WSD3810DN33

Dual N-Channel MOSFET

General Description

The WSD3810DN33 is the highest performance trench Dual N-Channel MOSFET with extreme high cell density, which provide excellent $R_{DS(ON)}$ and gate charge for most of the synchronous buck converter applications.

The WSD3810DN33 meet the RoHS and Green Product requirement 100% E_{AS} guaranteed with full function reliability approved.

Features

- Advanced high cell density Trench technology
- Super Low Gate Charge
- Excellent CdV/dt effect decline
- 100% E_{AS} Guaranteed
- Green Device Available

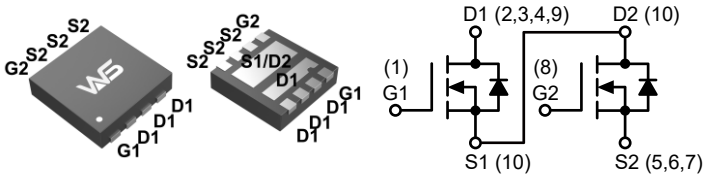
Product Summery

BV_{DSS}	$R_{DS(ON)}$	I_D	I_{TEM}
30V	9.0mΩ	18A	Q1
30V	8.5mΩ	18A	Q2

Applications

- High Frequency Point-of-Load Synchronous Buck Converter for MB/NB/UMPC/VGA
- Networking DC-DC Power System
- Load Switch

DFN33X33-8S Pin Configuration



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

Symbol	Parameter		Rating		Units
			Q1	Q2	
V_{DS}	Drain-Source Voltage		30	30	V
V_{GS}	Gate-Source Voltage		±20	±20	
I_D	Drain Current (Continuous) [1,3]	T_C=25°C	18	18	A
		T_C=100°C	12.3	12.3	
I_{DM}	Pulsed Drain Current [2]		45	45	
E_{AS}	Single Pulse Avalanche Energy	V_{DD}=25V , V_{GS}=10V , L=1.0mH , R_G=25Ω	11	11	mJ
P_D	Power Dissipation	T_C=25°C	20	20	W
T_{STG}	Storage Temperature Range		-55 to 150	-55 to 150	°C
T_J	Operating Junction Temperature Range		-55 to 150	-55 to 150	

Thermal Data

Symbol	Parameter	Typ.	Max.	Units
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	---	6	°C/W

Q1 Electrical Characteristics (T_A=25°C, Unless Otherwise Noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Units
Static						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V , I_D=250μA	30	---	---	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=30V , V_{GS}=0V	---	---	1.0	μA
I_{GSS}	Gate Leakage Current	V_{GS}=±20V , V_{DS}=0V	---	---	±100	nA
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_{DS}=250μA	1.0	1.6	2.5	V
$R_{DS(ON)}$	Drain-Source On-state Resistance	V_{GS}=10V , I_D=10A	---	9.0	10.8	mΩ
		V_{GS}=4.5V , I_D=8A	---	12	17.5	
g_{fs}	Forward Transconductance	V_{DS}=5V , I_D=5A	---	12	---	S
V_{SD}	Diode Forward Voltage	I_{SD}=1A , V_{GS}=0V	---	---	1.3	V
Switching						
Q_g	Total Gate Charge	V_{DS}=15V , V_{GS}=10V , I_D=5A	---	8	---	nC
Q_{gs}	Gate-Source Charge		---	1.6	---	
Q_{gd}	Gate-Drain Charge		---	1.2	---	
$T_{d(on)}$	Turn-on Delay Time	V_{DD}=15V , V_{GS}=10V , R_G=6Ω , I_D=1A	---	8.5	---	ns
T_r	Turn-on Rise Time		---	10	---	
$T_{d(off)}$	Turn-off Delay Time		---	14	---	
T_f	Turn-off Fall Time		---	10.6	---	
Dynamic						
C_{iss}	Input Capacitance	V_{DS}=15V , V_{GS}=0V , f = 1.0MHz	---	455	---	pF
C_{oss}	Output Capacitance		---	318	---	
C_{rss}	Reverse Transfer Capacitance		---	22	---	

Note:

1. The value of $R_{\theta JA}$ is measured with the device mounted on 1in² FR-4 board with 2oz. Copper, in a still air environment with T_A=25°C. The value in any given application depends on the user's specific board design.
2. Repetitive rating, pulse width limited by junction temperature.
3. The current rating is based on the t≤ 10s junction to ambient thermal resistance rating.

