

GL Silicon P-Channel Power MOSFET

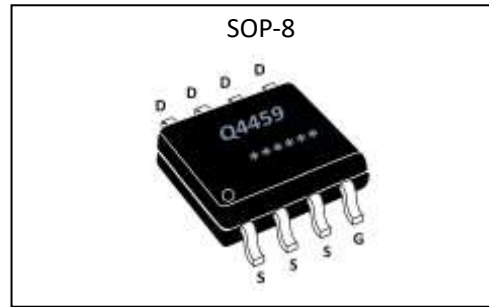
General Description:

The Q4459 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.

V_{DSS}	-30	V
I_D	-9.1	A
P_D	3.1	W
$R_{DS(ON)type}$	25	m Ω

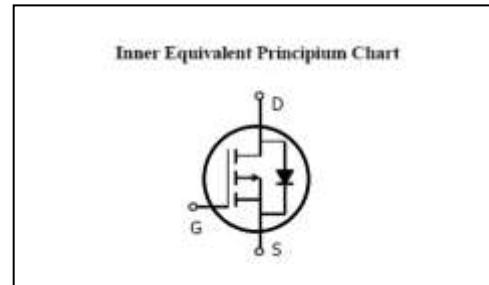
Features:

- $R_{DS(ON)} < 35m\Omega @ V_{GS}=10V$ (Typ25m 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	Rating	Units
V_{DSS}	Drain-to-Source Voltage	-30	V
I_D	Continuous Drain Current	-9	A
I_{DM}	Pulsed Drain Current	-45	A
V_{GS}	Gate-to-Source Voltage	± 20	V
P_D	Power Dissipation	3.1	W
T_J, T_{stg}	Operating Junction and Storage Temperature Range	155, -55 to 155	$^{\circ}C$



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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	-30	--	--	V
I _{DSS}	Drain to Source Leakage Current	V _{DS} =-30V, V _{GS} = 0V, T _a =25°C	--	--	-1.0	μA
I _{GSS(F)}	Gate to Source Forward Leakage	V _{GS} = +20V	--	--	0.1	μA
I _{GSS(R)}	Gate to Source Reverse Leakage	V _{GS} = -20V	--	--	-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 =-6.5A	--	25	35	mΩ
		V _{GS} =-4.5V, I _D =-5.0A		35	50	mΩ
V _{GS(TH)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =-250μA	-1.0	--	-3.0	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} =-15V, I _D =-6.5A	10	--	--	S
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =-15V f=1.0MHz	--	1600	--	pF
C _{oss}	Output Capacitance		--	350	--	
C _{rss}	Reverse Transfer Capacitance		--	300	--	

Resistive Switching Characteristics ^{a4}						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
t _{d(ON)}	Turn-on Delay Time	V _{DD} =-15V, I _D =-1A V _{GS} =-10V, R _G =6Ω	--	10	--	ns
t _r	Rise Time		--	15	--	
t _{d(OFF)}	Turn-Off Delay Time		--	110	--	
t _f	Fall Time		--	70	--	
Q _g	Total Gate Charge	V _{DD} =-15V, I _D =-9.1A V _{GS} =-10V	--	30	--	nC
Q _{gs}	Gate to Source Charge		--	5.5	--	
Q _{gd}	Gate to Drain ("Miller")Charge		--	8	--	



Q4459

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Source-Drain Diode Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
I_S	Continuous Source Current ^{a2} (Body Diode)		--	--	-9.1	A
V_{SD}	Diode Forward Voltage ^{a3}	$I_S = -2.1A, V_{GS} = 0V$	--	--	-1.2	V

Symbol	Parameter	Typ.	Units
$R_{\theta JC}$	Junction-to-Case ^{a2}	40	°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

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Test circuit & Thermal Characteristics

