

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

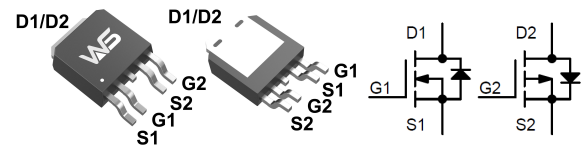
- 1, 100 % UIS + Rg Tested
- 2, Reliable and Rugged
- 3, Lead Free Available (RoHS Compliant)

Product Summary

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

Application

- Motor Control.
- Portable 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 _{θJC}	Thermal Resistance-Junction to Case	Steady State	6.6		°C/W
R _{θJA} ^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 1in² pad area.

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

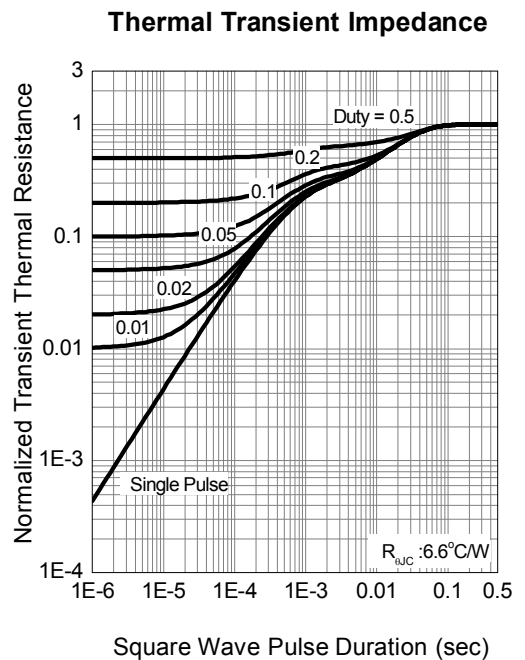
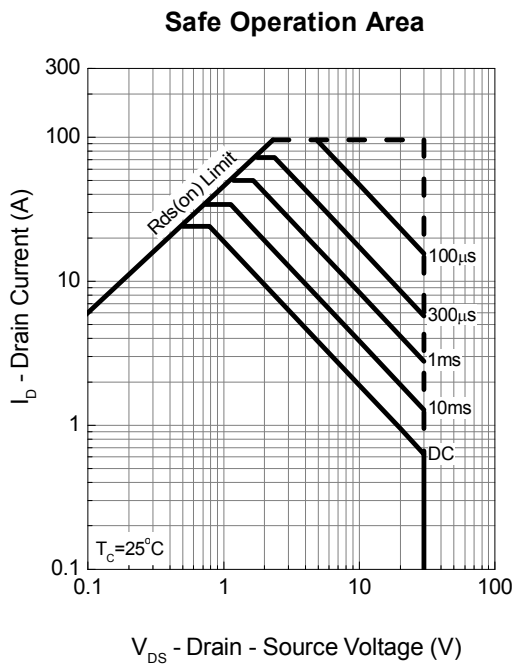
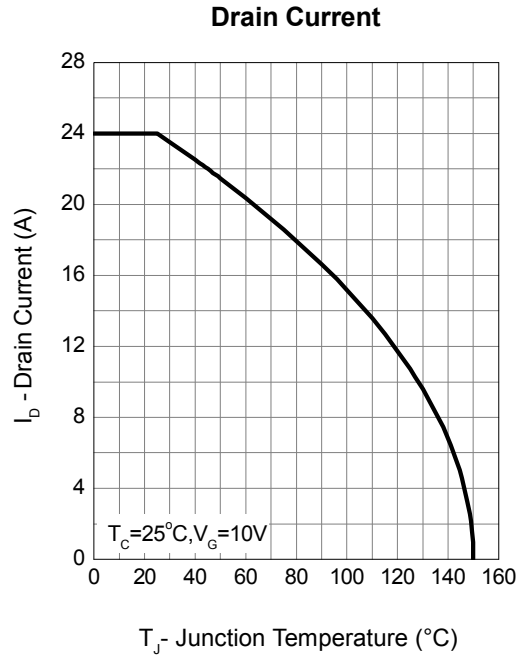
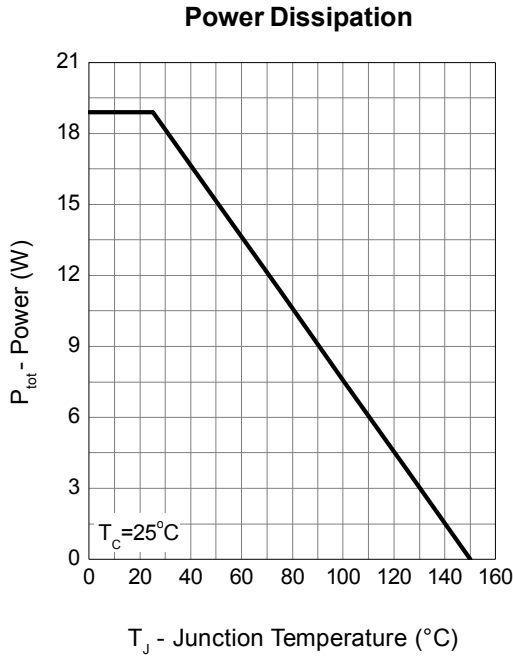
N Channel Electrical Characteristics (T= 25°C unless otherwise noted)

