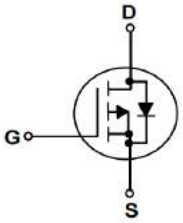
Features

- P-Channel
- Green Device Available
- Low Gate Charge
- Advanced High Cell Density Trench Technology
- 100% EAS Tested

V_{DS}	-20	V
$R_{DS(on),TYP}$@ V_{GS}=-4.5 V	5.5	mΩ
$R_{DS(on),TYP}$@ V_{GS}=-2.5 V	7.5	mΩ
$R_{DS(on),TYP}$@ V_{GS}=-1.8V	10	mΩ
I_D	-55	A

DNF3x3

Part ID	Package Type	Marking	Packing
ZT060P02Q	DFN3x3	ZT060P02Q	5000pcs/reel



Absolute Maximum Ratings T_A =25°C, unless otherwise specified

Symbol	Parameter		Rating	Unit
Common Ratings (T_C=25°C Unless Otherwise Noted)				
V_{GS}	Gate-Source Voltage		±10	V
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage		-20	V
T_J	Maximum Junction Temperature		150	°C
T_{STG}	Storage Temperature Range		-55 to 150	°C
I_{DM}	Drain Current-Continuous@ Current-Pulsed (Note 1)	T_C =25°C	-220	A
Mounted on Large Heat Sink				
I_D	Drain Current-Continuous	T_C =25°C	-55	A
		T_C =100°C	-34.8	A
P_D	Maximum Power Dissipation	T_C =25°C	39	W
$R_{\theta JC}$	Thermal Resistance-Junction to Case		3.2	°C/W
$R_{\theta JA}$	Thermal Resistance Junction-Ambient (Note 3)		38	°C/W
Drain-Source Avalanche Ratings				
EAS	Avalanche Energy, Single Pulsed (Note 2)		61.25	mJ

Electrical Characteristics (T_J=25℃ unless otherwise noted)

Symbol	Parameter	Condition	Min	Typ	Max	Unit
Static Electrical Characteristics @ T_j=25°C (unless otherwise stated)						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	V_{GS}=0V, I_D=-250μA	-20	--	--	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=-20V,V_{GS}=0V	--	--	-1	μA
I_{GSS}	Gate-Body Leakage Current	V_{GS}=±10V,V_{DS}=0V	--	--	±100	nA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS},I_D=-250μA	-0.4	-0.7	-1.0	V
$R_{DS(on)}$	Drain-Source On-State Resistance (Note 4)	V_{GS}=-4.5V,I_D=-15A	--	5.5	8.0	mΩ
$R_{DS(on)}$	Drain-Source On-State Resistance	V_{GS}=-2.5V,I_D=-10A	--	7.5	10	mΩ
$R_{DS(on)}$	Drain-Source On-State Resistance	V_{GS}=-1.8V,I_D=-8A	--	10	14	mΩ
g_{FS}	Forward Transconductance (Note 4)	V_{DS}=-5V,I_D=-15A	--	78	--	S
Dynamic Electrical Characteristics @ T_j = 25°C (unless otherwise stated)						
Ciss	Input Capacitance	V_{DS}=-10V,V_{GS}=0V, f=1MHz	--	3560	--	pF
Coss	OutputCapacitance		--	500	--	pF
Crss	ReverseTransferCapacitance		--	430	--	pF
Rg	Gate Resistance	f=1MHz	--	11	--	Ω
Qg	Total Gate Charge	V_{DS}=-4.5V,I_D=-15A, V_{GS}=-10V	--	43	--	nC
Qgs	Gate-SourceCharge		--	7.9	--	nC
Qgd	Gate-DrainCharge		--	11.2	--	nC
Switching Characteristics (Note 5)						
Td(on)	Turn-on Delay Time	V_{DD}=-10V, I_D=-15A, R_G=3Ω, V_{GS}=-4.5V	--	14.5	--	ns
Tr	Turn-on Rise Time		--	20.2	--	ns
Td(off)	Turn-Off Delay Time		--	93	--	ns
Tf	Turn-Off Fall Time		--	161	--	ns
Source- Drain Diode Characteristics@ T_j = 25°C (unless otherwise stated)						
I_{SD}	Source-Drain Current (Body Diode)		--	--	-55	A
V_{SD}	Forward on voltage (Note 4)	I_S =-1A,V_{GS}=0V	--	--	-1.2	V
Trr	Reverse Recovery Time	T_j=25℃,I_F =-15A, V_{GS}=0V di/dt=100A/μs	--	28	--	ns
Qrr	Reverse Recovery Charge		--	25.7	--	nC

Notes:

1. Repetitive rating, pulse width limited by junction temperature $T_{J(MAX)}$=150°C.
2. The EAS data shows Max. rating . The test condition is V_{DD}= -25V, V_{GS}= -10V, L= 0.1mH, I_{AS}= -35A.
3. The data tested by surface mounted on a 1 inch2 FR-4 board with 2OZ copper, The value in any given application depends on the user's specific board design.
4. The data tested by pulsed , pulse width ≤ 300us , duty cycle ≤ 2%.
5. This value is guaranteed by design hence it is not included in the production test.

