

General Description

The WSD3810DN is the highest performance trench Dual N-Ch MOSFET with extreme high cell density, which provide excellent $R_{DS(on)}$ and gate charge for most of the synchronous buck converter applications.

The WSD3810DN meet the RoHS and Green Product requirement 100% EAS guaranteed with full function reliability approved.

Features

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

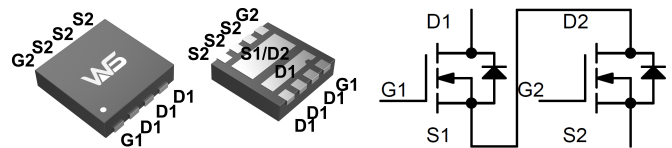
Product Summary

B_{VDSS}	$R_{DS(on)}$	I_D	I_{TEM}
30V	10.8m Ω	18A	Q1
30V	10.5m Ω	18A	Q2

Applications

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

DFN3X3 Asymmetric Dual Pin Configuration



Absolute Maximum Ratings @TA=25°C unless otherwise noted

Symbol	Parameter	Q1	Q2	Units		
V_{DS}	Drain-Source Voltage	30	30	V		
V_{GS}	Gate-Source Voltage	± 20	± 20	V		
I_D	Drain Current (Continuous) *AC	$T_C=25^\circ C$	18	18	A	
		$T_C=100^\circ C$	12.3	12.3		
I_{DM}	Drain Current (Pulse) *B	45	45	A		
P_D	Power Dissipation	$T_C=25^\circ C$	20	20	W	
EAS	Single Pulse Avalanche Energy	$V_{DD}=25V, V_{GS}=10V, L=1mH, R_G=25\Omega$		11	11	mJ
$R_{\theta JC}$	Thermal Resistance Junction to Case	6	6	6	$^\circ C/W$	
T_J/T_{STG}	Operating Temperature/ Storage Temperature	-55~150	-55~150	-55~150	$^\circ C$	

Q1 Electrical Characteristics @ $T_A=25^{\circ}\text{C}$ unless otherwise noted

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Static						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	$V_{GS} = 0V, I_D = 250\mu A$	30			V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = 30V, V_{GS} = 0V$			1	μA
I_{GSS}	Gate Leakage Current	$V_{GS} = \pm 20V, V_{DS} = 0V$			100	nA
$V_{GS(TH)}$	Gate Threshold Voltage	$V_{GS} = V_{DS}, I_{DS} = 250\mu A$	1	1.6	2.5	V
$R_{DS(on)}$	Drain-Source On-state Resistance	$V_{GS} = 10V, I_D = 10A$		9	10.8	$m\Omega$
		$V_{GS} = 4.5V, I_D = 8A$		12	17.5	$m\Omega$
gFS	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						
Qg	Total Gate Charge	$V_{GS} = 10V, V_{DS} = 15V, I_D = 5A$		8		nC
Qgs	Gate-Source Charge			1.6		nC
Qgd	Gate-Drain Charge			1.2		nC
td(on)	Turn-on Delay Time	$V_{GS} = 10V, V_{DD} = 15V, I_D = 1A, R_G = 6\Omega$		8.5		ns
tr	Turn-on Rise Time			10		ns
td(off)	Turn-off Delay Time			14		ns
tf	Turn-off Fall Time			10.6		ns
Dynamic						
Ciss	Input Capacitance	$V_{GS} = 0V, V_{DS} = 15V, f = 1MHz$		455		pF
Coss	Output Capacitance			318		pF
Crss	Reverse Transfer Capacitance			22		pF

