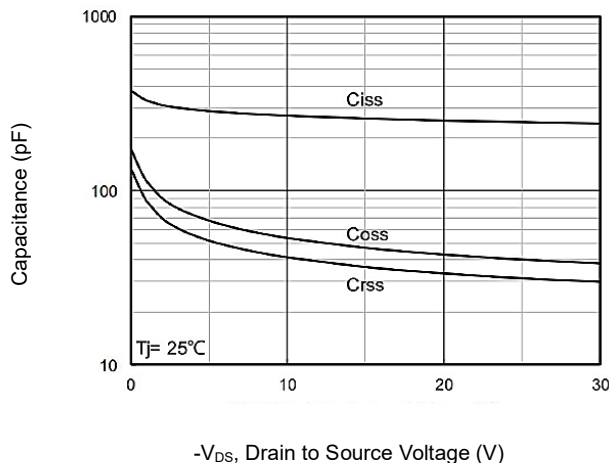
On-Region Characteristics



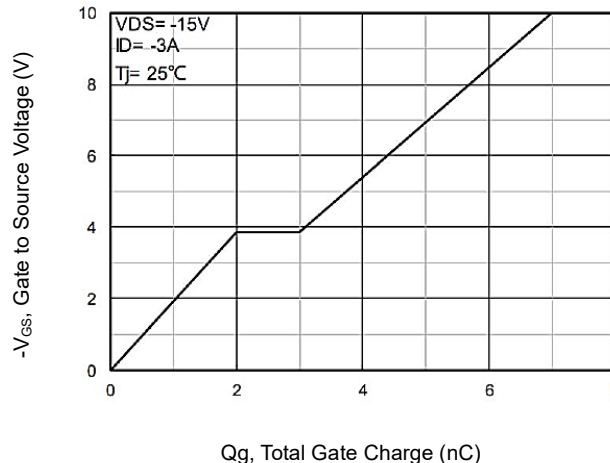
Transfer Characteristics



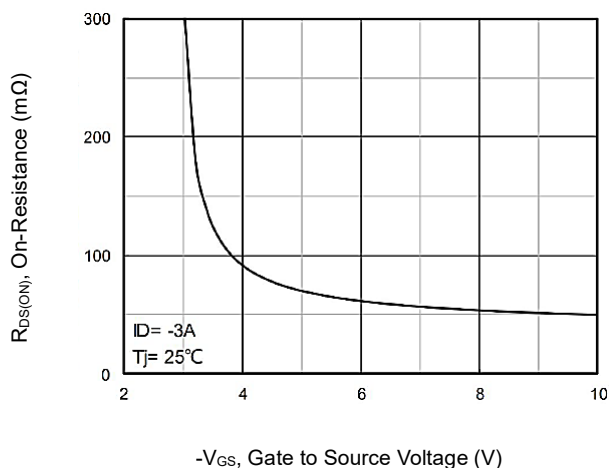
Capacitance vs. Drain-Source Voltage



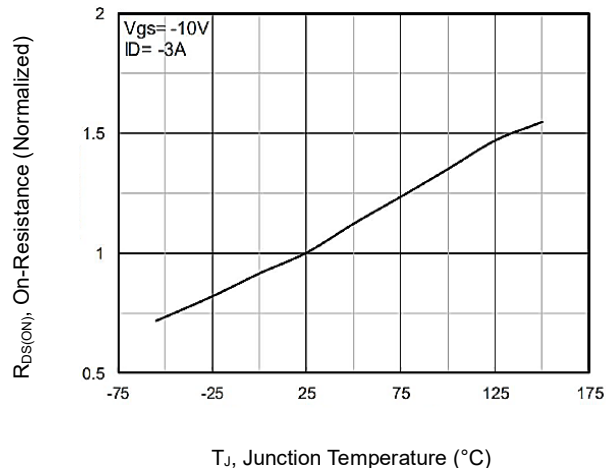
Gate Charge Characteristics



On-Resistance vs. Gate-Source Voltage



On-Resistance variation with Junction Temperature



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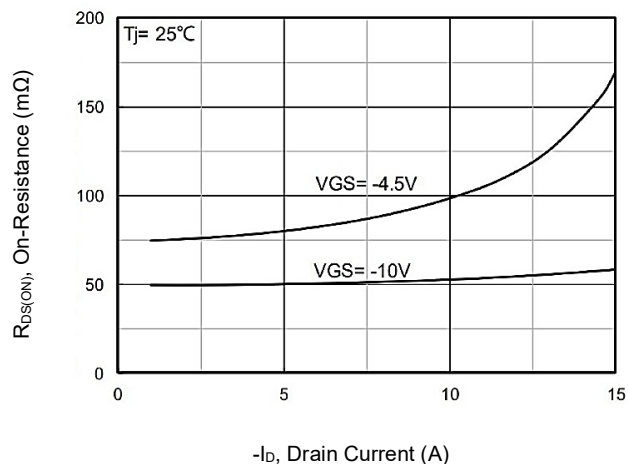
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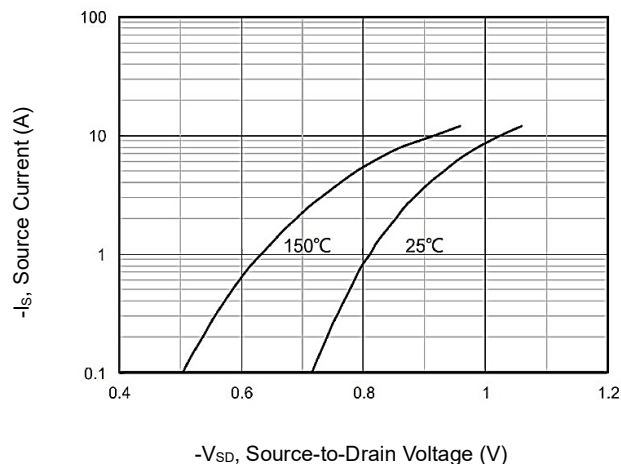
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CHARACTERISTIC CURVES - P-Ch

