WSF3055

N-Ch and P-Channel MOSFET

Description

The WSF3055 uses advanced trench technology to provide excellent RDS(ON), low gate charge and operation with gate voltages as low as 4.5V.This device is suitable for use as a Battery protection or in other Switching application

Features

1,100 % U IS + Rg Tested

2,Re liable and Rugged

3,Lead Free Available (RoHS Compliant)

Product Summery

VDS	RDS(ON)	ID
30	15mΩ	24A
-30	11mΩ	-19.8A

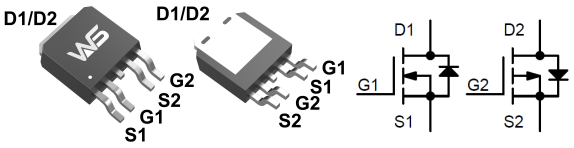
Application

Motor Control.

Protable equipment application.

Synchronous Rectification.

TO-252 Pin Configuration



Absolute Maximum Ratings (T= 25°C unless otherwise noted)

Symbol	Parameter		N Channel	P Channel	Unit
V_{DSS}	Drain-Source Voltage		30	-30	V
V_{GSS}	Gate-Source Voltage		±20	±20	
I_D	Continuous Drain Current	T_C=25°C	24	-19.8	A
		T_C=100°C	15	-12.6	
P_D	Maximum Power Dissipation	T_C=25°C	18.9		W
		T_C=100°C	7.6		
I_D	Continuous Drain Current	T_A=25°C	9	-7.6	A
		T_A=70°C	7.3	-6	
I_{DM}[a]	Pulsed Drain Current	T_A=25°C	36	-30.4	A
P_D	Maximum Power Dissipation	T_A=25°C	2.78		W
		T_A=70°C	1.78		
I_S	Diode Continuous Forward Current	T_C=25°C	3	-3	A
T_J	Maximum Junction Temperature		150		°C
T_{STG}	Storage Temperature Range		-55 to 150		
$R_{\Theta JC}$	Thermal Resistance-Junction to Case	Steady State	6.6		°C/W
$R_{\Theta JA}$[b]	Thermal Resistance-Junction to Ambient	t ≤10s	45		°C/W
		Steady State	95		°C/W
I_{AS}[c]	Avalanche Current, Single pulse	L=0.1mH	13	19	A
E_{AS}[c]	Avalanche Energy, Single pulse	L=0.1mH	8.5	18	mJ

Note a：Pulse width limited by max. junction temperature.

Note b：Surface mounted on 1in$_2$ pad area.

Note c：UIS tested and pulse width limited by maximum junction temperature 150°C(initial temperature T_j=25°C)

N Channel Electrical Characteristics (T= 25°C unless otherwise noted)

