General Description

The WSD3076DN33 is the highest performance trench N-Ch and P-Channel MOSFETs with extreme high cell density, which provide excellent $R_{DS(ON)}$ and gate charge for most of the synchronous buck converter applications.

The WSD3076DN33 meet the RoHS and Green Product requirement, 100% E_{AS} guaranteed with full function reliability approved.

Features

- 100% UIS + R_g Tested
- ESD Protection
- Reliable and Rugged
- Lead Free and Green Devices Available (RoHS Compliant)
- Moisture Sensitivity Level MSL1 (per JEDEC J-STD-020D)

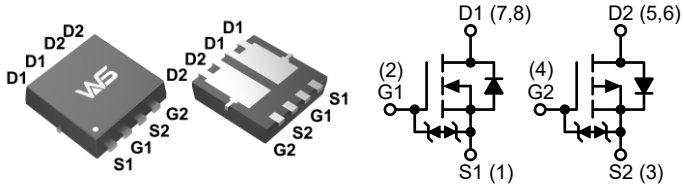
Product Summery

BV_{DSS}	$R_{DS(ON)}$	I_D
30V	11mΩ	30A
-30V	18.5mΩ	-26A

Applications

- Synchronous Rectification.
- Motor Control.
- High Current, High Speed Switching.
- Portable, equipment application.

DFN3X3-8L Pin Configuration



Absolute Maximum Ratings (T_A=25°C, Unless Otherwise Noted)

Symbol	Parameter		Rating		Units
			N-Channel	P-Channel	
V_{DS}	Drain-Source Voltage		30	-30	V
V_{GS}	Gate-Source Voltage		±20	±25	
I_D	Continuous Drain Current	T_A=25°C	30	-26	A
		T_A=70°C	23	-19	
I_{DM} [1]	Pulse Drain Current Tested	T_A=25°C	90	-78	A
E_{AS} [3]	Avalanche Energy, Single pulse	L=0.1mH	12.8	12.8	mJ
I_{AS} [3]	Avalanche Current, Single pulse	L=0.1mH	16	-16	A
P_D	Maximum Power Dissipation	T_A=25°C	1.4	1.4	W
		T_A=70°C	0.9	0.9	
$R_{\theta JA}$ [2]	Thermal Resistance-Junction to Ambient	Steady State	90	90	°C/W
T_{STG}	Storage Temperature Range		-55 to 150		°C
T_J	Maximum Junction Temperature		150		

N-Channel Electrical Characteristics (T_A=25°C, Unless Otherwise Noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Units
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V , I_D=250μA	30	---	---	V
$R_{DS(ON)}$ [4]	Drain-Source On-state Resistance	V_{GS}=10V , I_D=7A	---	11	15	mΩ
		V_{GS}=4.5V , I_D=5A	---	15	20	
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D=250μA	1.3	1.8	2.3	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=24V , V_{GS}=0V	---	---	1.0	μA
		T_J=85°C	---	---	30	
I_{GSS}	Gate Leakage Current	V_{GS}=±20V , V_{DS}=0V	---	---	±10	μA
R_G [5]	Gate Resistance	V_{DS}=0V , V_{GS}=0V , f=1.0MHz	---	4.5	---	Ω
Q_g [5]	Total Gate Charge	V_{DS}=15V , V_{GS}=10V , I_{DS}=7A	---	12.5	17.5	nC
Q_g [5]	Total Gate Charge	V_{DS}=15V , V_{GS}=4.5V , I_{DS}=7A	---	6.0	---	
Q_{gs} [5]	Gate-Source Charge		---	2.2	---	
Q_{gd} [5]	Gate-Drain Charge		---	2.5	---	
$T_{d(on)}$ [5]	Turn-On Delay Time	V_{DD}=15V , R_L=15Ω , I_{DS}=1A , V_{GEN}=10V , R_G=6Ω	---	9	17	ns
T_r [5]	Turn-On Rise Time		---	10	18	
$T_{d(off)}$ [5]	Turn-Off Delay Time		---	25	45	
T_f [5]	Turn-Off Fall Time		---	6.5	12	
C_{iss} [5]	Input Capacitance	V_{DS}=15V , V_{GS}=0V , f=1.0MHz	---	725	943	pF
C_{oss} [5]	Output Capacitance		---	105	---	
C_{rss} [5]	Reverse Transfer Capacitance		---	70	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Units
I_S	Continuous Source Current	T_A=25°C	---	---	1.2	A
V_{SD} [4]	Diode Forward Voltage	I_{SD}=1A , V_{GS}=0V	---	0.75	1.1	V
t_{rr}	Reverse Recovery Time	I_{SD}=7A , di_{SD}/dt=100A/μs	---	11	---	ns
Q_{rr}	Reverse Recovery Charge		---	5.0	---	nC

Note:

1. Pulse width limited by max. junction temperature.
2. Surface mounted on 1in^2 pad area, steady state t = 999s.
3. UIS tested and pulse width limited by maximum junction temperature (initial temperature T_J=25°C).
4. Pulse test ; pulse width≤300μs, duty cycle≤2%.
5. Guaranteed by design, not subject to production testing.

