FQD 60N07

60V N-Channel MOSFET

General Description

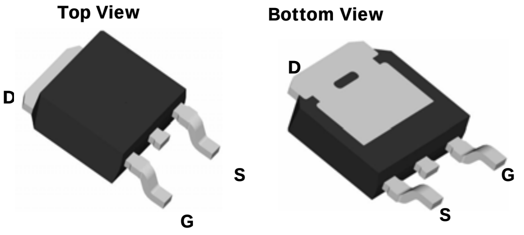
The FQD60N07 used advanced trench technology to provide excellent $R_{DS(ON)}$ and low gate charge. Those devices are suitable for use as a load switch or in PWM applications.

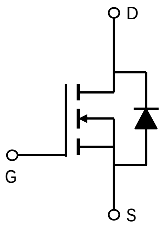
Product Summary

V_{DS}	60V
I_D (at V_{GS}=10V)	60A
$R_{DS(ON)}$ (at V_{GS}=10V)	< 18mΩ
$R_{DS(ON)}$ (at V_{GS} = 5V)	< 25mΩ

100% UIS Tested
100% R_g Tested

TO252
DPAK





Absolute Maximum Ratings T_A=25°C unless otherwise noted				
Parameter		**Symbol**	**Maximum**	**Units**
Drain-Source Voltage		V_{DS}	60	V
Gate-Source Voltage		V_{GS}	±20	V
Continuous Drain Current [G]	T_C=25°C	I_D	60	A
	T_C=100°C		30	
Pulsed Drain Current [C]		I_{DM}	80	
Continuous Drain Current	T_A=25°C	I_{DSM}	7	A
	T_A=70°C		5	
Avalanche Current [C]		I_{AS}, I_{AR}	30	A
Avalanche energy L=0.1mH [C]		E_{AS}, E_{AR}	45	mJ
Power Dissipation [B]	T_C=25°C	P_D	60	W
	T_C=100°C		30	
Power Dissipation [A]	T_A=25°C	P_{DSM}	2.1	W
	T_A=70°C		1.3	
Junction and Storage Temperature Range		T_J, T_{STG}	-55 to 175	°C

Thermal Characteristics					
Parameter		**Symbol**	**Typ**	**Max**	**Units**
Maximum Junction-to-Ambient [A]	t ≤ 10s	$R_{\theta JA}$	17.4	25	°C/W
Maximum Junction-to-Ambient [A D]	Steady-State		51	60	°C/W
Maximum Junction-to-Case	Steady-State	$R_{\theta JC}$	1.8	2.5	°C/W

Electrical Characteristics (T_J=25°C unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
STATIC PARAMETERS						
BV_{DSS}	Drain-Source Breakdown Voltage	I_D=250μA, V_{GS}=0V	60			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=48V, V_{GS}=0V			1	μA
		T_J=55°C			5	
I_{GSS}	Gate-Body leakage current	V_{DS}=0V, V_{GS}= ±20V			100	nA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS} I_D=250μA	1.3	1.8	2.3	V
$I_{D(ON)}$	On state drain current	V_{GS}=10V, V_{DS}=5V	60			A
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=10V, I_D=20A		15	20	mΩ
		T_J=125°C		31	37	
		V_{GS}=4.5V, I_D=30A		20	25	mΩ
g_{FS}	Forward Transconductance	V_{DS}=5V, I_D=20A		65		S
V_{SD}	Diode Forward Voltage	I_S=1A,V_{GS}=0V		0.7	1	V
I_S	Maximum Body-Diode Continuous Current				32	A
DYNAMIC PARAMETERS						
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=30V, f=1MHz	1535	1920	2300	pF
C_{oss}	Output Capacitance		108	155	200	pF
C_{rss}	Reverse Transfer Capacitance		70	116	165	pF
R_g	Gate resistance	V_{GS}=0V, V_{DS}=0V, f=1MHz	0.3	0.65	0.8	Ω
SWITCHING PARAMETERS						
Q_g(10V)	Total Gate Charge	V_{GS}=10V, V_{DS}=30V, I_D=20A	38	47.6	68	nC
Q_g(4.5V)	Total Gate Charge		20	24.2	30	nC
Q_{gs}	Gate Source Charge		4.8	6	7	nC
Q_{gd}	Gate Drain Charge		8.5	14.4	20	nC
$t_{D(on)}$	Turn-On DelayTime	V_{GS}=10V, V_{DS}=30V, R_L=1.5Ω, R_{GEN}=3Ω		7.4		ns
t_r	Turn-On Rise Time			5.1		ns
$t_{D(off)}$	Turn-Off DelayTime			28.2		ns
t_f	Turn-Off Fall Time			5.5		ns
t_{rr}	Body Diode Reverse Recovery Time	I_F=20A, dI/dt=100A/μs		34	41	ns
Q_{rr}	Body Diode Reverse Recovery Charge	I_F=20A, dI/dt=100A/μs		46		nC