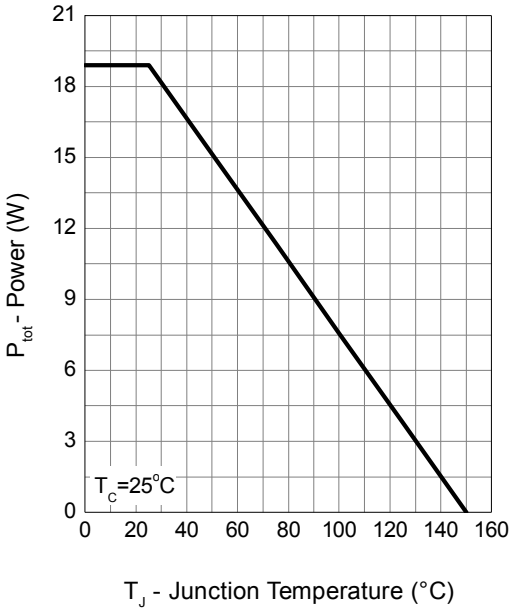
Symbol	Parameter	Test Conditions	N Channel			Unit
			Min.	Typ.	Max.	
Static Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V, I_{DS}=250μA	30	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=24V, V_{GS}=0V	-	-	50	A
		V_{DS}=24V, V_{GS}=0V, T_J=85°C	-	-	5	mA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_{DS}=250μA	1.3	1.8	2.3	V
I_{GSS}	Gate Leakage Current	V_{GS}=±20V, V_{DS}=0V	-	-	±100	nA
$R_{DS(ON)}$ d	Drain-Source On-state Resistance	V_{GS}=10V, I_{DS}=9A	-	15	20	mΩ
		V_{GS}=4.5V, I_{DS}=8A	-	18	23	mΩ
Diode Characteristics						
V_{SD} d	Diode Forward Voltage	I_{SD}=1A, V_{GS}=0V	0.3	0.4	0.55	V
t_{rr}	Reverse Recovery Time	I_{SD}=4.0A, dI_{SD}/dt=100A/μs	-	11	-	ns
Q_{rr}	Reverse Recovery Charge		-	3.5	-	nC
Dynamic Characteristics e						
R_G	Gate Resistance	V_{GS}=0V,V_{DS}=0V,f=1MHz	-	3.3	-	Ω
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=15V, Frequency=1.0MHz	-	395	514	pF
C_{oss}	Output Capacitance		-	105	-	
C_{rss}	Reverse Transfer Capacitance		-	42	-	
$t_{d(ON)}$	Turn-on Delay Time	V_{DD}=15V, R_L=15 , I_{DS}=1A, V_{GEN}=10V, R_G=6	-	5.5	-	ns
t_r	Turn-on Rise Time		-	10.5	-	
$t_{d(OFF)}$	Turn-off Delay Time		-	15	-	
t_f	Turn-off Fall Time		-	3.7	-	
Gate Charge Characteristics e						
Q_g	Total Gate Charge	V_{DS}=15V,V_{GS}=4.5V, I_{DS}=4A	-	4	-	nC
Q_g	Total Gate Charge	V_{DS}=15V, V_{GS}=10V, I_{DS}=4.0A	-	8.3	12.5	
Q_{gs}	Gate-Source Charge		-	1.1	-	
Q_{gd}	Gate-Drain Charge		-	1.8	-	

Note d：Pulse test ; pulse width:≤300μs, duty cycle≤2%.

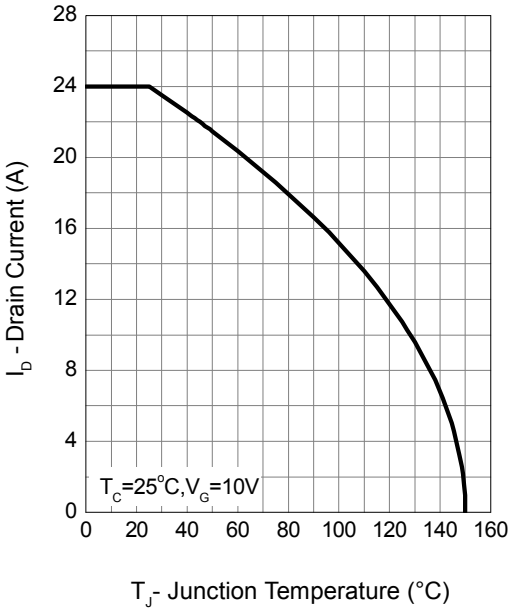
Note e：Guaranteed by design, not subject to production testing.

