

### 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 $\Omega$	18A	Q1
30V	10.5m $\Omega$	18A	Q2

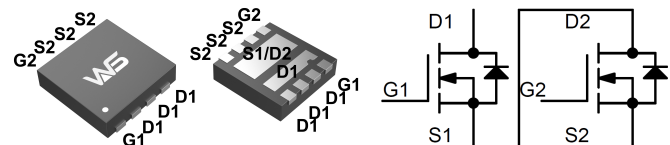
### Applications

- 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	$\pm 20$	$\pm 20$	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
<b>Static</b>						
$V_{(BR)DSS}$	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	$\mu A$
$I_{GSS}$	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	$m\Omega$
$g_{FS}$	Forward Transconductance	$V_{DS} = 5V, I_D = 5A$		12		S
$V_{SD}$	Diode Forward Voltage	$I_{SD} = 1A, V_{GS} = 0V$			1.3	V
<b>Switching</b>						
$Q_g$	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
<b>Dynamic</b>						
$C_{iss}$	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

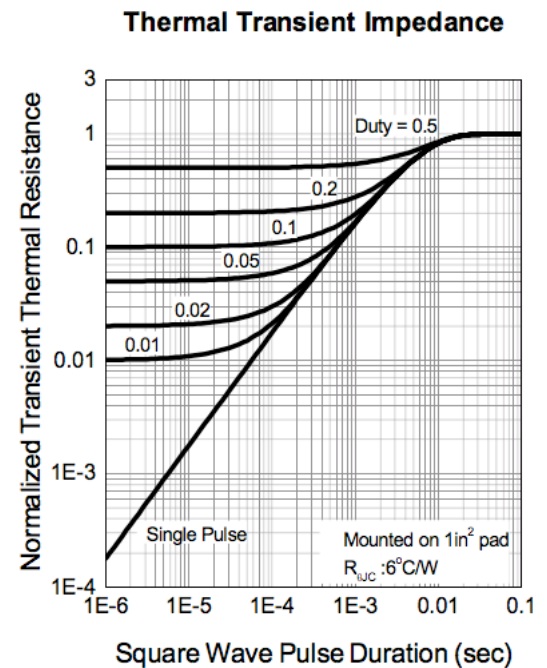
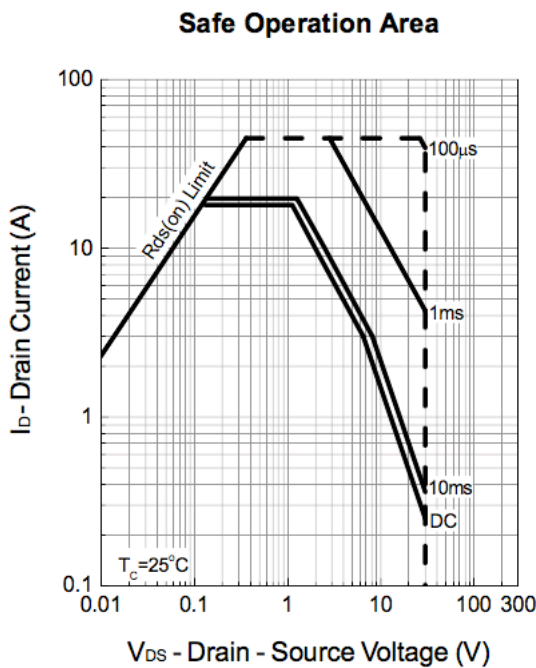
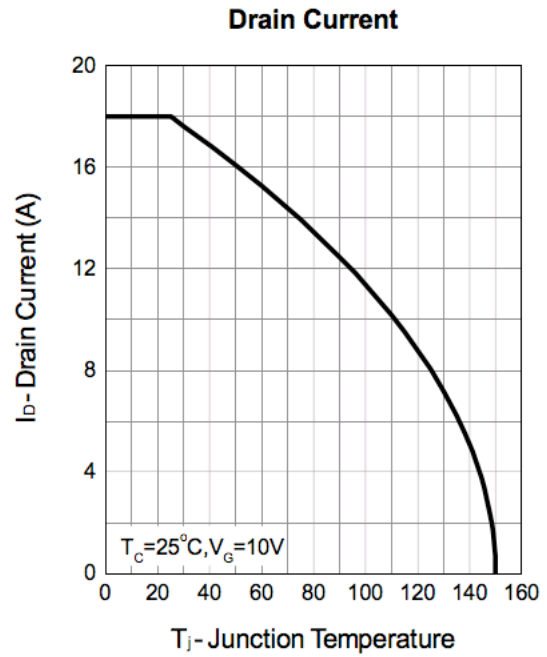
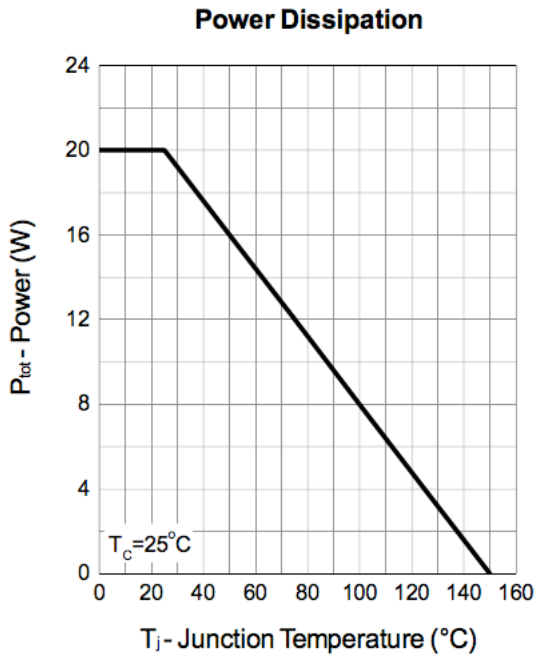
A: The value of  $R_{\theta JA}$  is measured with the device mounted on  $1in^2$  FR-4 board with 2oz. Copper, in a still air environment with  $T_A=25^{\circ}\text{C}$ . The value in any given application depends on the user's specific board design. B: Repetitive rating, pulse width limited by junction 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**

