

Description:

This N+P Channel MOSFET uses advanced trench technology and design to provide excellent $R_{DS(on)}$ with low gate charge.

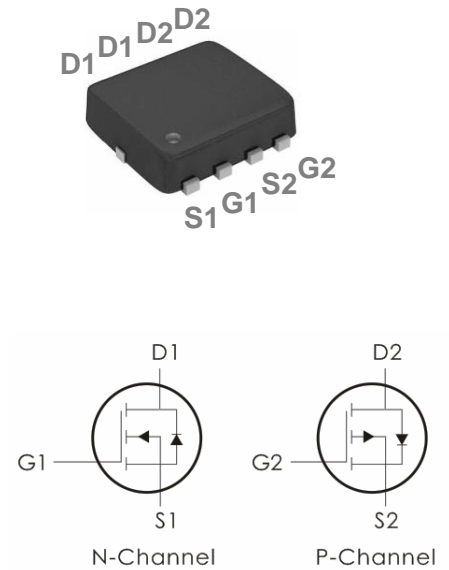
It can be used in a wide variety of applications.

Features:

N-Channel: $V_{DS}=60V, I_D=16A, R_{DS(on)}<36m\ \Omega @V_{GS}=10V$

P-Channel: $V_{DS}=-60V, I_D=-18A, R_{DS(on)}<90m\ \Omega @V_{GS}=-10V$

- 1) Low gate charge.
- 2) Green device available.
- 3) Advanced high cell density trench technology for ultra low $R_{DS(on)}$.
- 4) Excellent package for good heat dissipation.



Absolute Maximum Ratings: ($T_C=25^\circ C$ unless otherwise noted)

Symbol	Parameter	N-Channel	P-Channel	Units
V_{DS}	Drain-Source Voltage	60	-60	V
V_{GS}	Gate-Source Voltage	± 20	± 20	V
I_D	Continuous Drain Current- $T_C=25^\circ C$	15	-16	A
	Continuous Drain Current- $T_C=100^\circ C$	10	11	
	Pulsed Drain Current	68	-70	
P_D	Power Dissipation	20	20	W
T_J, T_{STG}	Operating and Storage Junction Temperature Range	-55 to +150		$^\circ C$

Thermal Characteristics:

Symbol	Parameter	Max	Units
$R_{\theta JC}$	Thermal Resistance, Junction to Case ²	7	$^\circ C/W$

Package Marking and Ordering Information:

Part NO.	Marking	Package
DON603	N603	DFN5*6-8D

N-CH Electrical Characteristics: ($T_C=25^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
Off Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\ \mu\text{A}$	60	---	---	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{GS}=0V, V_{DS}=60V$	---	---	1	μA
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$	---	---	± 100	nA
On Characteristics ^(Note 3)						
V_{GS(th)}	GATE-Source Threshold Voltage	$V_{GS}=V_{DS}, I_D=250\ \mu\text{A}$	1	1.6	3	V
R_{DS(on)}	Drain-Source On Resistance	$V_{GS}=10V, I_D=10A$	---	26	36	m Ω
		$V_{GS}=4.5V, I_D=5A$	---	36	45	
Dynamic Characteristics ^(Note 4)						
C_{iss}	Input Capacitance	$V_{DS}=25V, V_{GS}=0V, f=1\text{MHz}$	---	1100	---	pF
C_{oss}	Output Capacitance		---	52	---	
C_{rss}	Reverse Transfer Capacitance		---	45	---	
Switching Characteristics ^(Note 4)						
t_{d(on)}	Turn-On Delay Time	$V_{DD}=30V, R_{GEN}=1.8\ \Omega$ $I_D=15A, V_{GS}=10V$	---	7.6	---	ns
t_r	Rise Time		---	20	---	ns
t_{d(off)}	Turn-Off Delay Time		---	15	---	ns
t_f	Fall Time		---	24	---	ns
Q_g	Total Gate Charge	$V_{GS}=10V, V_{DS}=30V,$ $I_D=10A$	---	20.3	---	nC
Q_{gs}	Gate-Source Charge		---	3.7	---	nC
Q_{gd}	Gate-Drain "Miller" Charge		---	5.3	---	nC
Drain-Source Diode Characteristics						