P-Channel Electrical Characteristics (T_A=25°C, Unless Otherwise Noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Units
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V , I_D=-250μA	-30	---	---	V
$R_{DS(ON)}$ [4]	Drain-Source On-state Resistance	V_{GS}=-10V , I_D=-5A	---	18.5	27	mΩ
		V_{GS}=-4.5V , I_D=-3A	---	25	43	
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D=-250μA	-1.3	-1.8	-2.3	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=-24V , V_{GS}=0V	---	---	-1.0	μA
		T_J=85°C	---	---	-30	
I_{GSS}	Gate Leakage Current	V_{GS}=±25V , V_{DS}=0V	---	---	±10	μA
R_G [5]	Gate Resistance	V_{DS}=0V , V_{GS}=0V , f=1.0MHz	---	11	---	Ω
Q_g [5]	Total Gate Charge	V_{DS}=-15V , V_{GS}=-4.5V , I_{DS}=-5A	---	7.4	---	nC
Q_g [5]	Total Gate Charge	V_{DS}=-15V , V_{GS}=-10V , I_{DS}=-5A	---	14.3	20	
Q_{gs} [5]	Gate-Source Charge		---	2.2	---	
Q_{gd} [5]	Gate-Drain Charge		---	3.5	---	
$T_{d(on)}$ [5]	Turn-On Delay Time	V_{DD}=-15V , R_L=15Ω , I_{DS}=-1A , V_{GEN}=-10V , R_G=6Ω	---	9	16	ns
T_r [5]	Turn-On Rise Time		---	11	20	
$T_{d(off)}$ [5]	Turn-Off Delay Time		---	58	104	
T_f [5]	Turn-Off Fall Time		---	39	70	
C_{iss} [5]	Input Capacitance	V_{DS}=-15V , V_{GS}=0V , f=1.0MHz	---	725	943	pF
C_{oss} [5]	Output Capacitance		---	127	---	
C_{rss} [5]	Reverse Transfer Capacitance		---	105	---	

Diode Characteristics

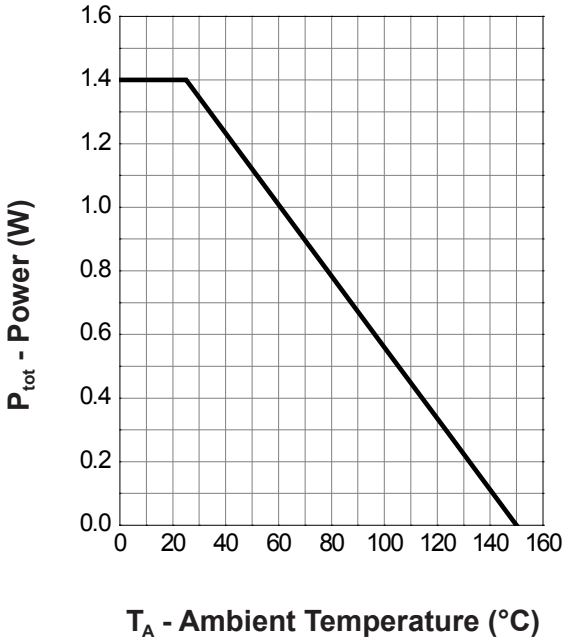
Symbol	Parameter	Conditions	Min.	Typ.	Max.	Units
I_S	Continuous Source Current	T_A=25°C	---	---	-1.2	A
V_{SD} [4]	Diode Forward Voltage	I_{SD}=-1A , V_{GS}=0V	---	-0.8	-1.1	V
t_{rr}	Reverse Recovery Time	I_{SD}=-5A , di_{SD}/dt=100A/μs	---	13	---	ns
Q_{rr}	Reverse Recovery Charge		---	6.0	---	nC

Note:

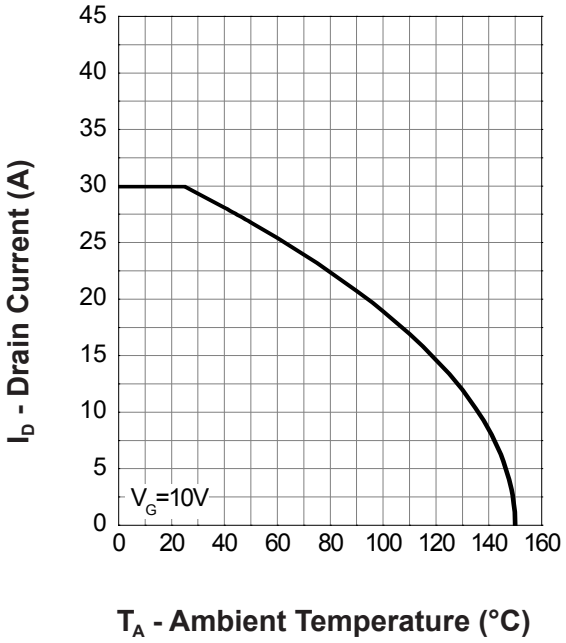
1. Pulse width limited by max. junction temperature.
2. Surface mounted on 1in^2 pad area, steady state t = 999s.
3. UIS tested and pulse width limited by maximum junction temperature (initial temperature T_J=25°C).
4. Pulse test ; pulse width≤300μs, duty cycle≤2%.
5. Guaranteed by design, not subject to production testing.