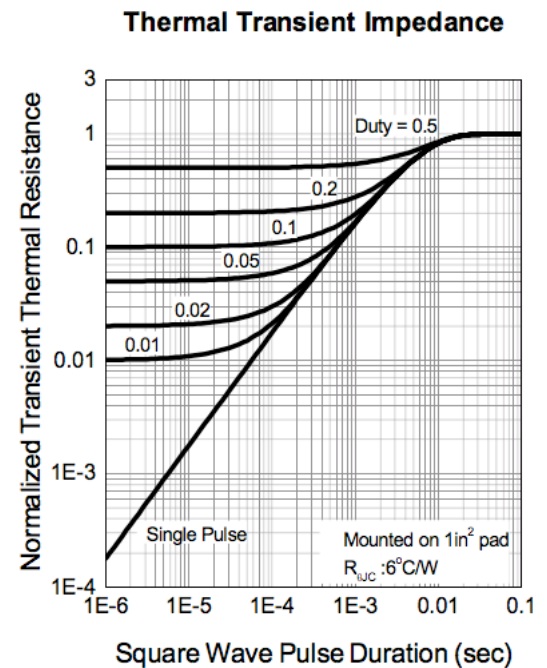
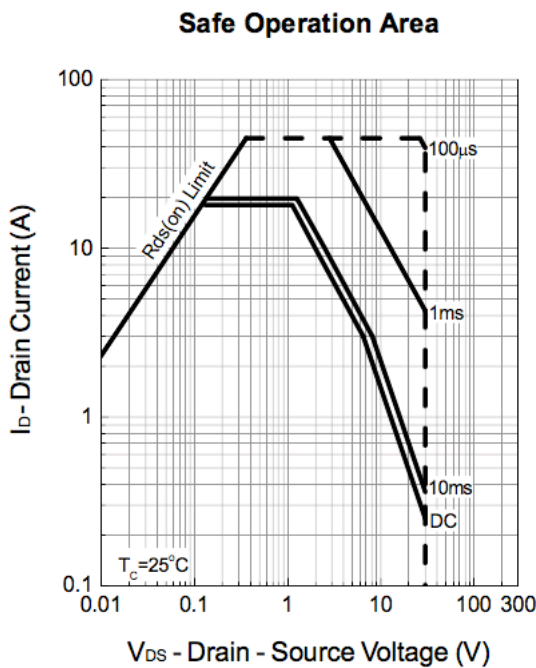
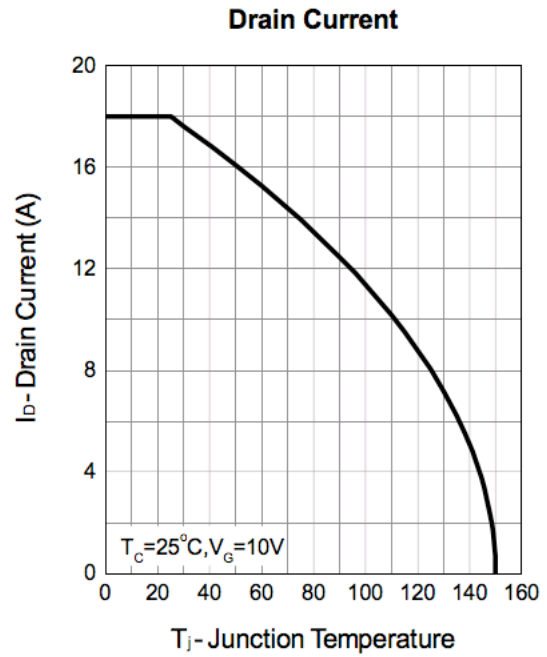
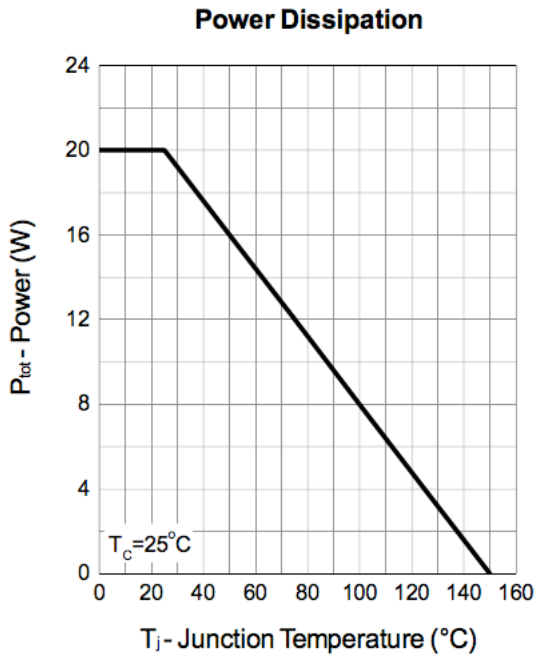
A: The value of $R_{\theta JA}$ is measured with the device mounted on $1in^2$ FR-4 board with 2oz. Copper, in a still air environment with $T_A = 25^{\circ}\text{C}$. The value in any given application depends on the user's specific board design. B: Repetitive rating, pulse width limited by junction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

