

General 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

- 100 % U IS + Rg Tested
- Reliable and Rugged
- Lead Free Available (RoHS Compliant)

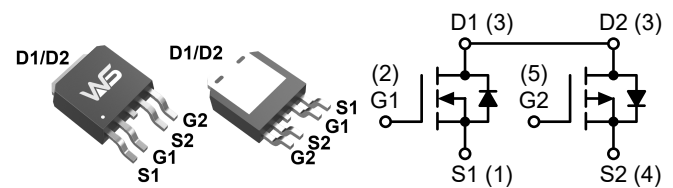
Product Summary

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

Applications

- Motor Control.
- Portable equipment application.
- Synchronous Rectification.

TO-252-4L 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)

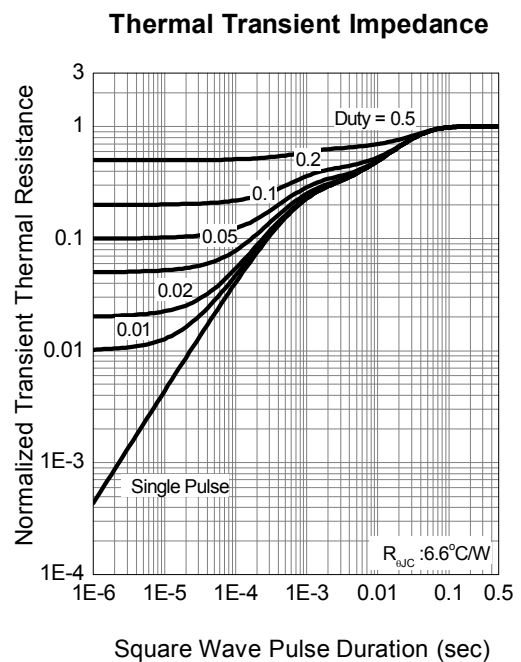
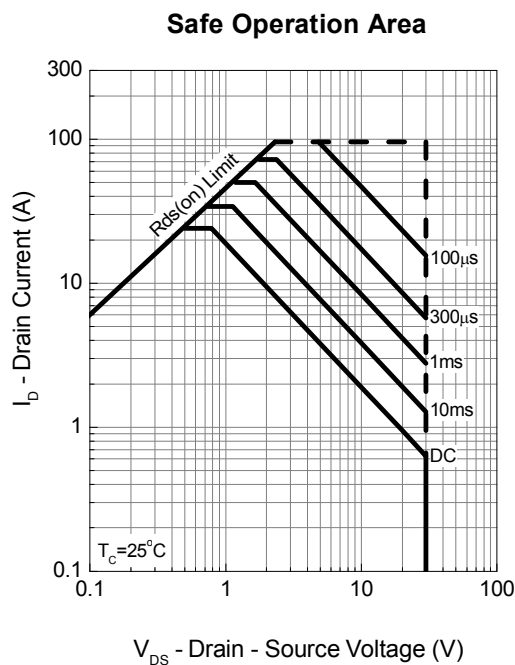
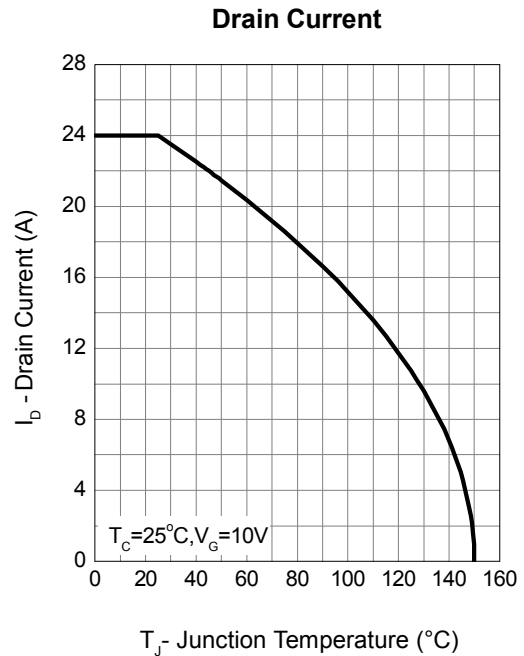
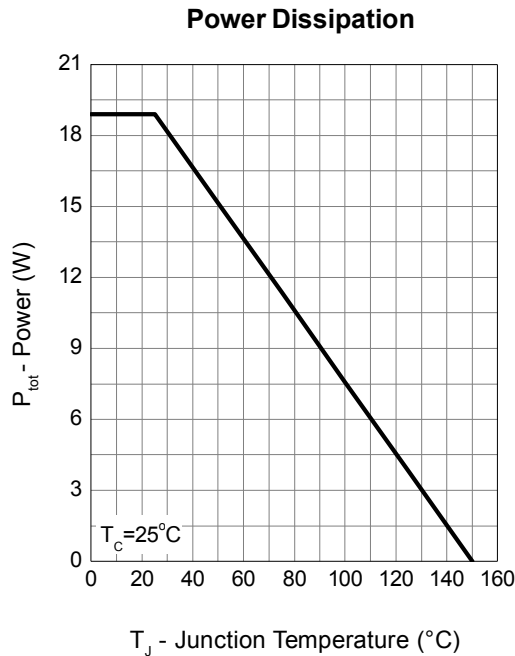
N Channel Electrical Characteristics (T= 25°C unless otherwise noted)