Q2 Electrical Characteristics (T_A=25°C, Unless Otherwise Noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Units
Static						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V , I_D=250μA	30	---	---	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=30V , V_{GS}=0V	---	---	1.0	μA
I_{GSS}	Gate Leakage Current	V_{GS}=±20V , V_{DS}=0V	---	---	±100	nA
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_{DS}=250μA	1.0	1.6	2.5	V
$R_{DS(ON)}$	Drain-Source On-state Resistance	V_{GS}=10V , I_D=10A	---	8.5	10.5	mΩ
		V_{GS}=4.5V , I_D=8A	---	12.5	16	
g_{fs}	Forward Transconductance	V_{DS}=5V , I_D=5A	---	12	---	S
V_{SD}	Diode Forward Voltage	I_{SD}=1A , V_{GS}=0V	---	---	1.3	V
Switching						
Q_g	Total Gate Charge	V_{DS}=15V , V_{GS}=10V , I_D=5A	---	8	---	nC
Q_{gs}	Gate-Source Charge		---	1.6	---	
Q_{gd}	Gate-Drain Charge		---	1.2	---	
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T_r	Turn-on Rise Time		---	10	---	
$T_{d(off)}$	Turn-off Delay Time		---	14	---	
T_f	Turn-off Fall Time		---	10.6	---	
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C_{iss}	Input Capacitance	V_{DS}=15V , V_{GS}=0V , f = 1.0MHz	---	455	---	pF
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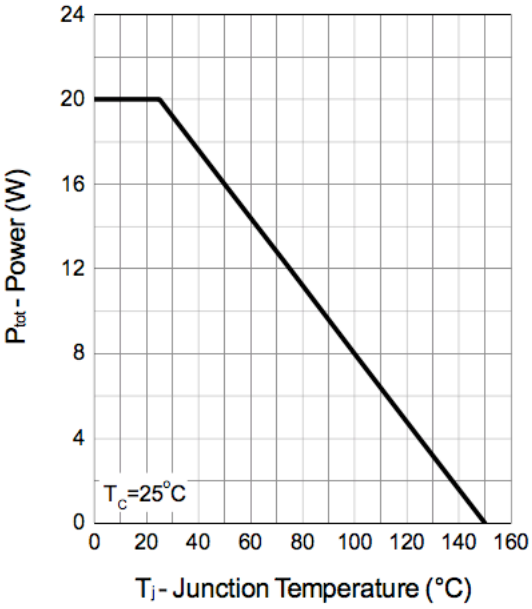
Note:

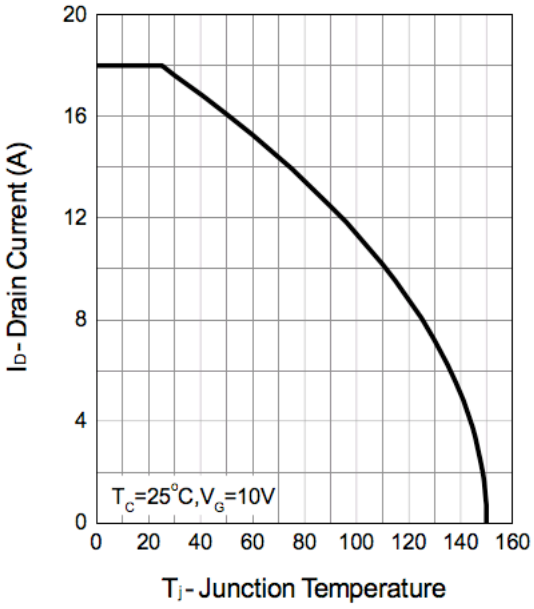
1. The value of $R_{\theta JA}$ is measured with the device mounted on 1in² FR-4 board with 2oz. Copper, in a still air environment with T_A=25°C. The value in any given application depends on the user's specific board design.
2. Repetitive rating, pulse width limited by junction temperature.
3. The current rating is based on the t≤ 10s junction to ambient thermal resistance rating.