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 T _J =85°C	-	-	50	A
			-	-	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	-	

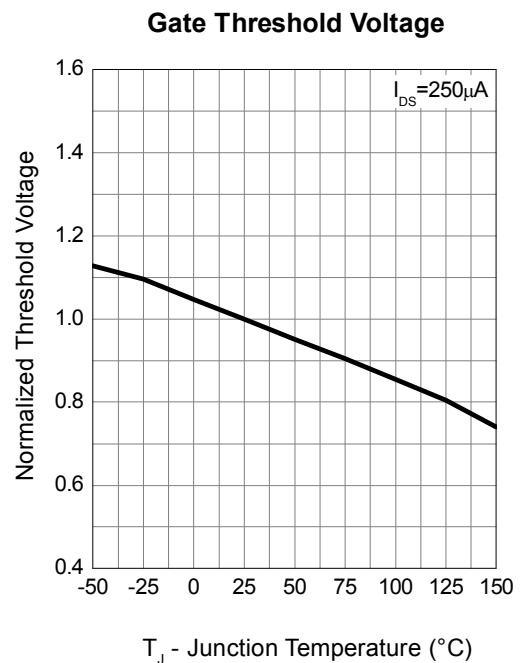
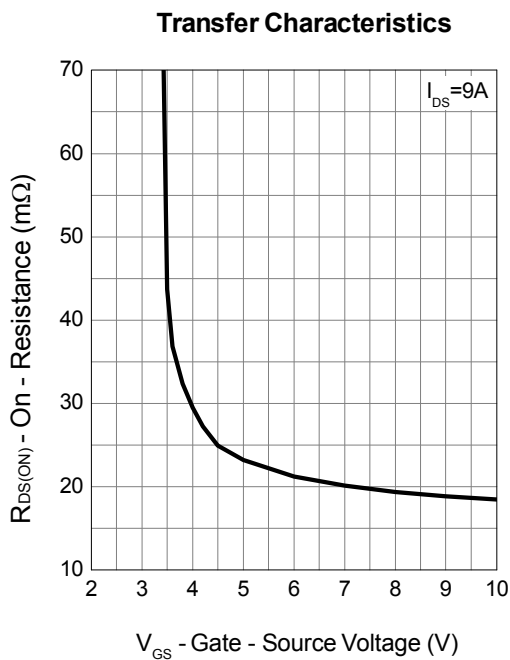
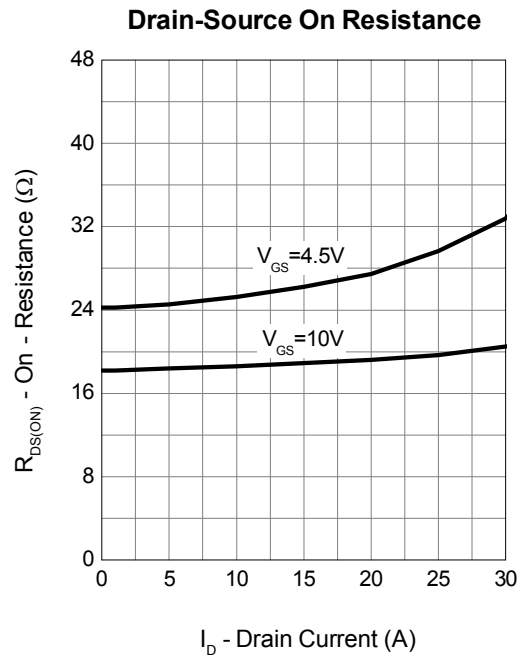
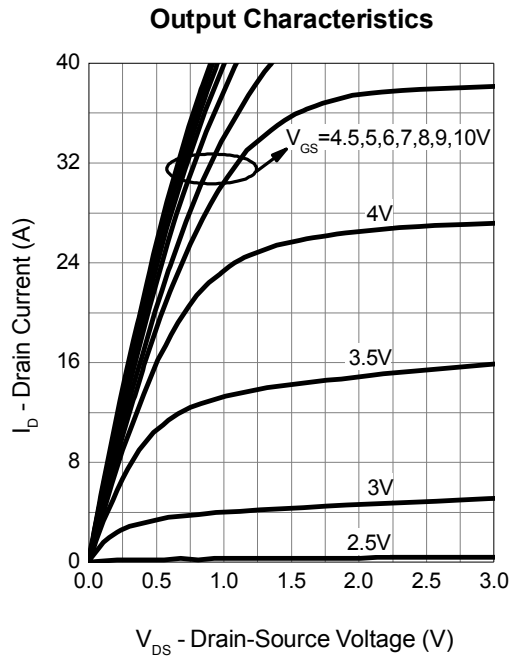
Note d : Pulse test ; pulse width: ≤300μs, duty cycle ≤2%.