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	-	-	50	A
		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 =15Ω, I _{DS} =1A, V _{GEN} =10V, R _G =6Ω	-	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	-	

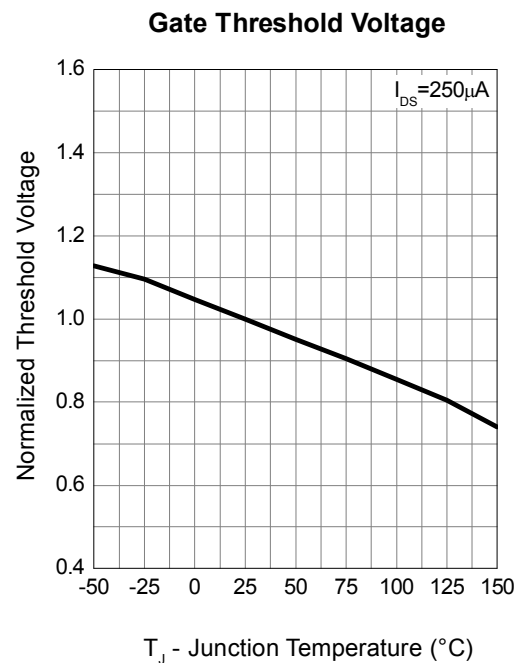
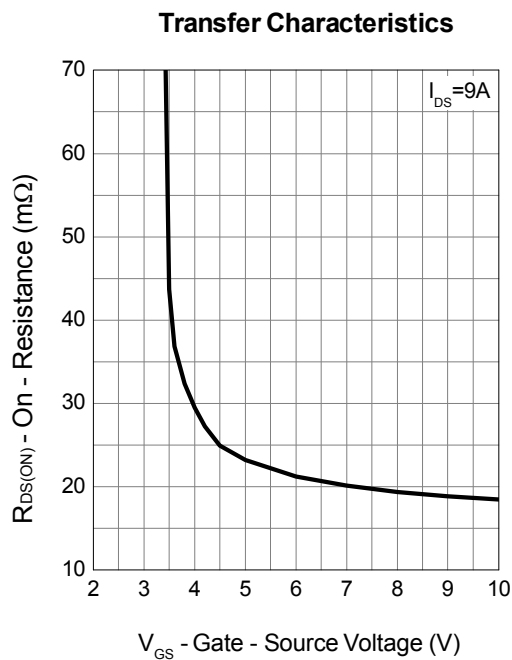
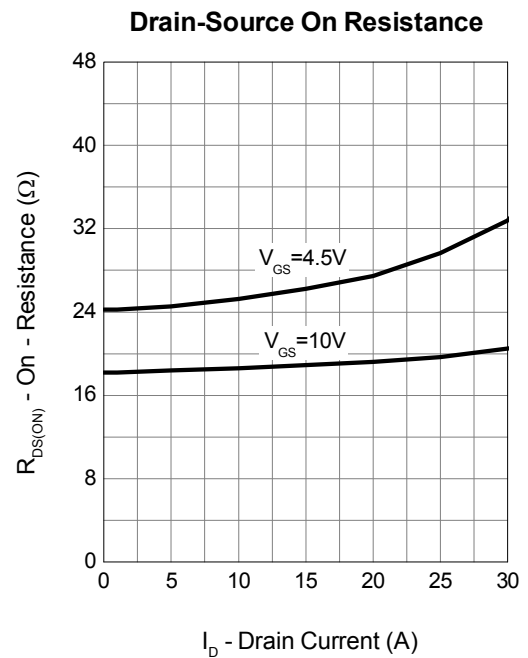
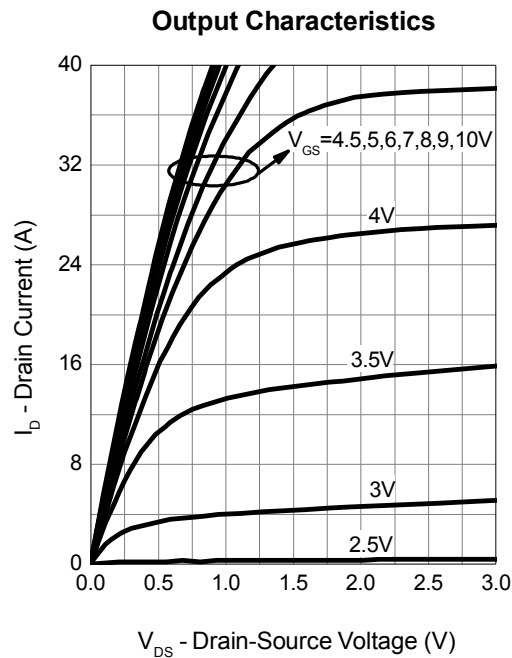
Note d : Pulse test ; pulse width: ≤300μs, duty cycle ≤2%.