N-Channel Typical Characteristics

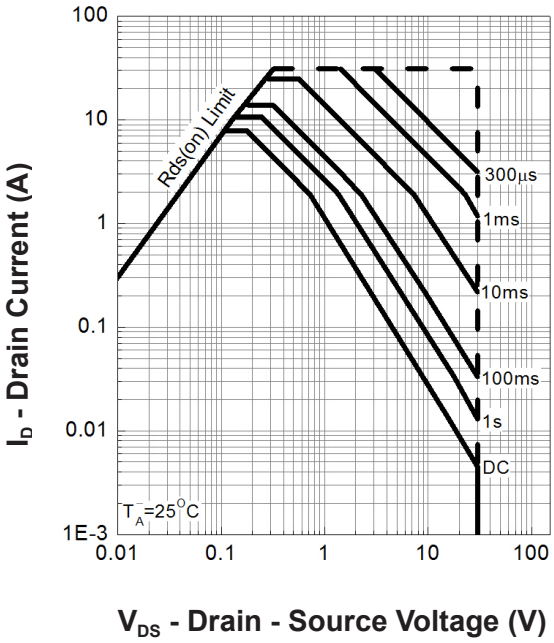
Power Dissipation



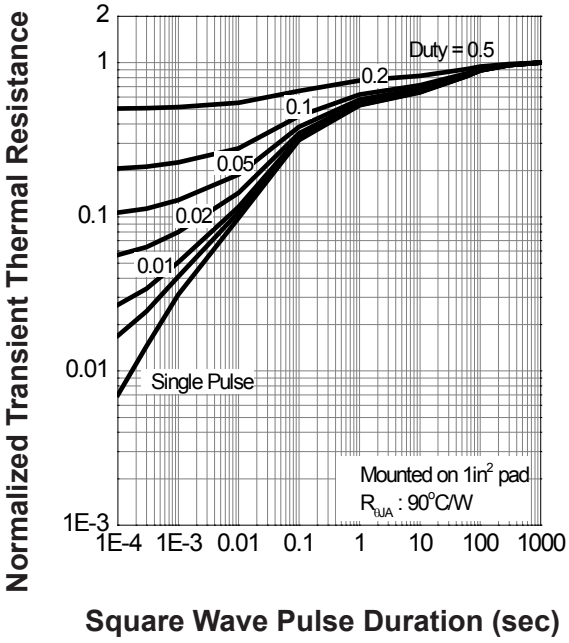
Drain Current



Safe Operation Area

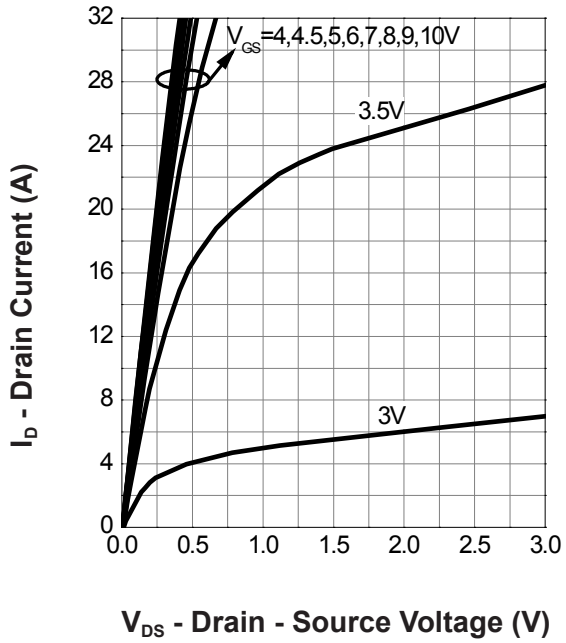


Thermal Transient Impedance

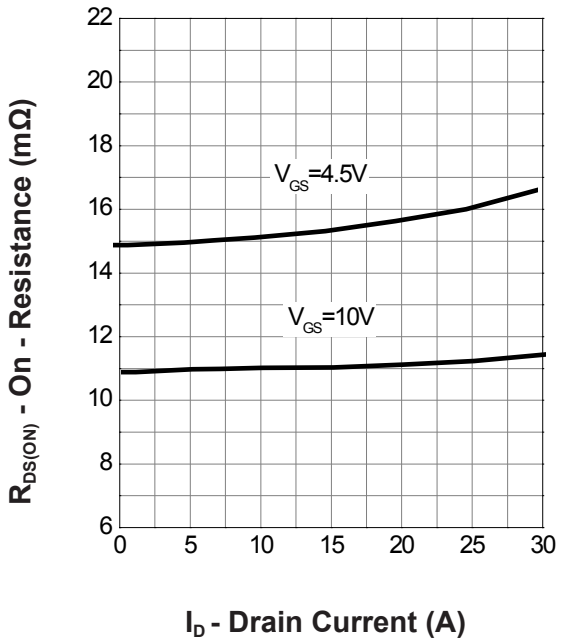


N-Channel Typical Characteristics (Cont.)