Q1 Typical Characteristics

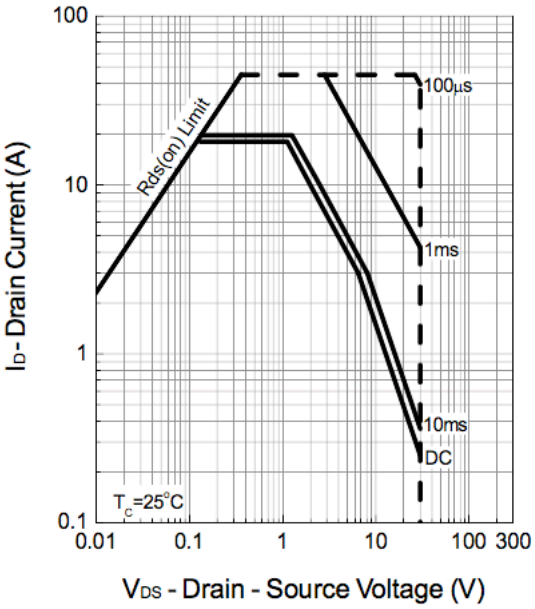
Power Dissipation



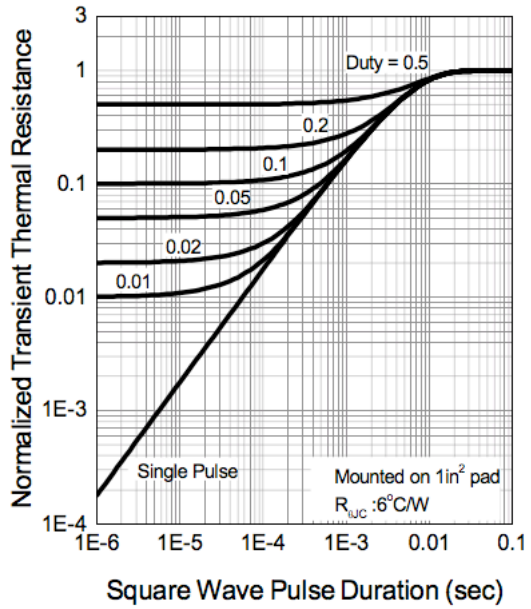
Drain Current



Safe Operation Area

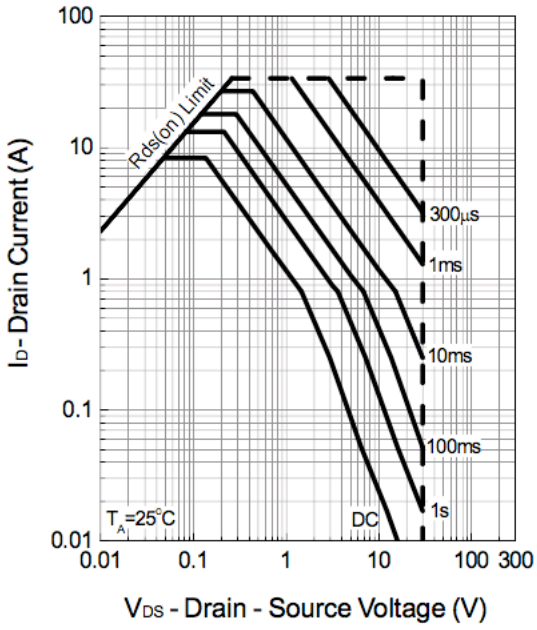


Thermal Transient Impedance

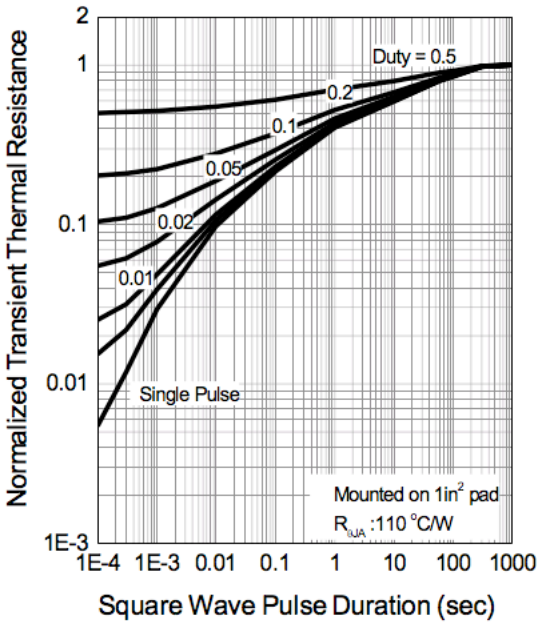


Q1 Typical Characteristics (Cont.)

