



GL8NP04V-D8

GL Silicon N+P Channel Power MOSFET

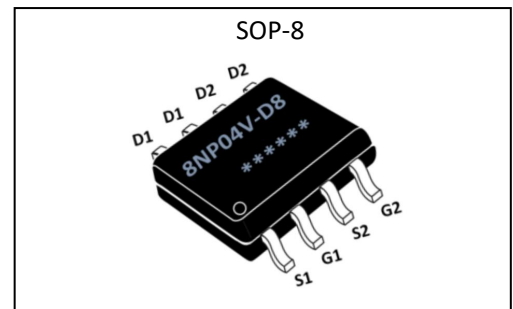
General Description

The GL8NP04V-D8 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. The package form is SOP-8, which accords with the RoHS standard.

	N-Channel	P-Channel	Units
V_{DSS}	40	-40	V
I_D	8	-8	A
P_D	2	2	W
$R_{DS(ON)type}$	14	26	m Ω

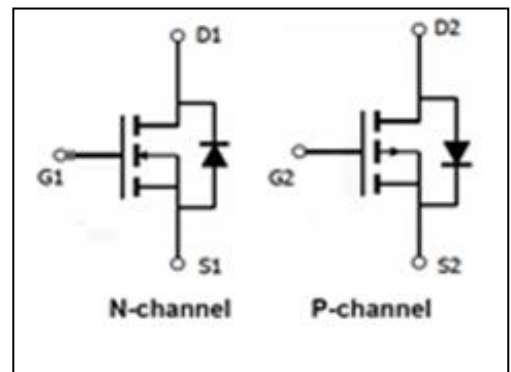
Features

- N-Channel:
 $R_{DS(ON)} < 18m\Omega @ V_{GS}=10V$ (Typ14m Ω)
- P-Channel:
 $R_{DS(ON)} < 33m\Omega @ V_{GS}=10V$ (Typ26m Ω)
- High density cell design for ultra low R_{dson}
- Fully characterized avalanche voltage and current
- Excellent package for good heat dissipation



Applications

- Power switching application
- Hard switched and high frequency circuits
- Uninterruptible power supply



Absolute (Tc= 25°C unless otherwise specified)

Symbol	Parameter	N-Channel	P-Channel	Units
V_{DSS}	Drain-to-Source Voltage	40	-40	V
I_D	Continuous Drain Current	8	-8	A
I_{DM}	Pulsed Drain Current	40	-40	A
V_{GS}	Gate-to-Source Voltage	± 20	± 20	V
P_D	Power Dissipation	2	2	W
T_J, T_{stg}	Operating Junction and Storage Temperature Range	-55 to 150	-55 to 150	°C



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N-CH Electrical Characteristics (Tc= 25°C unless otherwise specified)

OFF Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
V _{DSS}	Drain to Source Breakdown Voltage	V _{GS} =0V, I _D =250μA	40	--	--	V
I _{DSS}	Drain to Source Leakage Current	V _{DS} =40V, V _{GS} = 0V, T _a =25°C	--	--	1.0	μA
I _{GSS(F)}	Gate to Source Forward Leakage	V _{GS} = +10V	--	--	0.1	μA
I _{GSS(R)}	Gate to Source Reverse Leakage	V _{GS} = -10V	--	--	-0.1	μA

ON Characteristics ^{a3}						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
R _{DS(ON)}	Drain-to-Source On-Resistance	V _{GS} =10V, I _D =8A	--	14	18	mΩ
V _{GS(TH)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =250μA	1.0	1.5	2.0	V
Pulse width tp≤380μs, δ≤2%						

Dynamic Characteristics ^{a4}						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
g _{fs}	Forward Transconductance	V _{DS} =5V, I _D =8A	30	--	--	S
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =20V f=1.0MHz	--	415	--	pF
C _{oss}	Output Capacitance		--	115	--	
C _{rss}	Reverse Transfer Capacitance		--	11	--	

