Descriptions

The CTZ10DP02ZF uses advanced trench technology and design to provide excellent RDS(ON) with low gate charge. This device is suitable for use in DC-DC conversion applications. Standard Product CTZ10DP02ZF is Pb-free.

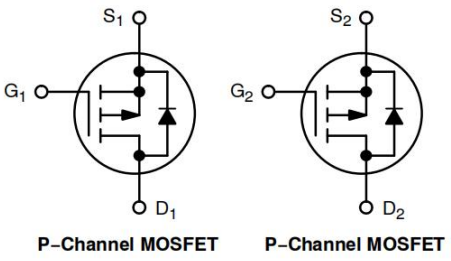
Features

- Lower $R_{DS(on)}$ Solution in 2x2 mm Package.
- TrenchFET® Power MOSFET
- Bidirectional Current Flow with Common Source Configuration

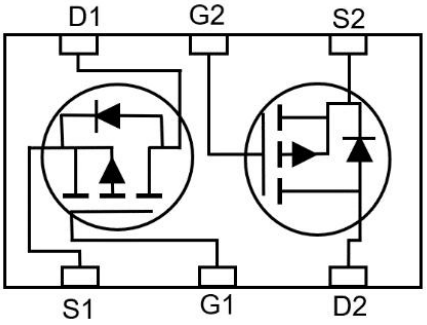
Applications

- Optimized for Battery and Load Management Applications in Portable Equipment
- Li−Ion Battery Charging and Protection Circuits
- High Power Management in Portable, Battery Powered Products
- High Side Load Switch

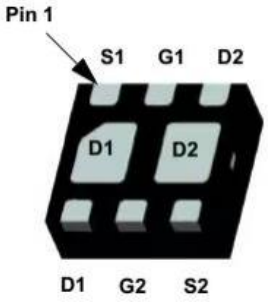
Equivalent Circuit & Pinning



Schematic Diagram



Pin configuration (Top view)



DFN2*2-6L

Absolute Maximum Ratings(Ta=25℃)

Characteristics		Symbol	10S	Steady State	Unit
DrainSource Voltage		V_{DSS}	-20		V
GateSource Voltage		V_{GSS}	±12		V
Continuous Drain Current(1) (T_J=150℃)[a]	T_A=25℃	I_D	-3.6	-3.1	A
	T_A=70℃		-2.9	-2.7	
Maximum Power Dissipation[a]	T_A=25℃	P_D	2.0	1.5	W
	T_A=70℃		1.3	1.0	
Continuous Drain Current (T_J=150℃)[b]	T_A=25℃	I_D	-2.3	-2.1	A
	T_A=70℃		-1.8	-1.7	
Maximum Power Dissipation[a]	T_A=25℃	P_D	0.8	0.7	W
	T_A=70℃		0.5	0.4	
Pulsed Drain Current [c]		I_{DM}	-18		A
Maximum Junction Temperature		T_J	150		℃
Storage Temperature Range		T_{stg}	-55~150		℃

a. Surface mounted on FR4 Board using 1 in sq pad size, 1oz Cu.

b. Surface mounted on FR4 board using the minimum recommended pad size, 1oz Cu.

c. Repetitive rating, pulse width limited by junction temperature, tp=10μs, Duty Cycle=1%

Thermal resistance ratings

Parameter		Symbol	Typical	Maximum	Units
Single Operation					
Junction-to-Ambient Thermal Resistance [a]	t ≤ 10 s	$R_{\theta JA}$	50	62	°C/W
	Steady State		65	82	
Junction-to-Ambient Thermal Resistance [b]	t ≤ 10 s	$R_{\theta JA}$	125	150	
	Steady State		145	175	
Junction-to-Case Thermal Resistance	Steady State	$R_{\theta JC}$	30	38	
Dual Operation					
Junction-to-Ambient Thermal Resistance [a]	t ≤ 10 s	$R_{\theta JA}$	40	50	°C/W
	Steady State		52	65	
Junction-to-Ambient Thermal Resistance [b]	t ≤ 10 s	$R_{\theta JA}$	100	120	
	Steady State		116	140	
Junction-to-Case Thermal Resistance	Steady State	$R_{\theta JC}$	25	30	

a. Surface mounted on FR4 Board using 1 in sq pad size, 1oz Cu.

b. Surface mounted on FR4 board using the minimum recommended pad size, 1oz Cu.