N Channel Typical Operating Characteristics

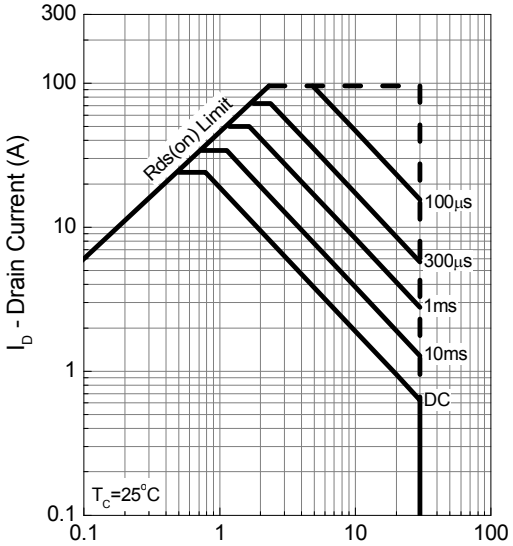
Power Dissipation



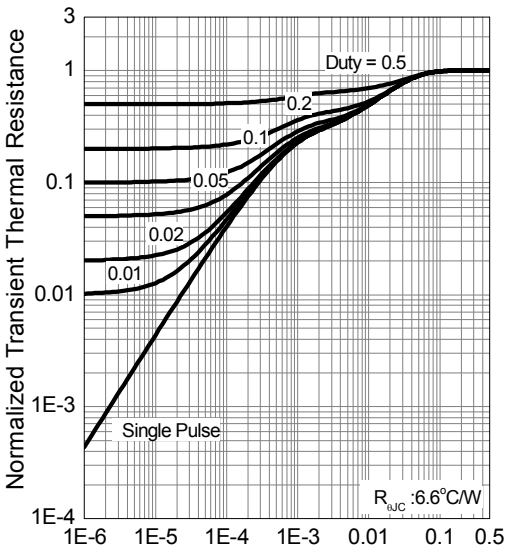
Drain Current



Safe Operation Area

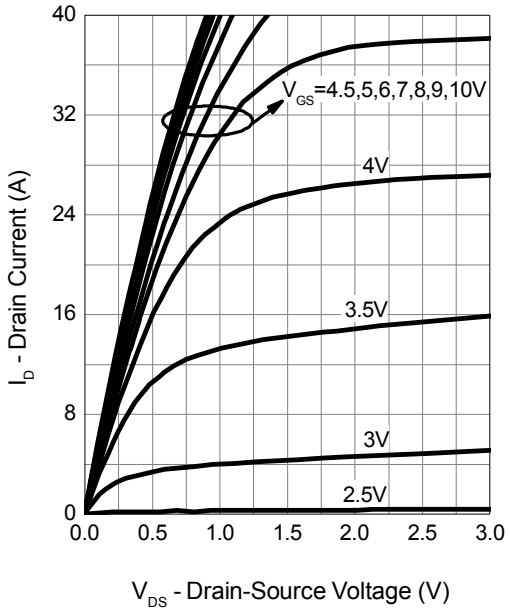


Thermal Transient Impedance

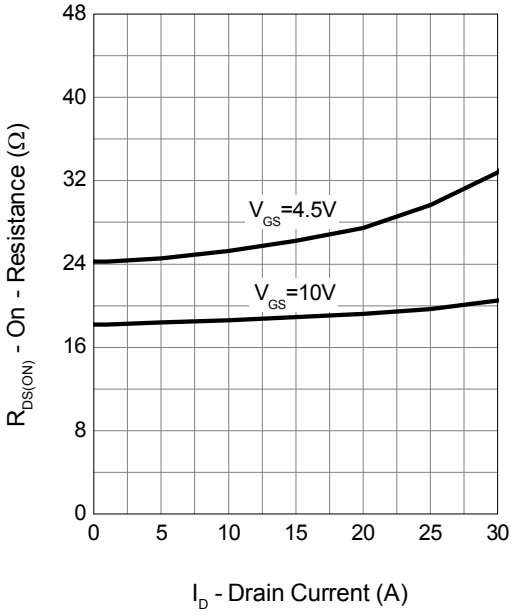


N Channel Typical Operating Characteristics (Cont.)