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

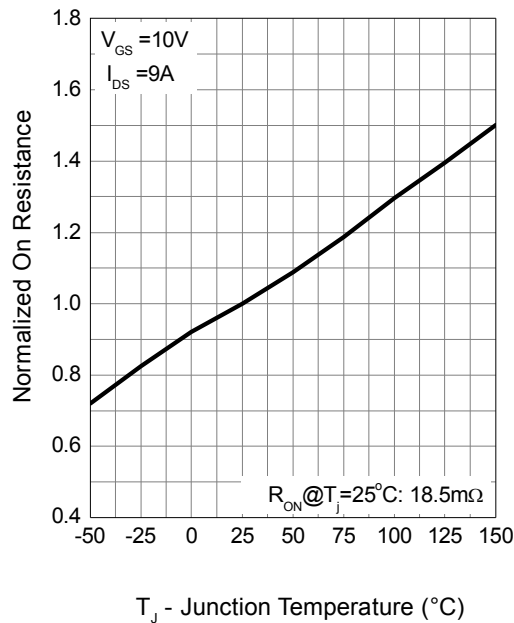
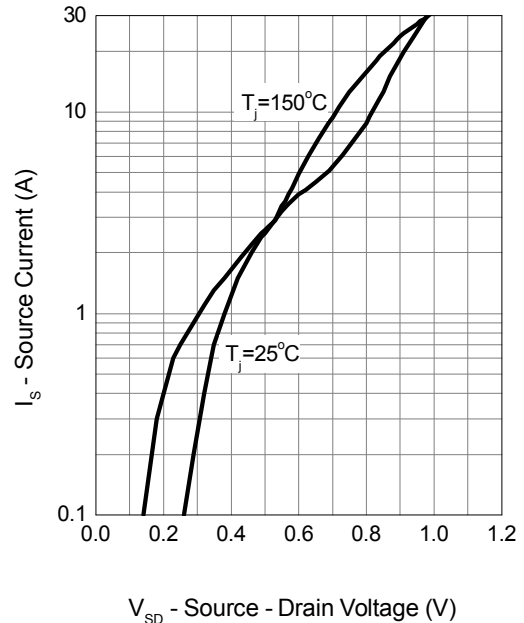
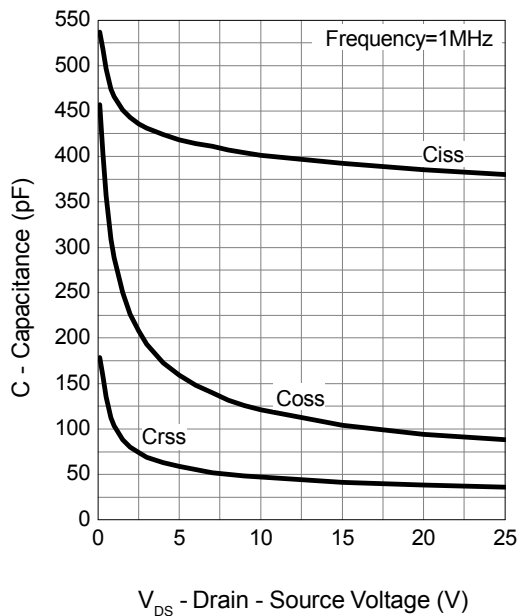
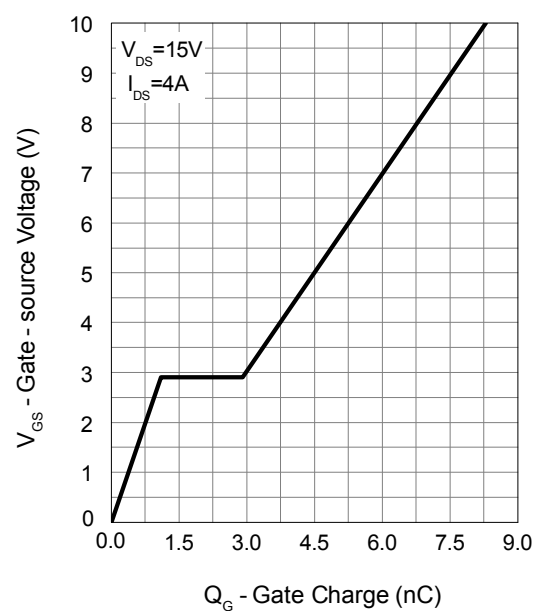
N Channel Typical Operating Characteristics