Typical Characteristics

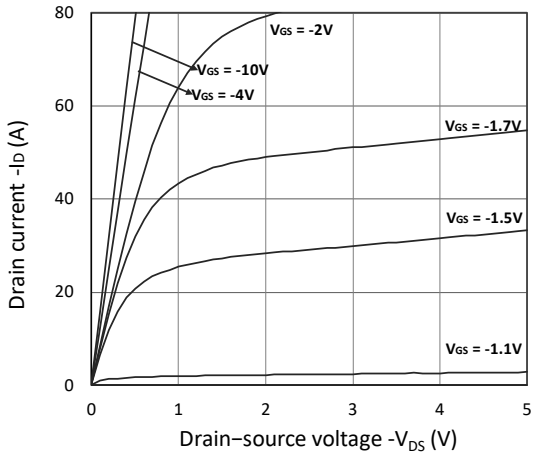


Figure 1. Output Characteristics

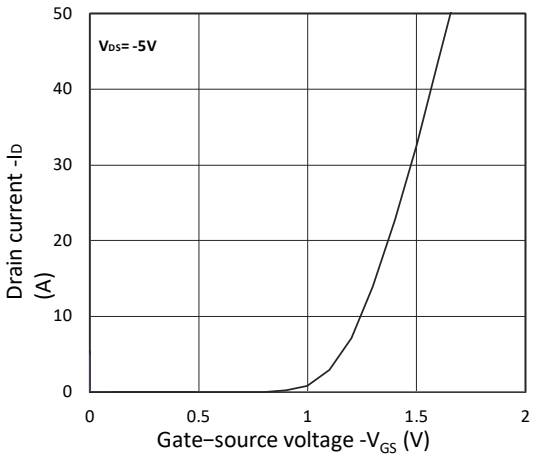


Figure 4. Transfer Characteristics

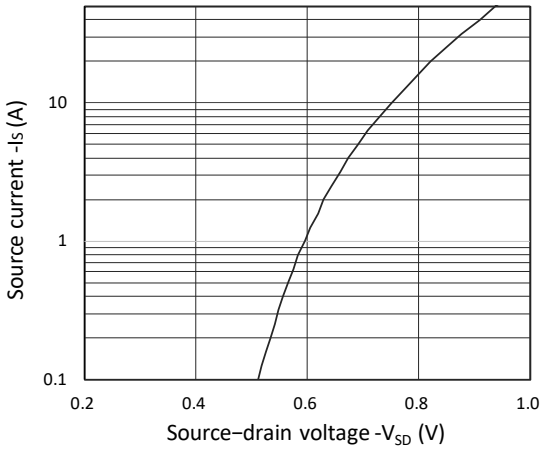


Figure 2. Forward Characteristics of Reverse

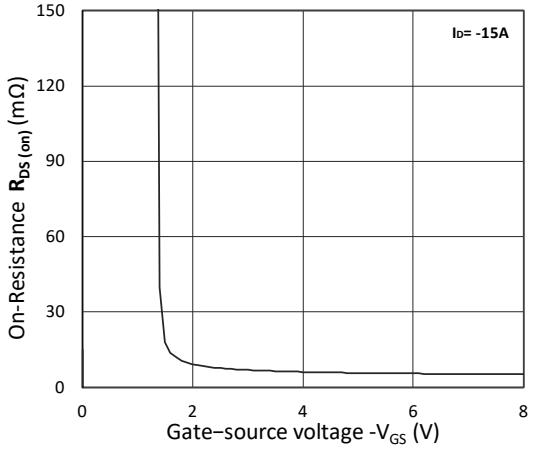