Q2 Electrical Characteristics @TA=25°C unless otherwise noted

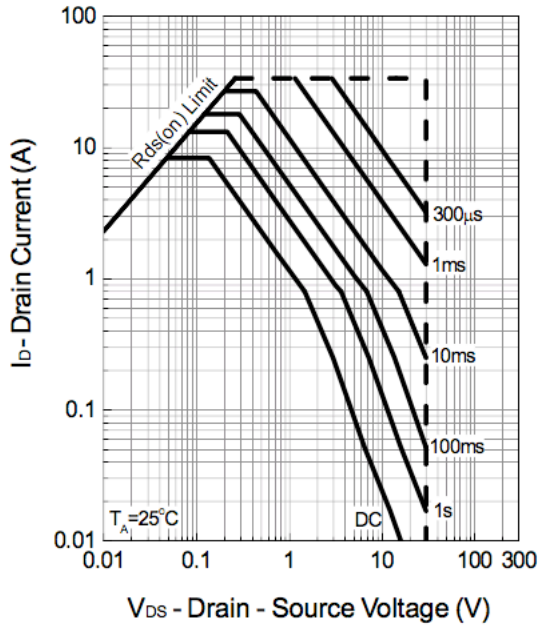
Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Static						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	$V_{GS} = 0V, I_D = 250\mu A$	30			V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = 30V, V_{GS} = 0V$			1	μA
I_{GSS}	Gate Leakage Current	$V_{GS} = \pm 20V, V_{DS} = 0V$			100	nA
$V_{GS(TH)}$	Gate Threshold Voltage	$V_{GS} = V_{DS}, I_{DS} = 250\mu A$	1	1.6	2.5	V
$R_{DS(on)}$	Drain-Source On-state Resistance	$V_{GS} = 10V, I_D = 10A$		8.5	10.5	m Ω
		$V_{GS} = 4.5V, I_D = 8A$		12.5	16	m Ω
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	$V_{GS} = 10V, V_{DS} = 15V, I_D = 5A$		8		nC
Q_{gs}	Gate-Source Charge			1.6		nC
Q_{gd}	Gate-Drain Charge			1.2		nC
$t_d(on)$	Turn-on Delay Time	$V_{GS} = 10V, V_{DD} = 15V, I_D = 1A, R_G = 6\Omega$		8.5		ns
t_r	Turn-on Rise Time			10		ns
$t_d(off)$	Turn-off Delay Time			14		ns
t_f	Turn-off Fall Time			10.6		ns
Dynamic						
C_{iss}	Input Capacitance	$V_{GS} = 0V, V_{DS} = 15V, f = 1MHz$		455		pF
C_{oss}	Output Capacitance			318		pF
C_{rss}	Reverse Transfer Capacitance			22		pF

A: 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 $T_A = 25^\circ C$. The value in any given application depends on the user's specific board design. B: Repetitive rating, pulse width limited by junction temperature. C: The current rating is based on the $t \leq 10s$ junction to ambient thermal resistance rating.

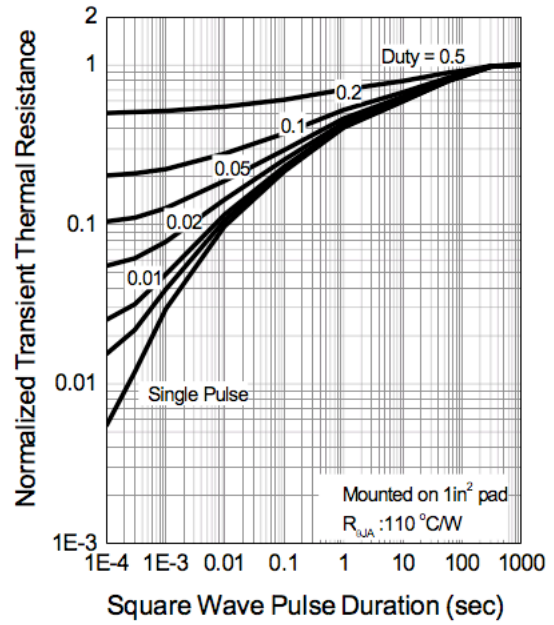
● Q1 TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS



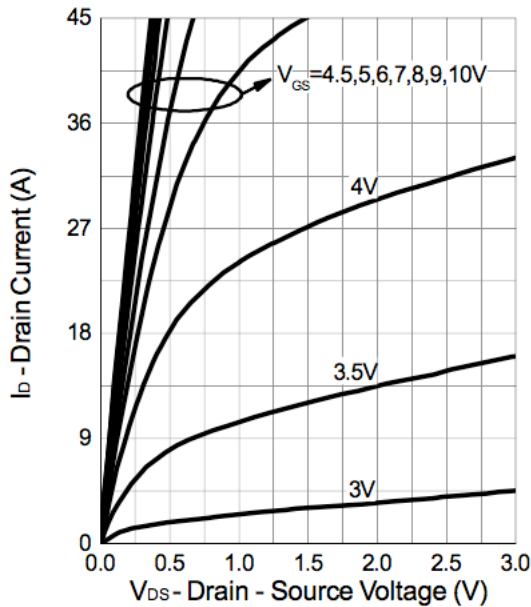
Safe Operation Area



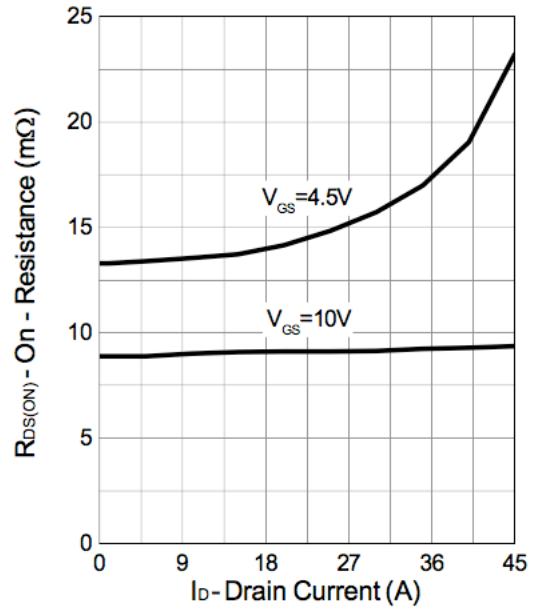
Thermal Transient Impedance



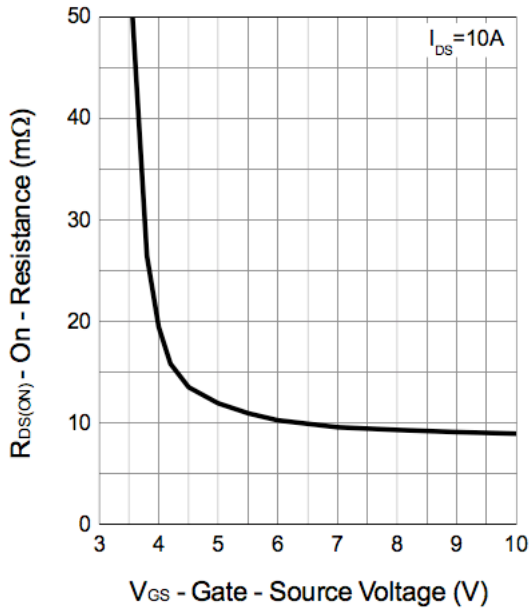
Output Characteristics



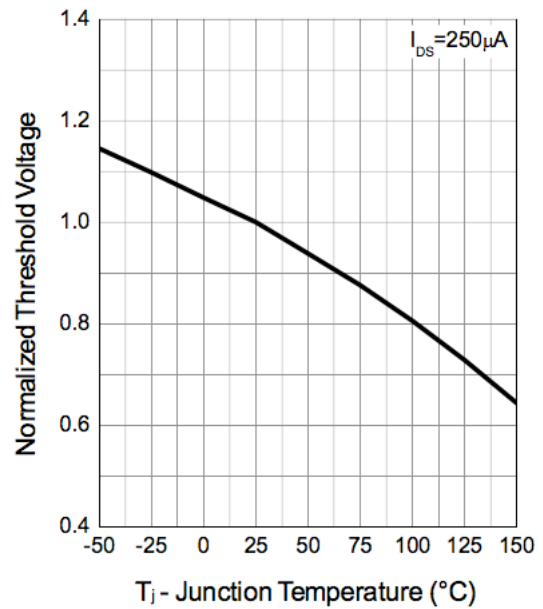
Drain-Source On Resistance



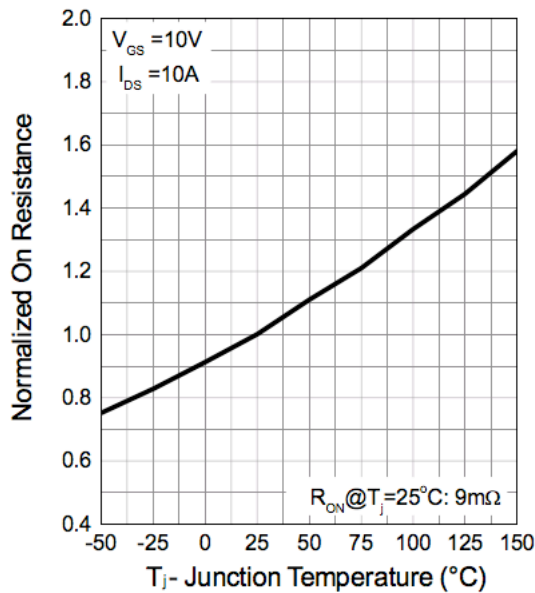