N Channel Typical Operating Characteristics (Cont.)



N Channel Typical Operating Characteristics (Cont.)

Drain-Source On Resistance

Source-Drain Diode Forward

Capacitance

Gate Charge


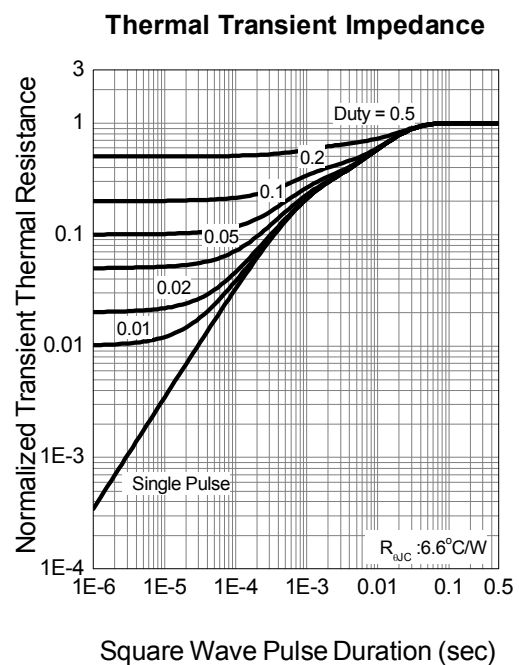
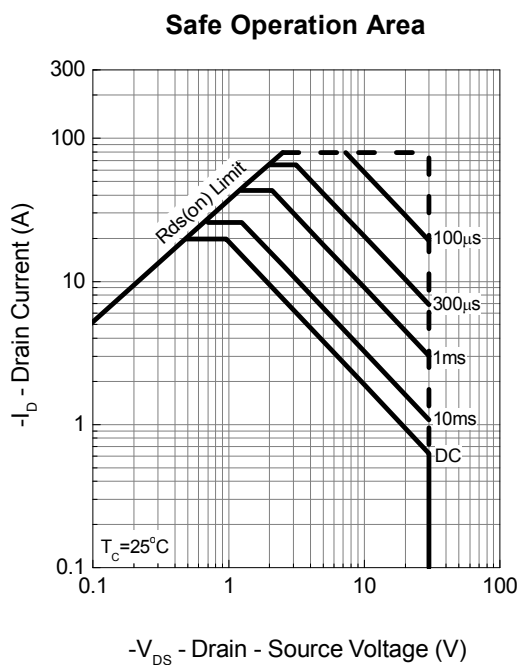
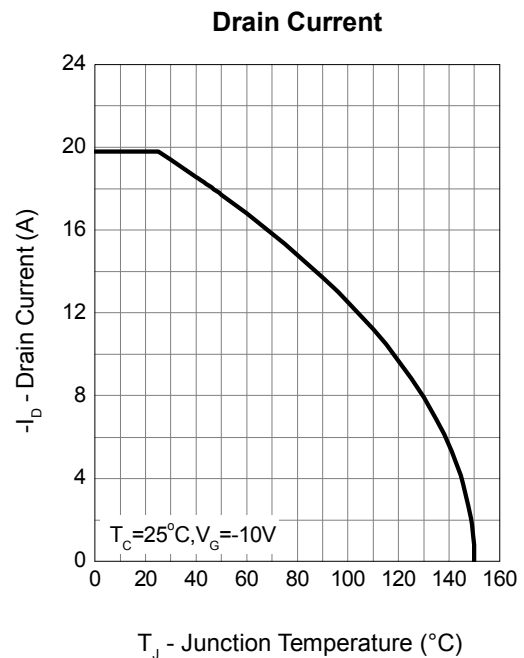
