Ruichips®

RU20C10H

Complementary Advanced Power MOSFET

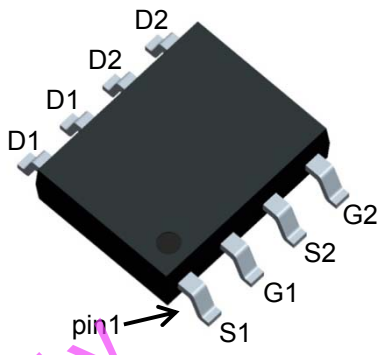
Features

• N-Channel
20V/10A,
$R_{DS\ (ON)}$ =12mΩ(Typ.) @ V_{GS}=4.5V
$R_{DS\ (ON)}$ =15mΩ(Typ.) @ V_{GS}=2.5V
• P-Channel
-20V/-10A,
$R_{DS\ (ON)}$ =20mΩ (Typ.) @ V_{GS}=-4.5V
$R_{DS\ (ON)}$ =30mΩ (Typ.) @ V_{GS}=-2.5V
• Reliable and Rugged
• Lead Free and Green Devices Available (RoHS Compliant)

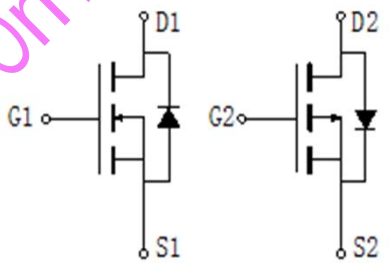
Applications

• Load Switch

Pin Description



SOP-8



Complementary MOSFET

Absolute Maximum Ratings

Symbol	Parameter		N-Channel	P-Channel	Unit
Common Ratings (T_A=25°C Unless Otherwise Noted)					
V_{DSS}	Drain-Source Voltage		20	-20	V
V_{GSS}	Gate-Source Voltage		±12	±12	
T_J	Maximum Junction Temperature		150	150	°C
T_{STG}	Storage Temperature Range		-55 to 150	-55 to 150	°C
I_S	Diode Continuous Forward Current	T_A=25°C	1	1	A
Mounted on Large Heat Sink					
I_{DP} ①	300μs Pulse Drain Current Tested	T_A=25°C	40	40	A
I_D ②	Continuous Drain Current(V_{GS}=±10V)	T_A=25°C	10	-10	A
		T_A=70°C	5	-5	
P_D	Maximum Power Dissipation	T_A=25°C	1.25	1.25	W
		T_A=70°C	0.75	0.75	
$R_{\theta JC}$	Thermal Resistance-Junction to Case		TBD	TBD	°C/W
$R_{\theta JA}$ ③	Thermal Resistance-Junction to Ambient		62.5	62.5	°C/W
Drain-Source Avalanche Ratings					
E_{AS} ④	Avalanche Energy, Single Pulsed		TBD	TBD	mJ

Electrical Characteristics (T_A=25°C Unless Otherwise Noted)

Symbol	Parameter	Test Condition		RU20C10H Min.	RU20C10H Typ.	RU20C10H Max.	Unit
Static Characteristics							
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V, I_{DS}=250μA	N	20			V
		V_{GS}=0V, I_{DS}=-250μA	P	-20			
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=20V, V_{GS}=0V	N			1	μA
		T_J=125°C	N			30	
		V_{DS}=-20V, V_{GS}=0V	P			-1	
		T_J=125°C	P			-30	
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_{DS}=250μA	N	0.5	0.7	1.1	V
		V_{DS}=V_{GS}, I_{DS}=-250μA	P	-0.4	0.7	-1.1	
I_{GSS}	Gate Leakage Current	V_{GS}=±12V, V_{DS}=0V	N			±10	μA
		V_{GS}=±12V, V_{DS}=0V	P			±10	
$R_{DS(ON)}$ ⑤	Drain-Source On-state Resistance	V_{GS}=4.5V, I_{DS}=5A	N		12	14	mΩ
		V_{GS}=-4.5V, I_{DS}=-5A	P		20	25	
		V_{GS}=2.5V, I_{DS}=4A	N		15	18	
		V_{GS}=-2.5V, I_{DS}=-4A	P		30	35	
Diode Characteristics							
V_{SD} ⑤	Diode Forward Voltage	I_{SD}=5A, V_{GS}=0V	N			1.2	V
		I_{SD}=-5A, V_{GS}=0V	P			-1.2	
t_{rr}	Reverse Recovery Time	N-Channel I_{SD}=10A, dI_{SD}/dt=100A/μs	N		15		ns
			P		17		
Q_{rr}	Reverse Recovery Charge	P-Channel I_{SD}=-10A, dI_{SD}/dt=100A/μs	N		8		nC
			P		23		
Dynamic Characteristics ⑥							
R_G	Gate Resistance	V_{GS}=0V,V_{DS}=0V,F=1MHz	N		1.5		Ω
			P		1.3		
C_{iss}	Input Capacitance	N-Channel V_{GS}=0V,V_{DS}=10V, Frequency=1.0MHz	N		590		pF
			P		640		
C_{oss}	Output Capacitance	P-Channel V_{GS}=0V,V_{DS}=-10V, Frequency=1.0MHz	N		125		
			P		135		
C_{rss}	Reverse Transfer Capacitance		N		90		
			P		85		