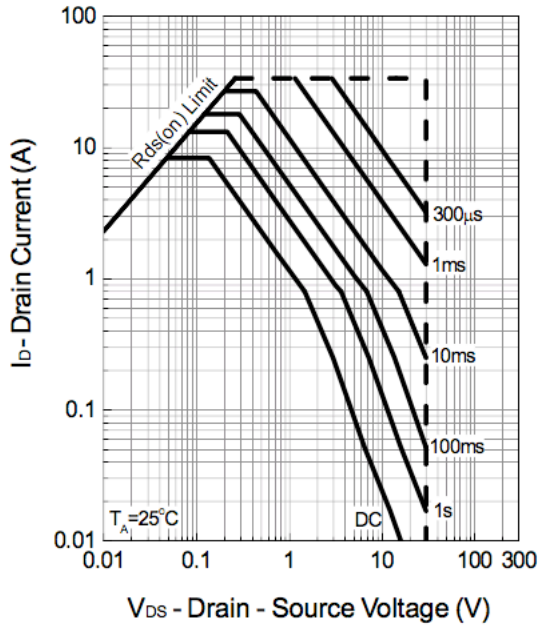
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$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS} = 30V, V_{GS} = 0V$			1	$\mu A$
$I_{GSS}$	Gate Leakage Current	$V_{GS} = \pm 20V, V_{DS} = 0V$			100	nA
$V_{GS(TH)}$	Gate Threshold Voltage	$V_{GS} = V_{DS}, I_{DS} = 250\mu A$	1	1.6	2.5	V
$R_{DS(on)}$	Drain-Source On-state Resistance	$V_{GS} = 10V, I_D = 10A$		8.5	10.5	m $\Omega$
		$V_{GS} = 4.5V, I_D = 8A$		12.5	16	m $\Omega$
$g_{FS}$	Forward Transconductance	$V_{DS} = 5V, I_D = 5A$		12		S
$V_{SD}$	Diode Forward Voltage	$I_{SD} = 1A, V_{GS} = 0V$			1.3	V
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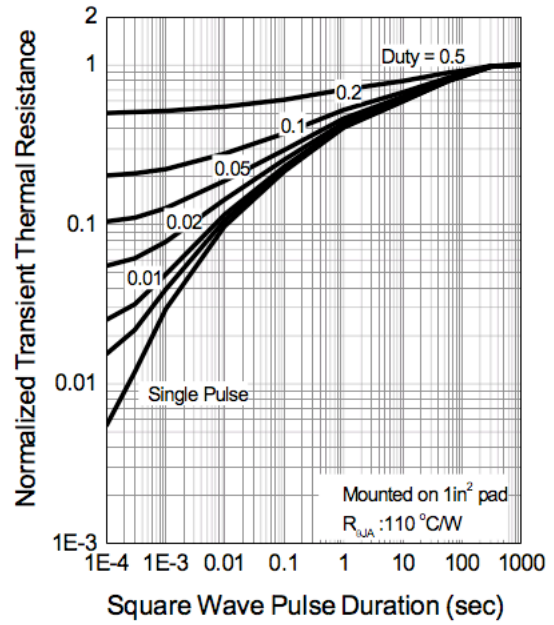
● Q1 TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS



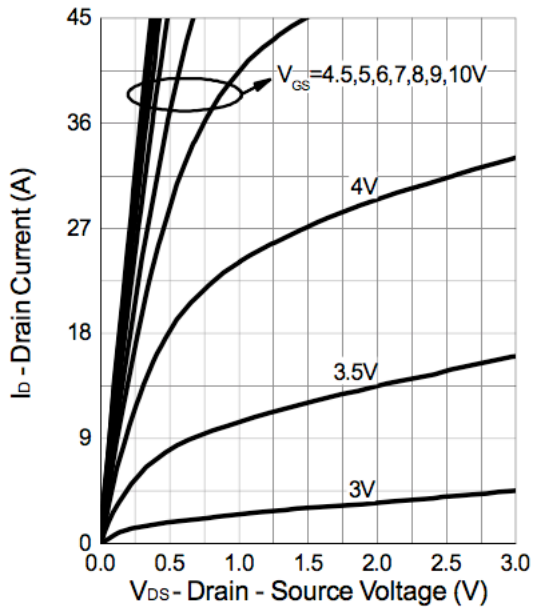
**Safe Operation Area**



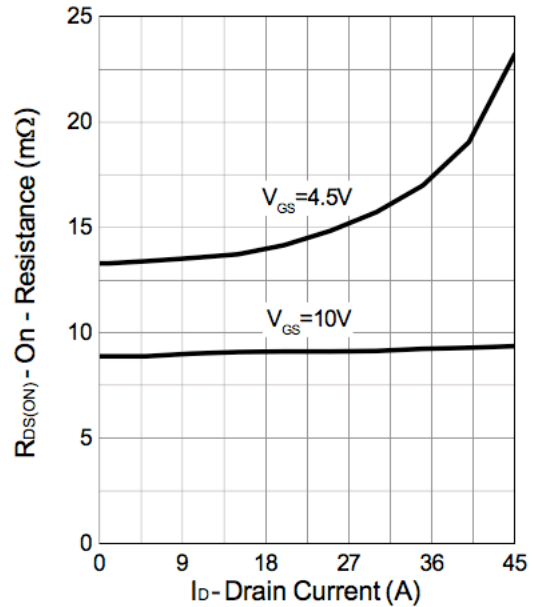
**Thermal Transient Impedance**



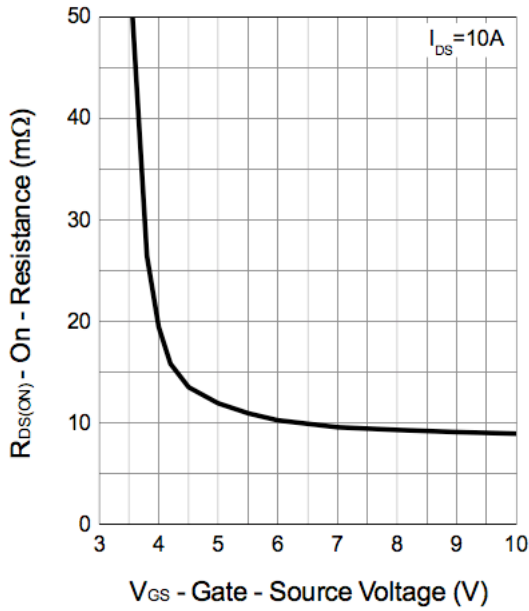
**Output Characteristics**



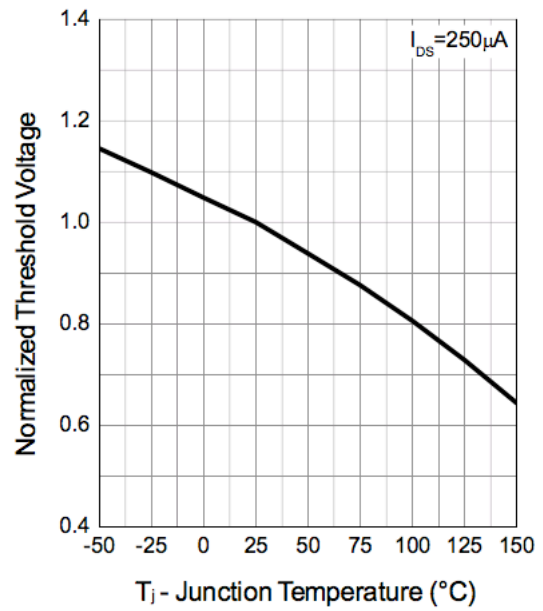