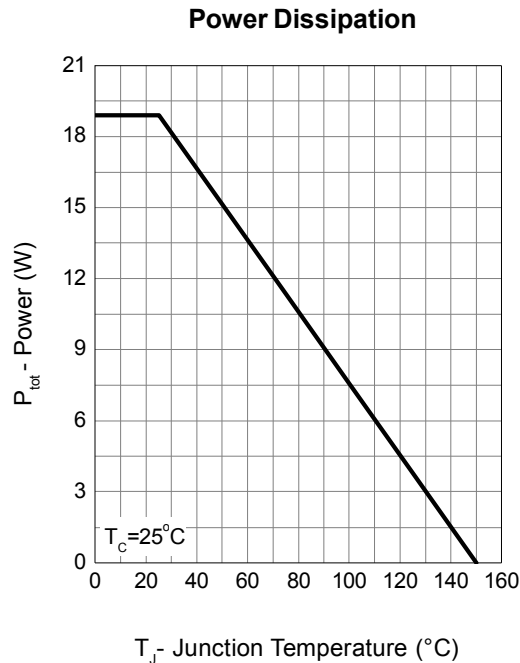
P Channel Electrical Characteristics (T= 25°C unless otherwise noted)

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	-	-	-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%.

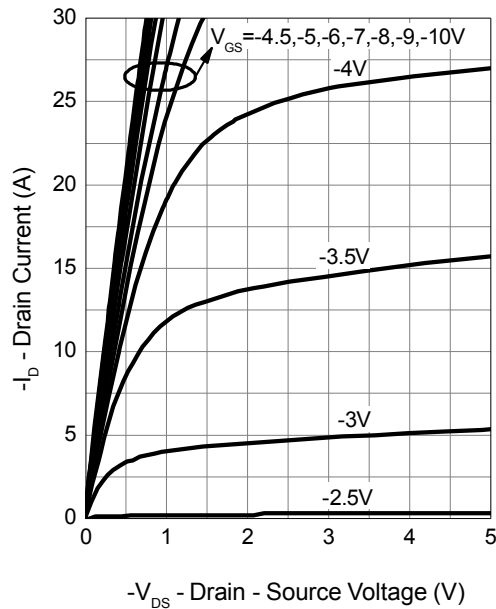
Note e : Guaranteed by design, not subject to production testing.