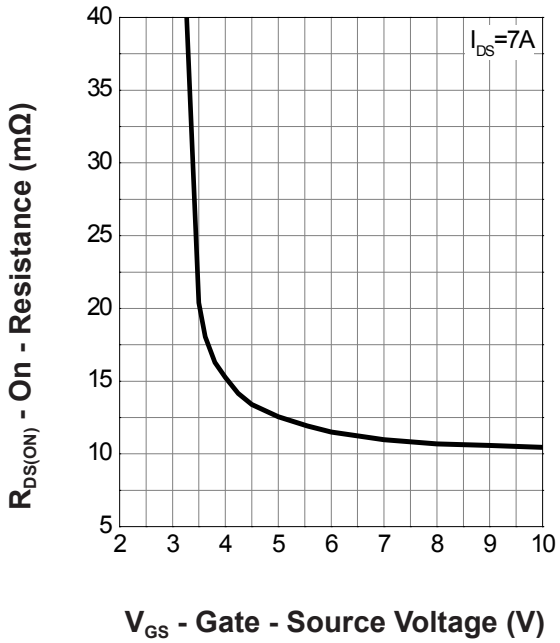
Output Characteristics



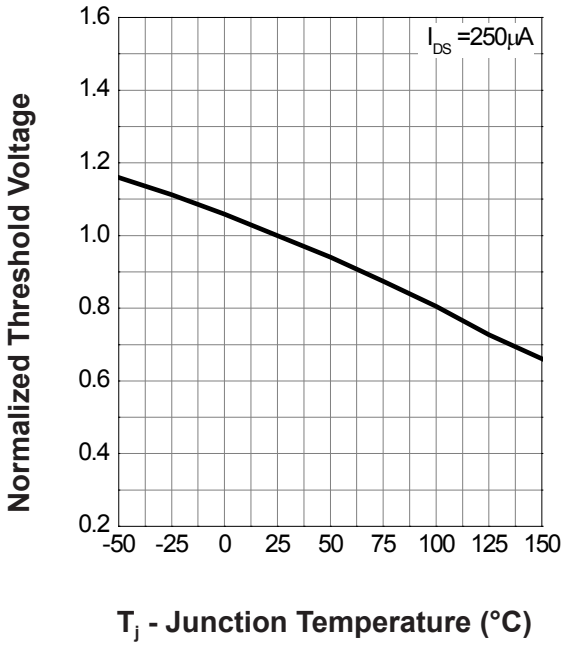
Drain-Source On Resistance



Gate-Source On Resistance

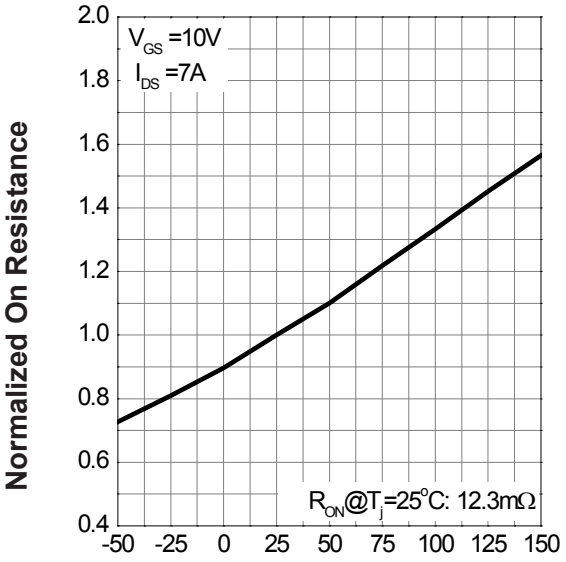


Gate Threshold Voltage

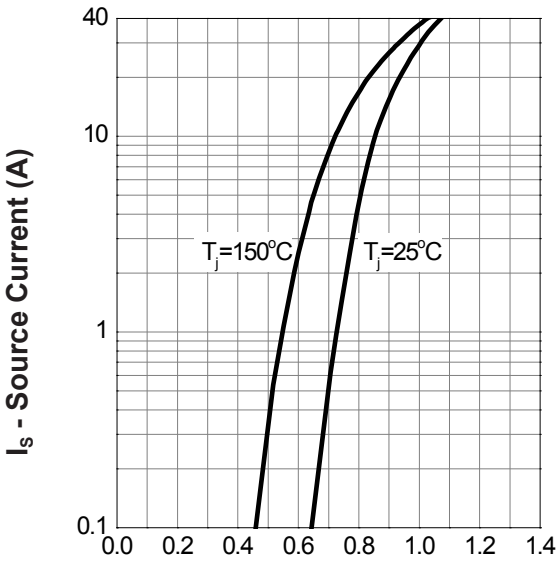


N-Channel Typical Characteristics (Cont.)