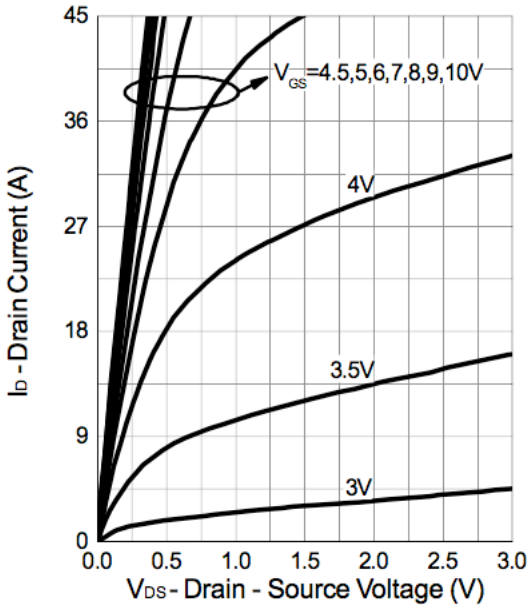
Safe Operation Area



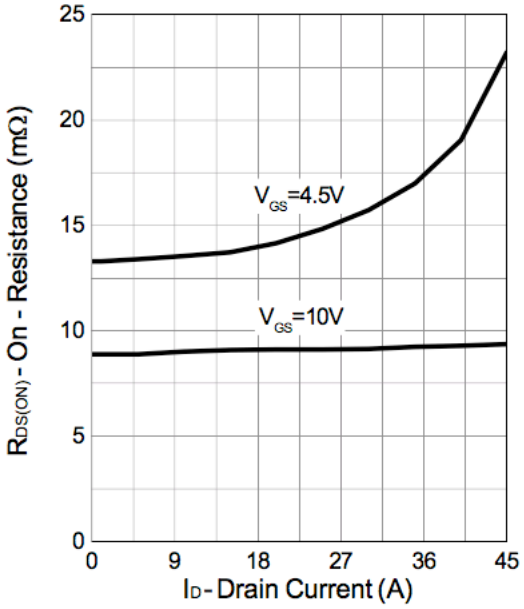
Thermal Transient Impedance



Output Characteristics

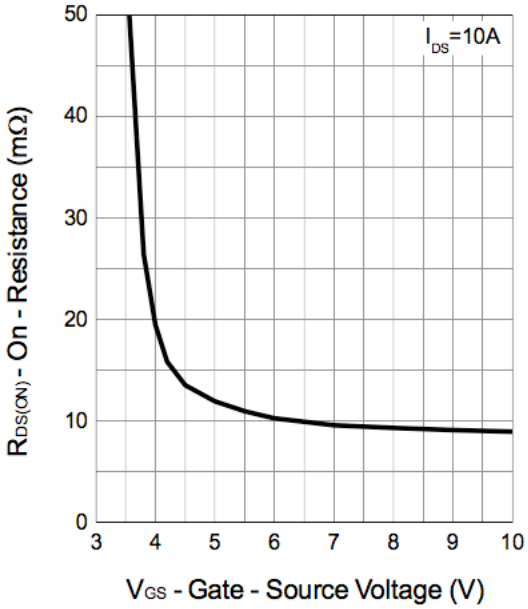


Drain-Source On Resistance

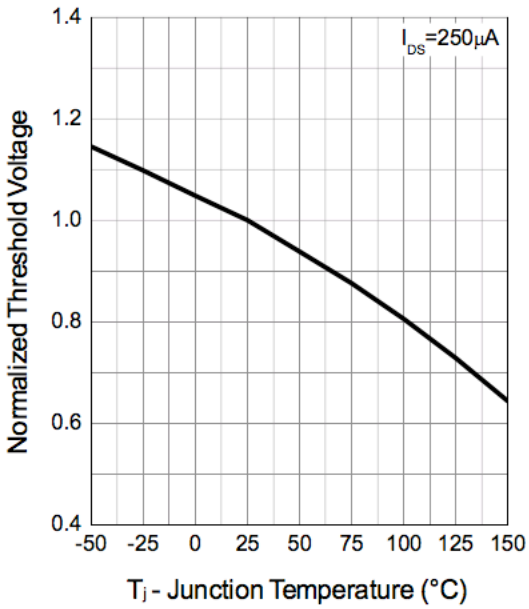


Q1 Typical Characteristics (Cont.)