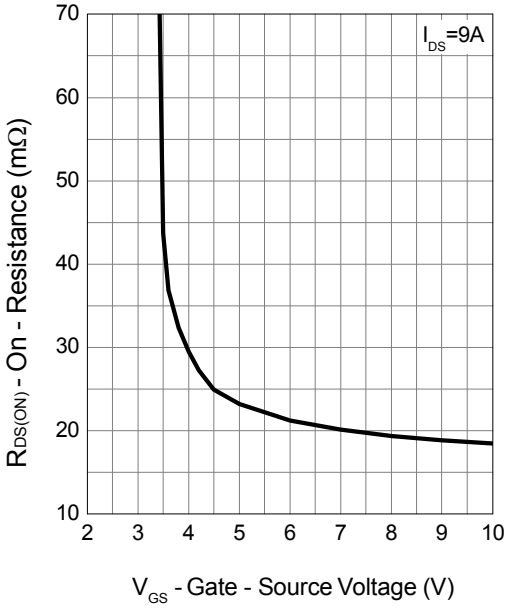
Output Characteristics



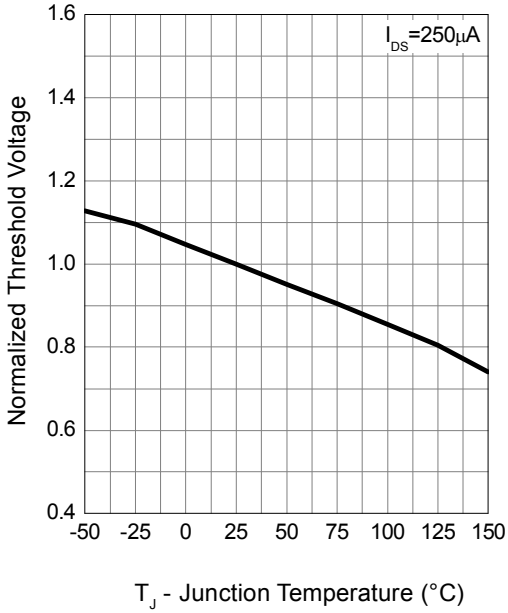
Drain-Source On Resistance



Transfer Characteristics

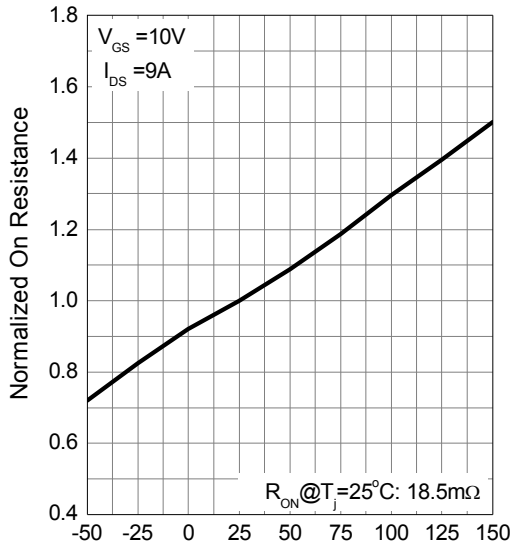


Gate Threshold Voltage



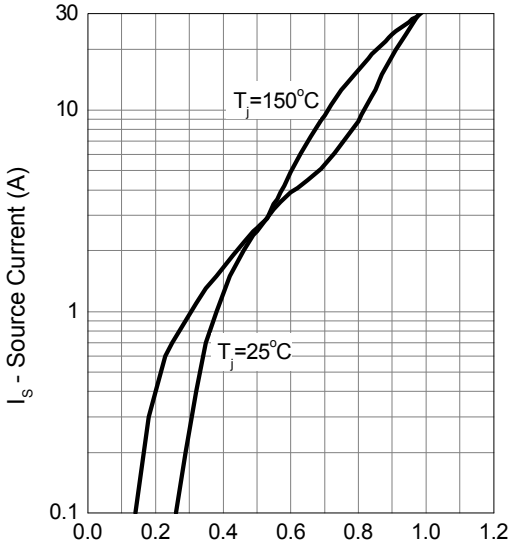
N Channel Typical Operating Characteristics (Cont.)

Drain-Source On Resistance



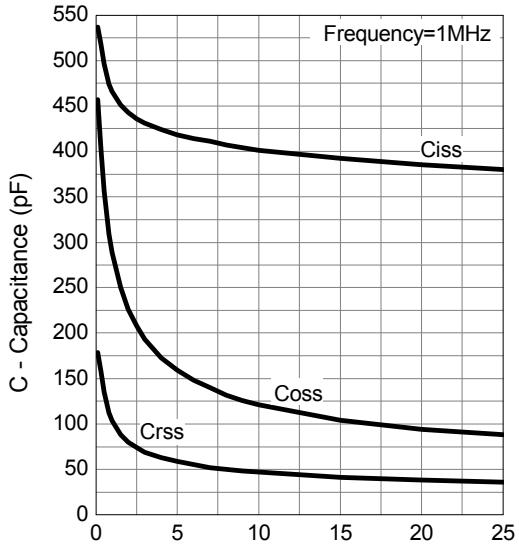
T_J - Junction Temperature (°C)