Resistive Switching Characteristics ^{a4}						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
t _{d(ON)}	Turn-on Delay Time	V _{DD} =15V, R _L =2.5Ω V _{GS} =10V, R _G =3Ω	--	4.5	--	ns
t _r	Rise Time		--	3.0	--	
t _{d(OFF)}	Turn-Off Delay Time		--	14.5	--	
t _f	Fall Time		--	3.0	--	
Q _g	Total Gate Charge	V _{DD} =20V, I _D =8A V _{GS} =10V	--	12	--	nC
Q _{gs}	Gate to Source Charge		--	3.2	--	
Q _{gd}	Gate to Drain ("Miller")Charge		--	3.1	--	

Source-Drain Diode Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
I _S	Continuous Source Current ^{a2} (Body Diode)		--	--	6	A
V _{SD}	Diode Forward Voltage ^{a3}	I _S =6A, V _{GS} =0V	--	--	1.2	V



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P-CH Electrical Characteristics (Tc= 25°C unless otherwise specified)

OFF Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
V_{DSS}	Drain to Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	-40	--	--	V
I_{DSS}	Drain to Source Leakage Current	$V_{DS}=-40V, V_{GS}=0V, T_a=25^\circ C$	--	--	-1.0	μA
$I_{GSS(F)}$	Gate to Source Forward Leakage	$V_{GS}=+10V$	--	--	-0.1	μA
$I_{GSS(R)}$	Gate to Source Reverse Leakage	$V_{GS}=-10V$	--	--	0.1	μA

ON Characteristics ^{a3}						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
$R_{DS(ON)}$	Drain-to-Source On-Resistance	$V_{GS}=-10V, I_D=-5A$	--	26	36	m Ω
$V_{GS(TH)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=-250\mu A$	-1.0	-1.5	-2.0	V
Pulse width $t_p \leq 380\mu s, \delta \leq 2\%$						

Dynamic Characteristics ^{a4}						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
g_{fs}	Forward Transconductance	$V_{DS}=-5V, I_D=-5A$	10	--	--	S
C_{iss}	Input Capacitance	$V_{GS}=0V, V_{DS}=-20V$ $f=1.0MHz$	--	940	--	pF
C_{oss}	Output Capacitance		--	97	--	
C_{rss}	Reverse Transfer Capacitance		--	72	--	

Resistive Switching Characteristics ^{a4}						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
$t_{d(ON)}$	Turn-on Delay Time	$V_{DD}=-20V, R_L=2.3\Omega$ $V_{GS}=-10V, R_G=6\Omega$	--	6.2	--	ns
t_r	Rise Time		--	8.4	--	
$t_{d(OFF)}$	Turn-Off Delay Time		--	44.8	--	
t_f	Fall Time		--	16	--	
Q_g	Total Gate Charge	$V_{DD}=-20V, I_D=-5A$ $V_{GS}=-10V$	--	17	--	nC
Q_{gs}	Gate to Source Charge		--	3.4	--	
Q_{gd}	Gate to Drain ("Miller") Charge		--	3.2	--	

Source-Drain Diode Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
I_S	Continuous Source Current ^{a2} (Body Diode)		--	--	-6	A
V_{SD}	Diode Forward Voltage ^{a3}	$I_S=-6A, V_{GS}=0V$	--	--	-1.2	V

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Thermal Characteristics

Symbol	Parameter	Typ.	Units
$R_{\theta JA}$	Junction-to-Case ^{a2} ,N-Ch	62.5	°C/W
$R_{\theta JA}$	Junction-to-Case ^{a2} ,P-Ch	62.5	°C/W

^{a1}: Repetitive Rating: Pulse width limited by maximum junction temperature.

^{a2}: Surface Mounted on FR4 Board, $t \leq 10\text{sec}$.

^{a3}: Pulse Test: Pulse Width $\leq 300\mu\text{s}$, Duty Cycle $\leq 2\%$.