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

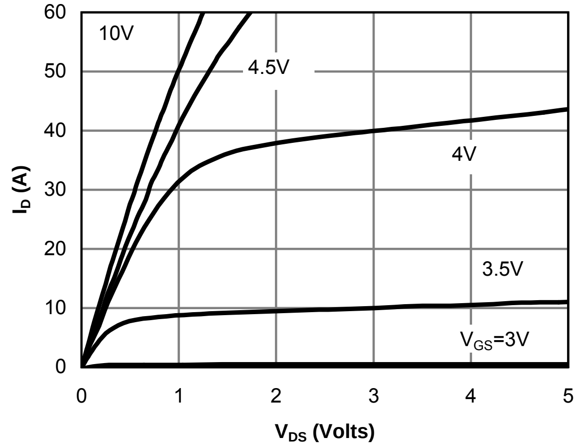


Fig 1: On-Region Characteristics (Note E)

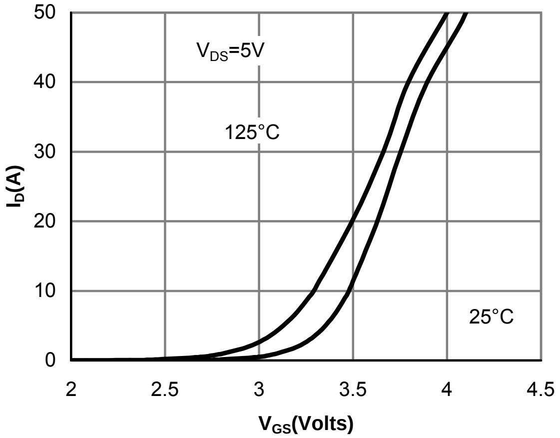


Figure 2: Transfer Characteristics (Note E)

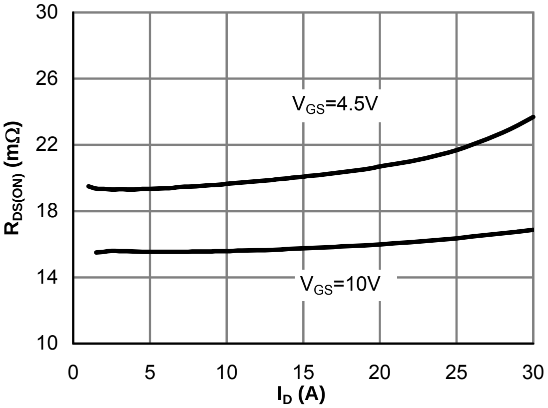


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

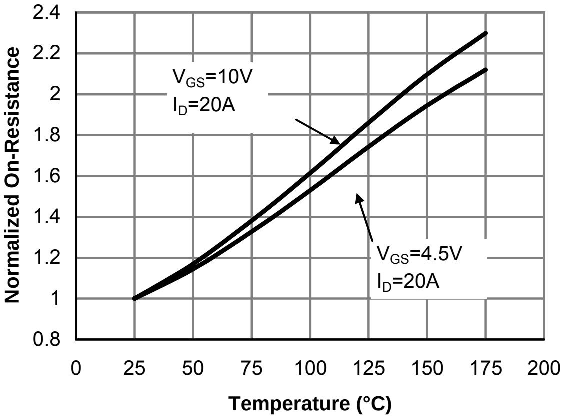


Figure 4: On-Resistance vs. Junction Temperature (Note E)