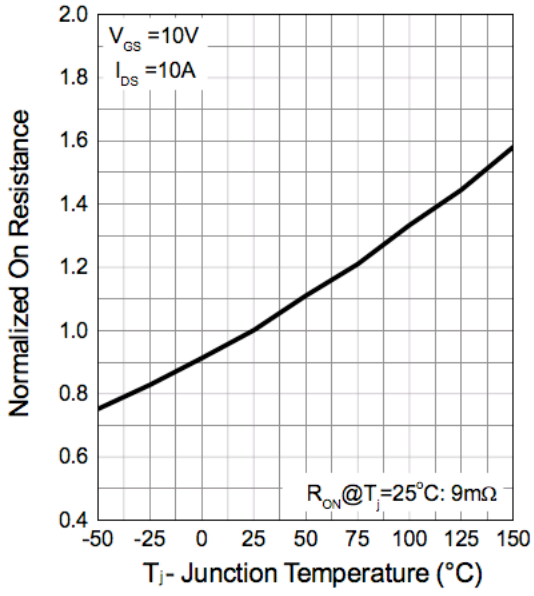
Gate-Source On Resistance



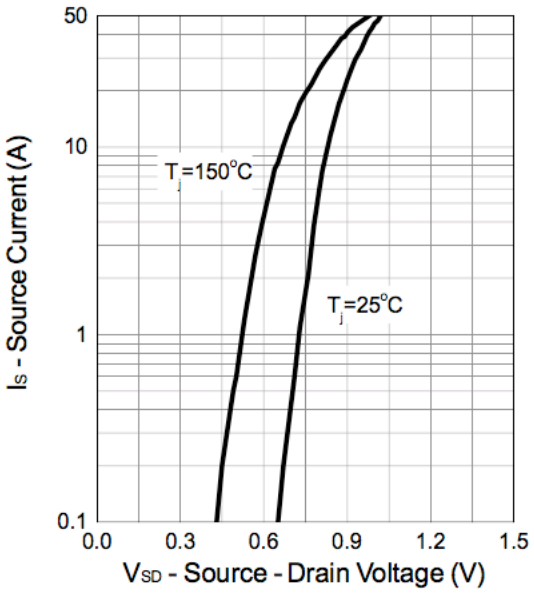
Gate Threshold Voltage



Drain-Source On Resistance

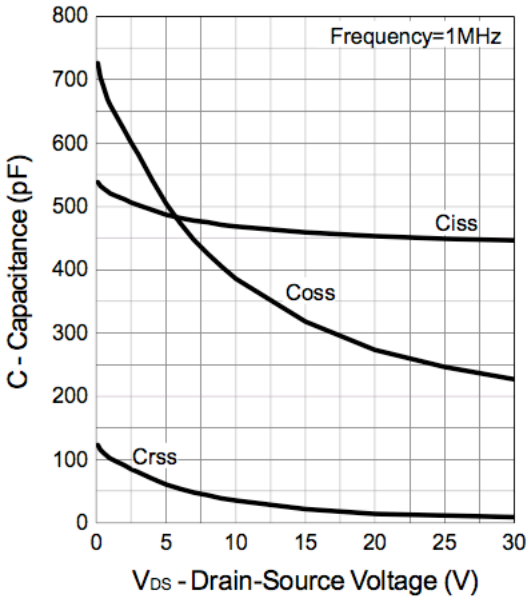


Source-Drain Diode Forward

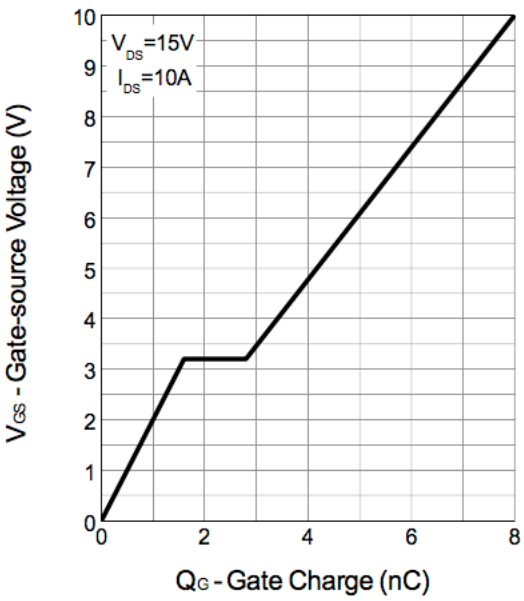


Q1 Typical Characteristics (Cont.)