Source-Drain Diode Forward



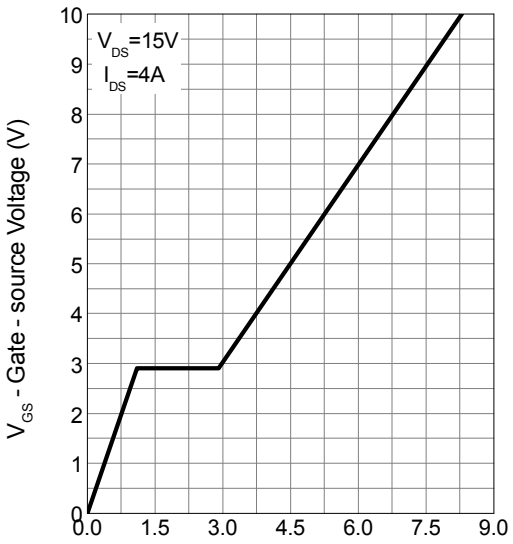
V_{SD} - Source - Drain Voltage (V)

Capacitance



V_{DS} - Drain - Source Voltage (V)

Gate Charge



Q_G - Gate Charge (nC)

P Channel Electrical Characteristics (T= 25°C unless otherwise noted)

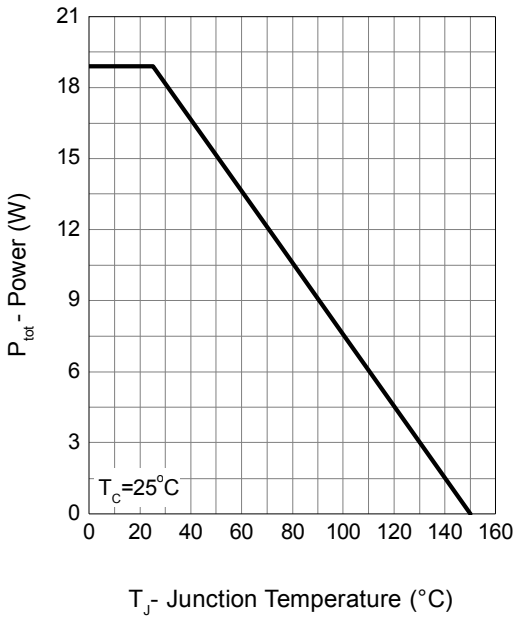
Symbol	Parameter	Test Conditions		P Channel Min.	P Channel Typ.	P Channel Max.	Unit
Static Characteristics							
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V, I_{DS}=-250μA		-30	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=-24V, V_{GS}=0V		-	-	-1	A
			T_J=85°C	-	-	-30	
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_{DS}=-250μA		-1.3	-1.8	-2.3	V
I_{GSS}	Gate Leakage Current	V_{GS}=±20V, V_{DS}=0V		-	-	±100	nA
$R_{DS(ON)}$ [d]	Drain-Source On-state Resistance	V_{GS}=-10V, I_{DS}=-7A		-	11	14	mΩ
		V_{GS}=-4.5V, I_{DS}=-4A		-	15	20	mΩ
Diode Characteristics							
V_{SD} [d]	Diode Forward Voltage	I_{SD}=-1A, V_{GS}=0V		-	-0.75	-1	V
t_{rr}	Reverse Recovery Time	I_{SD}=-7.0A, dI_{SD}/dt=100A/μs		-	17	-	ns
Q_{rr}	Reverse Recovery Charge			-	9	-	nC
Dynamic Characteristics [e]							
R_G	Gate Resistance	V_{GS}=0V,V_{DS}=0V,f=1MHz		-	12	-	Ω
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=-15V, Frequency=1.0MHz		-	750	975	pF
C_{oss}	Output Capacitance			-	142	-	
C_{rss}	Reverse Transfer Capacitance			-	102	-	
$t_{d(ON)}$	Turn-on Delay Time	V_{DD}=-15V, R_L=15 , I_{DS}=-1A, V_{GEN} =-10V, R_G =6		-	9	17	ns
t_r	Turn-on Rise Time			-	11	20	
$t_{d(OFF)}$	Turn-off Delay Time			-	55	99	
t_f	Turn-off Fall Time			-	34	62	
Gate Charge Characteristics [e]							
Q_g	Total Gate Charge	V_{DS}=-15V, V_{GS}=-4.5V, I_{DS}=-7.0A		-	8	-	nC
Q_g	Total Gate Charge	V_{DS}=-15V, V_{GS}=-10V, I_{DS}=-7.0A		-	17	24	
Q_{gth}	Threshold Gate Charge			-	1	-	
Q_{gs}	Gate-Source Charge			-	2	-	
Q_{gd}	Gate-Drain Charge			-	4	-	

Note d：Pulse test ; pulse width ≤300μs, duty cycle≤2%.