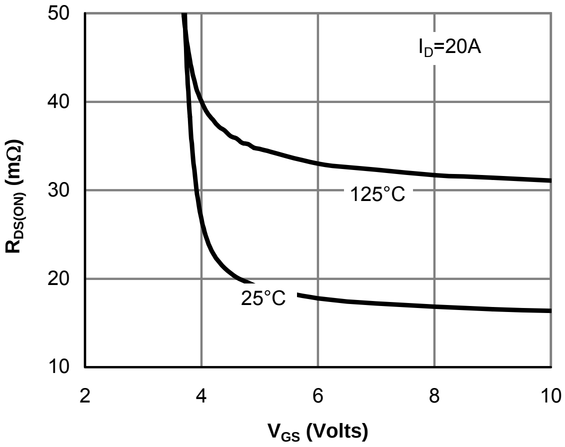


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

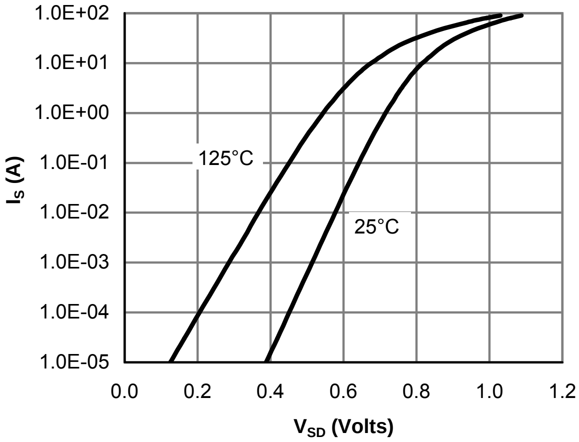


Figure 6: Body-Diode Characteristics (Note E)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