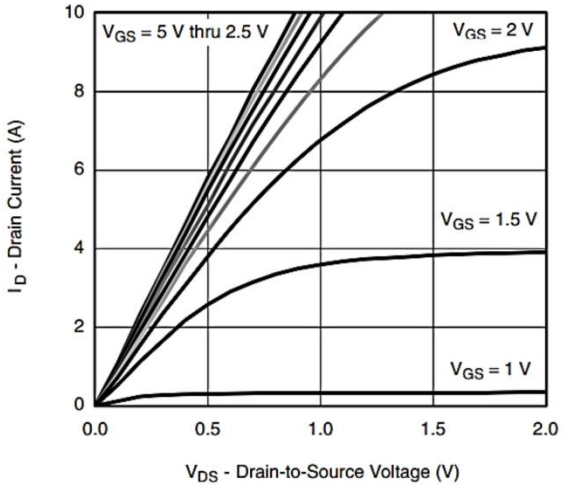
Electrical Characteristics(Ta=25℃)

Symbol	Characteristics	Test Conditions	Min	Typ	Max	Unit
Static Characteristics						
B_{VDSS}	Drain-Source Breakdown Voltage	I_D = -250μA , V_{GS} =0V	-20			V
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS} =V_{GS}, I_D = -250μA	-0.4	-0.65	-0.95	V
I_{DSS}	Drain CutOff Current	V_{DS} = -20V, V_{GS} =0V			-1	μA
I_{GSS}	Gate Leakage Current	V_{GS} =±12V,V_{DS} =0V			±0.1	μA
$R_{DS(on)}$	Drain-Source On-Resistance	V_{GS} =-4.5V, I_D = -1A		82	100	mΩ
		V_{GS} = -2.5V, I_D = -1A		113	130	mΩ
g_{FS}	Forward Transconductance	V_{DS} = -5V, I_D = -5A		21		S
Dynamic Characteristics						
Qg	Total Gate Charge	V_{DS} = -10V, I_D =-2.7A, V_{GS} = -4.5V		6		nc
Qgs	Gate Source Charge			0.75		
Qgd	Gate Drain Charge			1.2		
Ciss	Input Capacitance	V_{DS} =-10V, V_{GS} =0V, f=1.0MHz		470		pF
Crss	Reverse Transfer Capacitance			55		
Coss	Output Capacitance			50		
t_{D}(on)	Turn-On Delay Time	V_{GS} = -4.5V, V_{DS} = -10V, R_L =3Ω, R_G =6Ω		9		ns
tr	Rise Time			7		
t_{D}(off)	Turn-Off Delay Time			40		
tf	Fall Time			7		
Rg	Gate Resistance	f=1MHz				Ω
Drain-Source Body Diode Characteristics						
V_{SD}	SourceDrain Diode Forward Voltage	I_S =-1.6A, V_{GS} =0V		-0.85	-1.5	V
trr	Body Diode Reverse Recovery Time	I_F =-3.0A, dI/dt=100A/μS		25		ns
Qrr	Body Diode Reverse Recovery Charge			15		nc

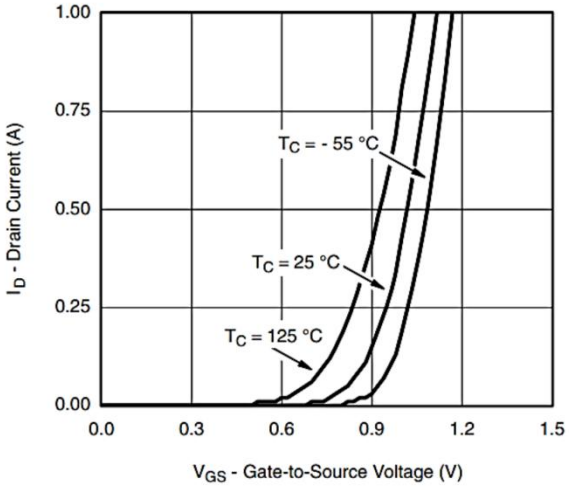
Notes

1.Repetitive Rating: Pulse width limited by maximum junction temperature.