Capacitance

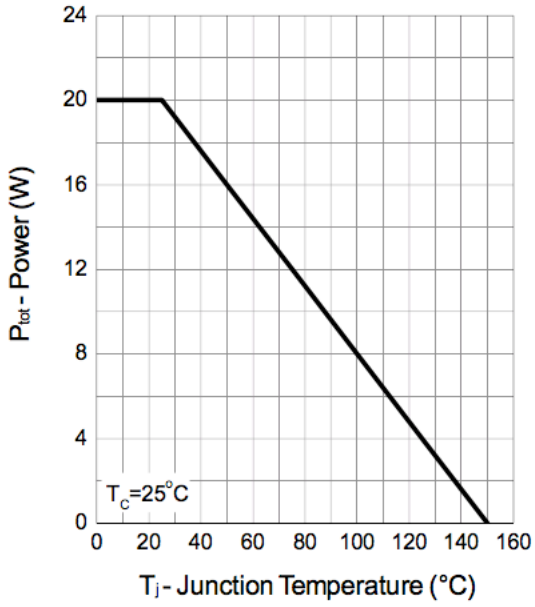


Gate Charge

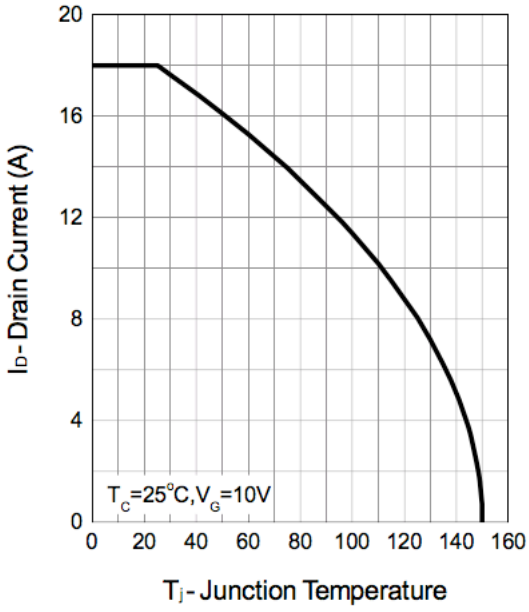


Q2 Typical Characteristics

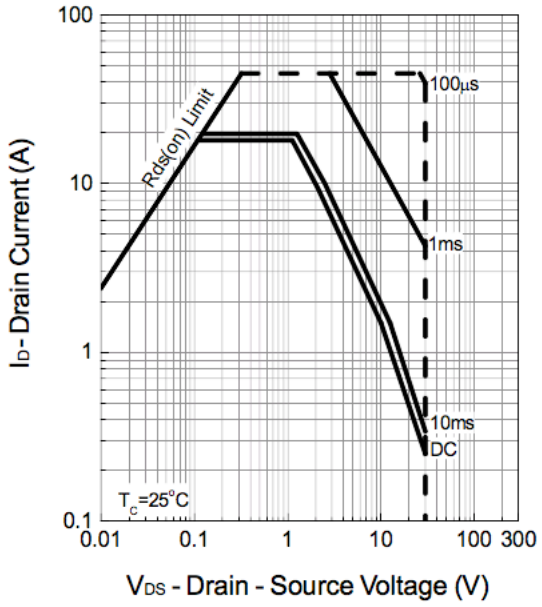
Power Dissipation



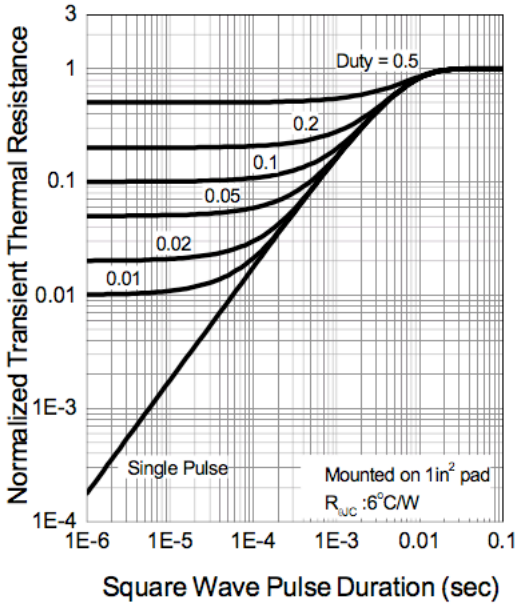
Drain Current



Safe Operation Area

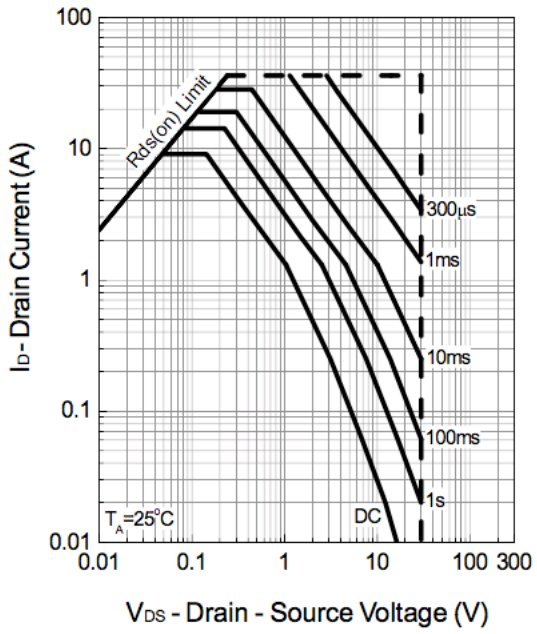


Thermal Transient Impedance

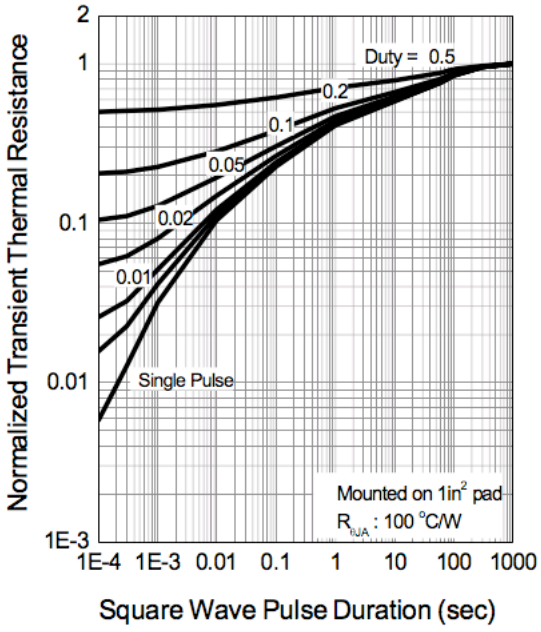


Q2 Typical Characteristics (Cont.)