Gate-Source On Resistance



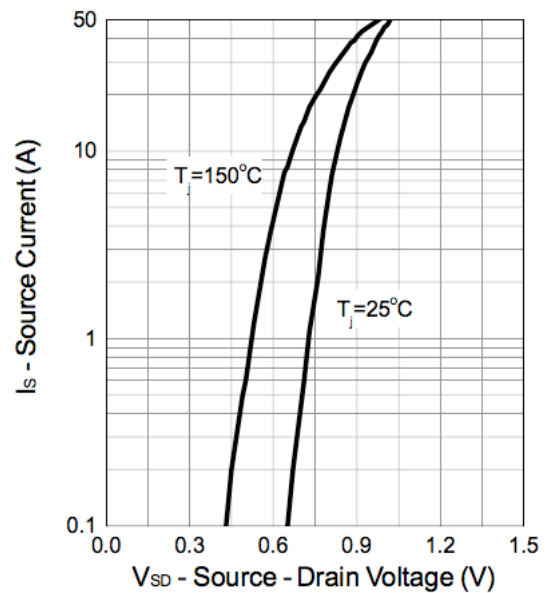
Gate Threshold Voltage



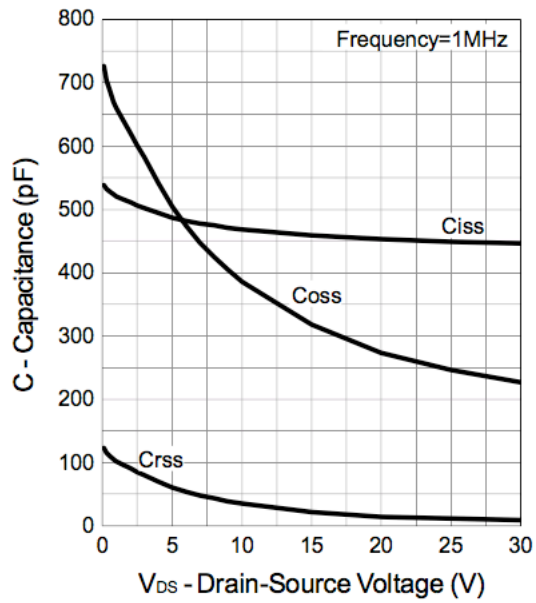
Drain-Source On Resistance



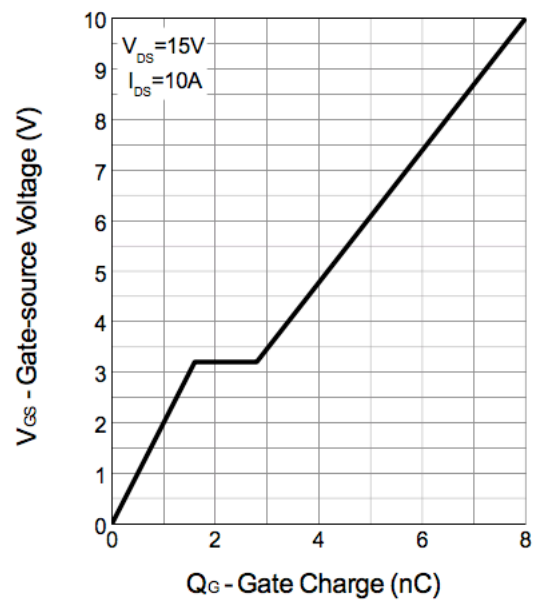
Source-Drain Diode Forward



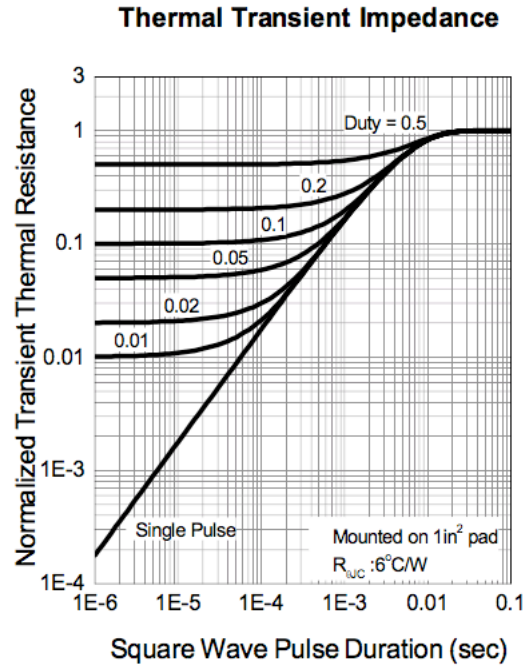