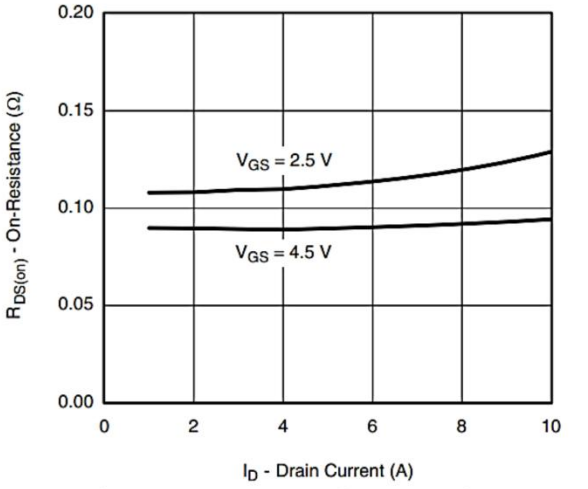
Electrical Characteristic Curve



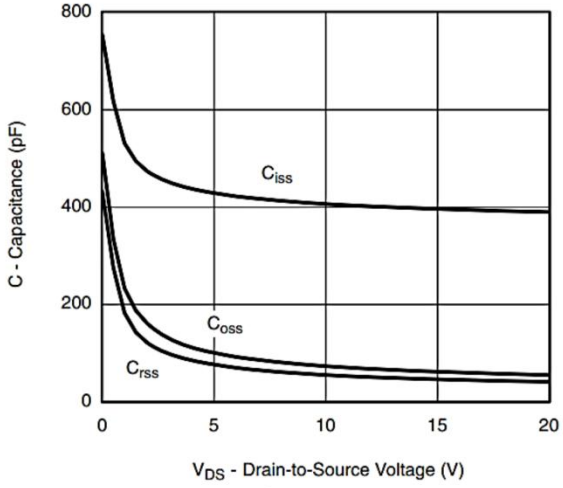
Output Characteristics



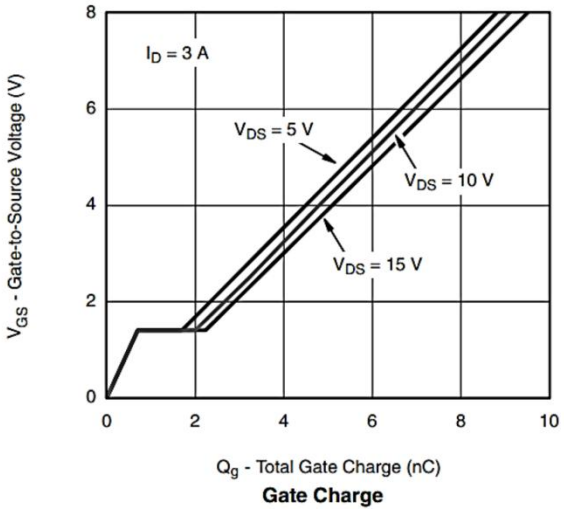
Transfer Characteristics



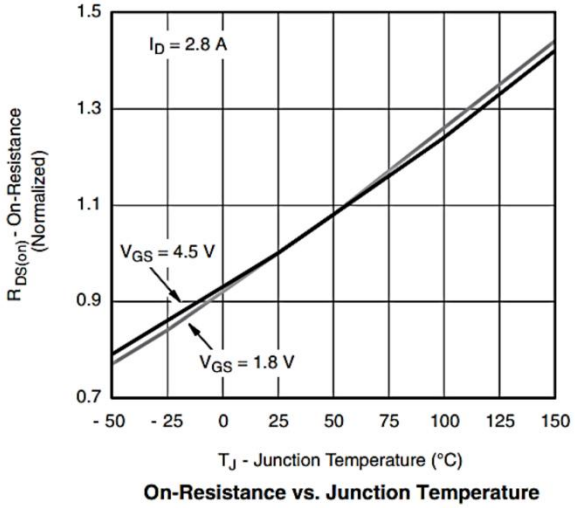
On-Resistance vs. Drain Current and Gate Voltage