^{a4}: Guaranteed by design, not subject to production

N-Channel Characteristics Curves

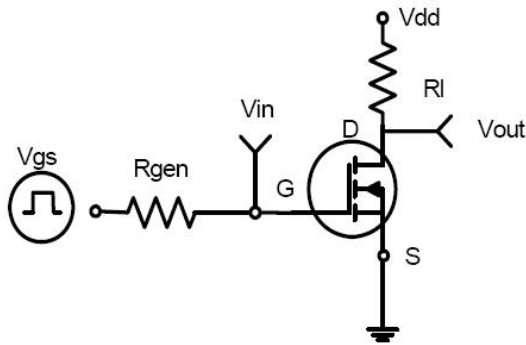


Figure 1: Switching Test Circuit

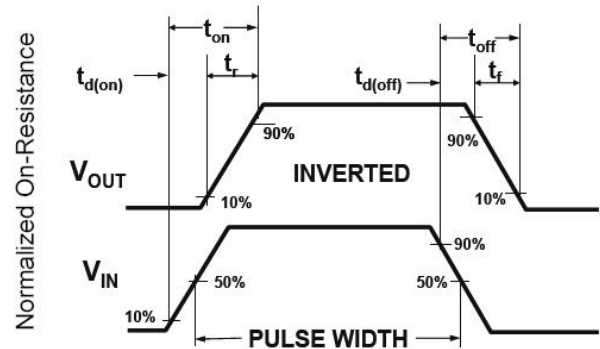


Figure 2: Switching Waveforms