P Channel Typical Operating Characteristics

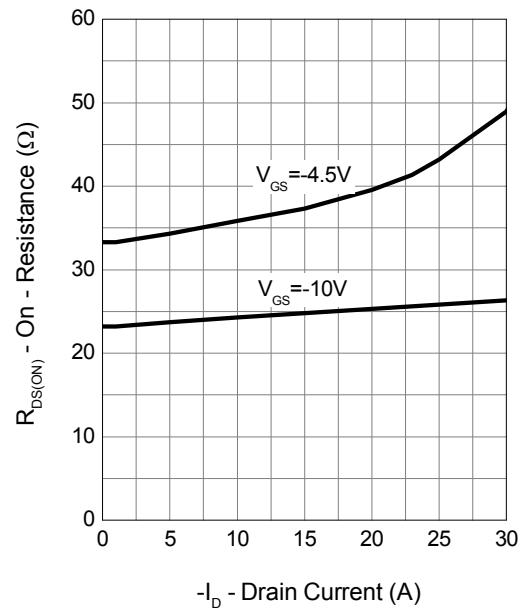


P Channel Typical Operating Characteristics (Cont.)

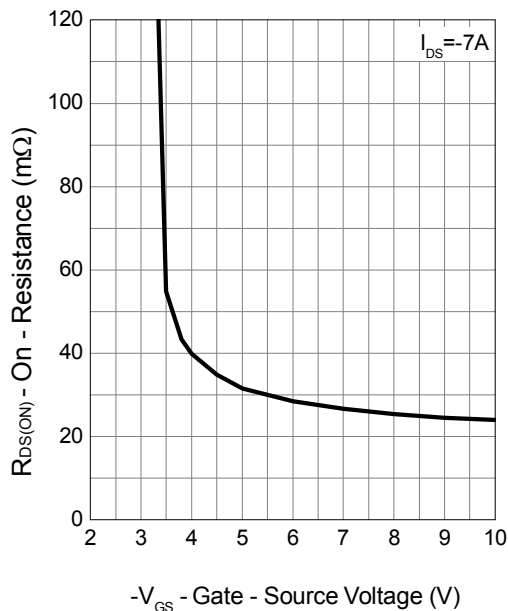
Output Characteristics



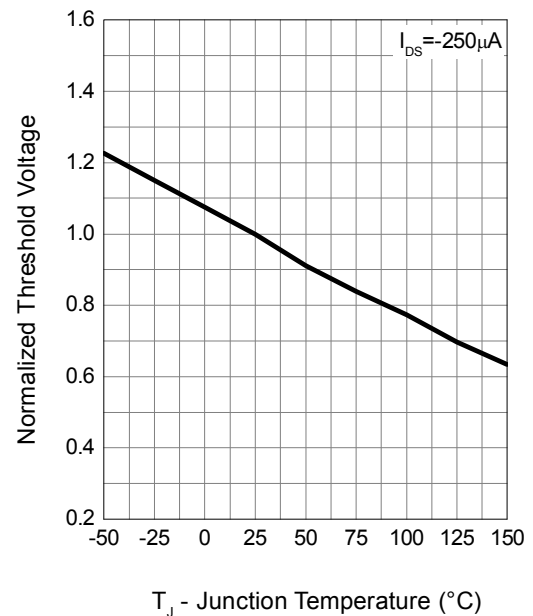