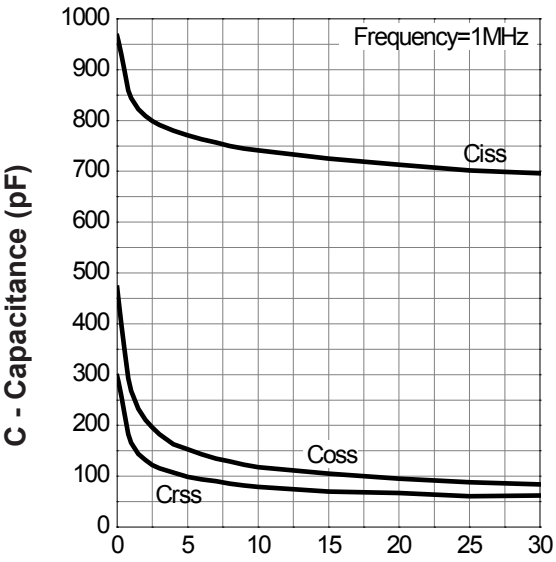
Drain-Source On Resistance



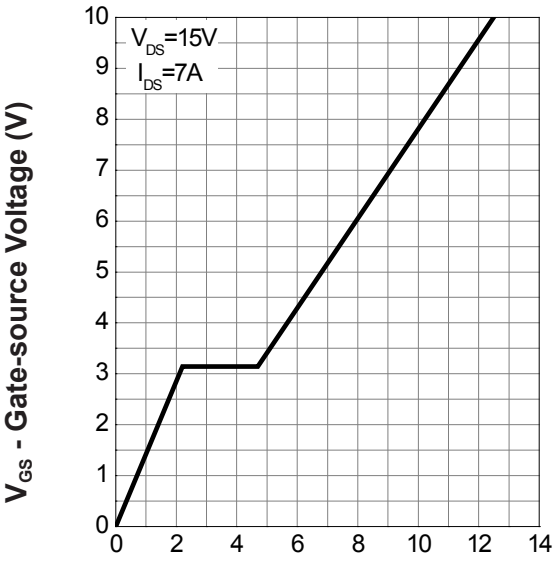
Source-Drain Diode Forward



Capacitance

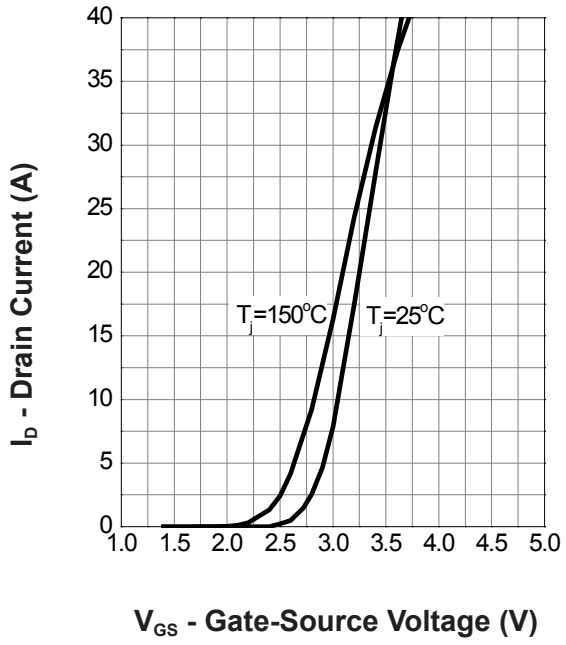


Gate Charge



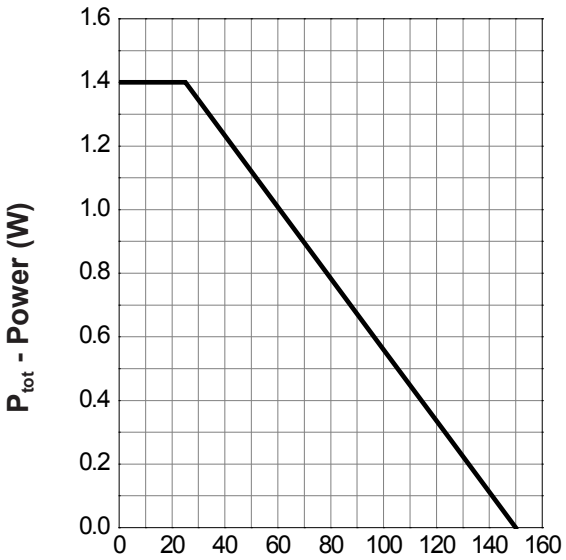
N-Channel Typical Characteristics (Cont.)