**Drain-Source On Resistance**



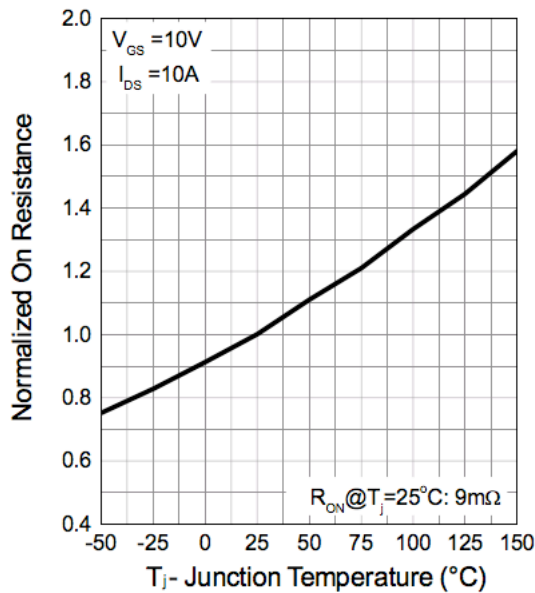
**Gate-Source On Resistance**



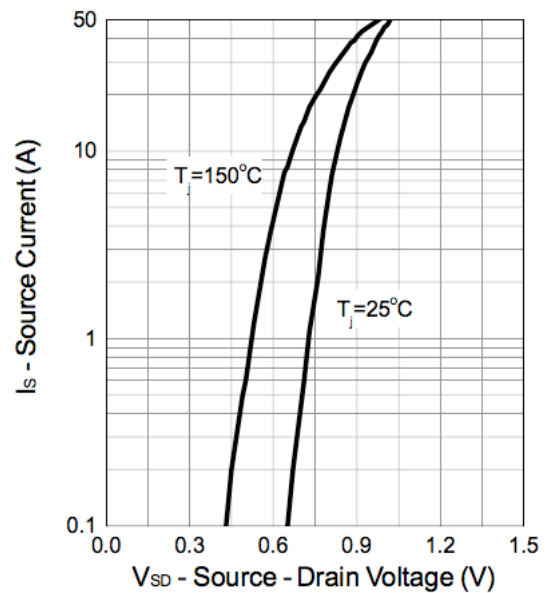
**Gate Threshold Voltage**



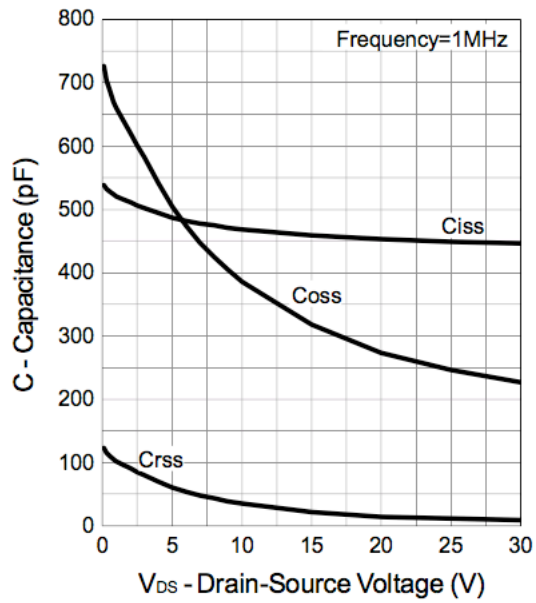
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