Drain-Source On Resistance



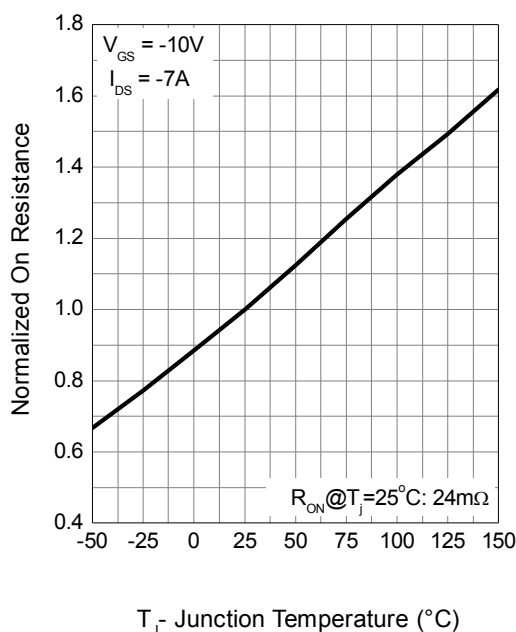
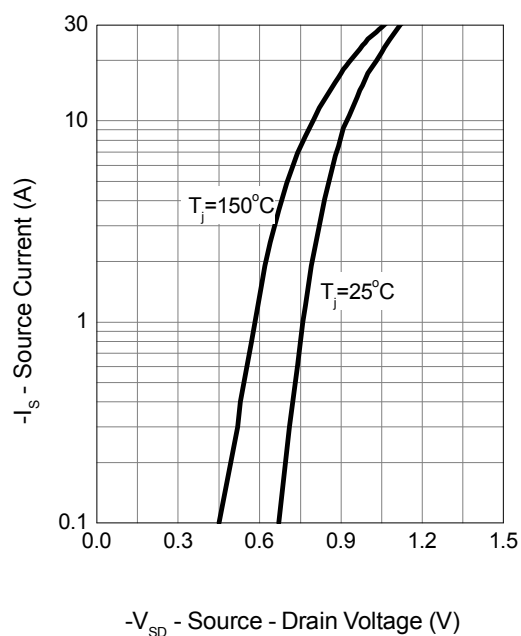
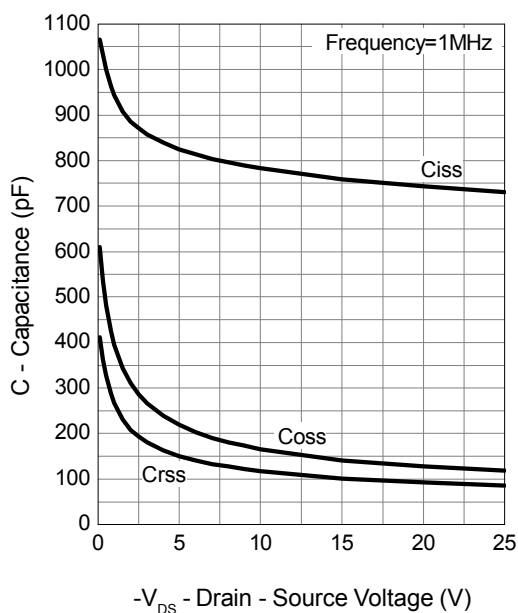
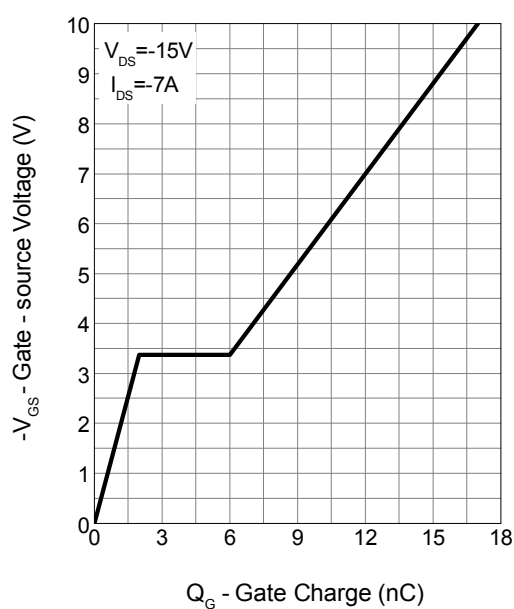
Transfer Characteristics