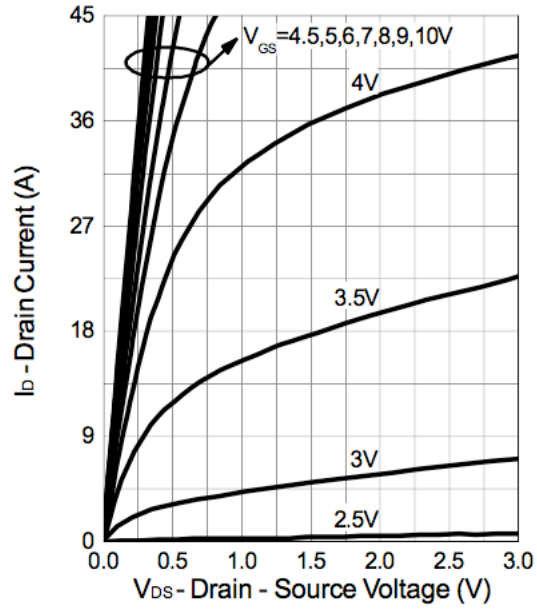
Safe Operation Area



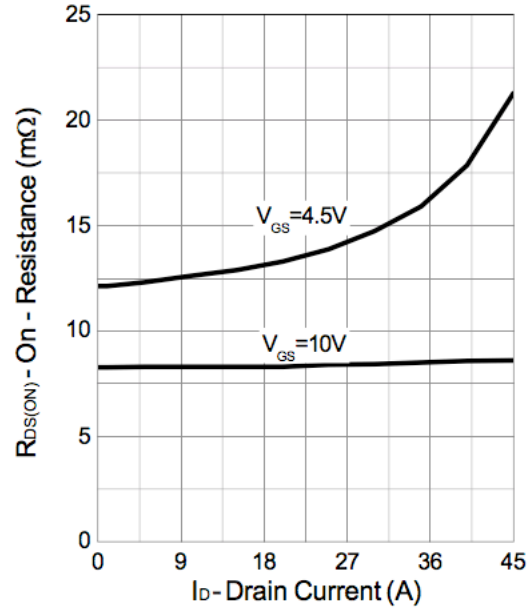
Thermal Transient Impedance



Output Characteristics

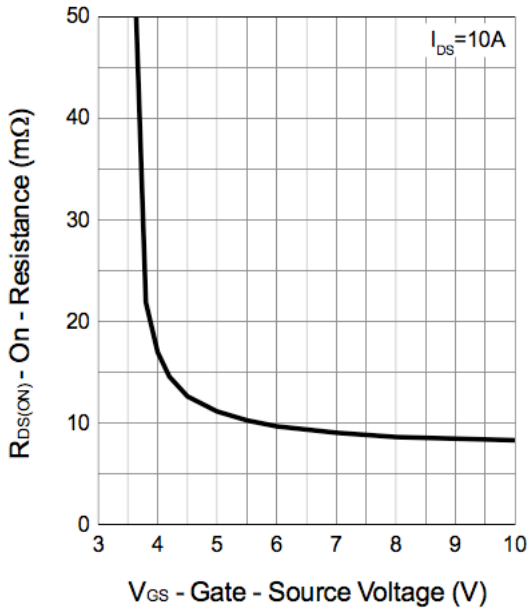


Drain-Source On Resistance

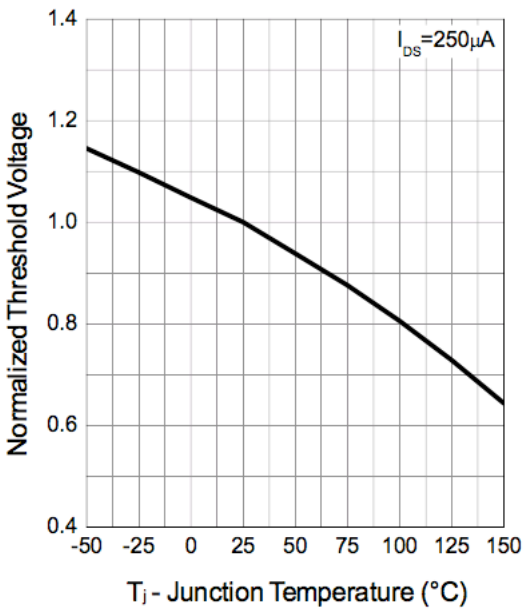


Q2 Typical Characteristics (Cont.)