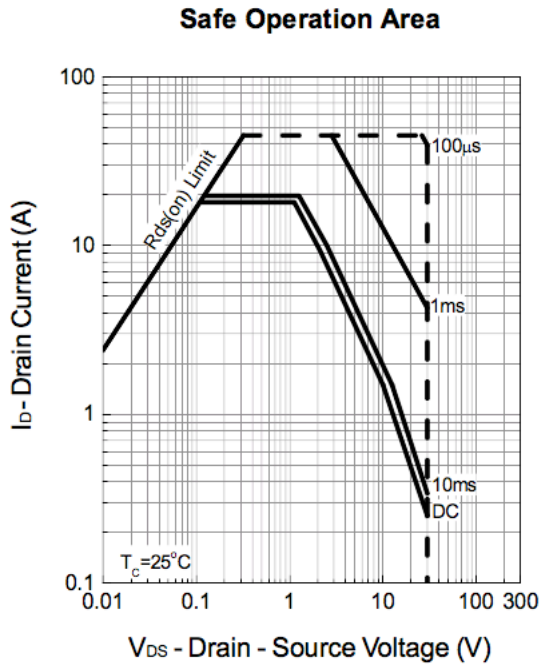
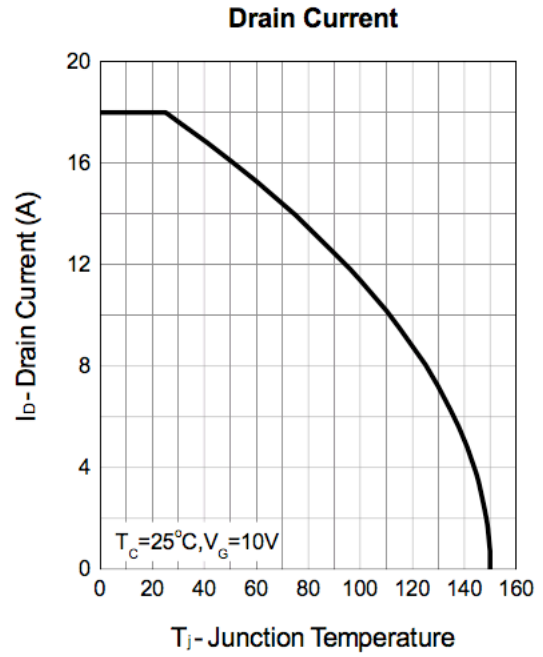
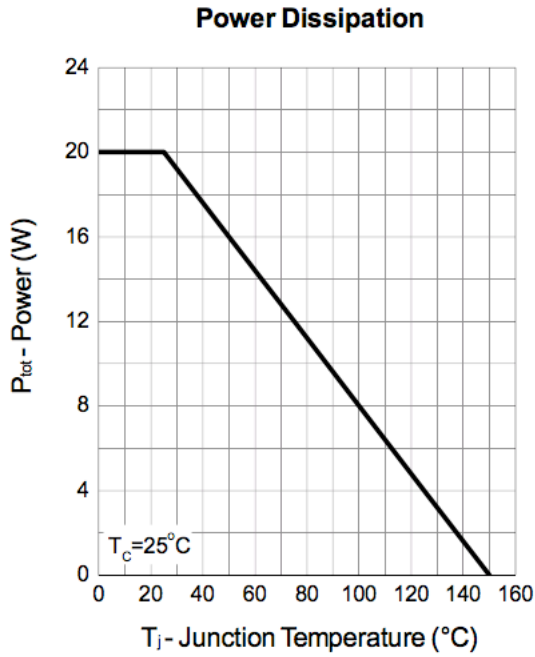
Capacitance



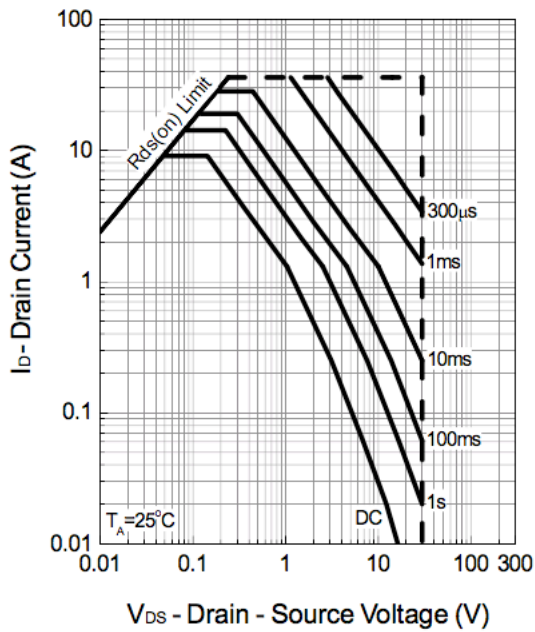
Gate Charge



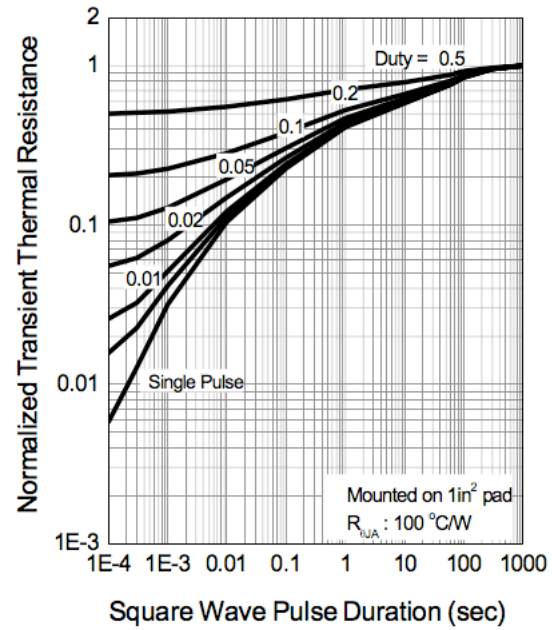
● Q2 TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS



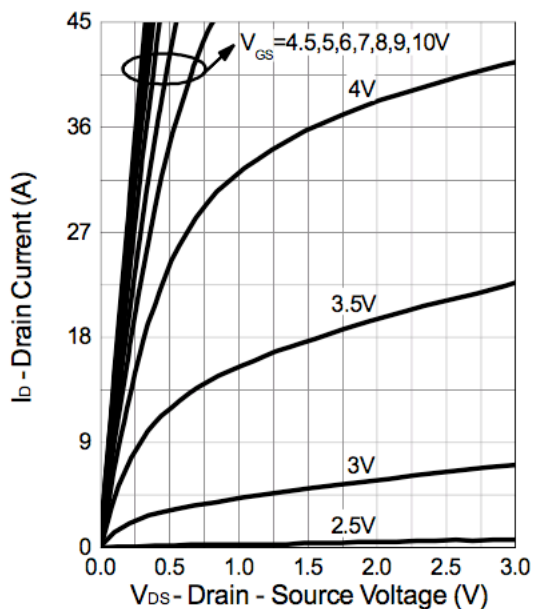
Safe Operation Area



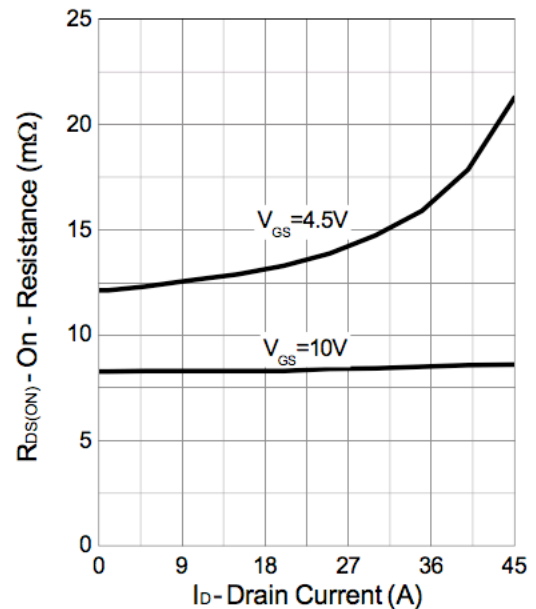
Thermal Transient Impedance



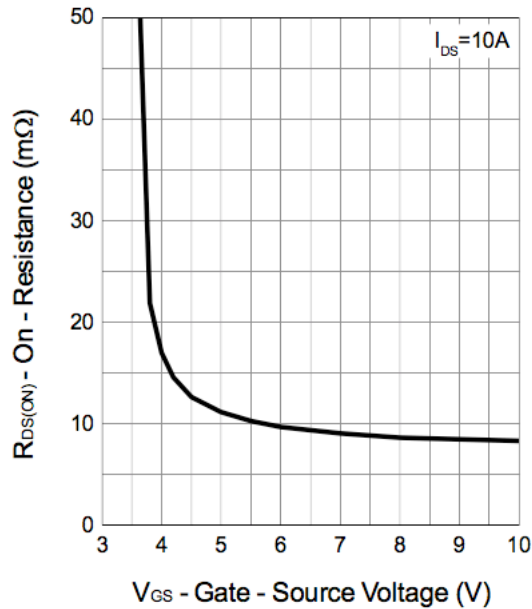
Output Characteristics



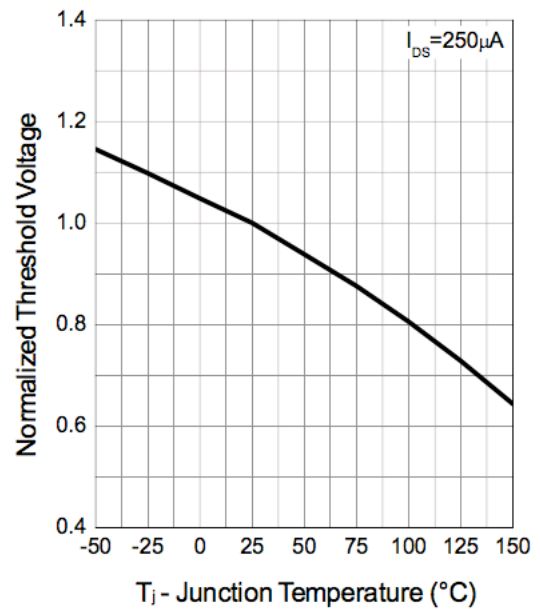
Drain-Source On Resistance



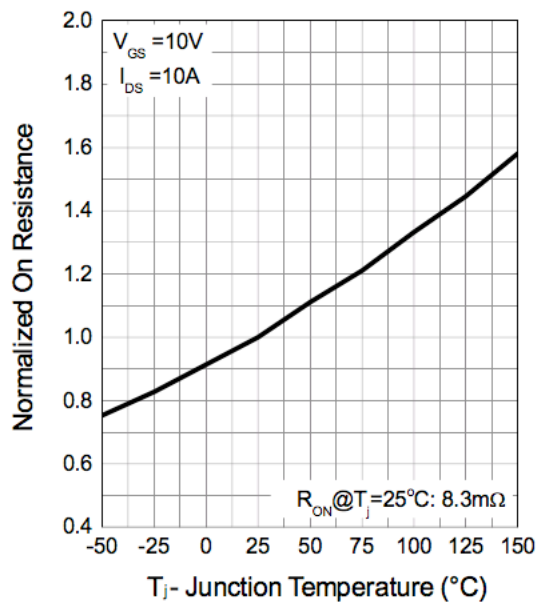