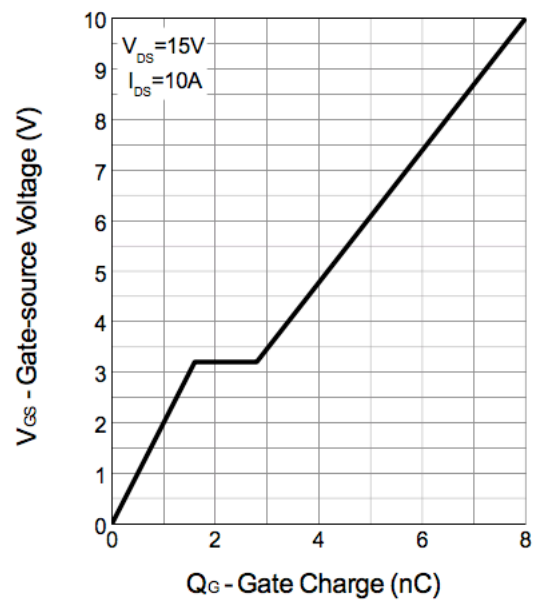
**Source-Drain Diode Forward**



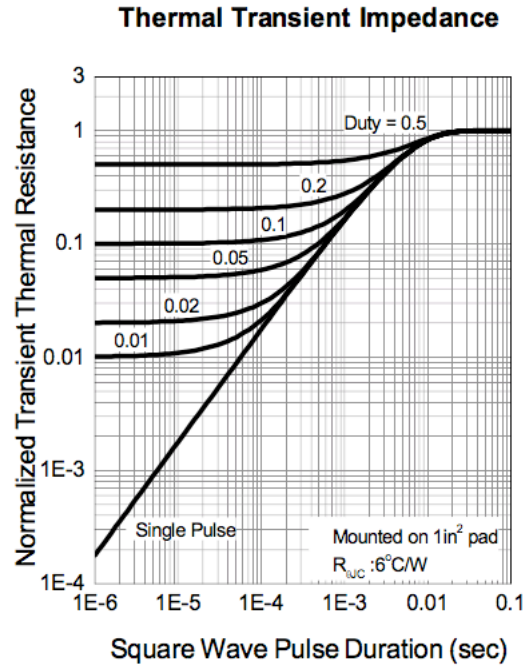
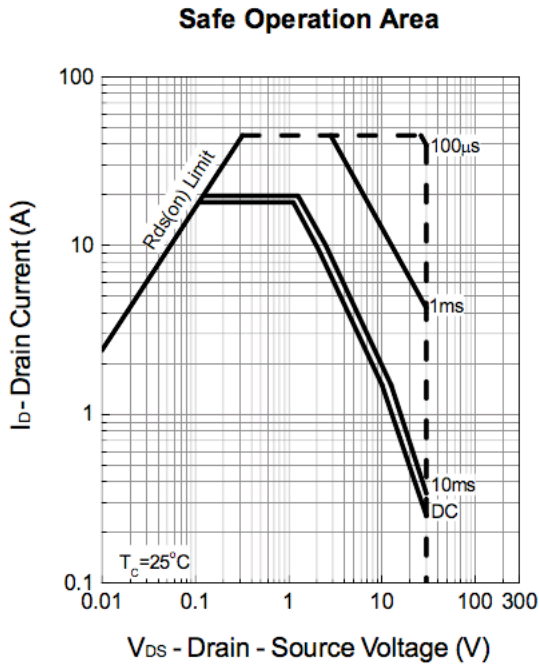
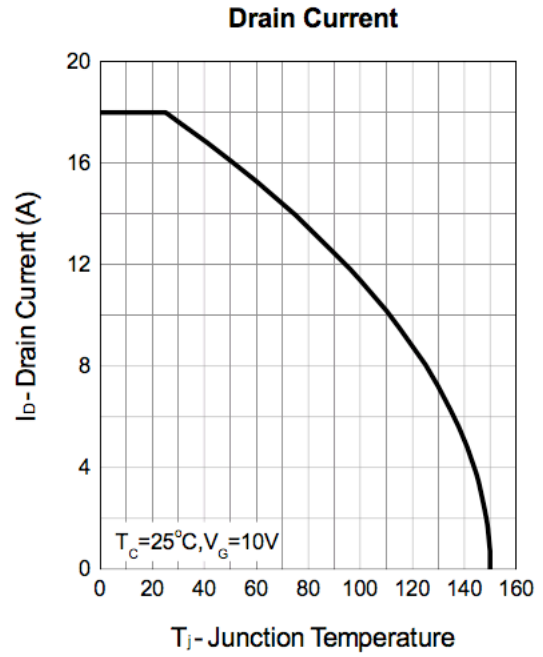
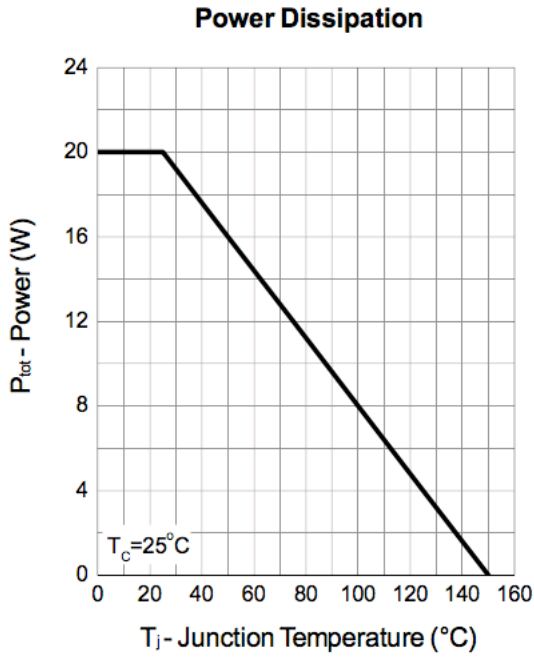
**Capacitance**