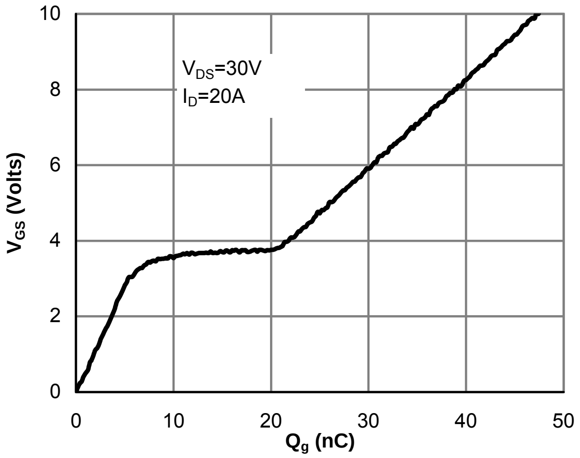


Figure 7: Gate-Charge Characteristics

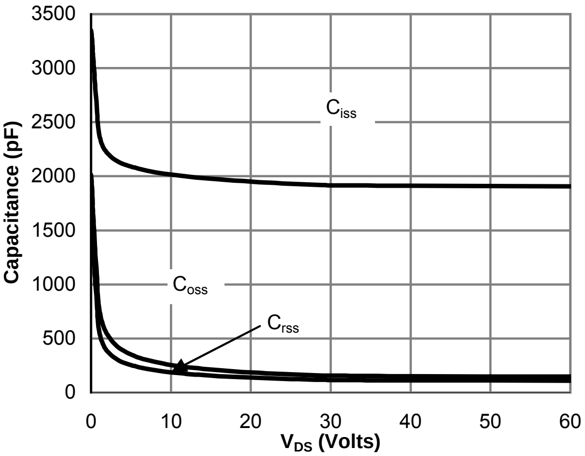


Figure 8: Capacitance Characteristics

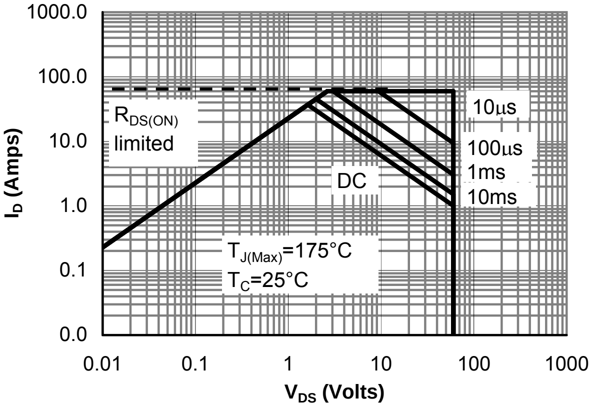


Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

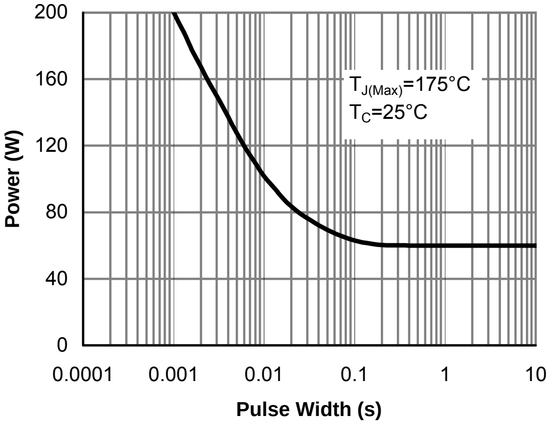


Figure 10: Single Pulse Power Rating Junction-to-Case (Note F)

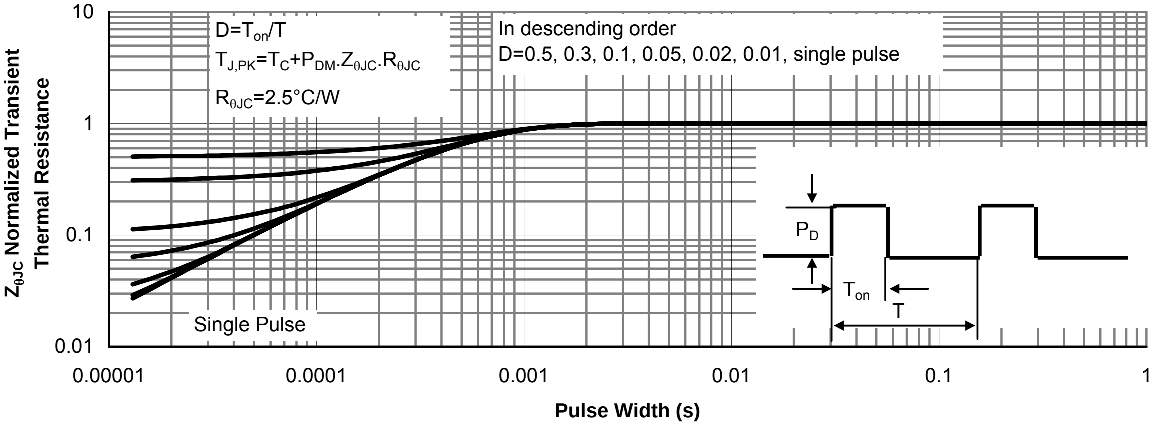


Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

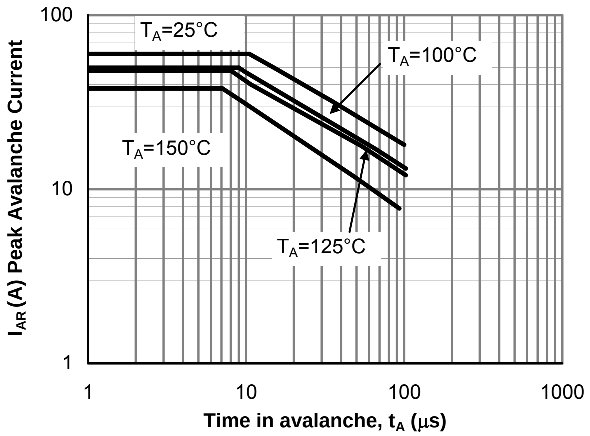


Figure 12: Single Pulse Avalanche capability (Note C)