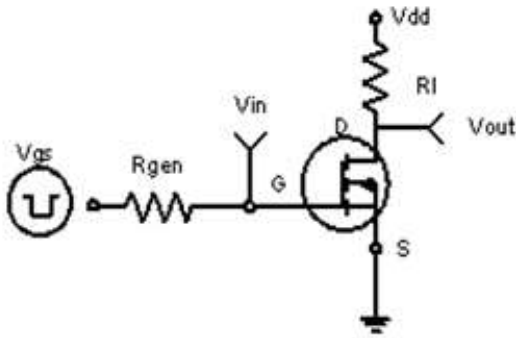


Figure 1: Switching Test Circuit

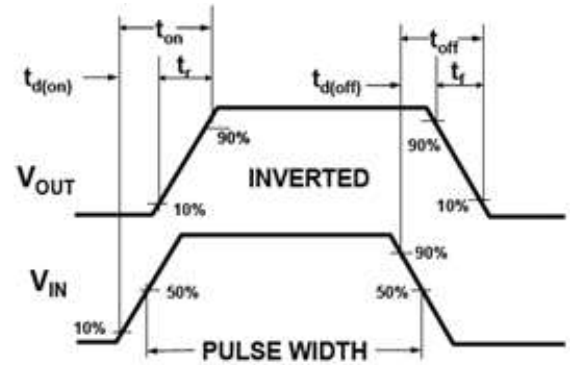


Figure 2: Switching Waveforms

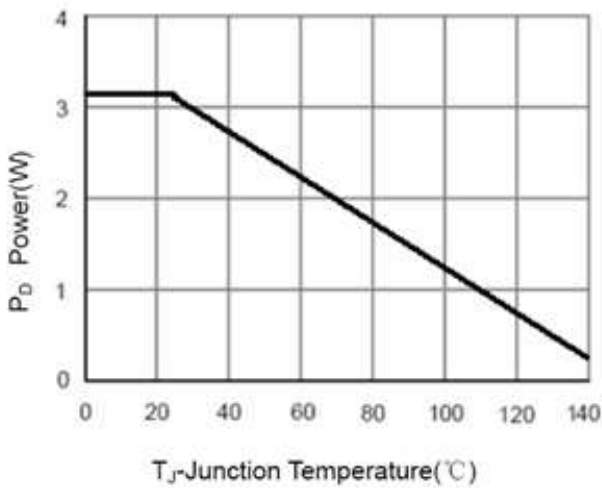


Figure 3 Power Dissipation

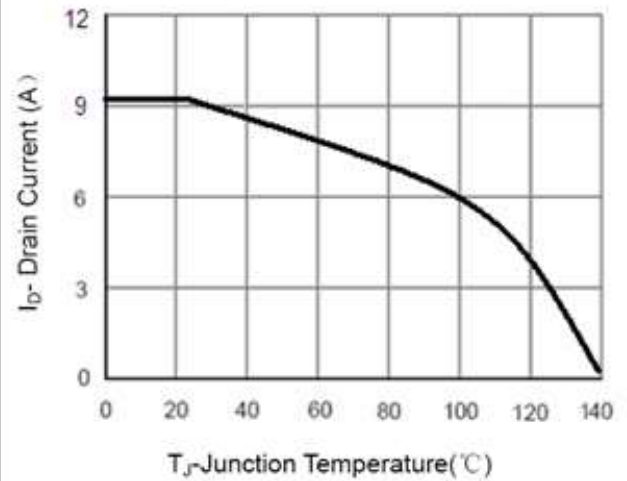