V_{SD}	Drain Diode Forward Voltage	V _{GS} =0V, I _S =20A	---	---	1.2	V
I_S	Maximum Continuous Drain to Source Diode Forward Current		---	---	20	A
I_{SM}	Maximum Pulsed Drain to Source Diode Forward Current		---	---	80	A
T_{rr}	Reverse Recovery Time	I _F = 10A, di/dt = 100A/μs	---	29	---	Ns
Q_{rr}	Reverse Recovery Charge		---	43	---	nc

Typical Characteristics: (T_c=25°C unless otherwise noted)

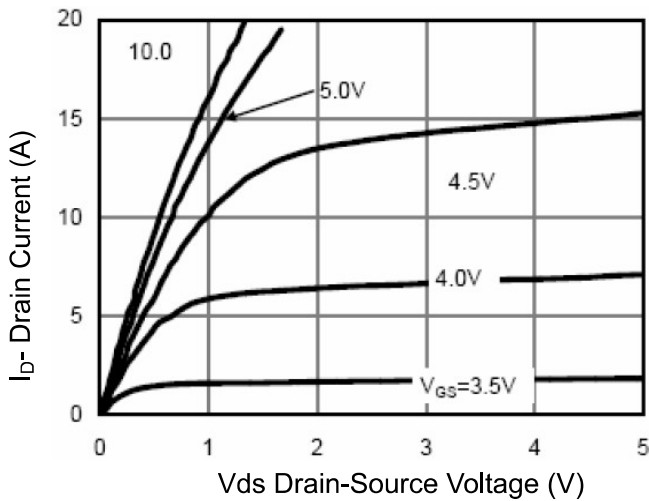


Figure 1 Output Characteristics

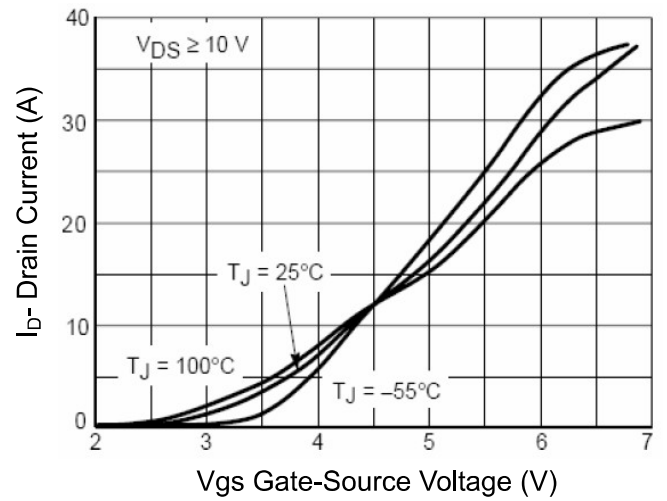


Figure 2 Transfer Characteristics

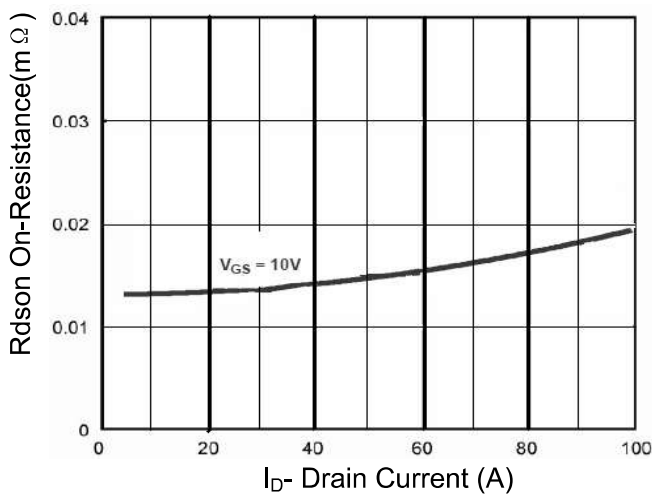


Figure 3 Rdson- Drain Current

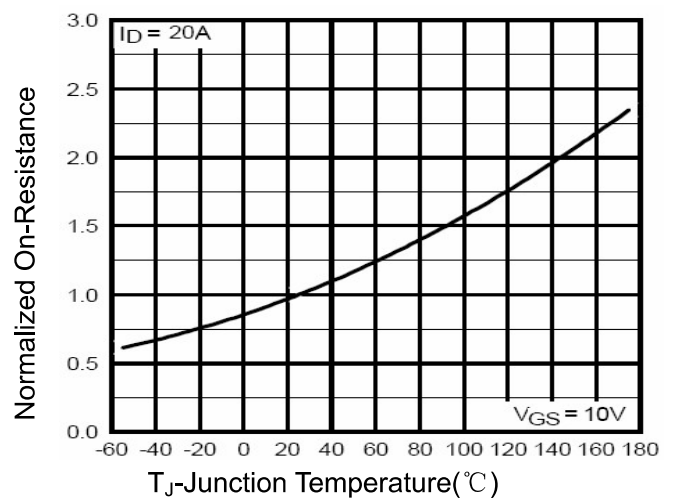


Figure 4 Rdson-Junction Temperature

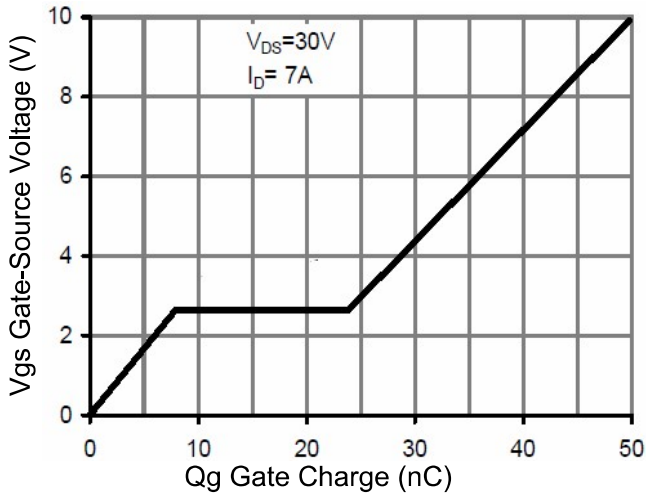


Figure 5 Gate Chare