Figure 5. $R_{DS(ON)}$ vs. V_{GS}

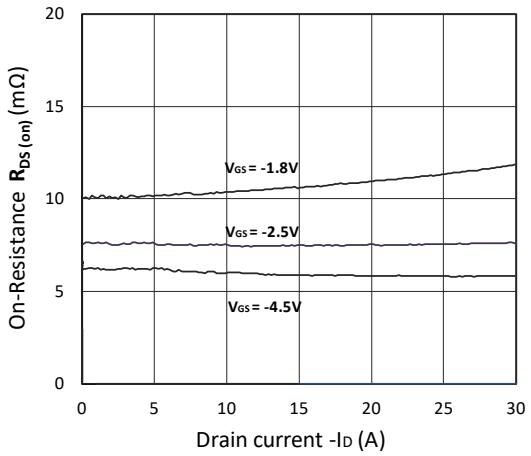


Figure 3. $R_{DS(ON)}$ vs. I_D

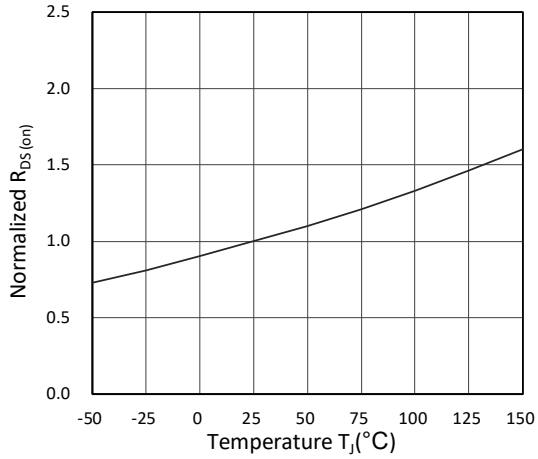


Figure 6. Normalized $R_{DS(on)}$ vs. Temperature

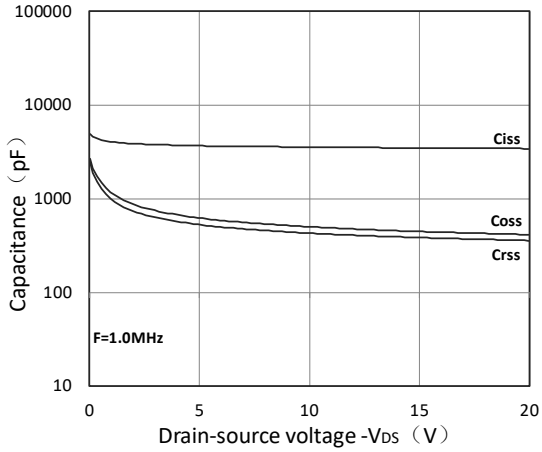


Figure 7. Capacitance Characteristics

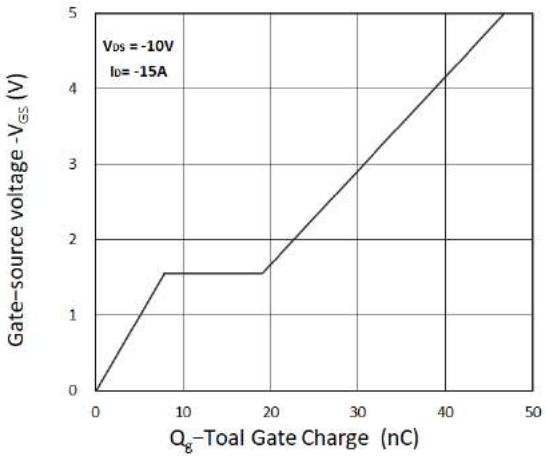