Figure 4 Drain Current

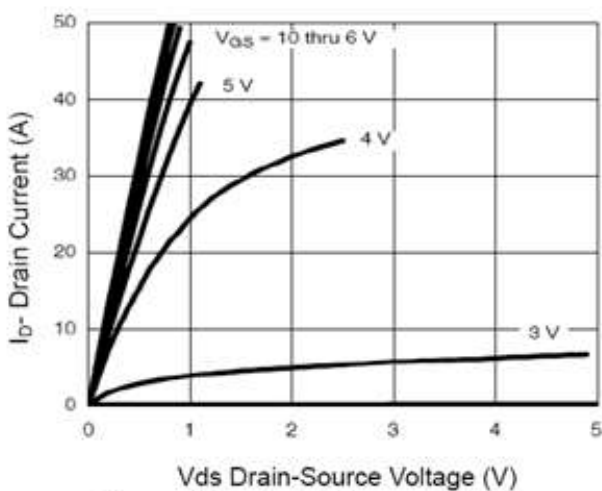


Figure 5 Output Characteristics

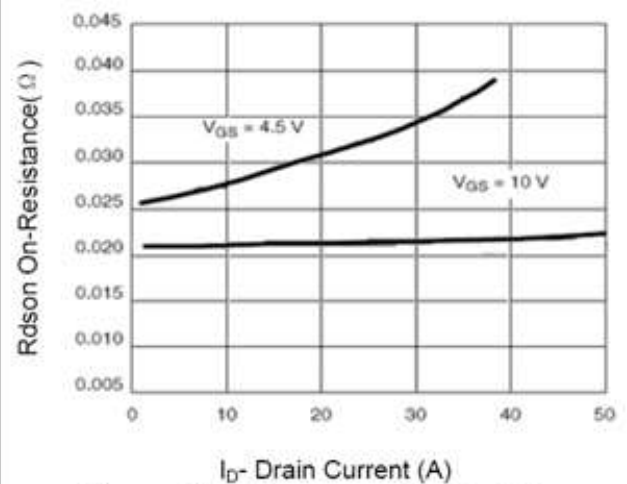


Figure 6 Drain-Source On-Resistance

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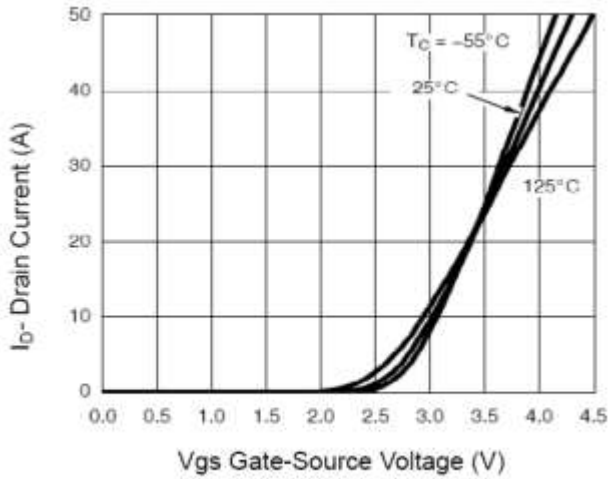


Figure 7 Transfer Characteristics

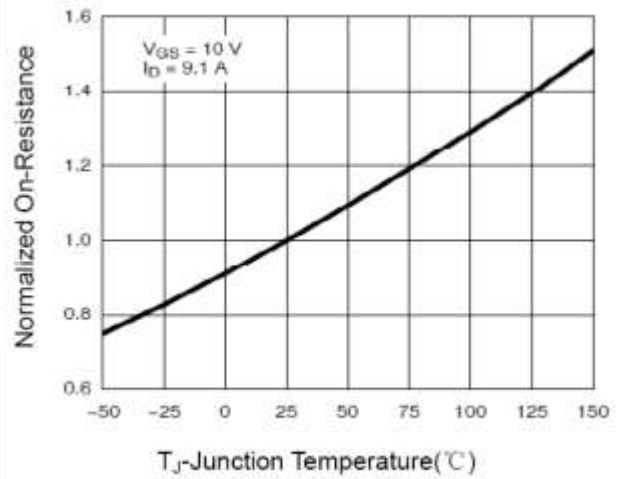


Figure 8 Drain-Source On-Resistance

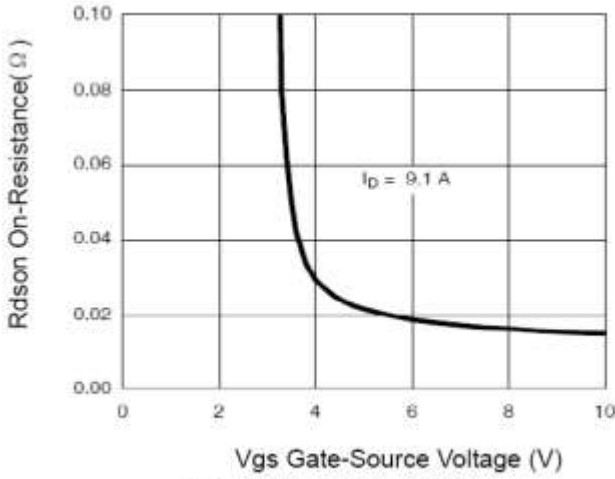


Figure 9 R_{dson} vs V_{GS}

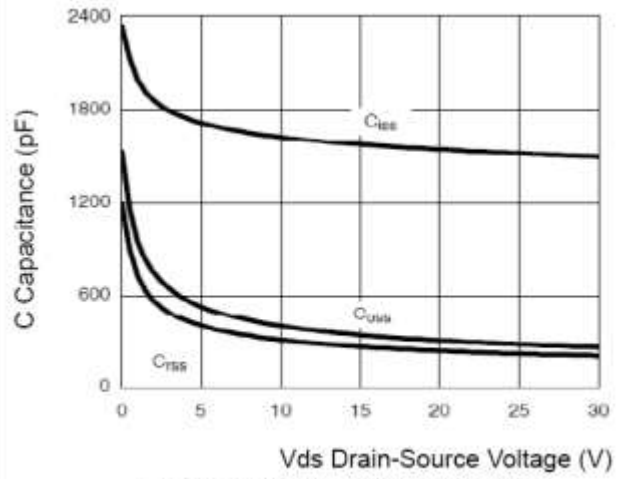


Figure 10 Capacitance vs V_{DS}

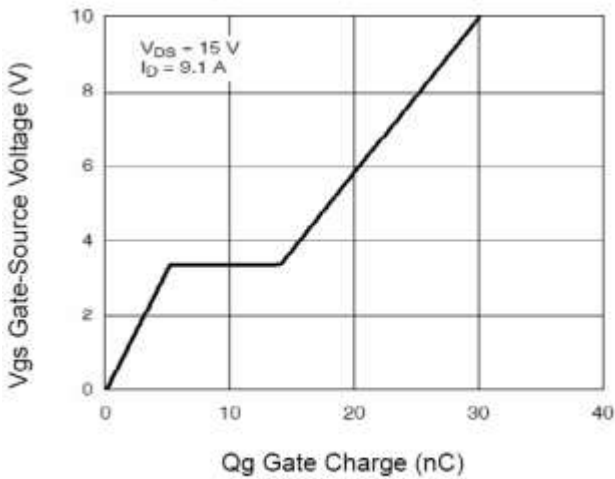


Figure 11 Gate Charge

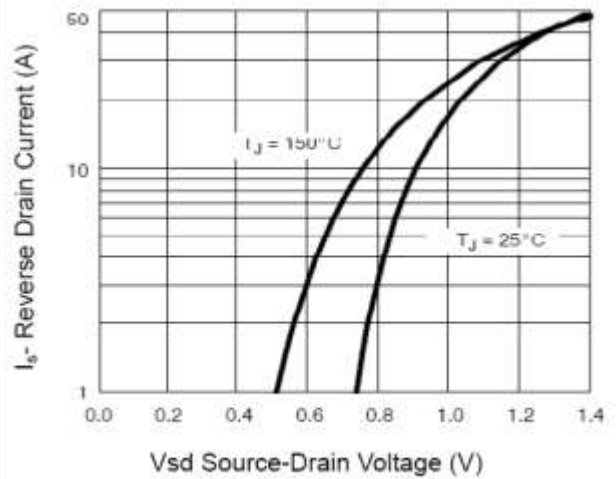


Figure 12 Source- Drain Diode Forward

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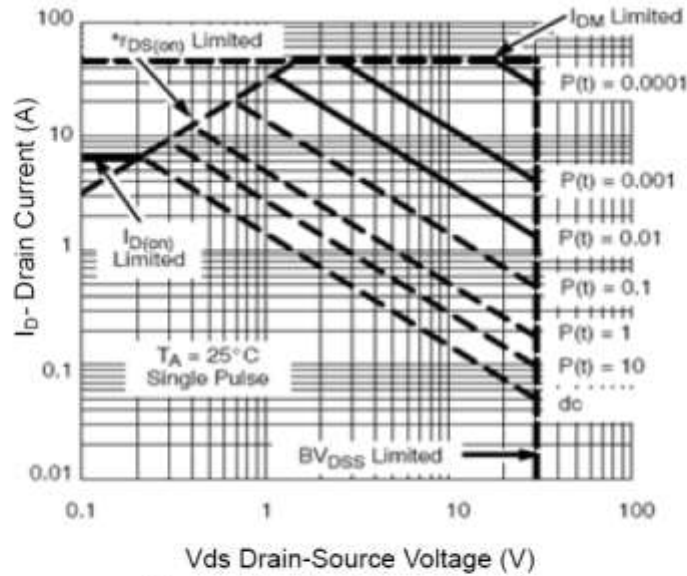


Figure 13 Safe Operation Area

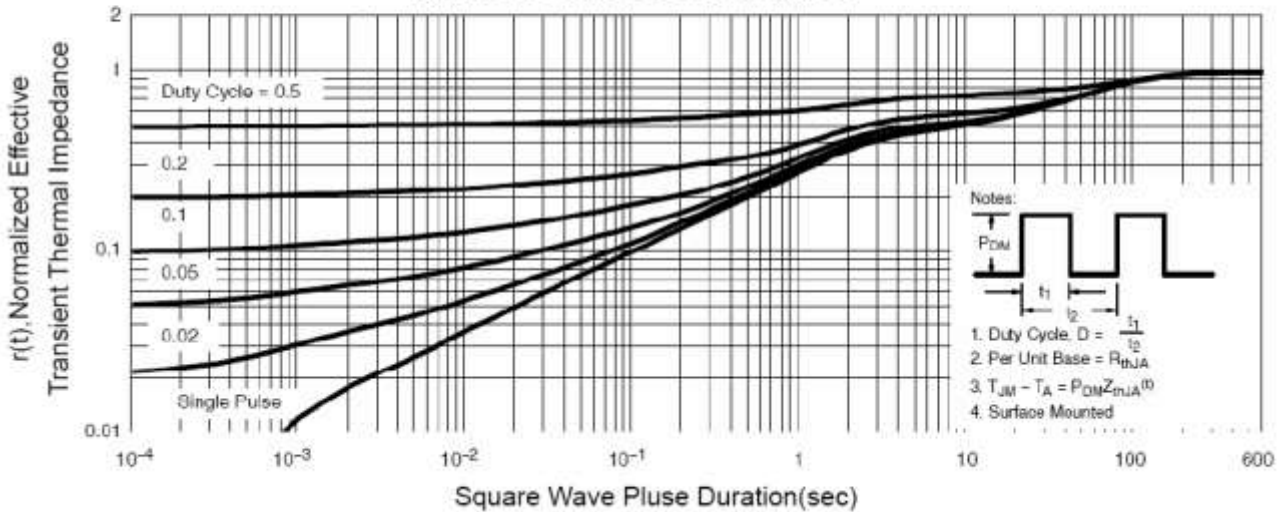


Figure 14 Normalized Maximum Transient Thermal Impedance

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