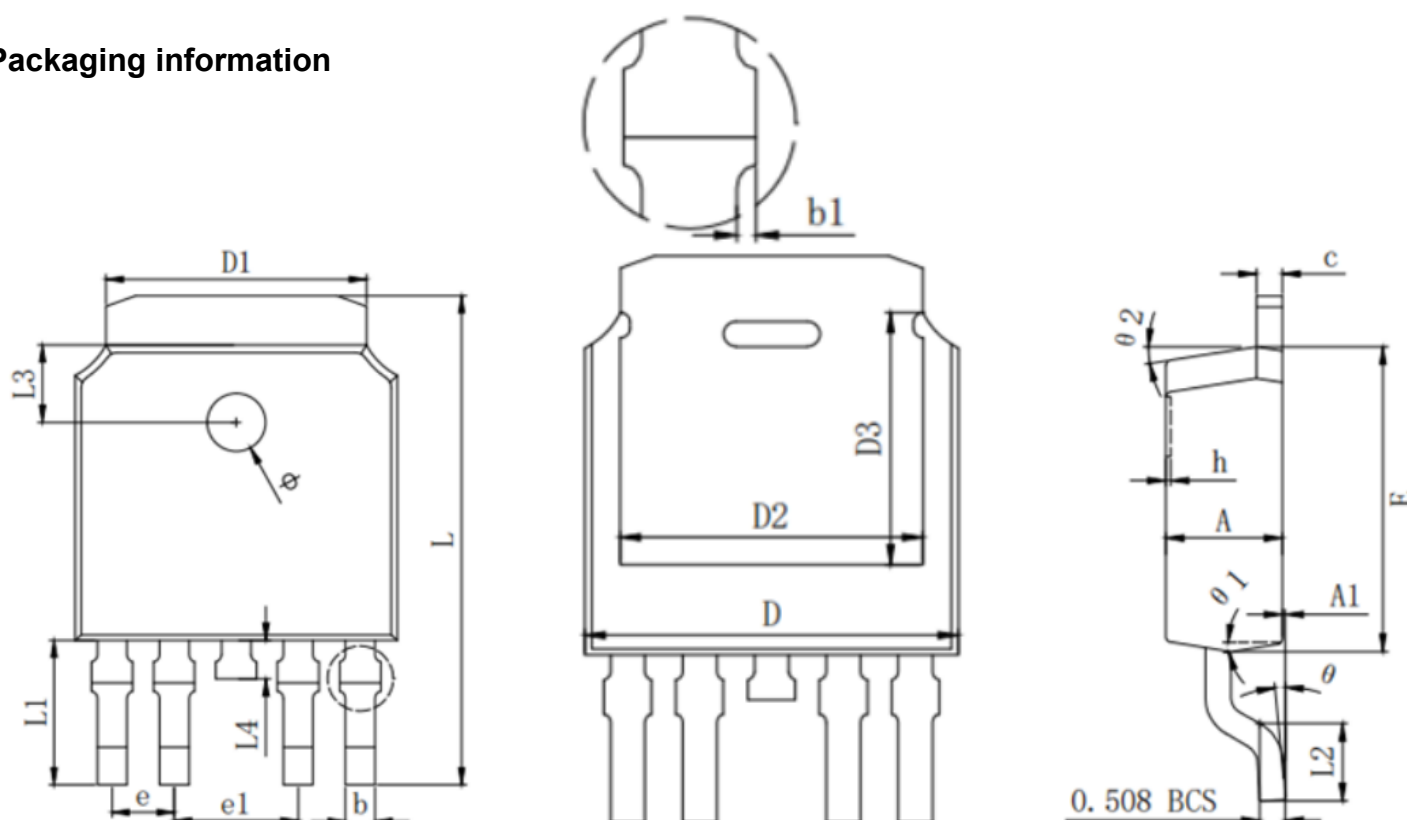
Gate Threshold Voltage



P Channel Typical Operating Characteristics (Cont.)

Drain-Source On Resistance

Source-Drain Diode Forward

Capacitance

Gate Charge


Packaging information



SYMBOLS	MILLIMETERS		
	MIN.	Typ.	MAX.
A	2.200	2.300	2.400
A1	0.000	-	0.127
b	0.550	0.600	0.650
b1	0.000	-	0.120
c(电镀后)	0.460	0.520	0.580
D	6.500	6.600	6.700
D1	5.334 REF		
D2	5.346 REF		
D3	4.490 REF		
E	6.000	6.100	6.200
e	1.270 TYP		
e1	2.540 TYP		
h	0.000	0.100	0.200
L	9.900	10.100	10.300
L1	2.988 REF		
L2	1.400	1.550	1.700
L3	1.600 REF		
L4	0.700	0.800	0.900
Φ	1.100	1.200	1.300
θ	0°	-	8°
θ 1	9° TYP		
θ 2	9° TYP		

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