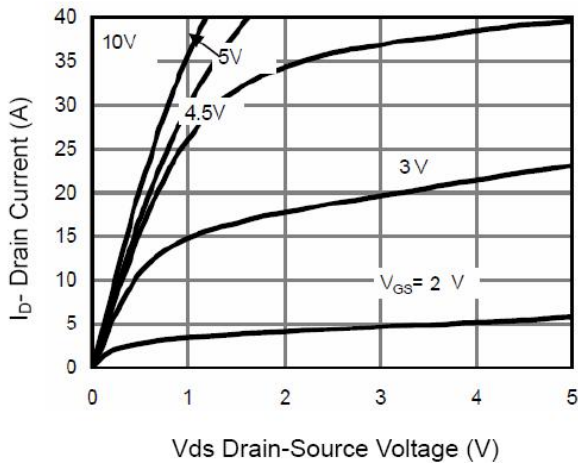


Figure 3 Output Characteristics

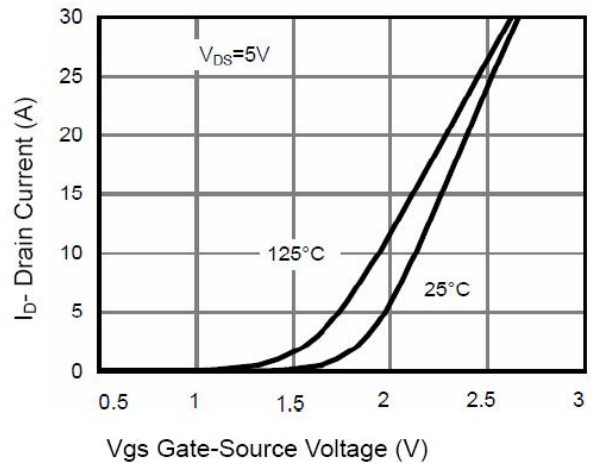


Figure 4 Transfer Characteristics

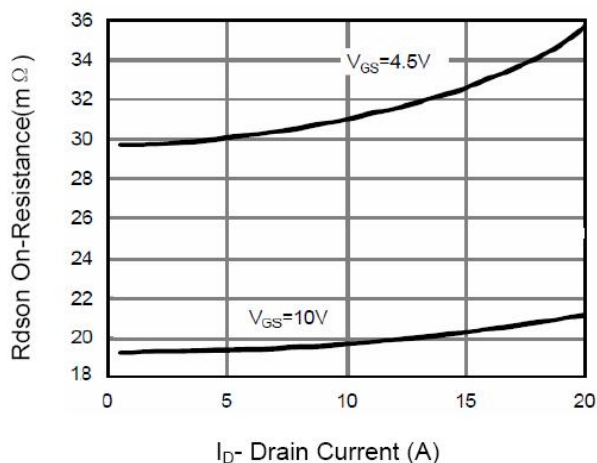


Figure 5 Drain-Source On-Resistance

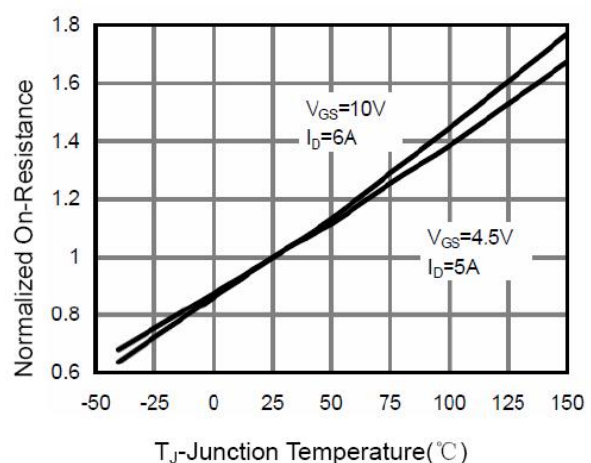
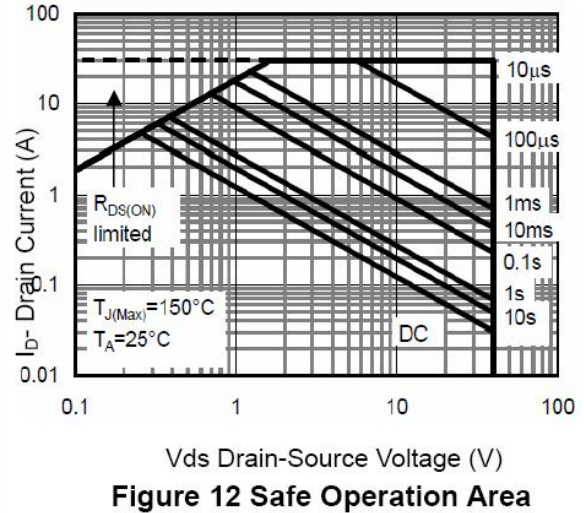
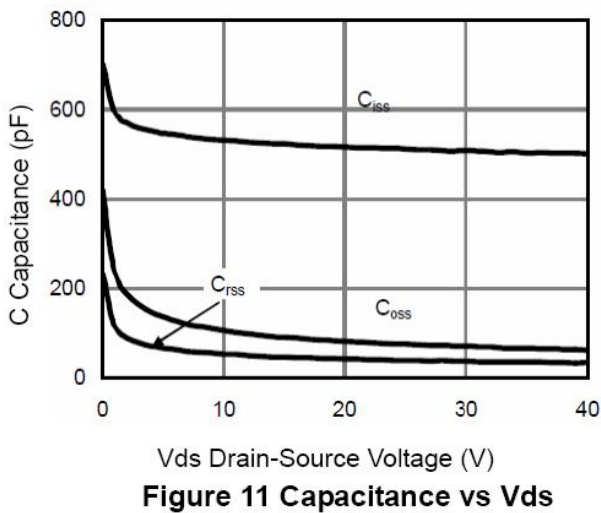
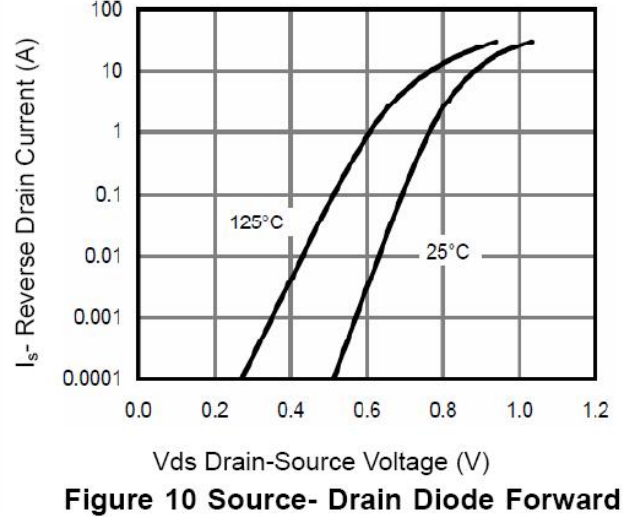
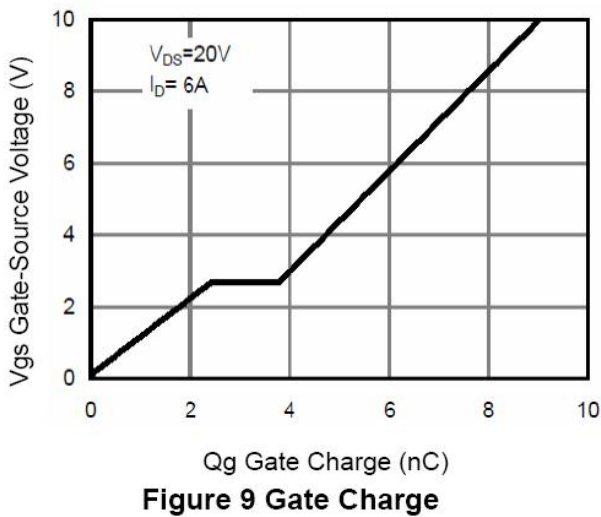
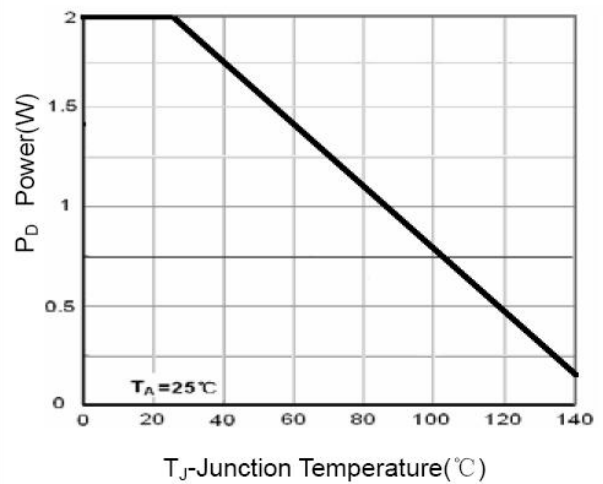
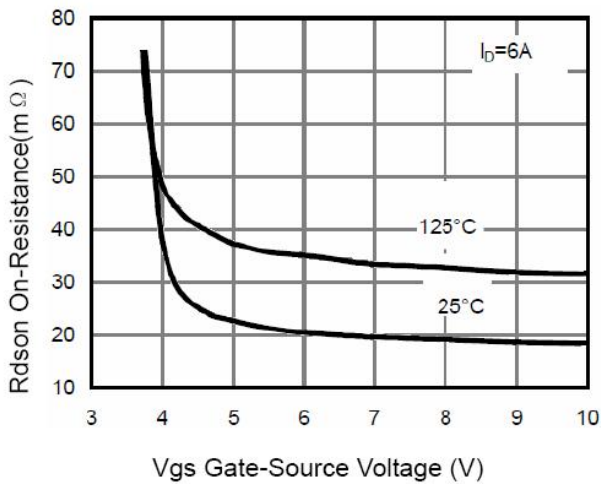


Figure 6 Drain-Source On-Resistance



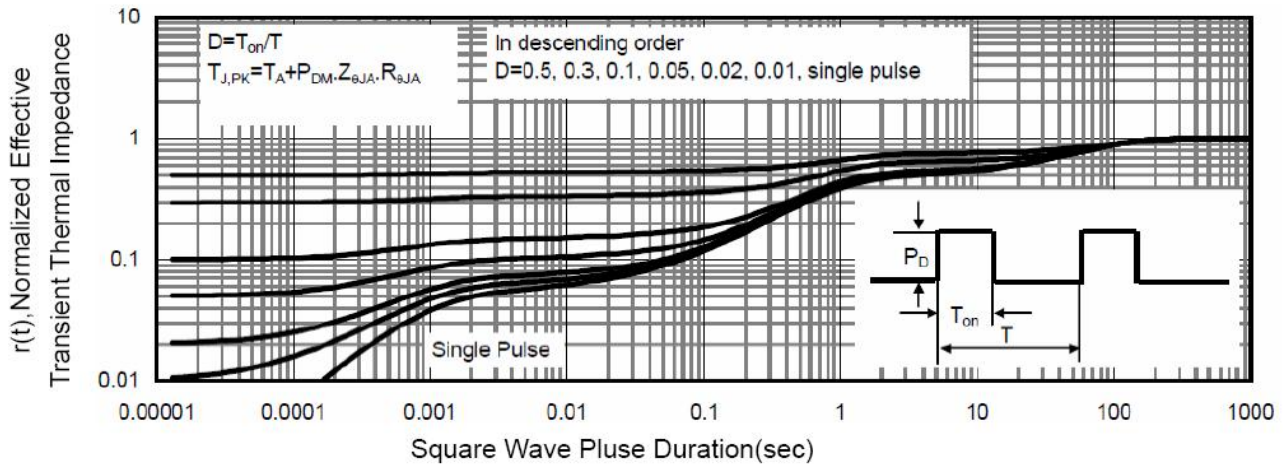


Figure 13 Normalized Maximum Transient Thermal Impedance

P-Channel Characteristics Curves

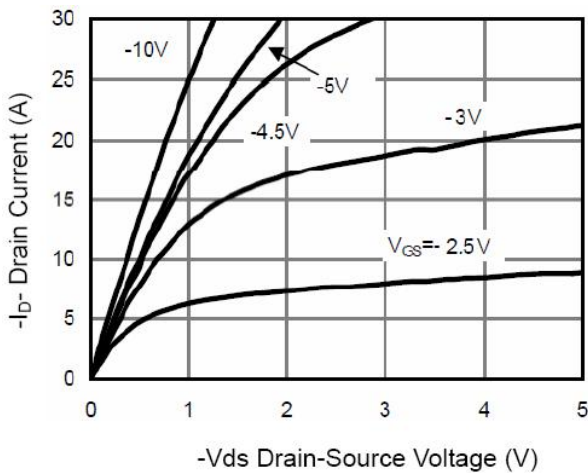


Figure 1 Output Characteristics

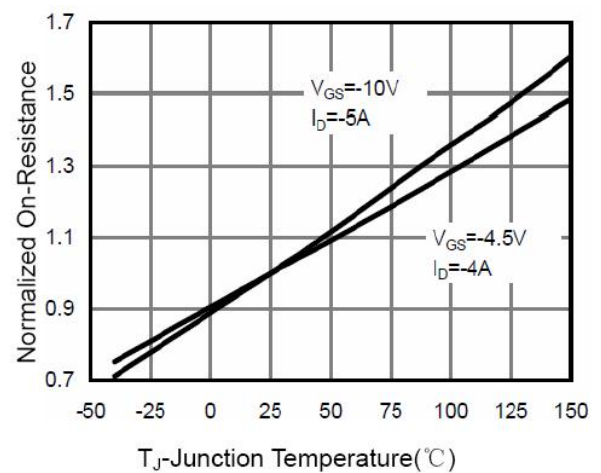


Figure 4 Rdson-Junction Temperature

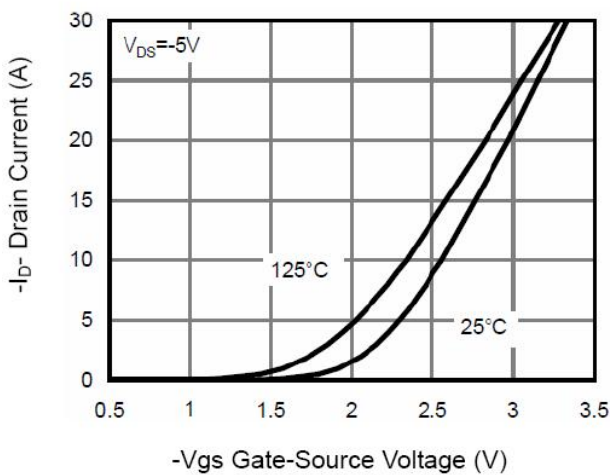


Figure 2 Transfer Characteristics

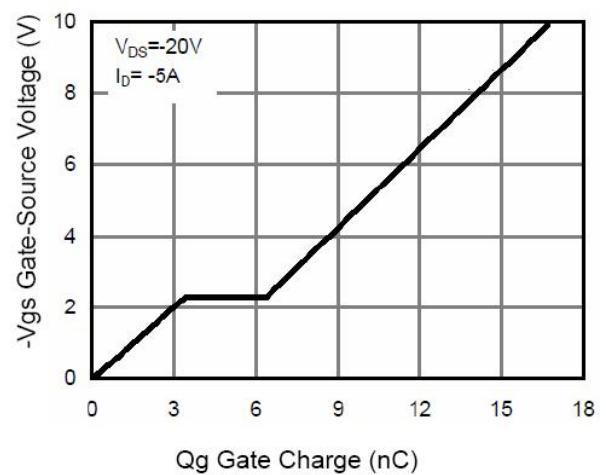


Figure 5 Gate Charge

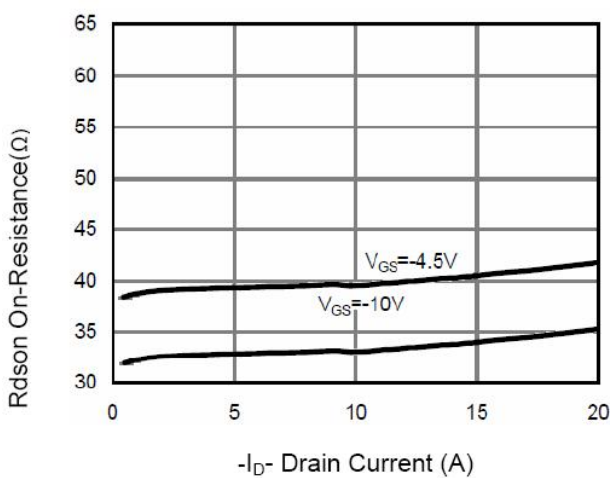


Figure 3 Rdson- Drain Current

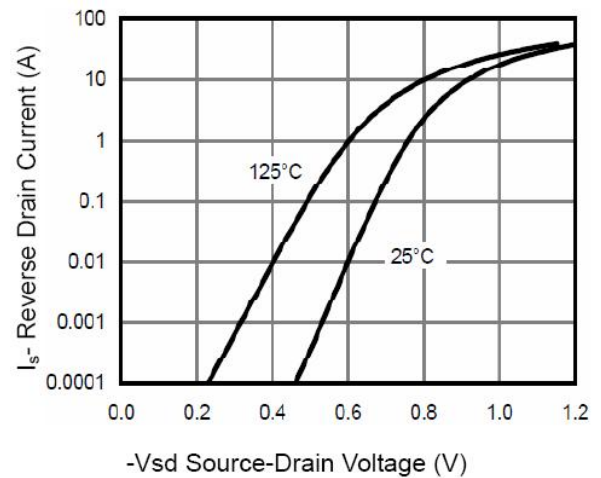


Figure 6 Source- Drain Diode Forward



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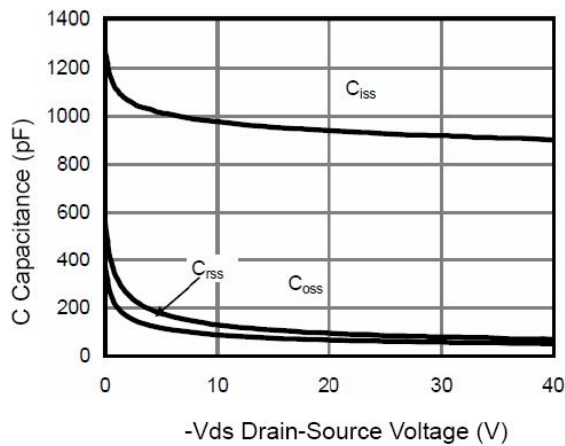


Figure 7 Capacitance vs Vds

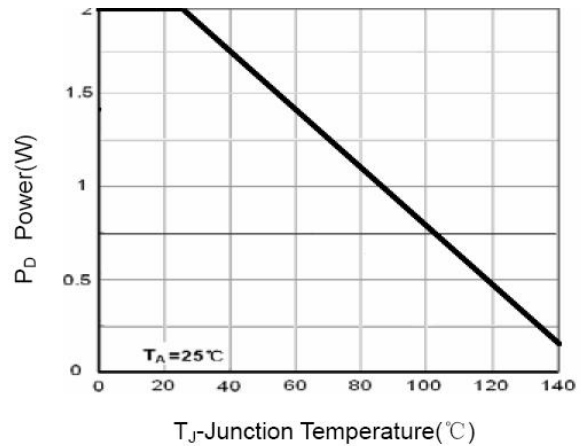


Figure 9 Power Dissipation

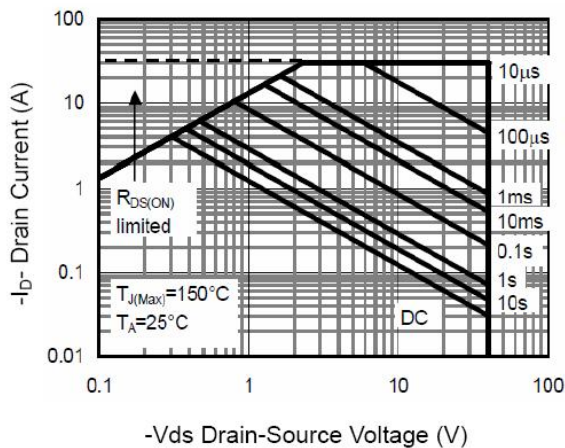


Figure 8 Safe Operation Area

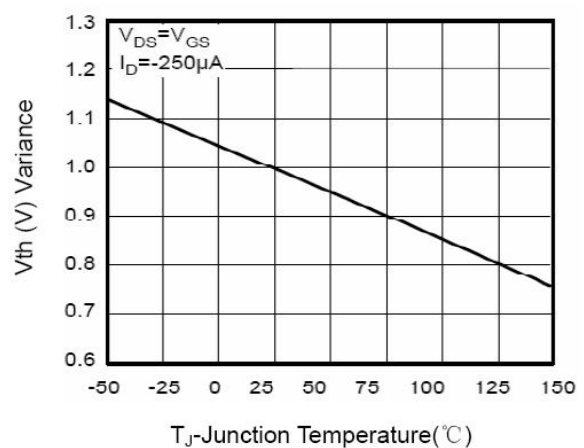


Figure 10 $V_{GS(th)}$ vs Junction Temperature

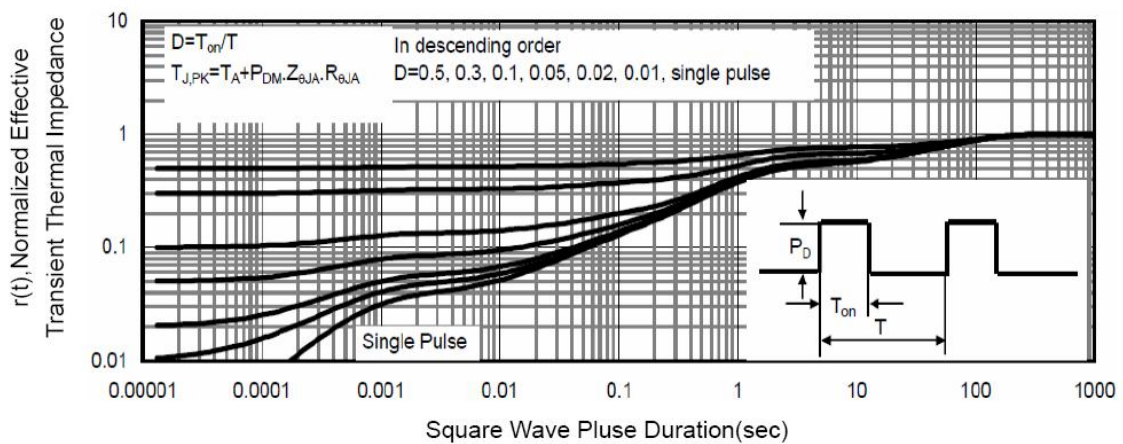


Figure 11 Normalized Maximum Transient Thermal Impedance

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