Transfer Characteristics

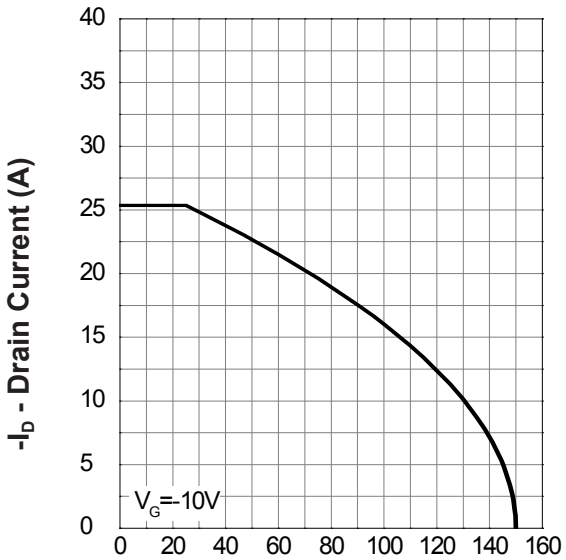


P-Channel Typical Characteristics

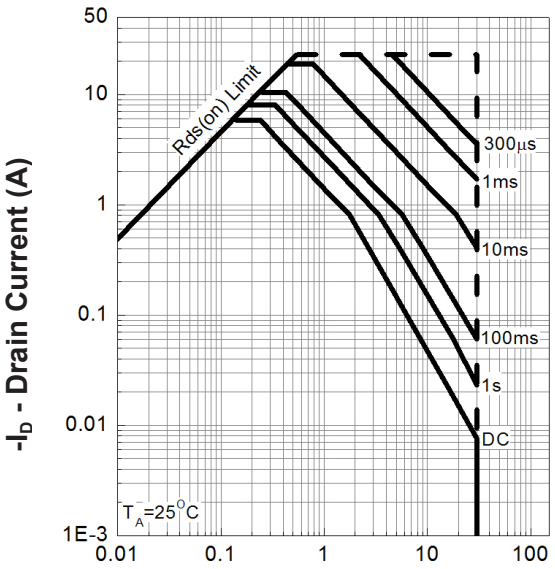
Power Dissipation



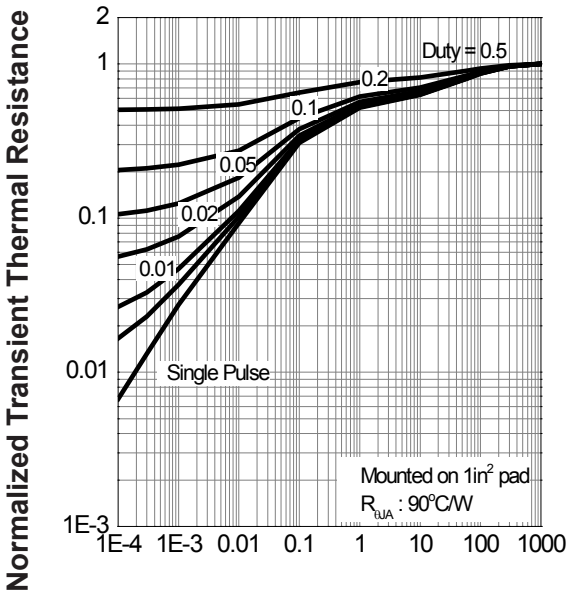
Drain Current



Safe Operation Area

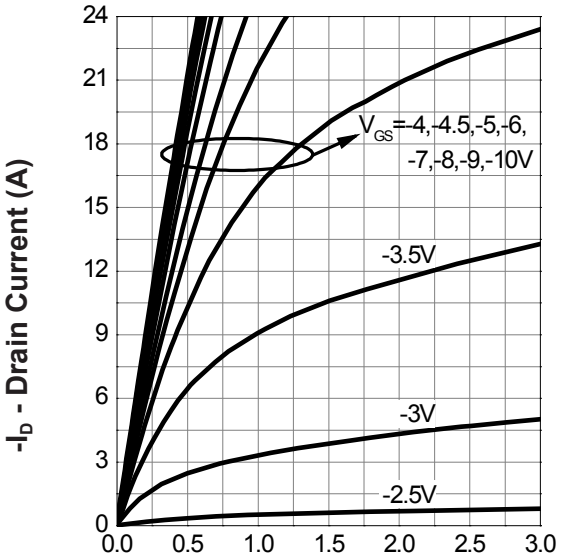


Thermal Transient Impedance

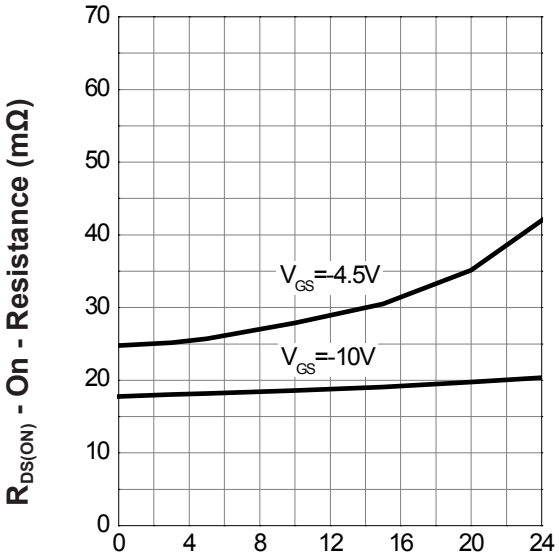


P-Channel Typical Characteristics (Cont.)