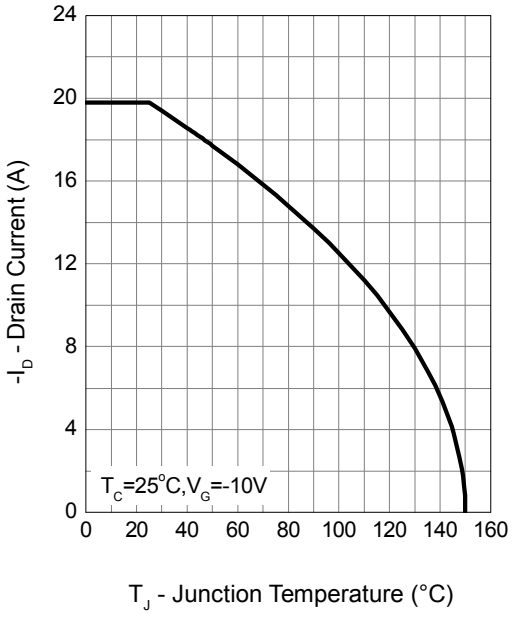
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P Channel Typical Operating Characteristics

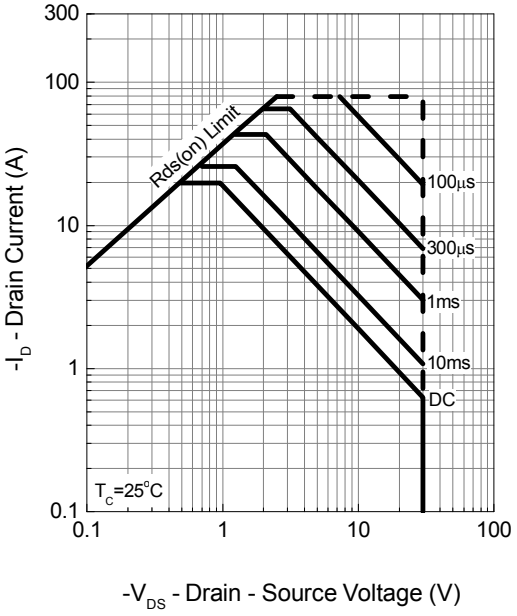
Power Dissipation



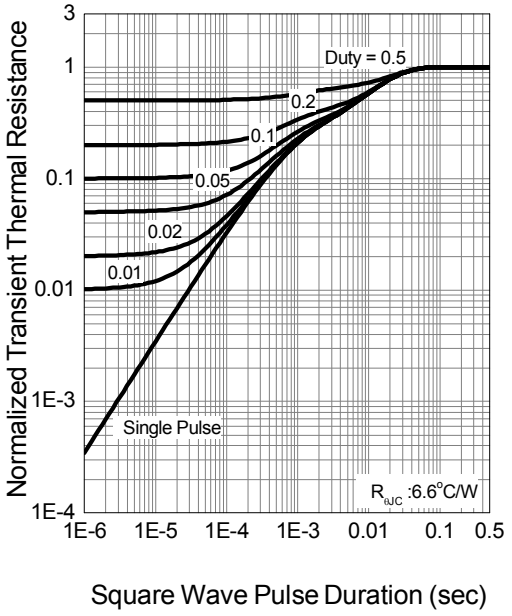
Drain Current



Safe Operation Area

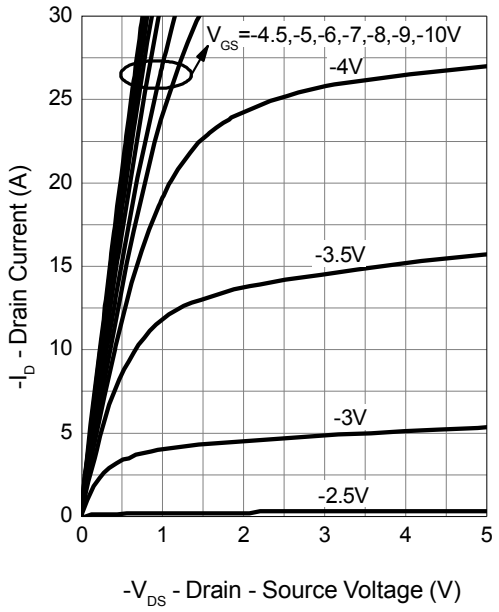


Thermal Transient Impedance

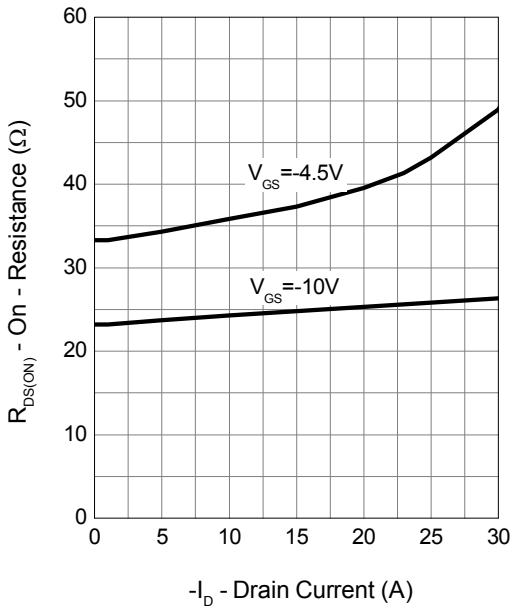


P Channel Typical Operating Characteristics (Cont.)

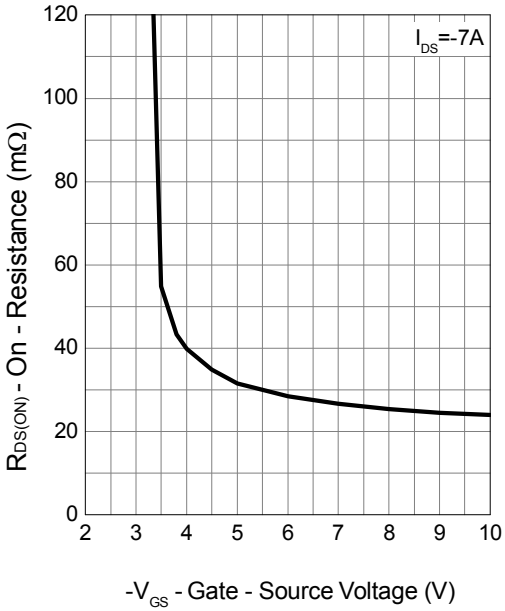
Output Characteristics



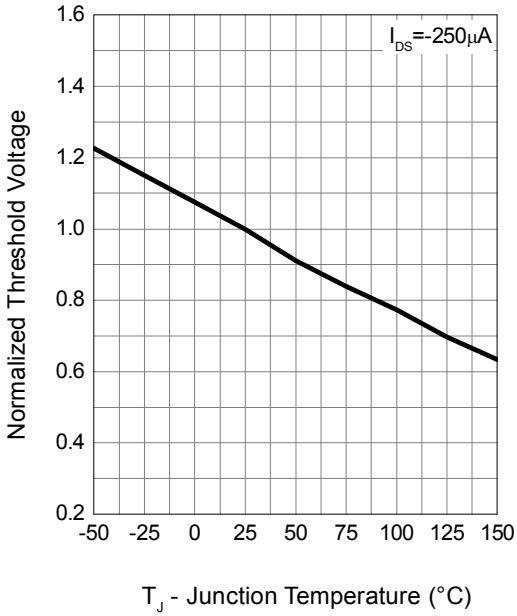
Drain-Source On Resistance



Transfer Characteristics

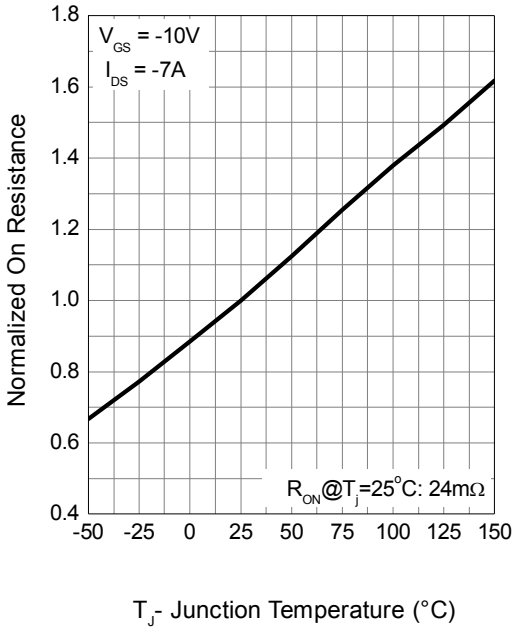


Gate Threshold Voltage

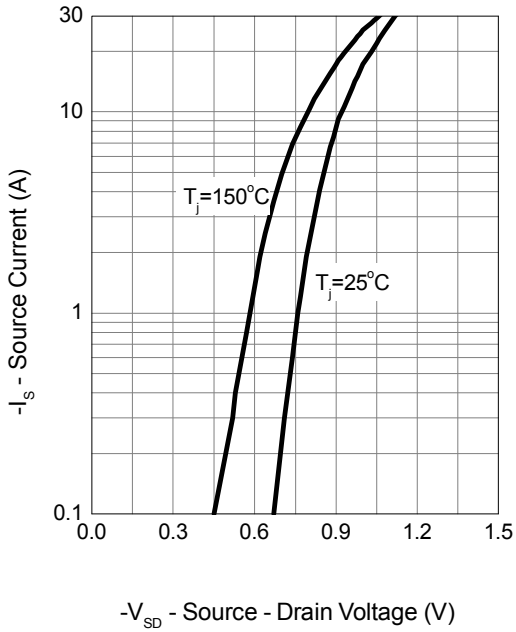


P Channel Typical Operating Characteristics (Cont.)

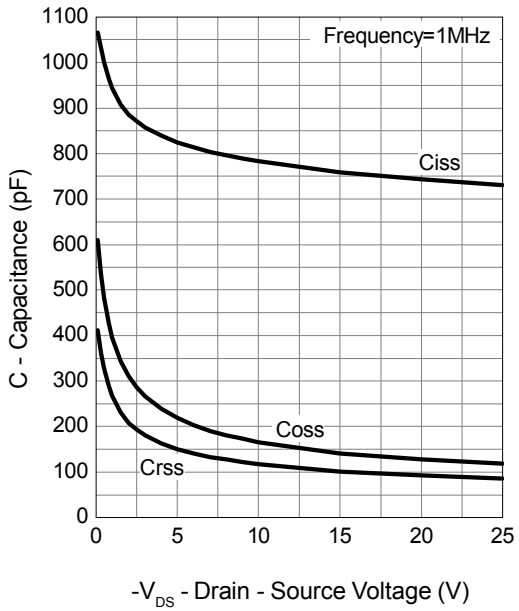
Drain-Source On Resistance



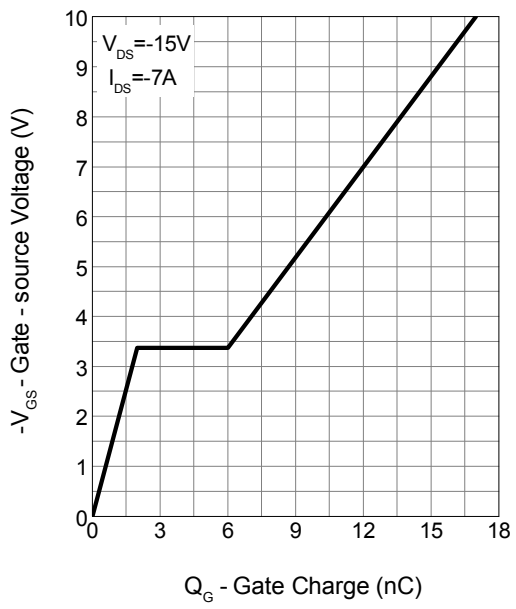
Source-Drain Diode Forward



Capacitance



Gate Charge



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