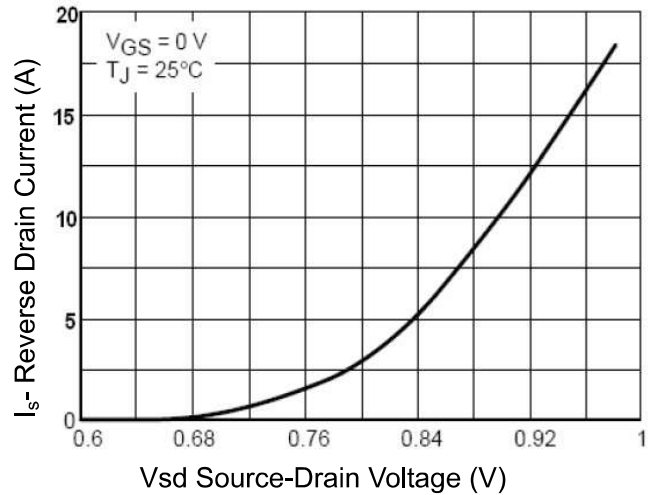


Figure 6 Source- Drain Diode Forward

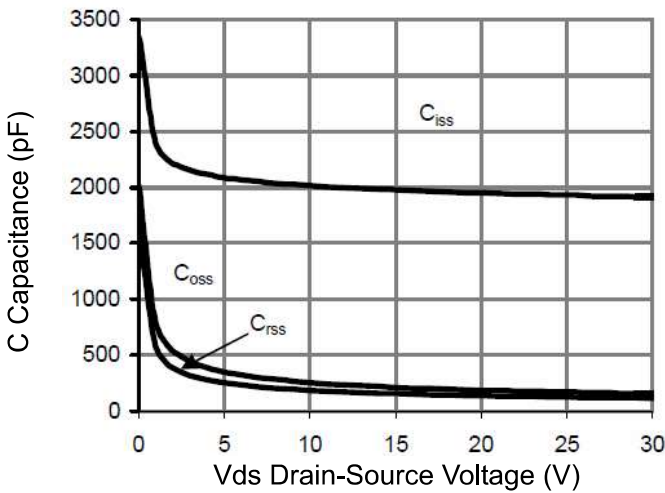


Figure 7 Capacitance vs Vds

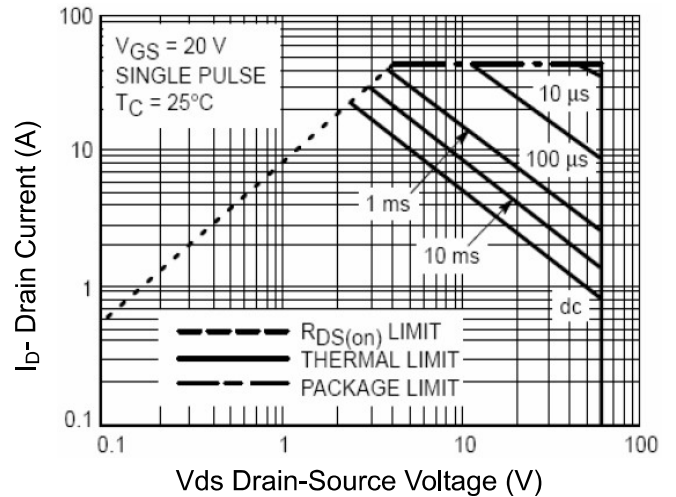


Figure 8 Safe Operation Area

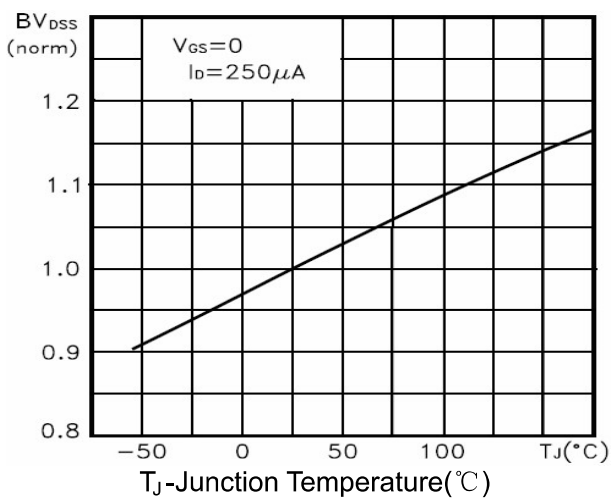


Figure 9 BV vs Junction Temperature

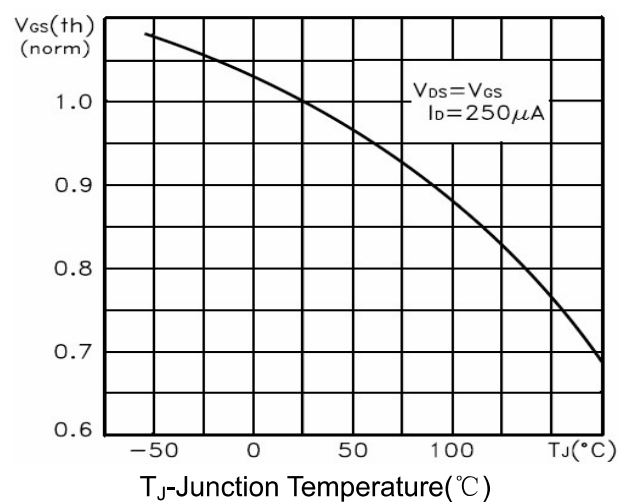


Figure 10 VGS(th) vs Junction Temperature

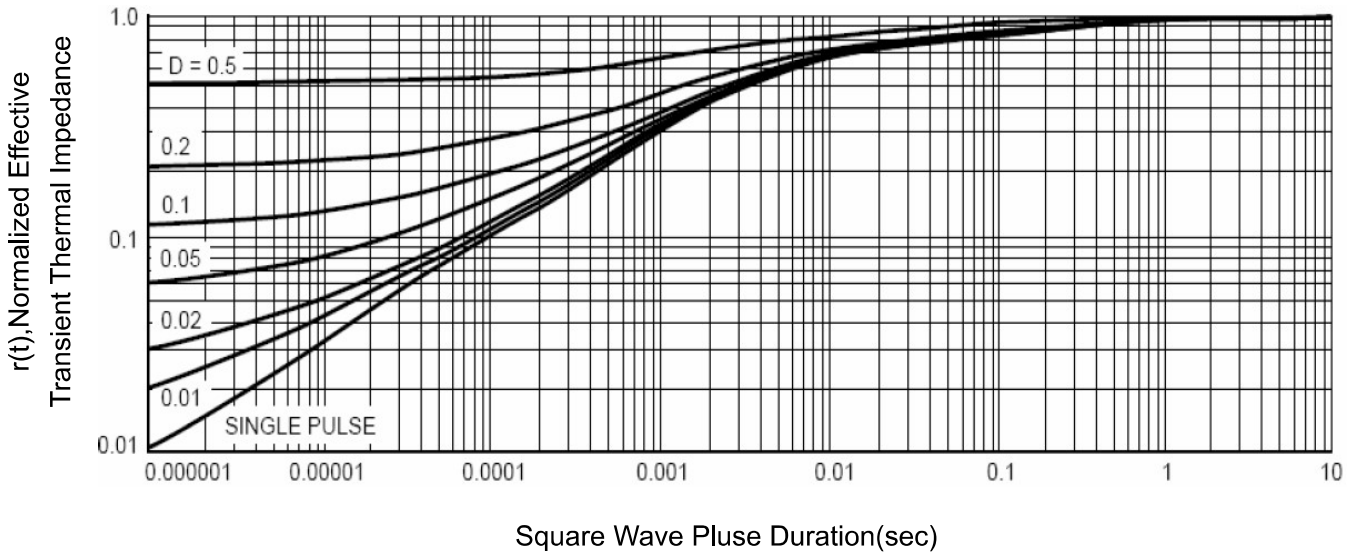


Figure 11 Normalized Maximum Transient Thermal Impedance

P-CH Electrical Characteristics: ($T_c=25^{\circ}\text{C}$ unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
Off Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\ \mu A$	-60	---	---	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{GS}=0V, V_{DS}=-60V$	---	---	-1	μA