Figure 9. Gate Charge Characteristics

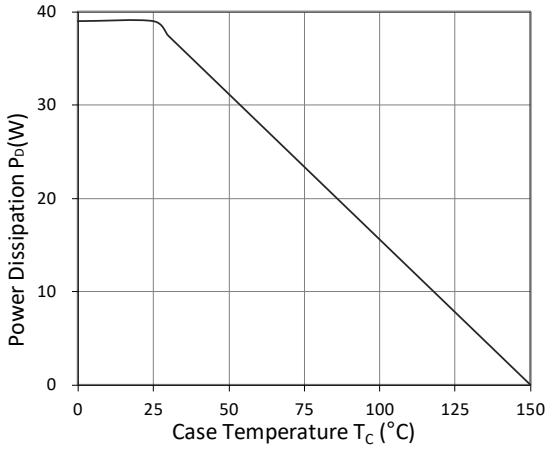


Figure 8. Power Dissipation

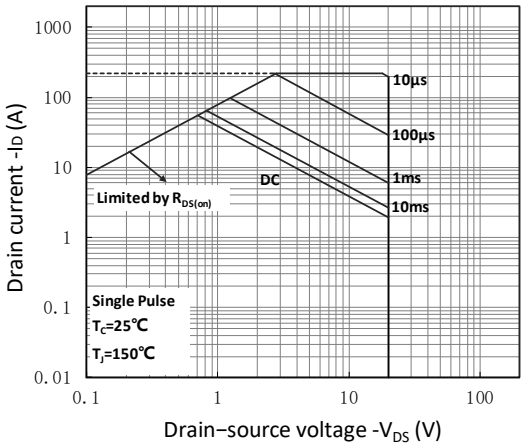


Figure10. Safe Operating Area

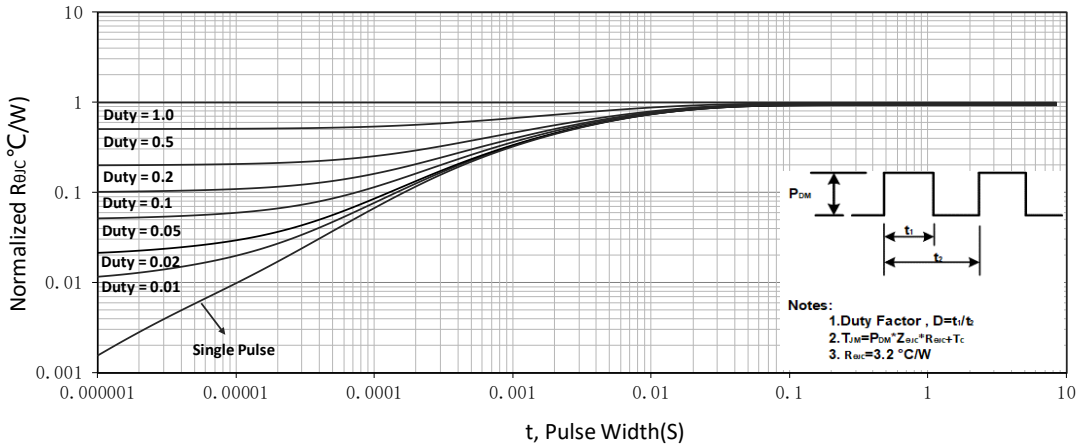
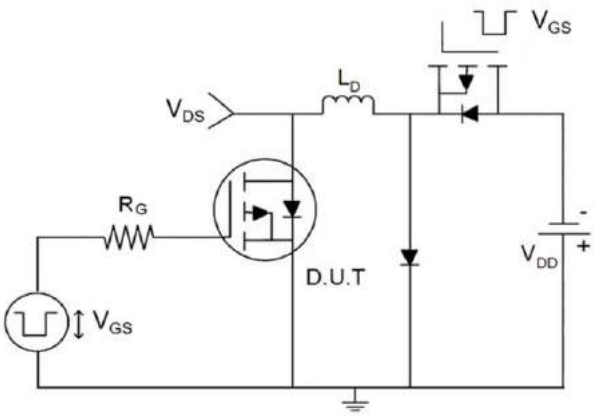
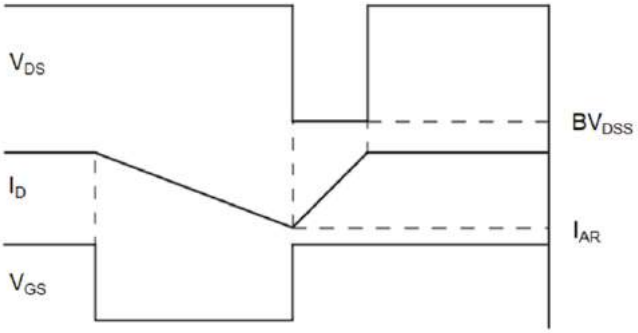