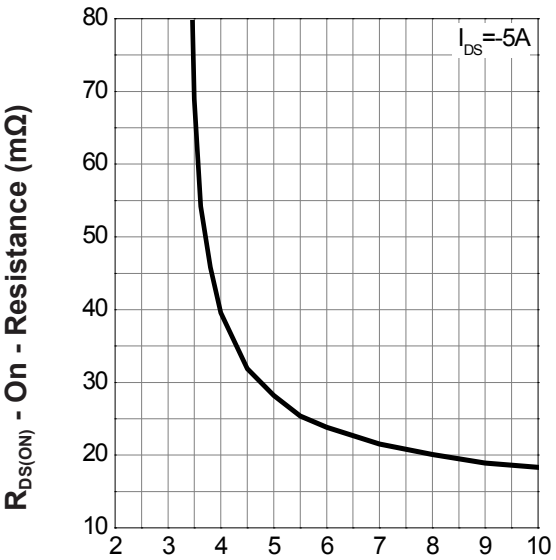
Output Characteristics



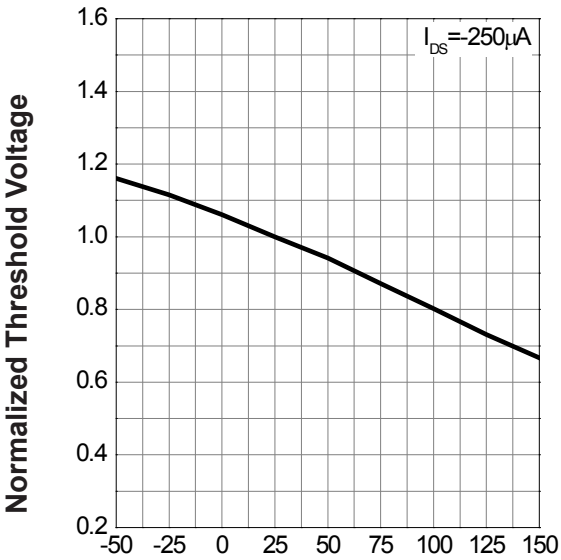
Drain-Source On Resistance



Gate-Source On Resistance

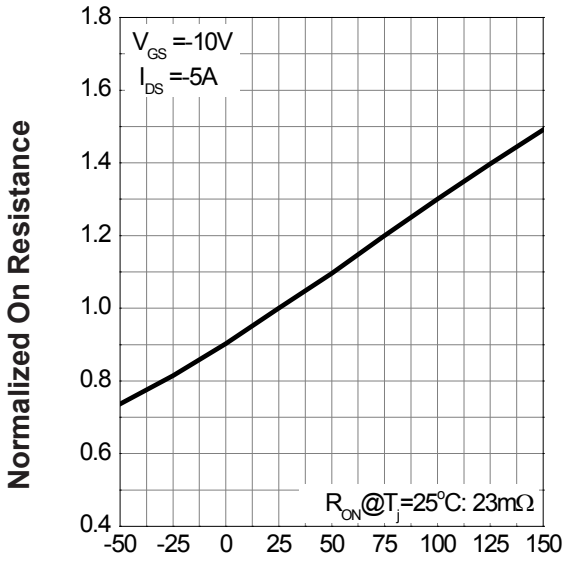


Gate Threshold Voltage

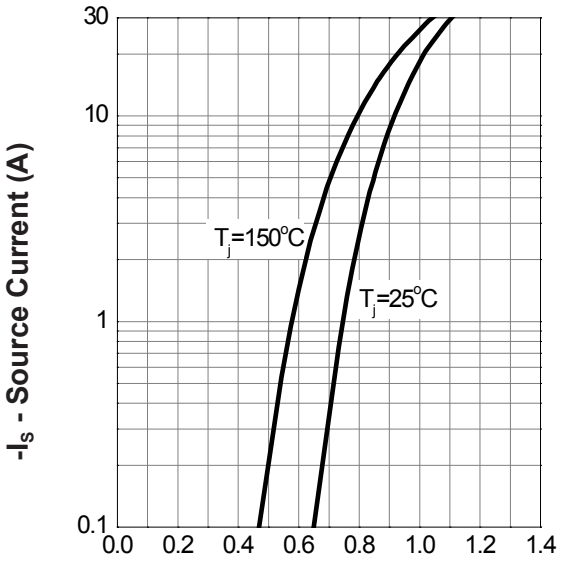


P-Channel Typical Characteristics (Cont.)