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0A$	---	---	± 100	nA
On Characteristics³						
$V_{GS(th)}$	GATE-Source Threshold Voltage	$V_{GS}=V_{DS}, I_D=250\ \mu A$	-1	-1.5	-2.2	V
$R_{DS(ON)}$	Drain-Source On Resistance	$V_{GS}=-10V, I_D=-12A$	---	80	90	m Ω
		$V_{GS}=-4.5V, I_D=-8A$	---	95	120	
G_{FS}	Forward Transconductance	$V_{DS}=-5V, I_D=-2A$	---	10	---	S
Dynamic Characteristics⁴						
C_{iss}	Input Capacitance	$V_{DS}=-30V, V_{GS}=0V, f=1MHz$	---	1600	---	pF
C_{oss}	Output Capacitance		---	90	---	
C_{rss}	Reverse Transfer Capacitance		---	75	---	

Switching Characteristics ⁴						
$t_{d(on)}$	Turn-On Delay Tim	$V_{DS}=-30V, R_{GEN}=3\Omega, V_{GS}=-10V$	---	11	---	ns
t_r	Rise Time		---	14	---	ns
$t_{d(off)}$	Turn-Off Delay Time		---	33	---	ns
t_f	Fall Time		---	13	---	ns
Q_g	Total Gate Charge	$V_{GS}=-10V, V_{DS}=-30V, I_D=-12A$	---	37.6	---	nC
Q_{gs}	Gate-Source Charge		---	4.3	---	nC
Q_{gd}	Gate-Drain Charge		---	7.2	---	nC
Drain-Source Diode Characteristics						
V_{SD}	Drain Diode Forward Voltage ³	$V_{GS}=0V, I_S=-12A, T_J=25^\circ C$	---	---	-1.2	V
I_S	Continuous Source Current ²	---	---	---	-12	A
T_{rr}	Reverse Recovery Time	$T_J=25^\circ C, I_F=-12A$	---	-35	---	ns
Q_{rr}	Reverse Recovery Charge	$di/dt = -100A/\mu s^{(Note3)}$	---	-38	---	nC

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, $t \leq 10$ sec.
3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.
4. Guaranteed by design, not subject to production
5. E_{AS} condition: $T_J=25^\circ C, V_{DD}=-20V, V_G=-10V, L=1mH, R_g=25\Omega$

Typical Characteristics: ($T_C=25^\circ C$ unless otherwise noted)