Capacitance

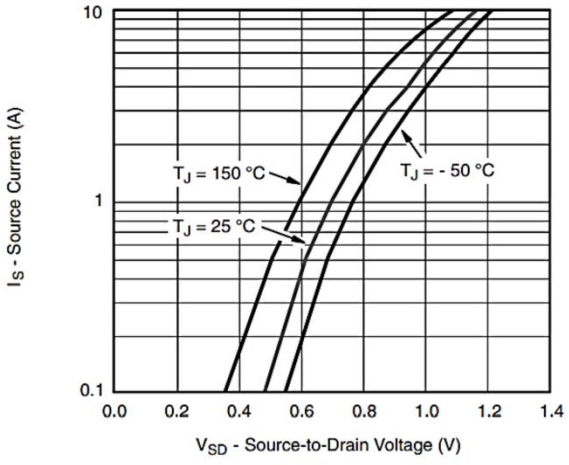


Gate Charge

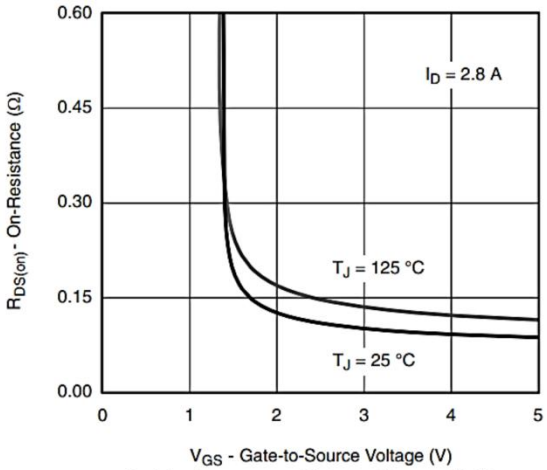


On-Resistance vs. Junction Temperature

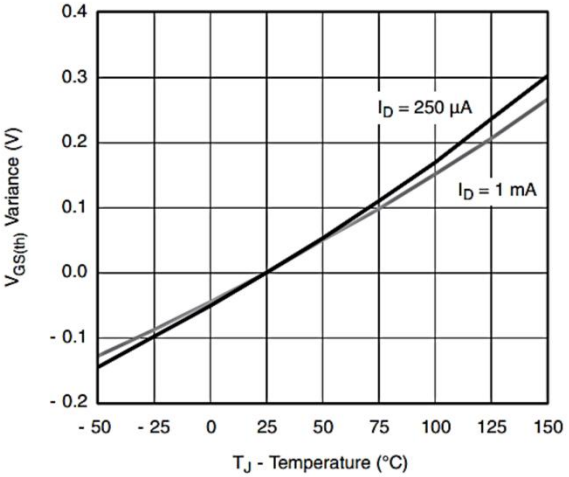
Electrical Characteristic Curve



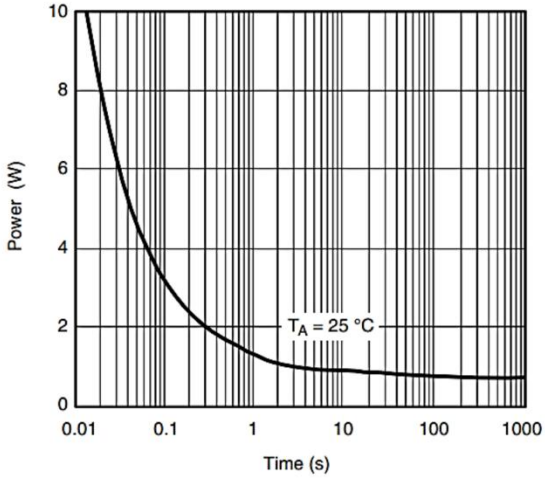
Source-Drain Diode Forward Voltage



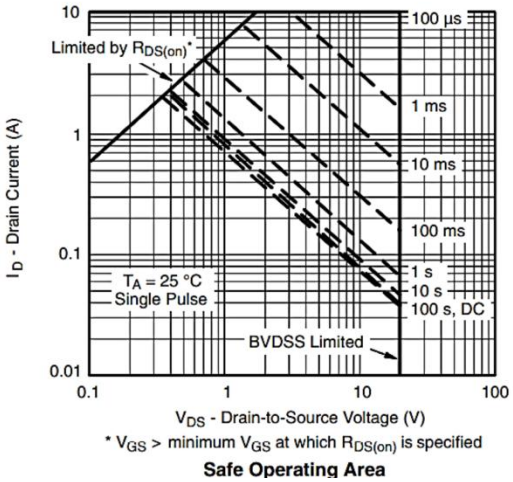
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage

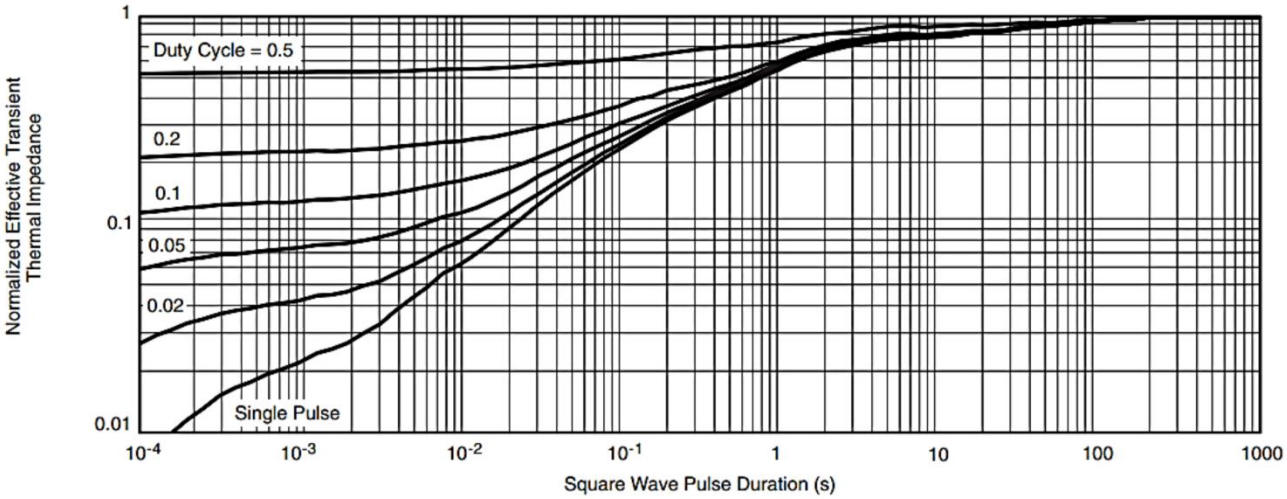


Single Pulse Power

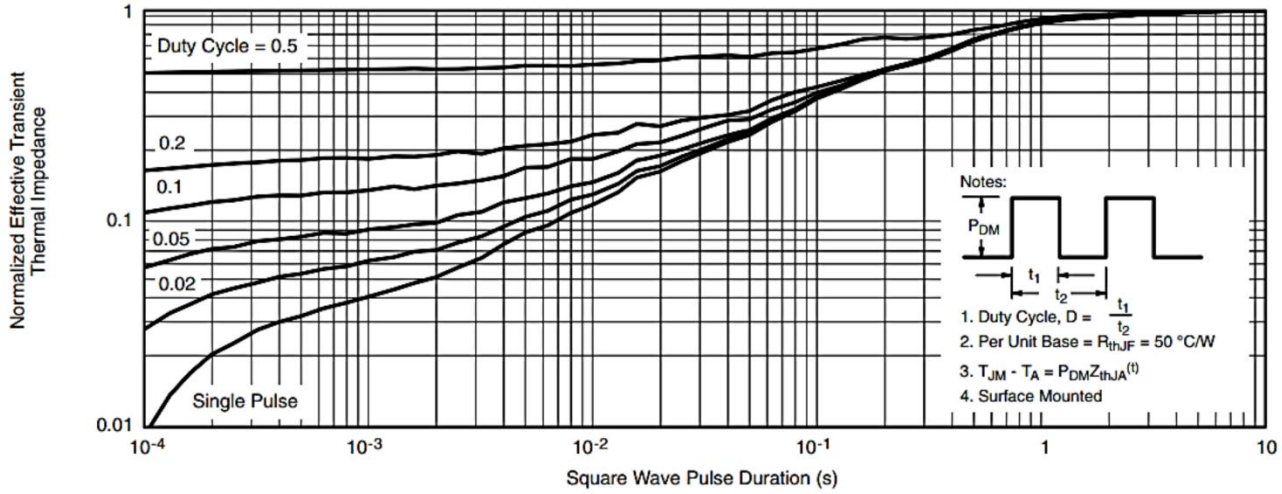


Safe Operating Area

Electrical Characteristic Curve



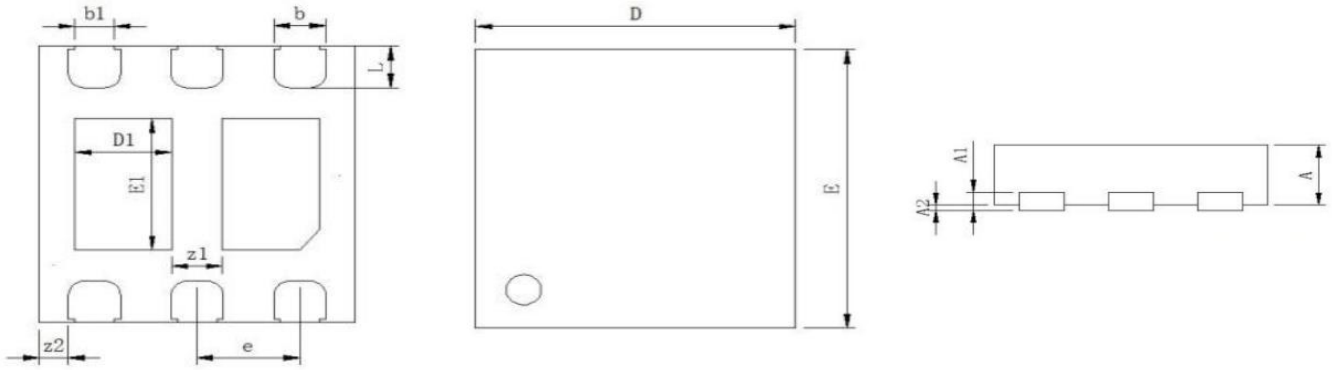
Normalized Thermal Transient Impedance, Junction-to-Ambient



Normalized Thermal Transient Impedance, Junction-to-Foot

Package Outline Dimensions

Device Marking	Device	Package	Reel size	Tape width	Quantity
MP2068	CTZ10DP02ZF	DFN2*2-6L	7inch	8mm	5000



DFN2*2-6L POD			
Dimension / Symbol	Min(mm)	TYP(mm)	Max（mm）
D	1.95	2.00	2.05
E	1.95	2.00	2.05
D1	0.56	0.61	0.66
E1	0.90	0.95	1.00
b	0.28	0.33	0.38
b1	0.20	0.25	0.30
z1	0.27	0.32	0.37
z2	0.14	0.19	0.24
L	0.25	0.30	0.35
e1		0.65BSC	
A	0.45	0.60	0.75
A1		0.152REF	
A2	0.00		0.05