Gate-Source On Resistance



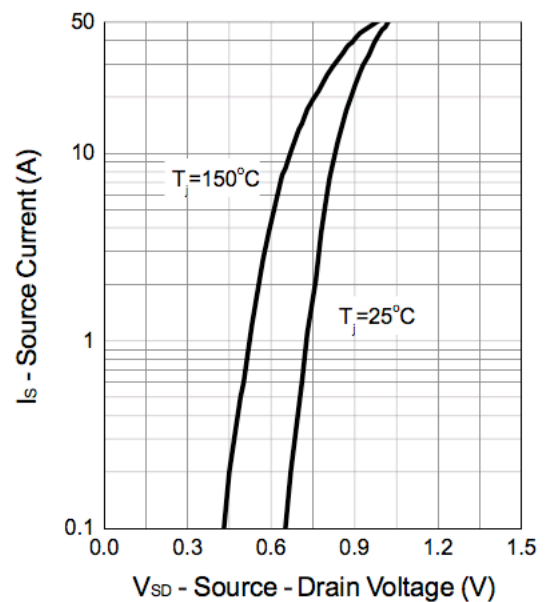
Gate Threshold Voltage



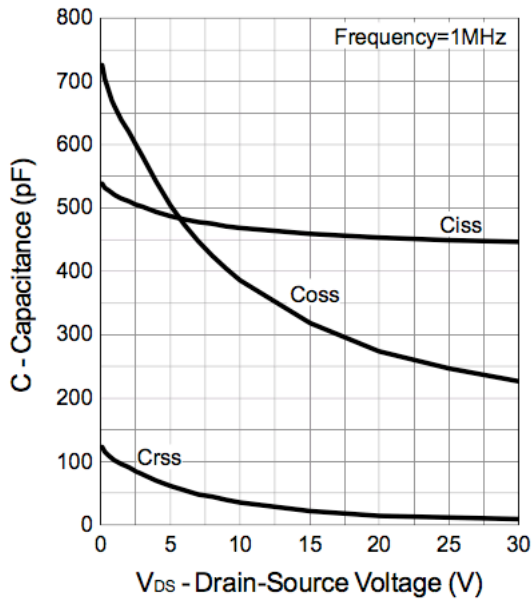
Drain-Source On Resistance



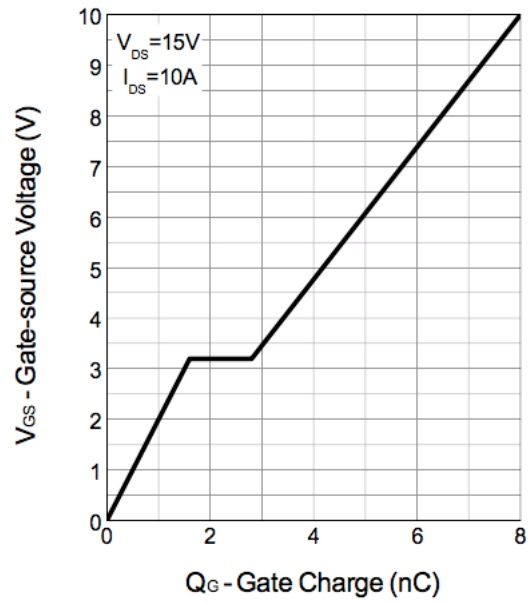
Source-Drain Diode Forward



Capacitance



Gate Charge





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