Figure 11. Normalized Maximum Transient Thermal Impedance

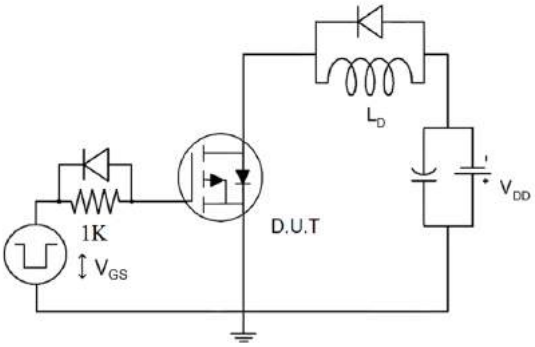
Test Circuit

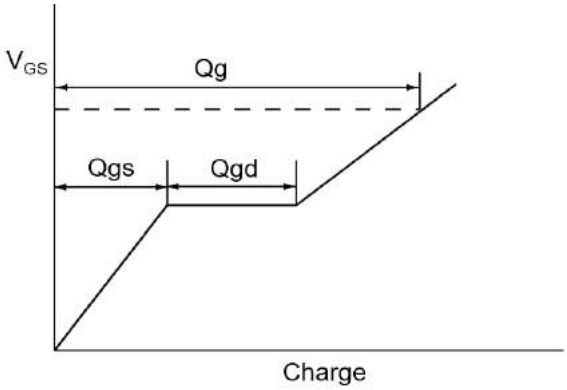
1) E_{AS} Test Circuits



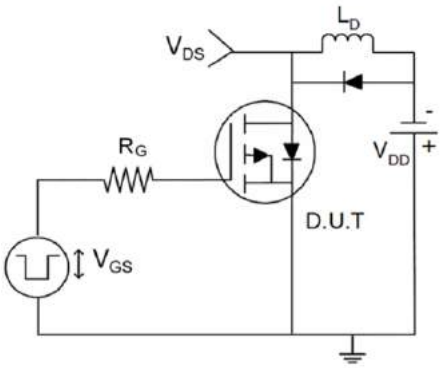


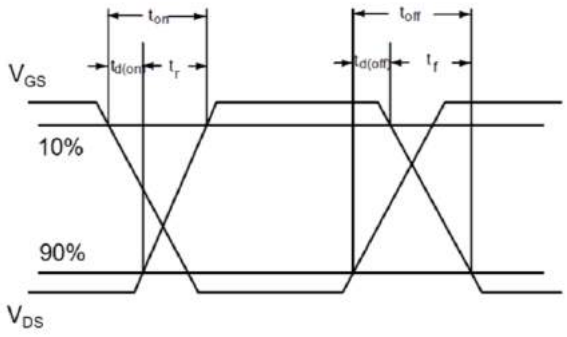
2) Gate Charge Test Circuit



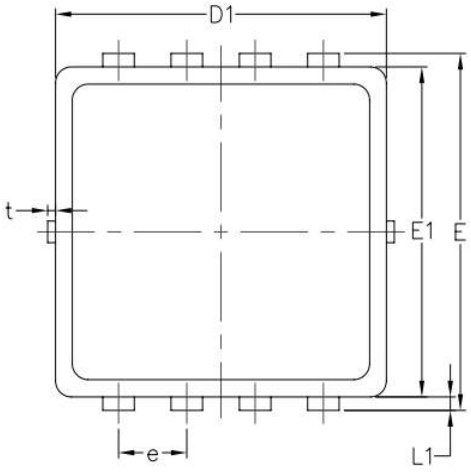


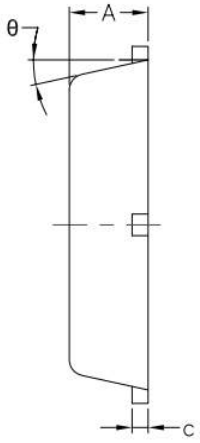
3) Switch Time Test Circuit

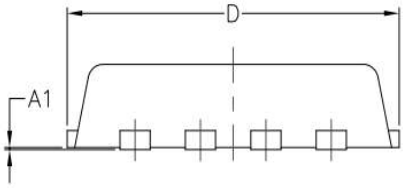


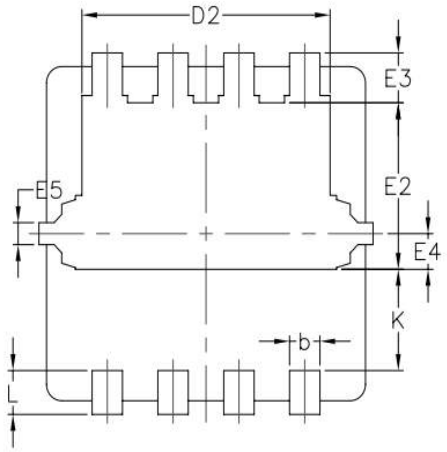


DFN3x3-8L Package Information









SYMBOL	COMMON		
	MM		
	MIN	NOM	MAX
A	0.70	0.75	0.85
A1	/	/	0.05
b	0.20	0.30	0.40
c	0.10	0.152	0.25
D	3.15	3.30	3.45
D1	3.00	3.15	3.25
D2	2.29	2.45	2.65
E	3.15	3.30	3.45
E1	2.90	3.05	3.20
E2	1.32	1.52	1.72
E3	0.28	0.46	0.65
E4	0.18	0.33	0.48
E5	0.10	0.20	0.30
e	0.60	0.65	0.70
K	0.78	0.93	1.13
L	0.30	0.40	0.50
L1	0.06	0.125	0.20
t	0	0.075	0.13
θ	10°	12°	14°

Customer Service

Sales and Service:

zj@ztasemi.com