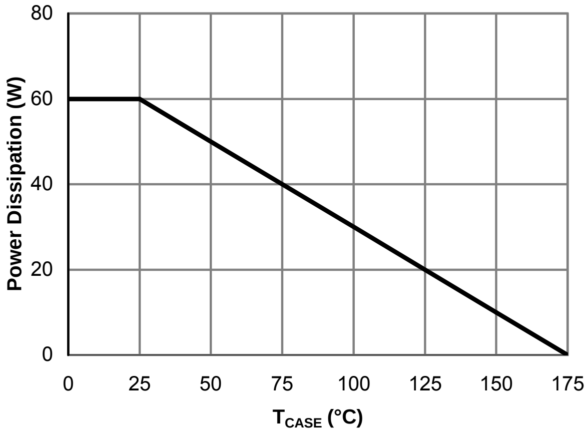


Figure 13: Power De-rating (Note F)

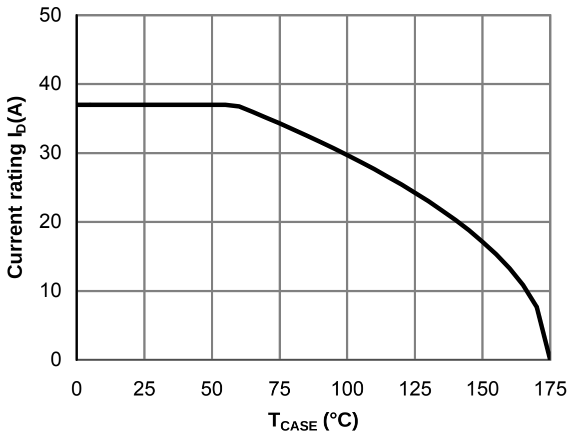


Figure 14: Current De-rating (Note F)

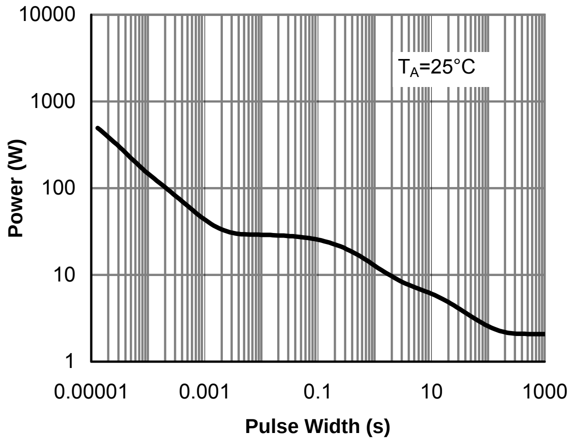


Figure 15: Single Pulse Power Rating Junction-to-Ambient (Note H)