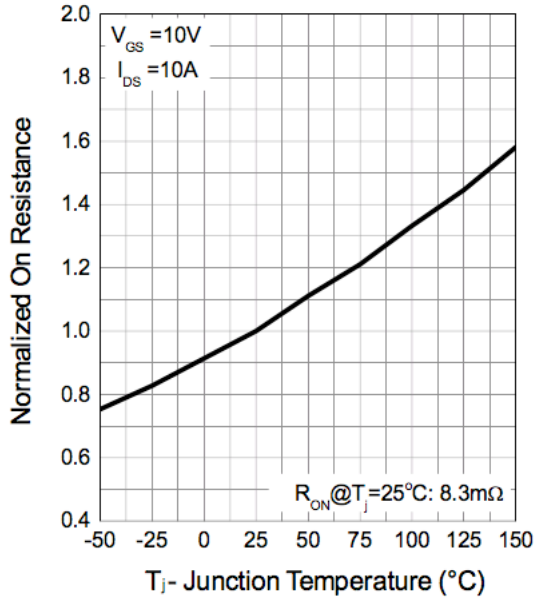
Gate-Source On Resistance



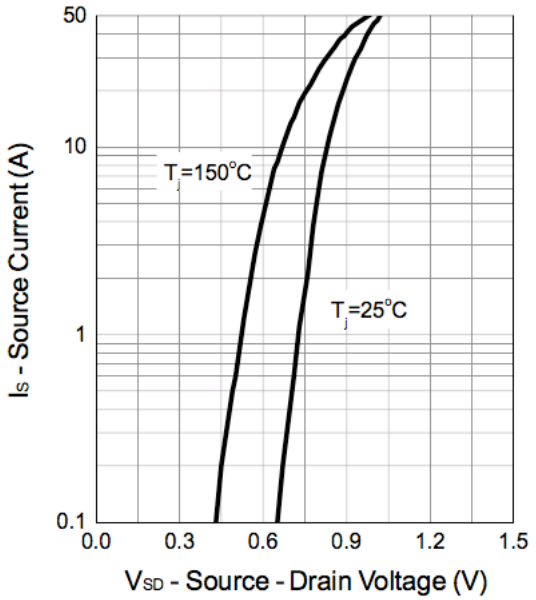
Gate Threshold Voltage



Drain-Source On Resistance

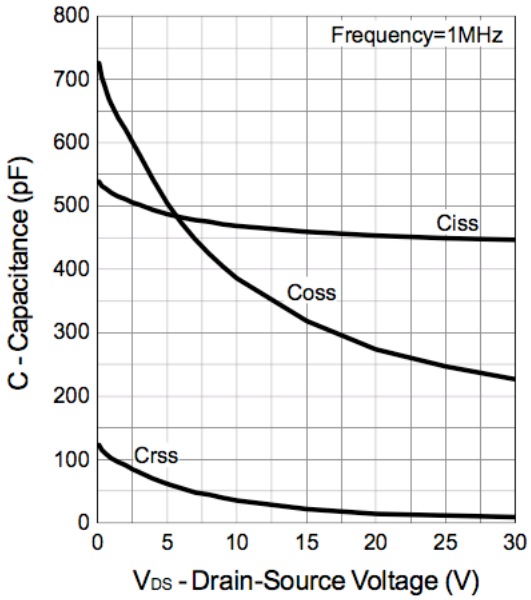


Source-Drain Diode Forward

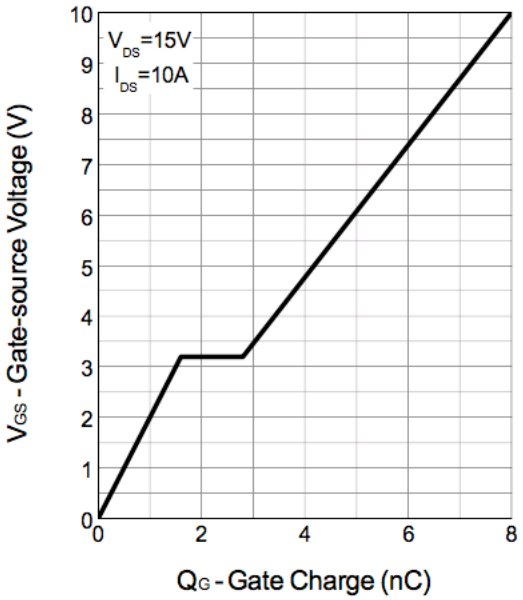


Q2 Typical Characteristics (Cont.)

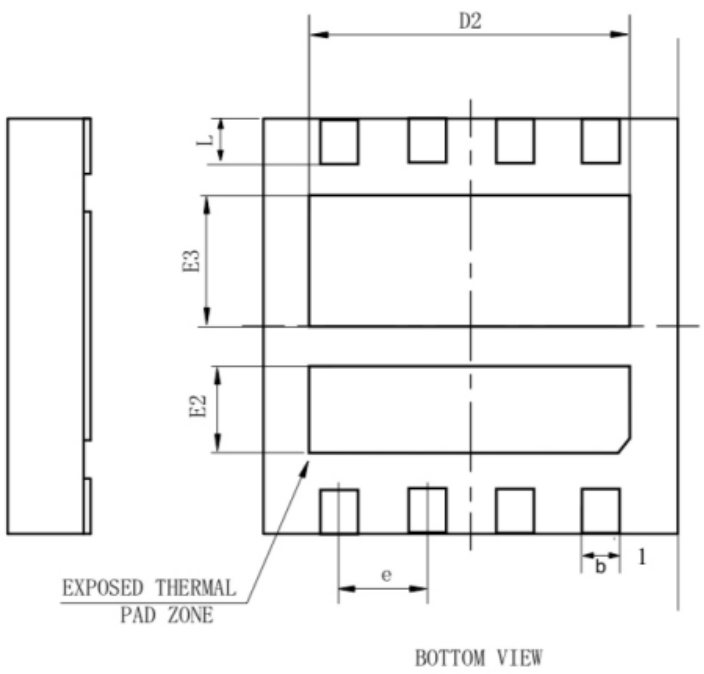
Capacitance



Gate Charge



Packaging information



SYMBOL	MILLIMETER		
	MIN	MID	MAX
A	0. 70	0.75	0. 80
A1	—	0.02	0. 05
b	0. 25	0.30	0. 35
c	0. 18	0.20	0. 25
D	3. 20	3. 30	3. 40
D2	2. 50	2. 60	2. 70
E	3. 20	3. 30	3. 40
E2	0. 65	0. 70	0. 75
E3	0. 95	1. 05	1. 15
e	0. 70 BSC		
L	0. 30	0.35	0. 40

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