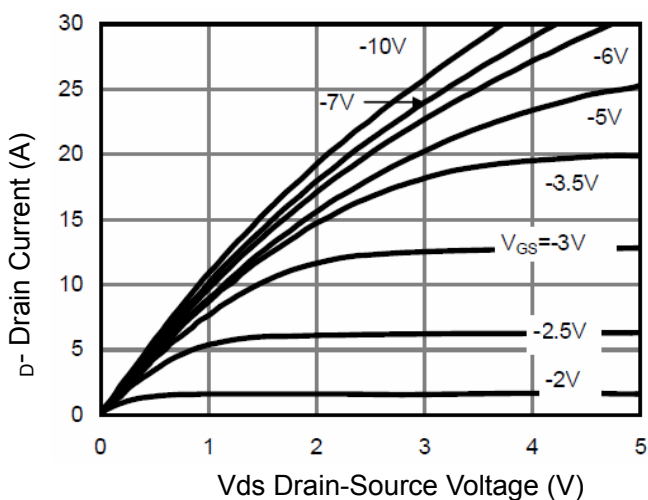


Figure 1 Output Characteristics

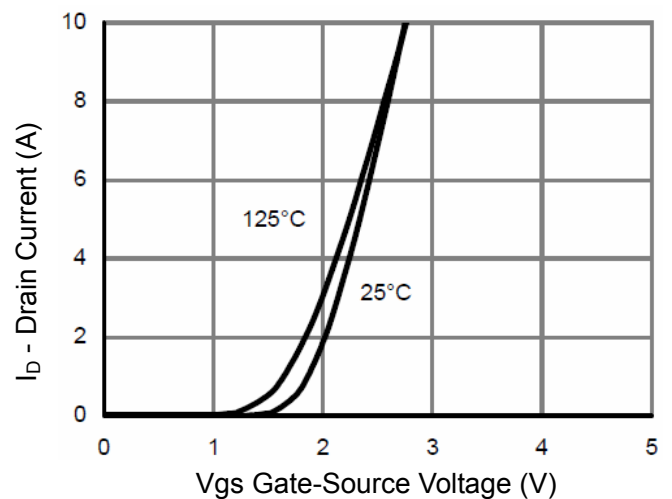


Figure 2 Transfer Characteristics

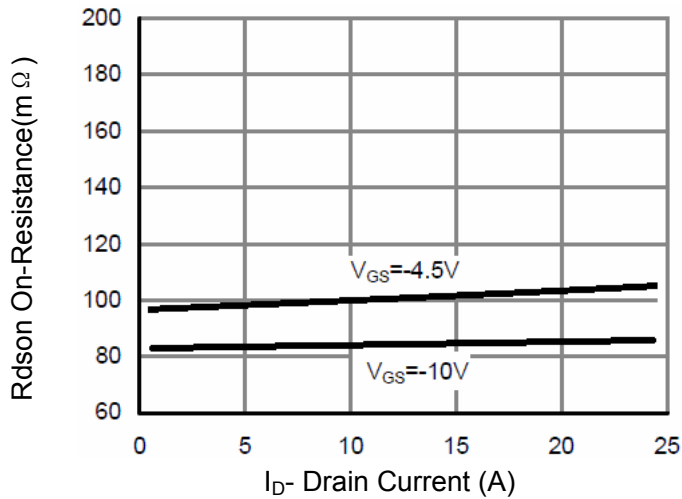


Figure 3 Rdson- Drain Current

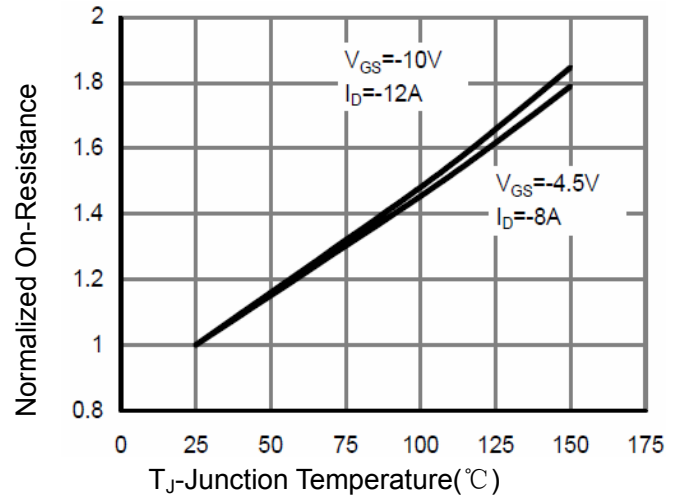


Figure 4 Rdson-Junction Temperature

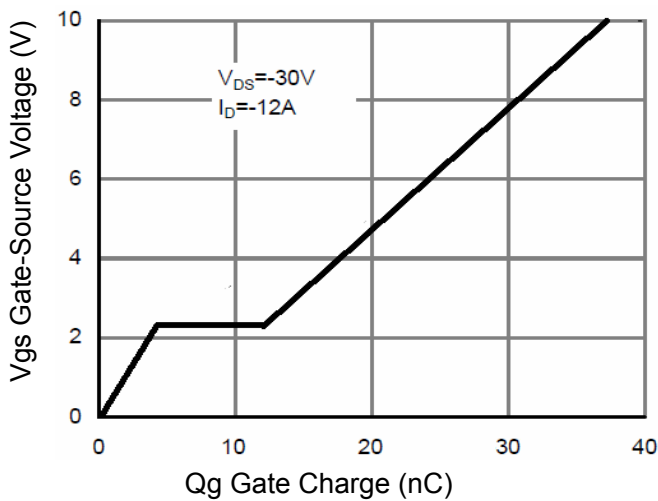


Figure 5 Gate Charge

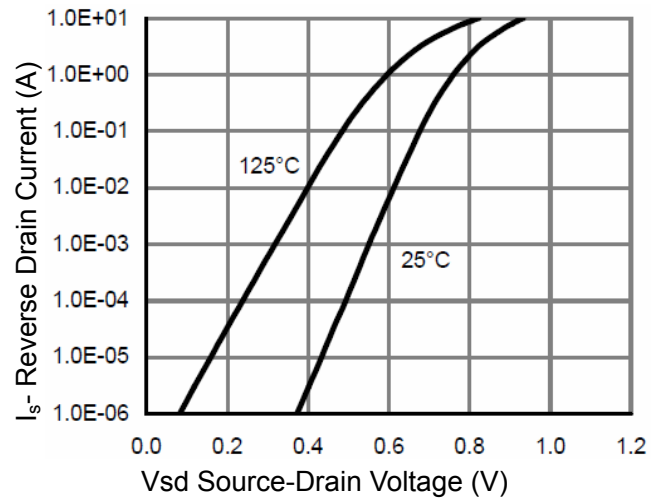


Figure 6 Source- Drain Diode Forward

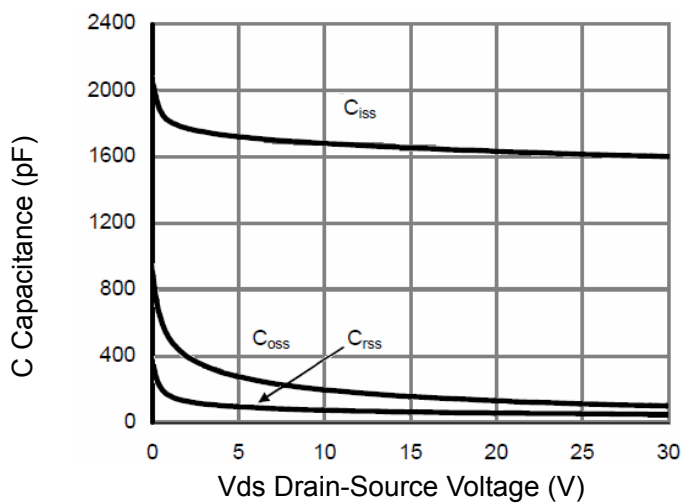


Figure 7 Capacitance vs Vds

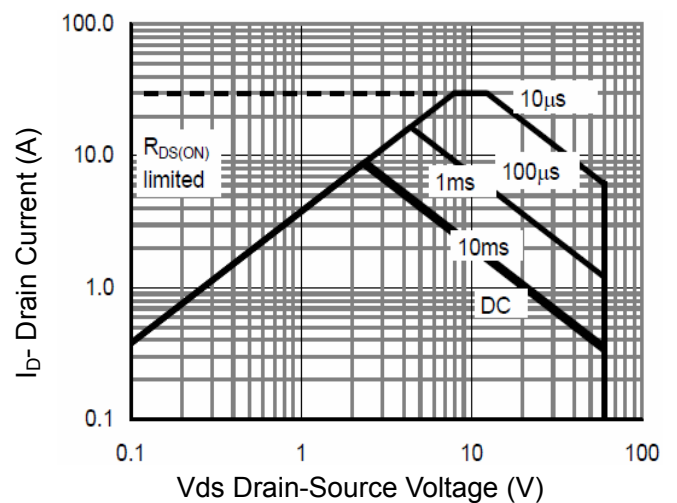