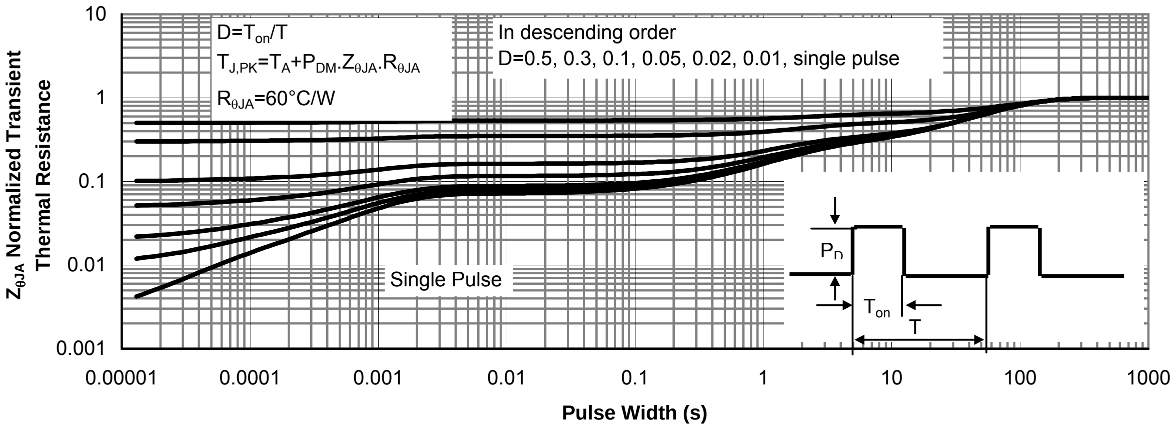
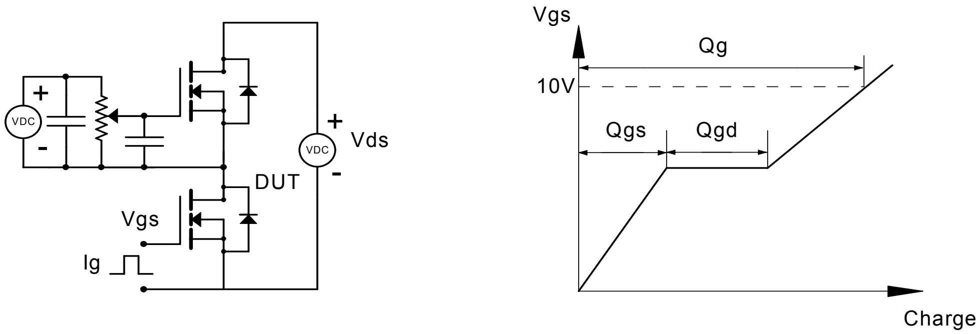
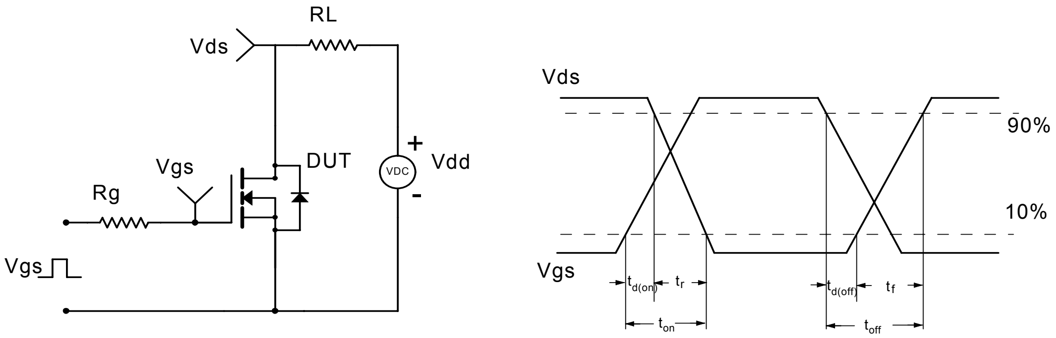


Figure 16: Normalized Maximum Transient Thermal Impedance (Note H)

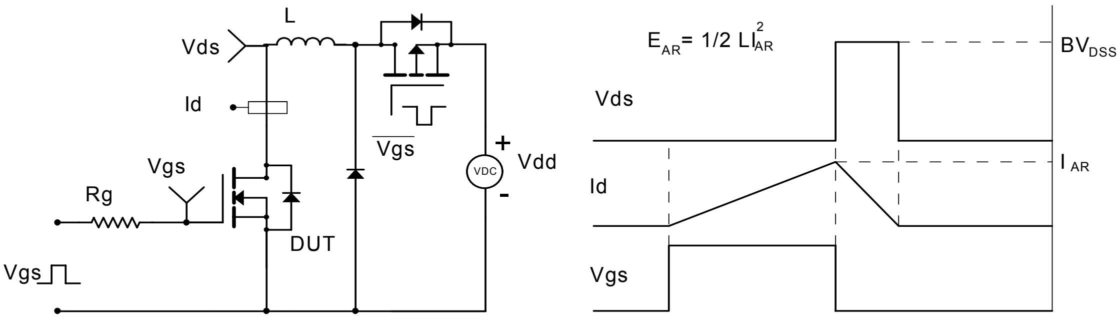
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms