WSD3070DN33

N-Channel MOSFET

General Description

The WSD3070DN33 is the highest performance trench N-Channel MOSFETs with extreme high cell density, which provide excellent $R_{DS(ON)}$ and gate charge for most of the synchronous buck converter applications.

The WSD3070DN33 meet the RoHS and Green Product requirement, 100% E_{AS} guaranteed with full function reliability approved.

Features

- Advanced high cell density Trench technology
- Super Low Gate Charge
- Excellent CdV/dt effect decline
- 100% E_{AS} Guaranteed
- Green Device Available

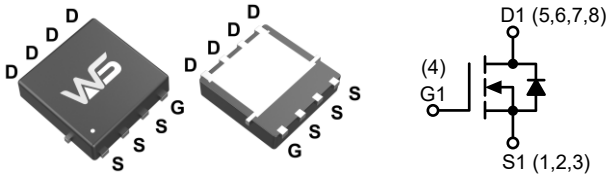
Product Summery

BV_{DSS}	$R_{DS(ON)}$	I_D
25V	3.0mΩ	70A

Applications

- High Frequency Point-of-Load Synchronous Buck Converter for MB/NB/UMPC/VGA
- Networking DC-DC Power System
- Load Switch

DFN3X3-8L Pin Configuration



Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	25	V
V_{GS}	Gate-Source Voltage	±20	
I_D@T_C=25°C	Continuous Drain Current, V_{GS} @ 10V [1]	70	A
I_D@T_C=100°C	Continuous Drain Current, V_{GS} @ 10V [1]	42	
I_D@T_A=25°C	Continuous Drain Current, V_{GS} @ 10V [1]	17	
I_D@T_A=70°C	Continuous Drain Current, V_{GS} @ 10V [1]	13	
I_{DM}@T_C=25°C	Pulsed Drain Current [2]	200	
E_{AS}	Avalanche Energy, Single Pulse (L=0.5mH) [3]	145	mJ
I_{AS}	Avalanche Current, Single pulse(L=0.5mH) [3]	24	A
P_D@T_C=25°C	Total Power Dissipation [4]	32	W
P_D@T_A=25°C	Total Power Dissipation [4]	2.08	
T_{STG}	Storage Temperature Range	-55 to 150	°C
T_J	Operating Junction Temperature Range	-55 to 150	

Thermal Data

Symbol	Parameter	Typ.	Max.	Units
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient [1]	---	60	°C/W
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case [1]	---	3.9	

Electrical Characteristics (T_J=25°C, Unless Otherwise Noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Units
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V , I_D=250μA	25	---	---	V
$\Delta BV_{DSS}/\Delta T_J$	BV_{DSS} Temperature Coefficient	Reference to 25°C, I_D=1mA	---	0.028	---	V/°C
$R_{DS(ON)}$	Static Drain-Source On-Resistance [2]	V_{GS}=10V , I_D=20A	---	3.0	4.5	mΩ
		V_{GS}=4.5V , I_D=20A	---	4.0	6.0	
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D=250μA	1.2	1.6	2.5	V
$\Delta V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	-6.16	---	mV/°C
I_{DSS}	Drain-Source Leakage Current	V_{DS}=24V , V_{GS}=0V , T_J=25°C	---	---	1.0	μA
		V_{DS}=24V , V_{GS}=0V , T_J=55°C	---	---	5.0	
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±20V , V_{DS}=0V	---	---	±100	nA
g_{fs}	Forward Transconductance	V_{DS}=5V , I_D=40A	---	36	---	S
R_g	Gate Resistance	V_{DS}=0V , V_{GS}=0V , f = 1.0MHz	---	1.2	---	Ω
Q_g	Total Gate Charge (4.5V)	V_{DS}=15V , V_{GS}=10V , I_{DS}=20A	---	24	---	nC
Q_{gs}	Gate-Source Charge		---	5.7	---	
Q_{gd}	Gate-Drain Charge		---	12.3	---	
$T_{d(on)}$	Turn-On Delay Time	V_{DD}=15V , V_{GEN}=10V , R_G=6Ω , I_{DS}=1A , R_L=15Ω	---	11	---	ns
T_r	Rise Time		---	9.0	---	
$T_{d(off)}$	Turn-Off Delay Time		---	34	---	
T_f	Fall Time		---	15	---	
C_{iss}	Input Capacitance	V_{DS}=15V , V_{GS}=0V , f = 1.0MHz	---	2350	---	pF
C_{oss}	Output Capacitance		---	410	---	
C_{rss}	Reverse Transfer Capacitance		---	345	---	

Diode Characteristics

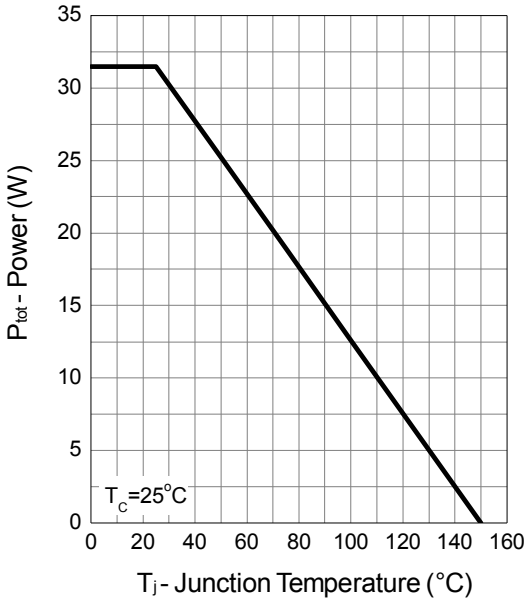
Symbol	Parameter	Conditions	Min.	Typ.	Max.	Units
I_S	Continuous Source Current [1,6]	V_G=V_D=0V , Force Current	---	---	25	A
I_{SM}	Pulsed Source Curren [2,6]		---	---	70	
V_{SD}	Diode Forward Voltage [2]	V_{GS}=0V , I_S=1A , T_J=25°C	---	---	1.1	V
t_{rr}	Reverse Recovery Time	I_F=25A, dI/dt=100A/μs	---	19	---	ns
Q_{rr}	Reverse Recovery Charge		---	8	---	nC

Note:

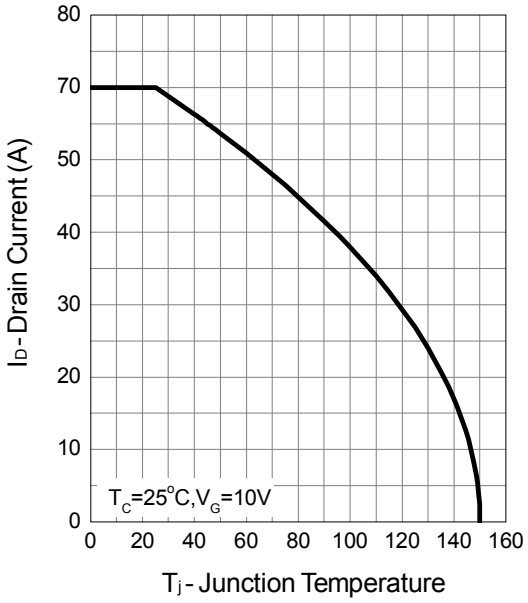
4. Pulse test; pulse width ≤ 300μs, duty cycle ≤ 2%.
5. Guaranteed by design, not subject to production testing.

Typical Characteristics

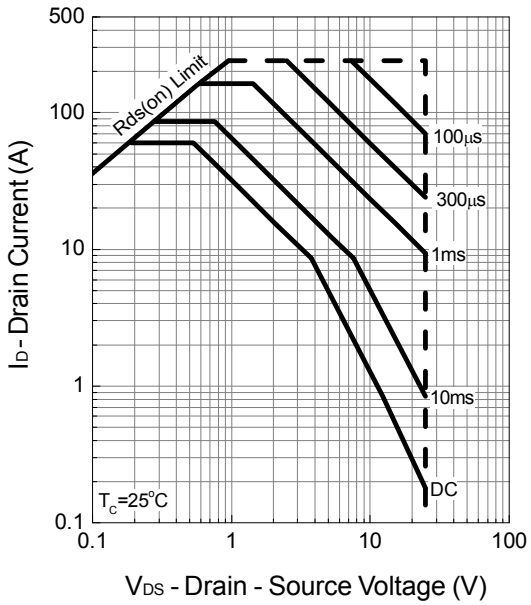
Power Dissipation



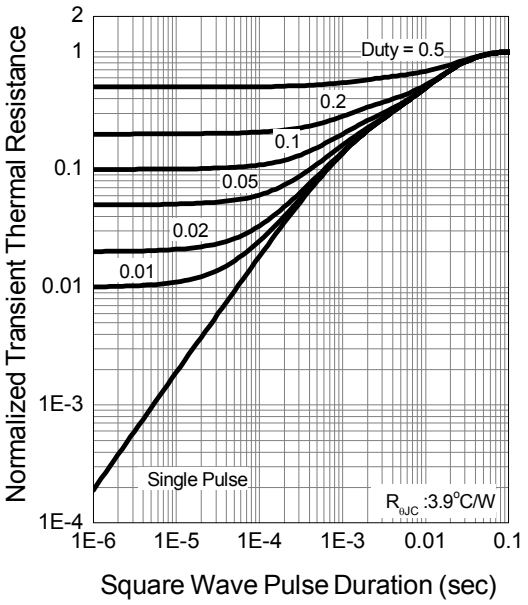
Drain Current



Safe Operation Area

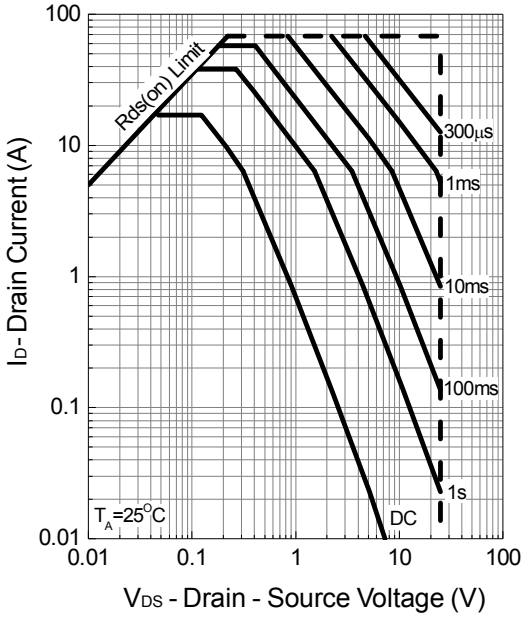


Thermal Transient Impedance

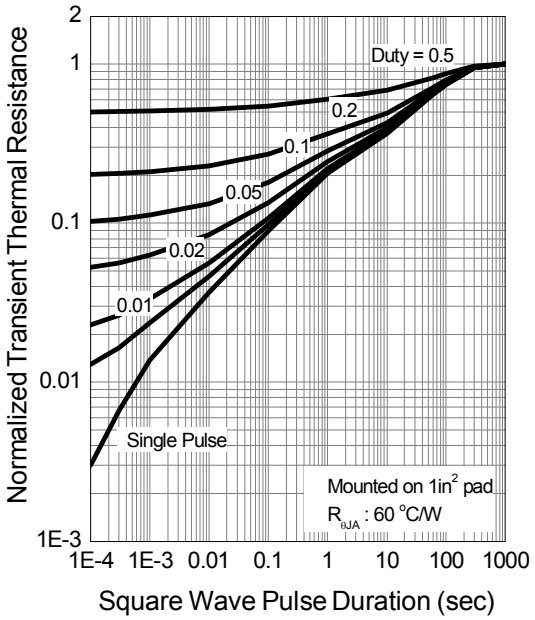


Typical Characteristics (Cont.)

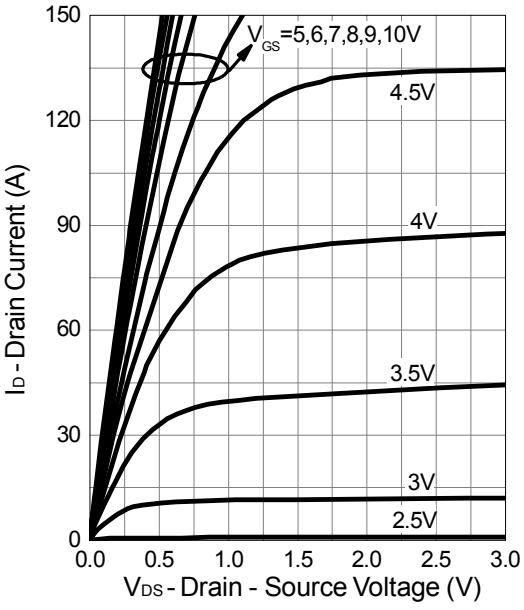
Safe Operation Area



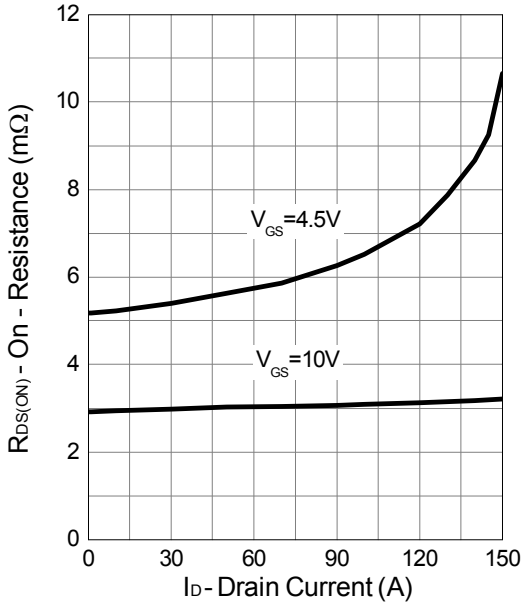
Thermal Transient Impedance



Output Characteristics

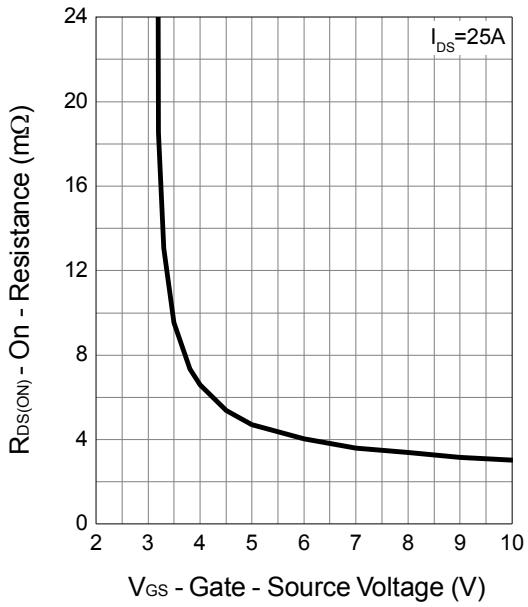


Drain-Source On Resistance

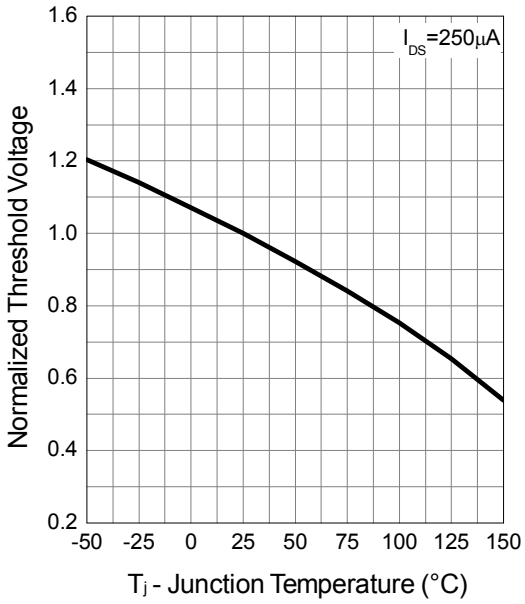


Typical Characteristics (Cont.)

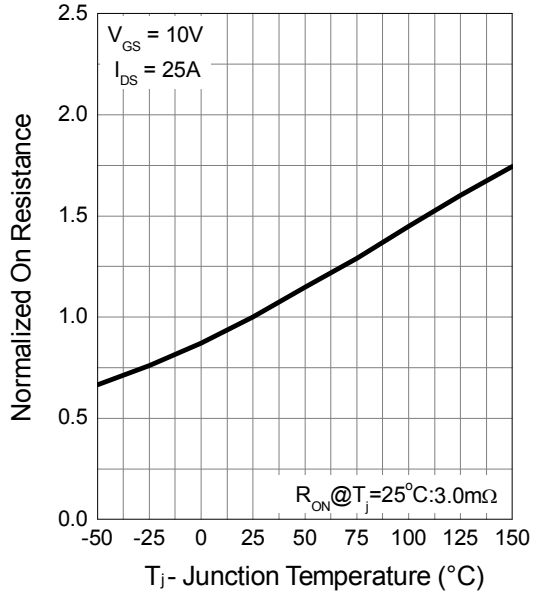
Gate-Source On Resistance



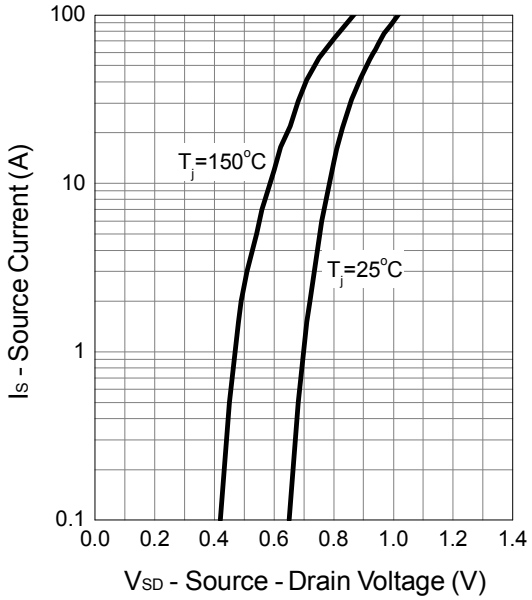
Gate Threshold Voltage



Drain-Source On Resistance

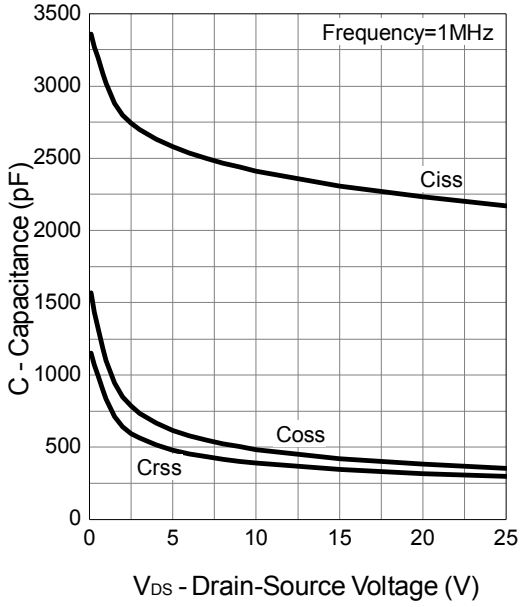


Source-Drain Diode Forward

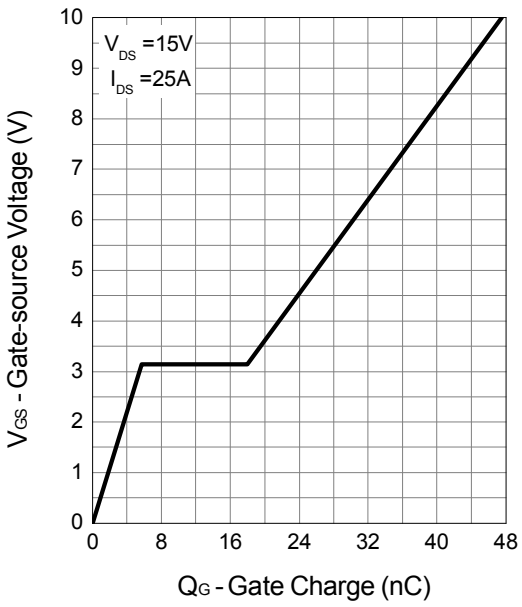


Typical Characteristics (Cont.)

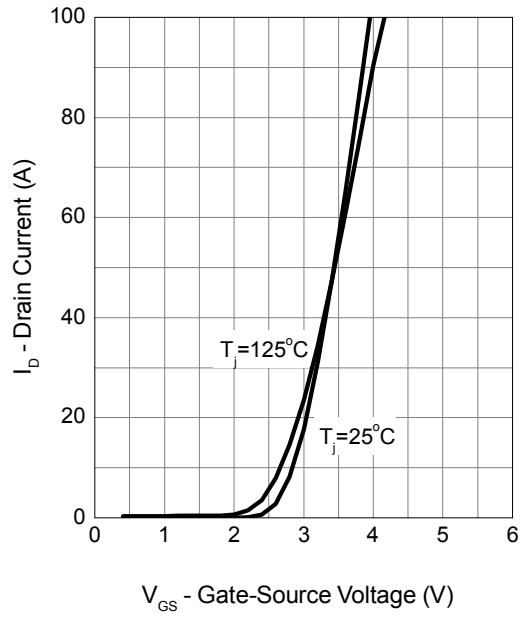
Capacitance



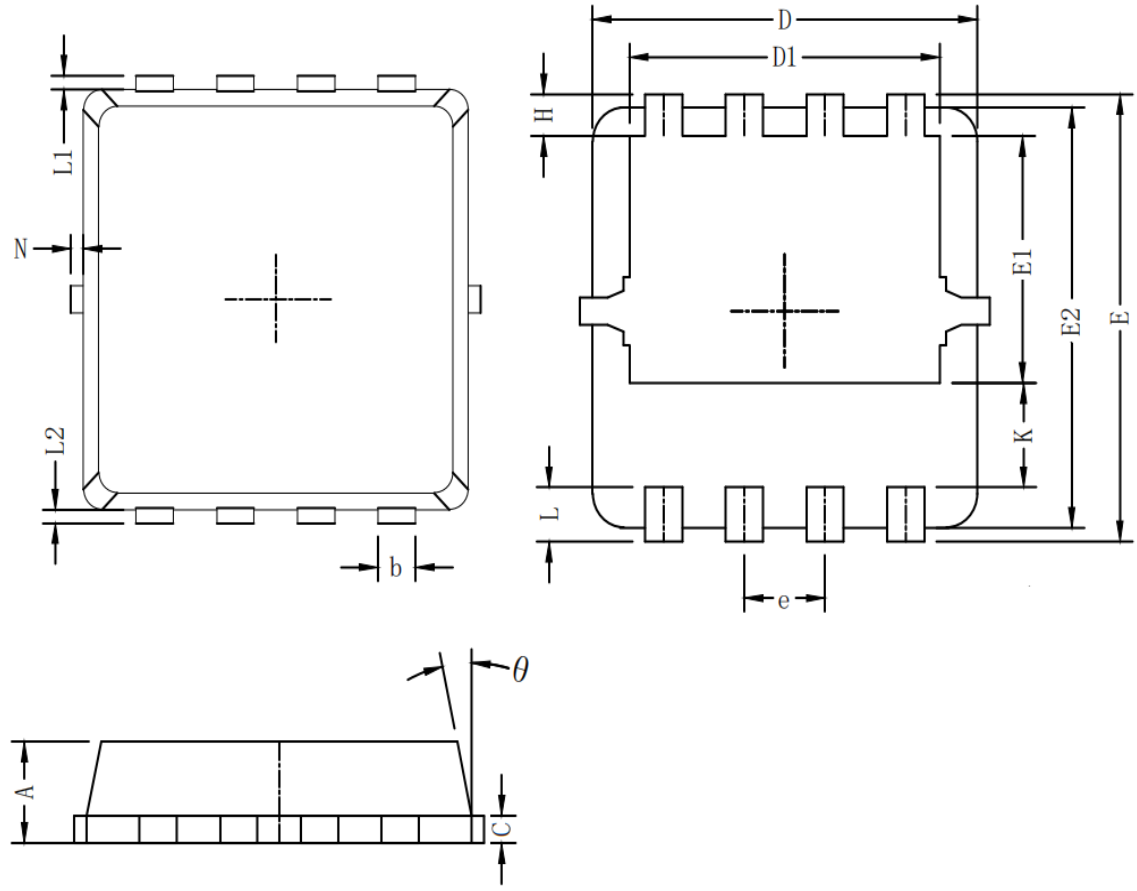
Gate Charge



Transfer Characteristics



Packaging information



Symbol	Dim in mm		
	min	typ	max
A	0.6	0.75	0.9
b	0.2	0.3	0.4
C	0.15	0.2	0.25
D	3	3.1	3.2
D1	2.3	2.45	2.6
E	3.15	3.3	3.45
E1	1.43	1.73	1.93
E2	2.9	3.05	3.2
e	0.65BSC		
H	0.2	0.35	0.5
K	0.57	0.77	0.87
L	0.3	0.4	0.5
L1/L2	0.1REF		
θ	8°	10°	13°
N	0		0.15

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