Electrical Characteristics (T_A=25°C Unless Otherwise Noted)

Symbol	Parameter	Test Condition		RU20C10H			Unit
				Min.	Typ.	Max.	
Dynamic Characteristics⑥							
$t_{d(ON)}$	Turn-on Delay Time	N-Channel V_{DD}=10V, I_{DS}=10A, V_{GEN}=4.5V, R_G=4.7Ω	N		8		ns
			P		9		
t_r	Turn-on Rise Time		N		15		
			P		15		
$t_{d(OFF)}$	Turn-off Delay Time	P-Channel V_{DD}=-10V, I_{DS}=-10A, V_{GEN}= -4.5V, R_G=4.7Ω	N		33		
			P		34		
t_f	Turn-off Fall Time		N		13		
			P		15		
Gate Charge Characteristics⑥							
Q_g	Total Gate Charge	N-Channel V_{DS}=16V, V_{GS}=4.5V, I_{DS}=10A	N		10		nC
			P		10		
Q_{gs}	Gate-Source Charge	P-Channel V_{DS}=-16V, V_{GS}= -4.5V, I_{DS}=-10A	N		1.4		
			P		2		
Q_{gd}	Gate-Drain Charge		N		3.6		
			P		3		

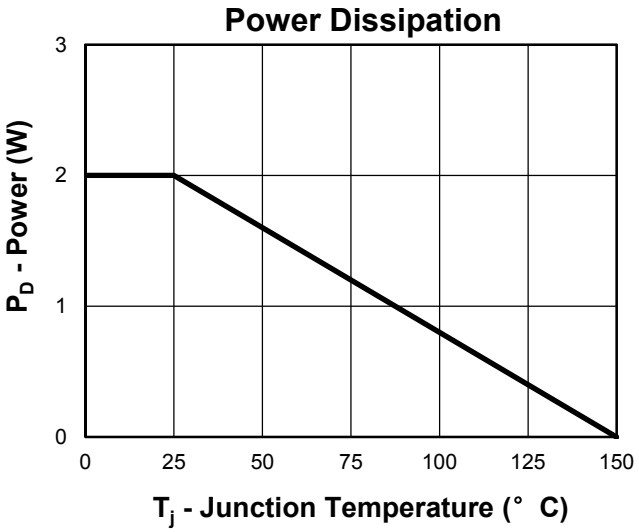
Notes:

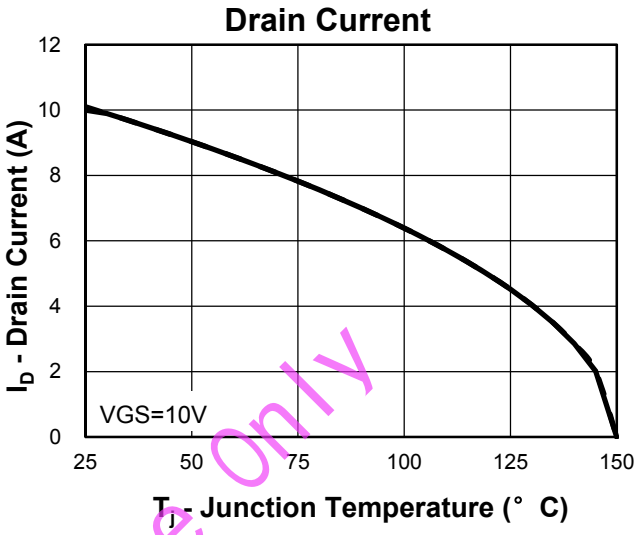
①Pulse width limited by safe operating area.
②Calculated continuous current based on maximum allowable junction temperature.
③When mounted on 1 inch square copper board, t≤10sec. The value in any given application depends on the user's specific board design.
④Limited by $T_{Jmax.}$ Starting T_J = 25°C.
⑤Pulse test;Pulse width≤300μs, duty cycle≤2%.
⑥Guaranteed by design, not subject to production testing.