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

N Channel Typical Operating Characteristics

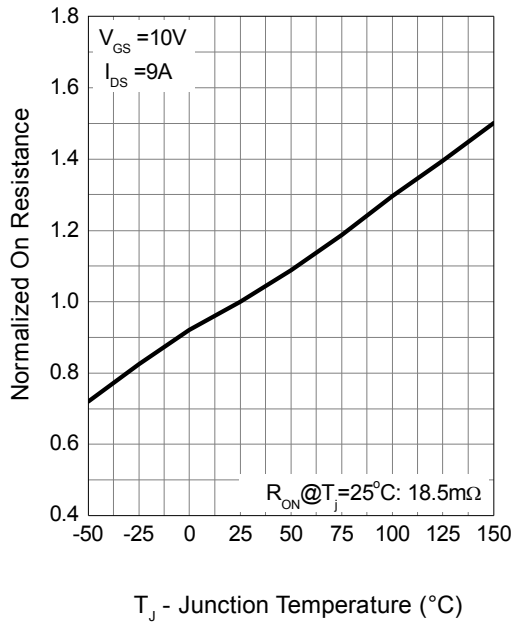


N Channel Typical Operating Characteristics (Cont.)

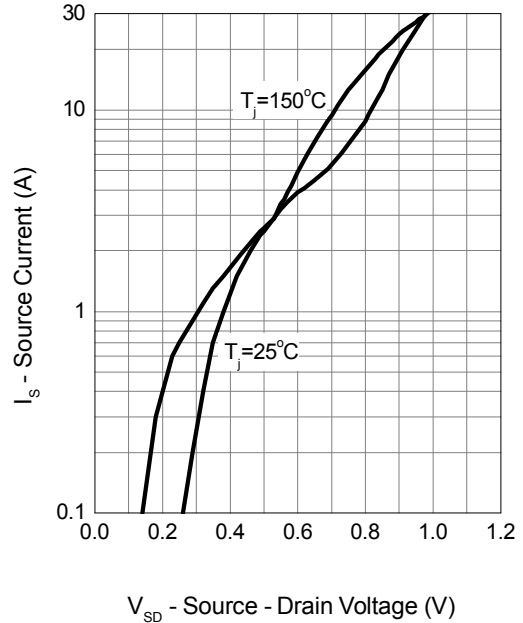


N Channel Typical Operating Characteristics (Cont.)

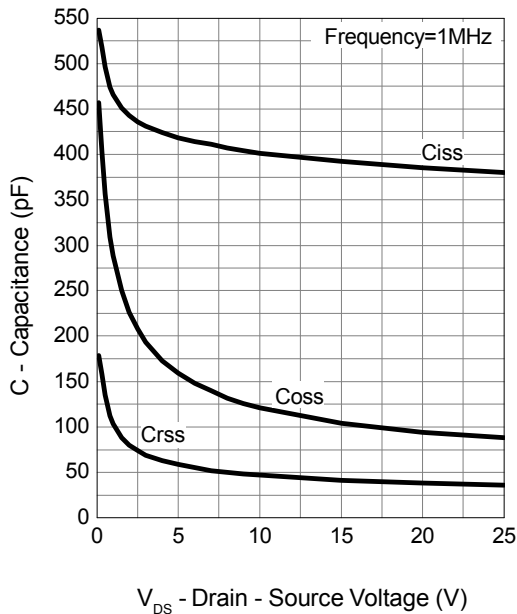
Drain-Source On Resistance



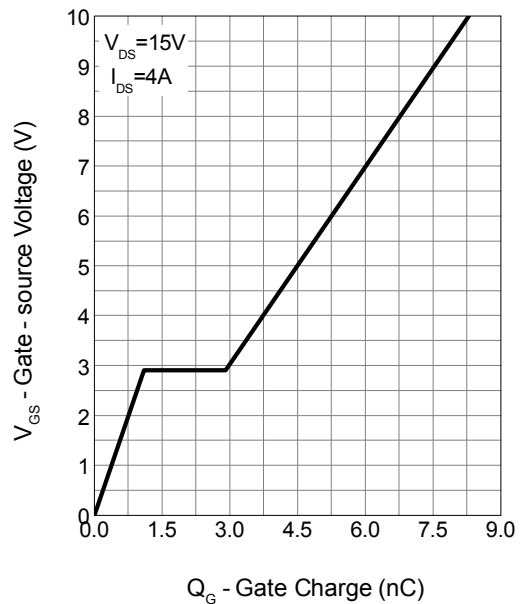
Source-Drain Diode Forward



Capacitance



Gate Charge



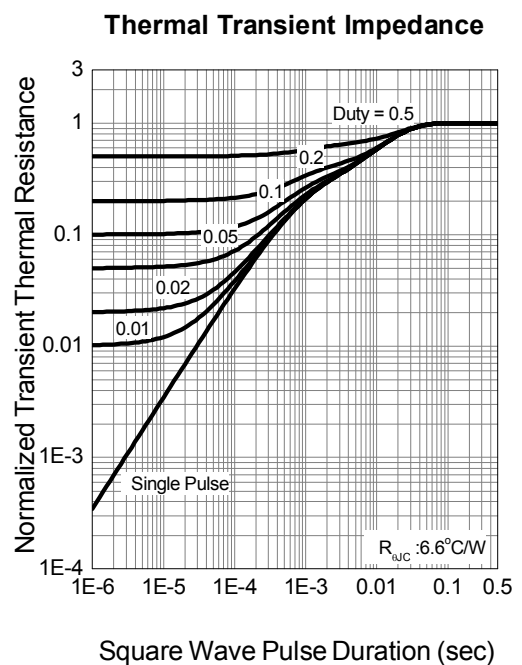
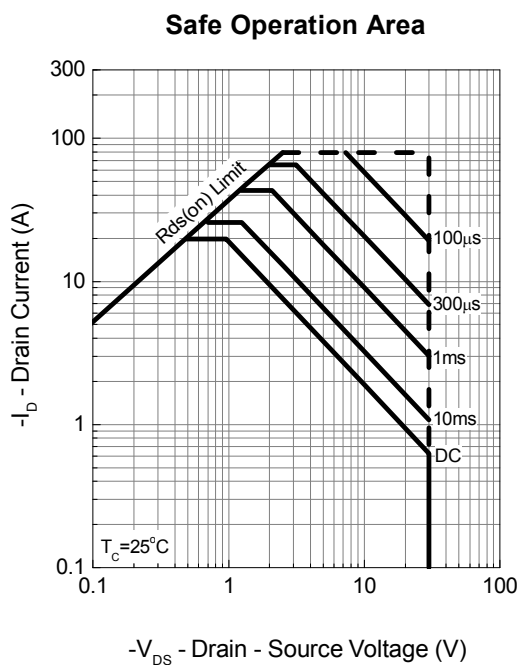
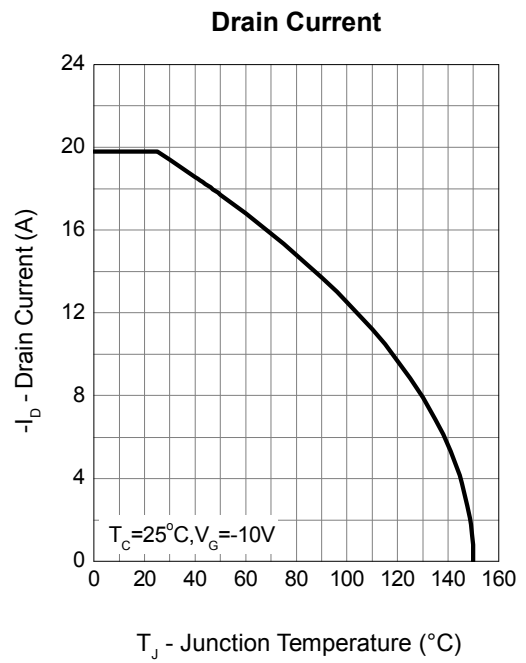
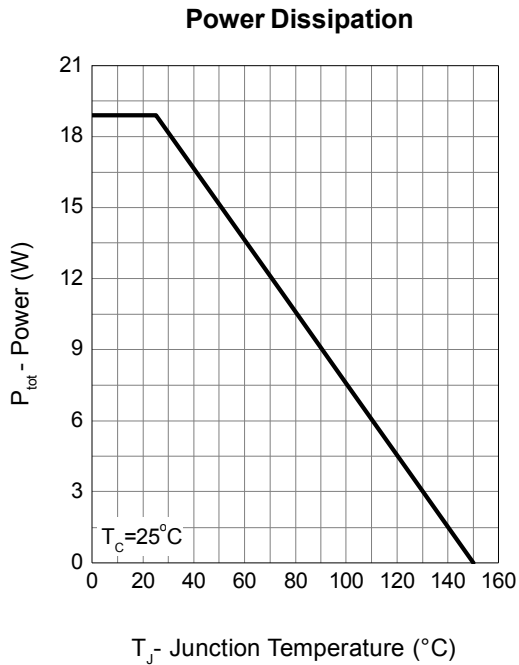
P Channel Electrical Characteristics (T= 25°C unless otherwise noted)

Symbol	Parameter	Test Conditions	P 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 T _J =85°C	-	-	-1	A	
			-	-	-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 =15Ω, I _{DS} =-1A, V _{GEN} =-10V, R _G =6Ω	-	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		-	17	24		
Q _{gth}	Threshold Gate Charge		V _{DS} =-15V, V _{GS} =-10V, I _{DS} =-7.0A	-	1		-
Q _{gs}	Gate-Source Charge			-	2		-
Q _{gd}	Gate-Drain Charge			-	4		-

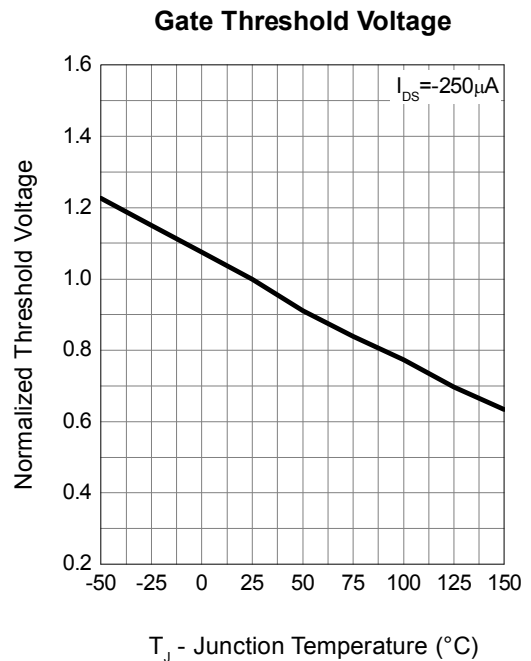
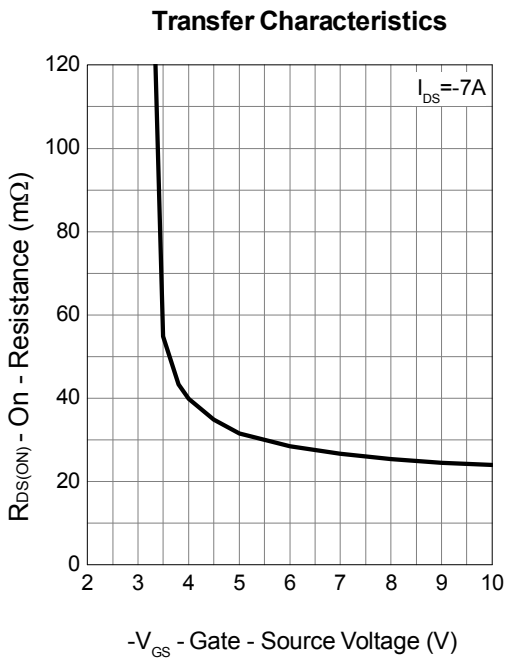
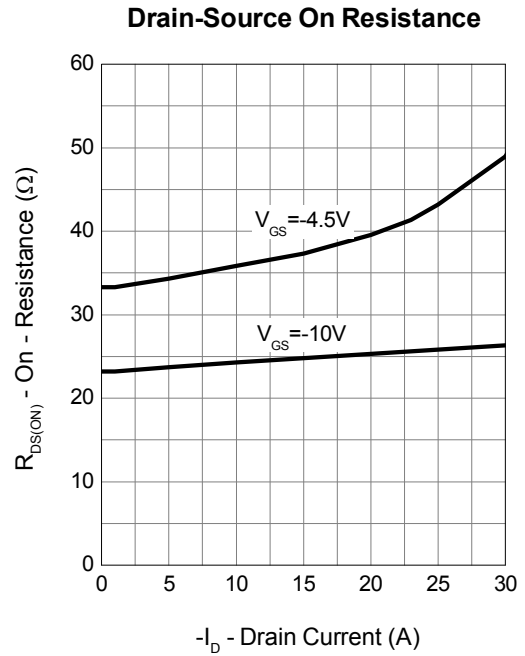
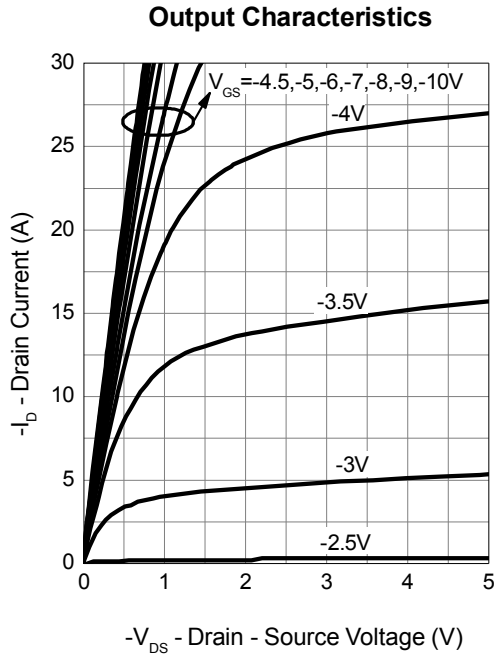
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P Channel Typical Operating Characteristics