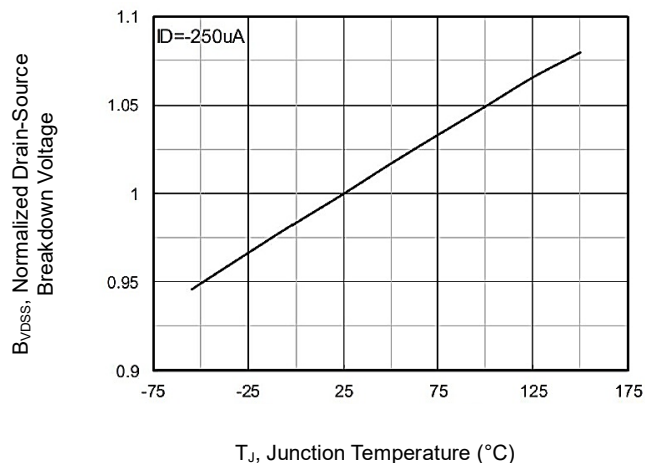
On-Resistance vs. Drain Current



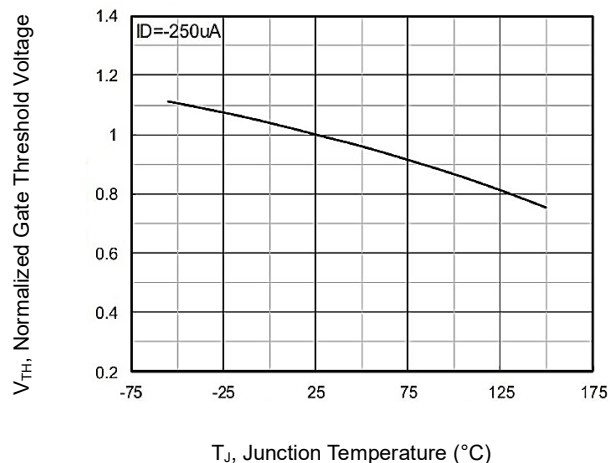
Body Diode Characteristics



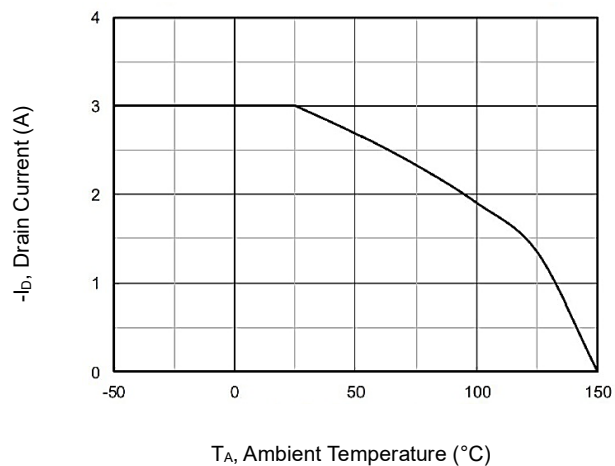
Breakdown Voltage Variation with Temperature



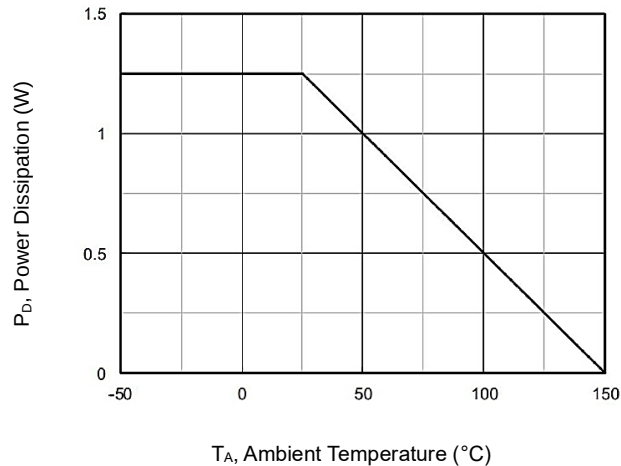
Threshold Voltage Variance with Temperature



Maximum Drain Current vs. Temperature

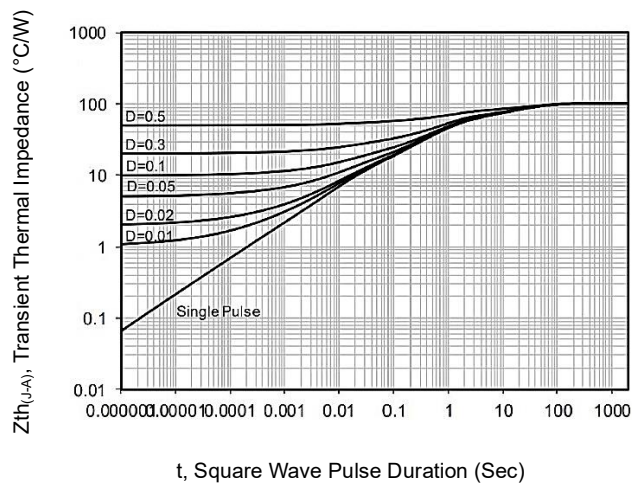


Power Dissipation



CHARACTERISTIC CURVES - P-Ch

Maximum Transient Thermal Impedance Curve



Maximum Safe Operating Area