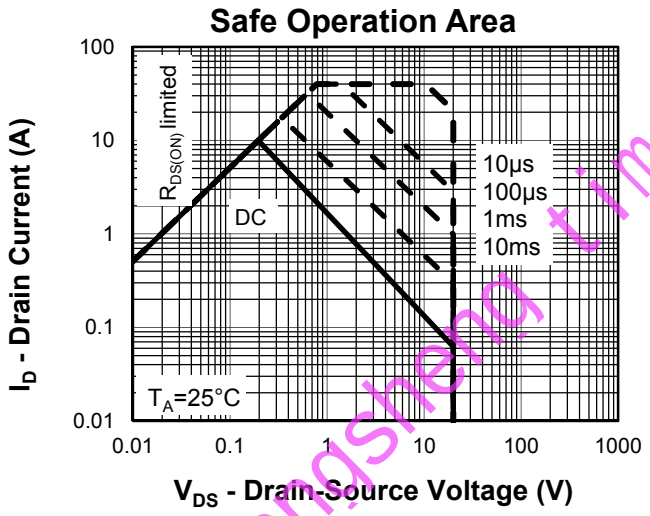
Ordering and Marking Information

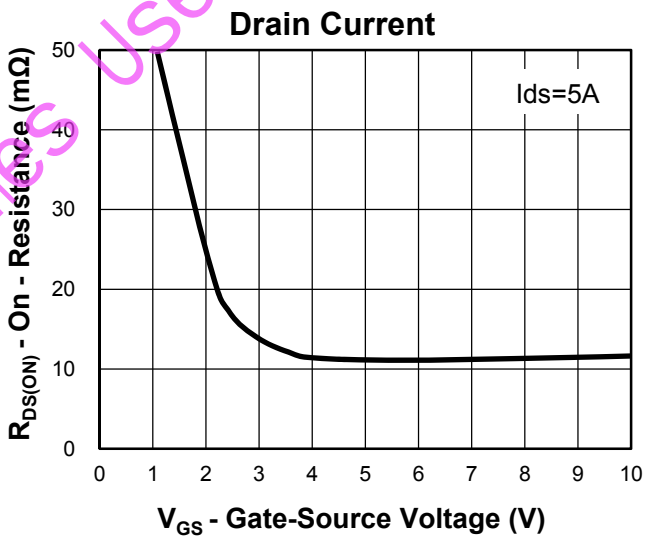
Device	Marking	Package	Packaging	Quantity	Reel Size	Tape width
RU20C10H	RU20C10H	SOP-8	Tape&Reel	2500	13”	12mm

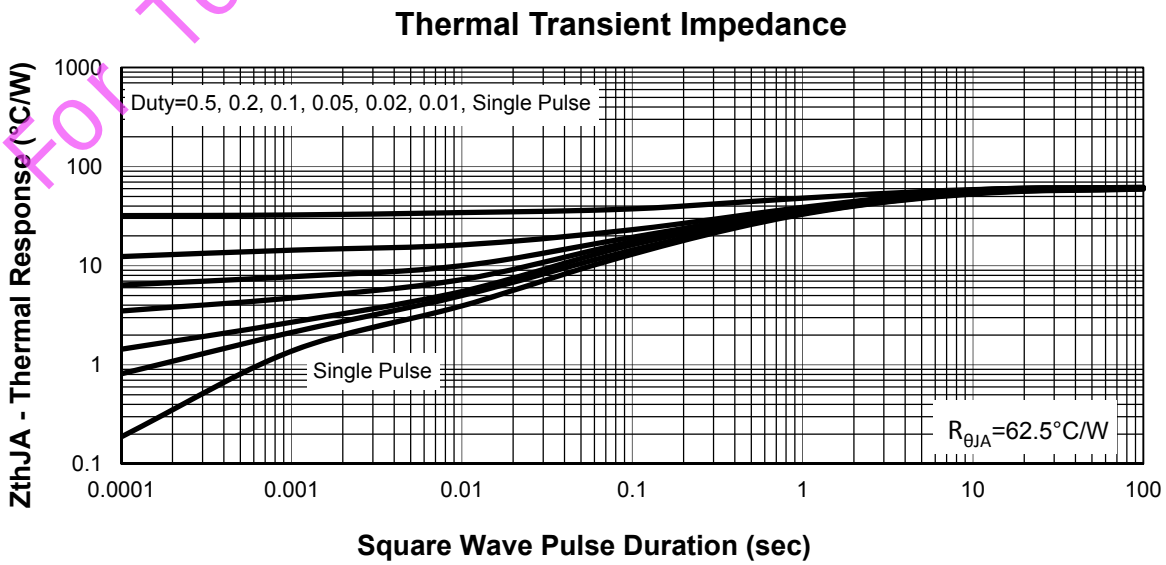
Typical Characteristics(N-Channel)