**Gate Charge**

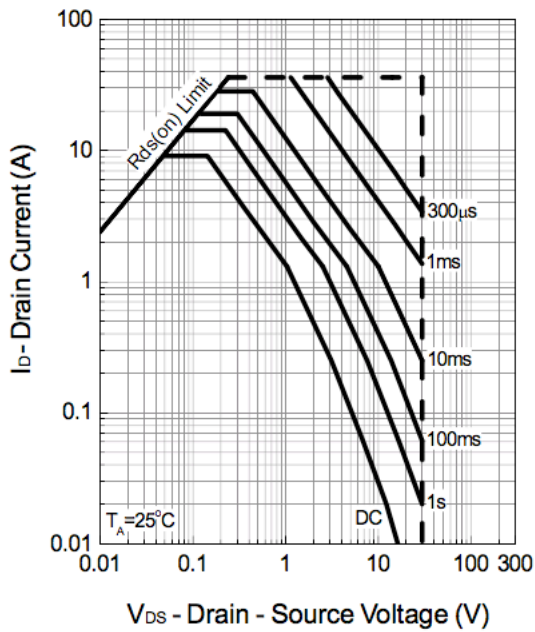


● Q2 TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

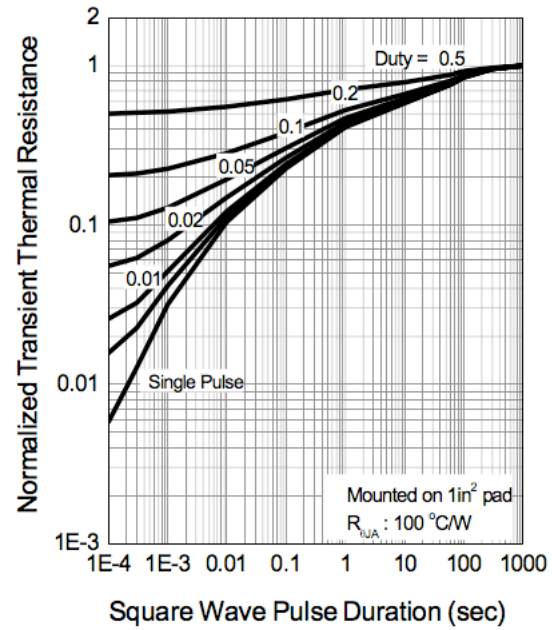




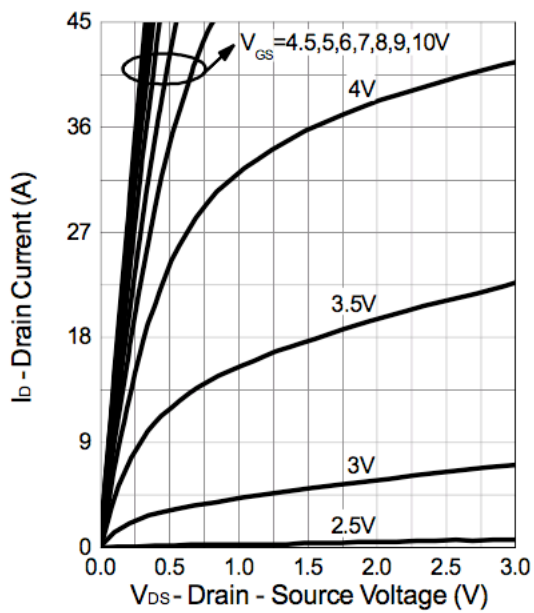
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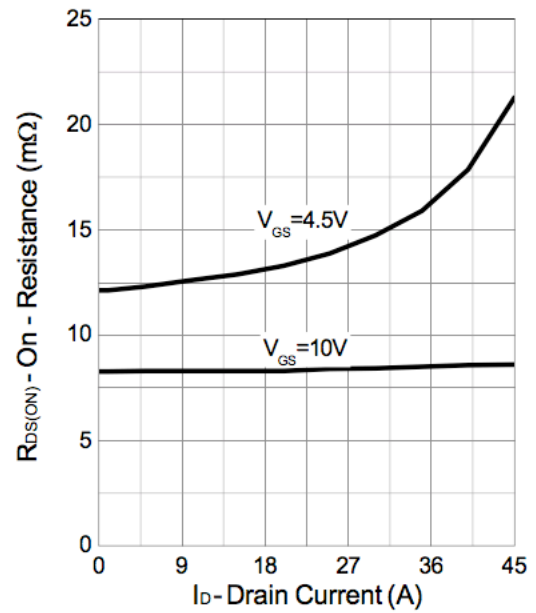
**Thermal Transient Impedance**