Figure 8 Safe Operation Area

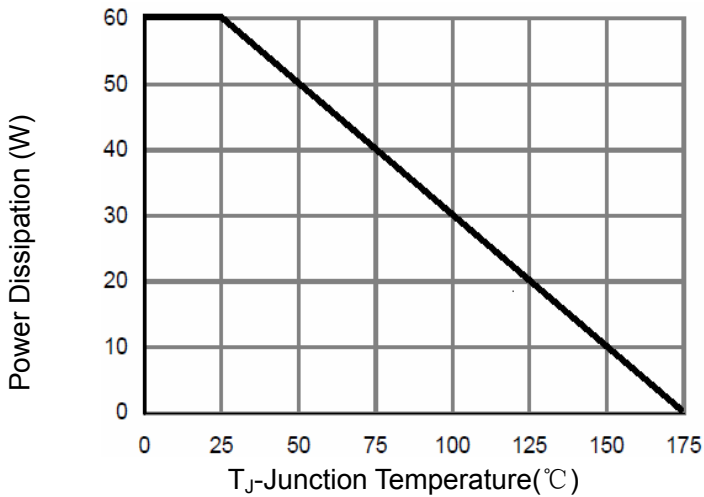


Figure 9 Power De-rating

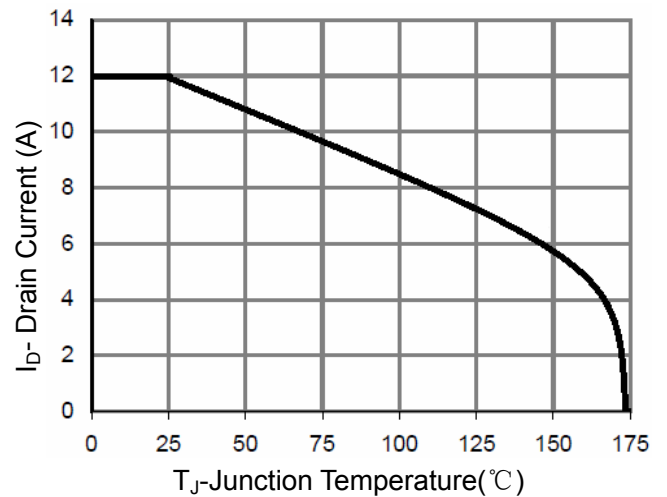


Figure 10 ID Current De-rating

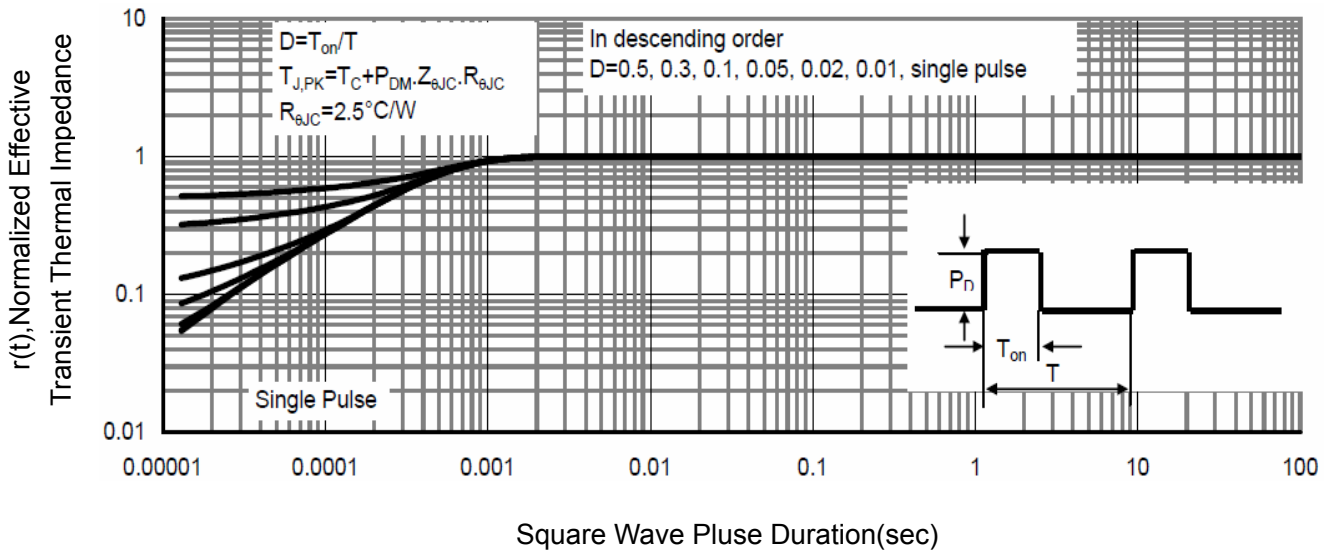


Figure 11 Normalized Maximum Transient Thermal Impedance