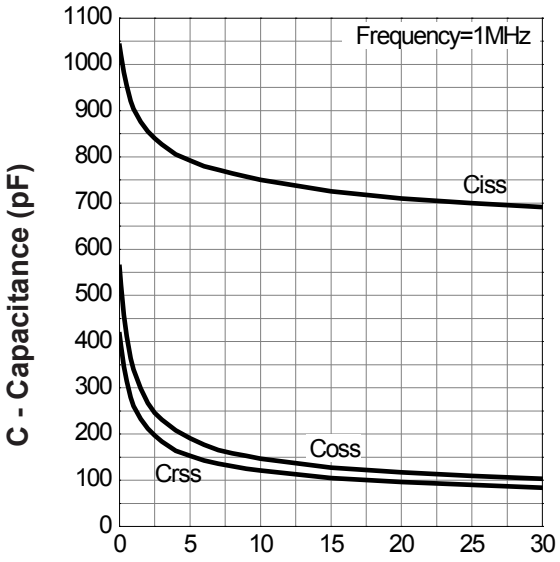
Drain-Source On Resistance



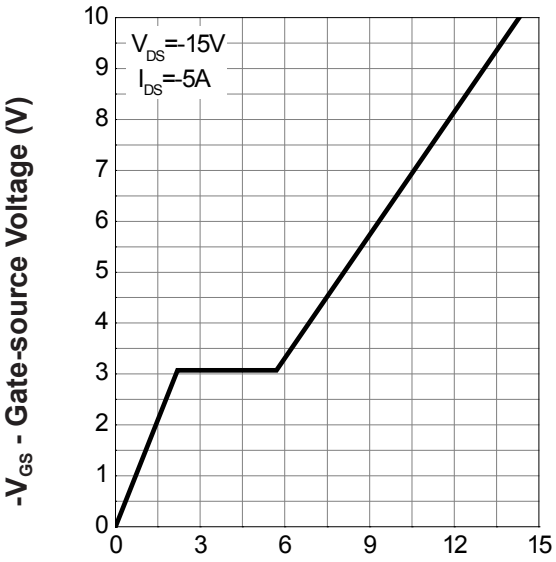
Source-Drain Diode Forward



Capacitance

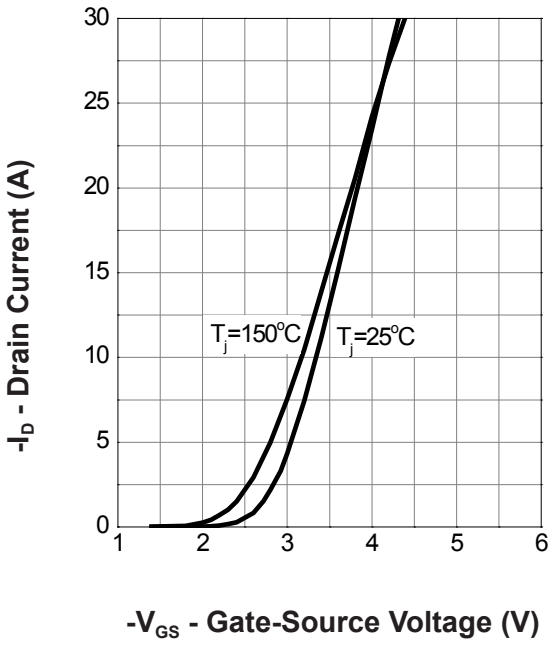


Gate Charge

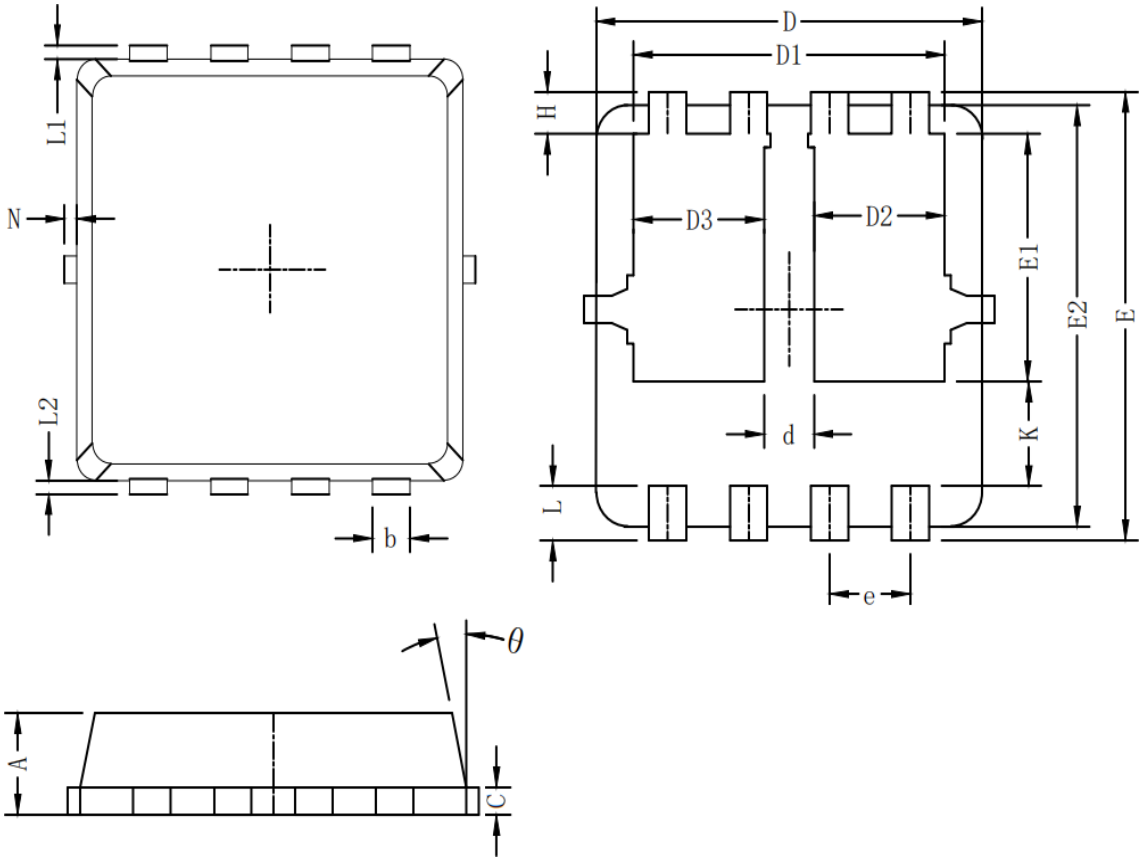


P-Channel Typical Characteristics (Cont.)

Transfer Characteristics



Packaging information



Symbol	Dim in mm		
	min	typ	max
A	0.6	0.75	0.9
b	0.2	0.3	0.4
C	0.15	0.2	0.25
D	3	3.1	3.2
D1	2.3	2.45	2.6
D2/D3	0.8	1	1.2
E	3.15	3.3	3.45
E1	1.43	1.73	1.93
E2	2.9	3.05	3.2
e	0.65BSC		
H	0.2	0.35	0.5
K	0.57	0.77	0.87
L	0.3	0.4	0.5
L1/L2	0.1REF		
θ	8°	10°	13°
N	0		0.15
d	0.3	0.4	0.5

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