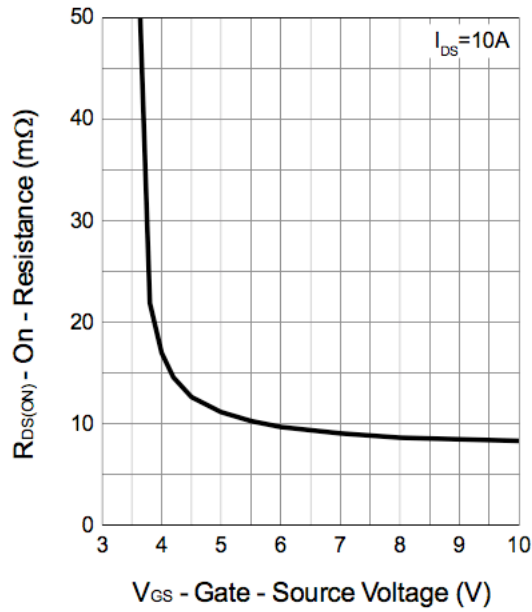
**Output Characteristics**



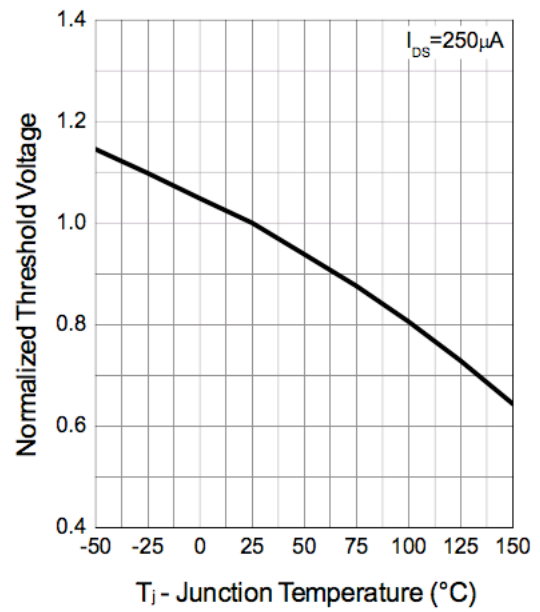
**Drain-Source On Resistance**



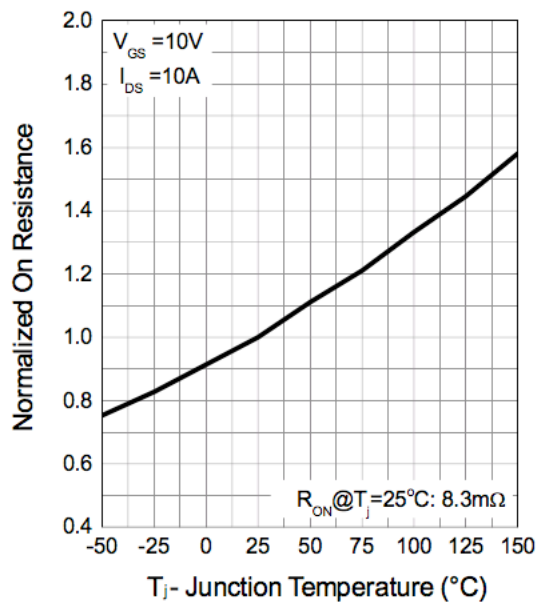
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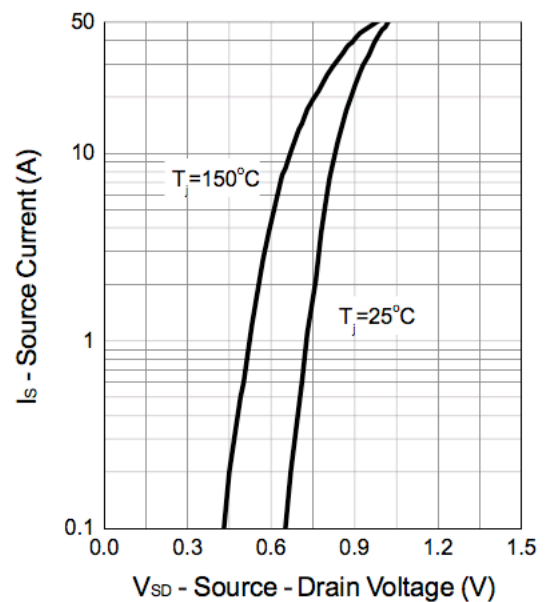