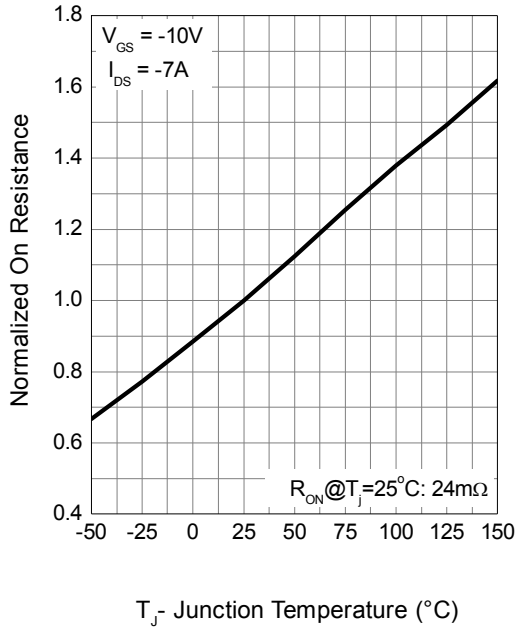


P Channel Typical Operating Characteristics (Cont.)

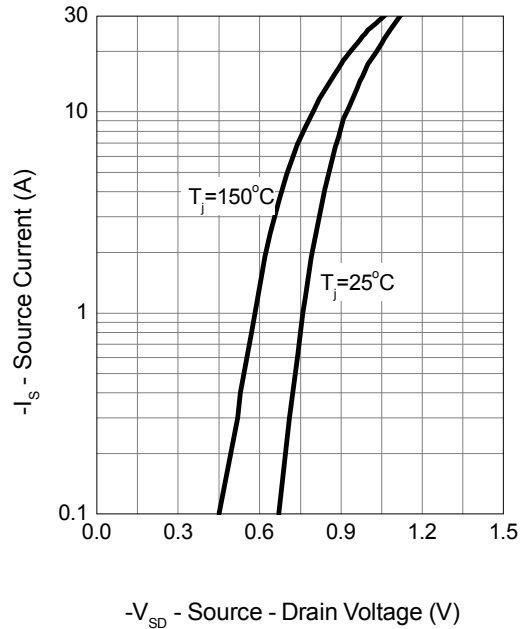


P Channel Typical Operating Characteristics (Cont.)

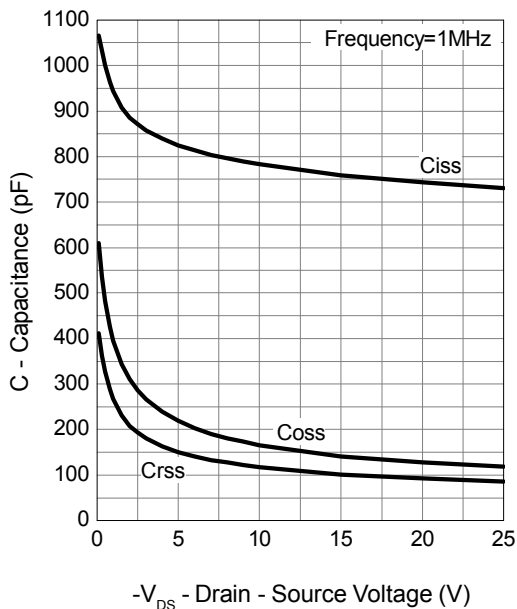
Drain-Source On Resistance



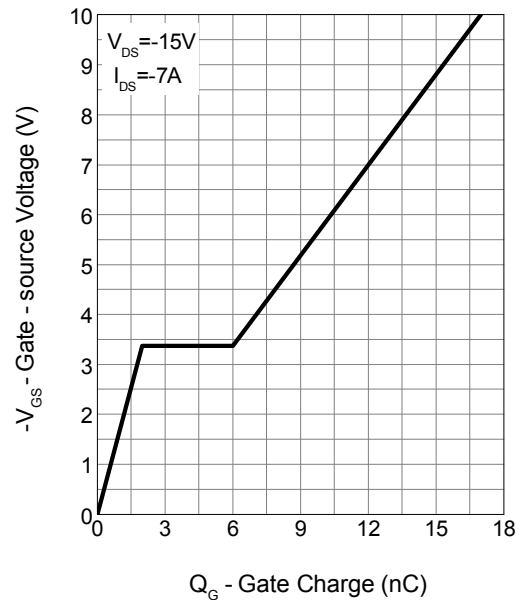
Source-Drain Diode Forward



Capacitance



Gate Charge



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