**Gate Threshold Voltage**



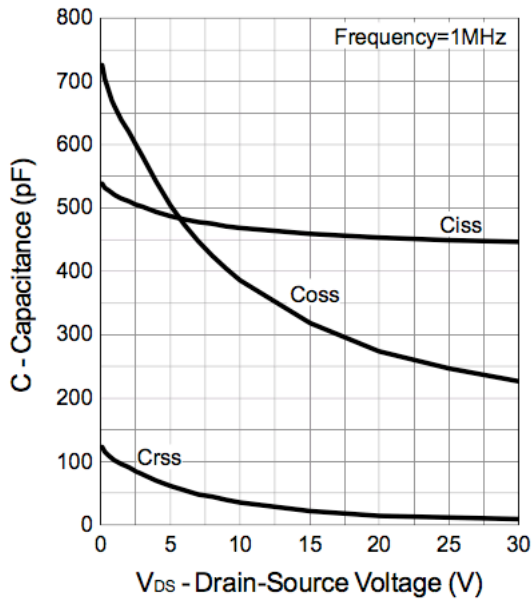
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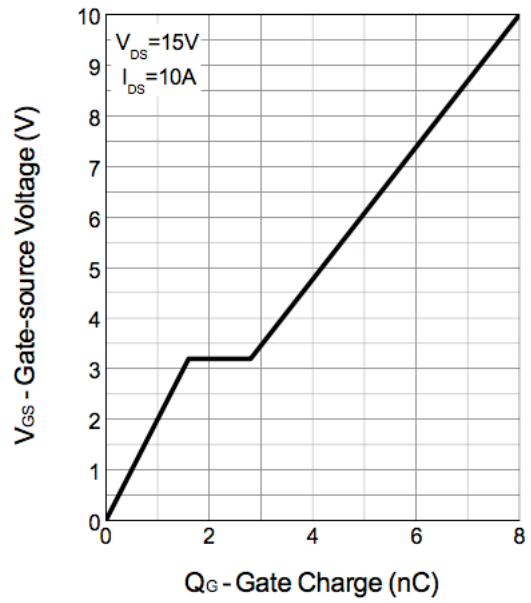
**Source-Drain Diode Forward**



**Capacitance**



**Gate Charge**





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