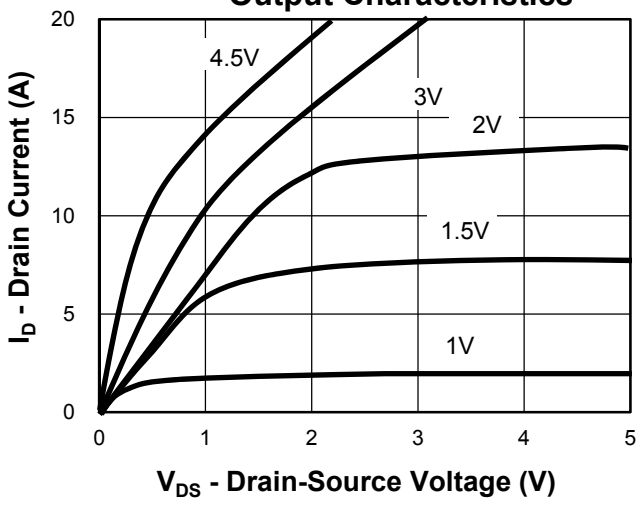




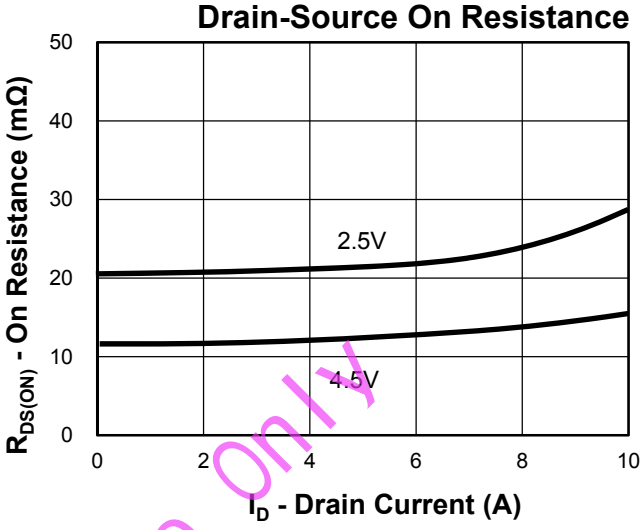


Typical Characteristics(N-Channel)

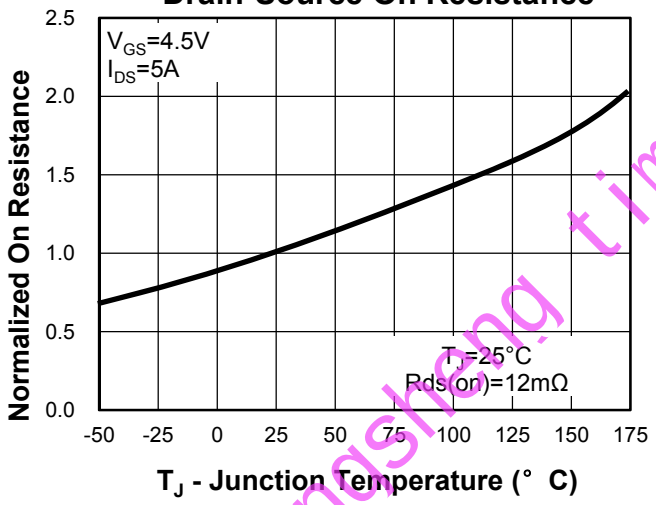
Output Characteristics



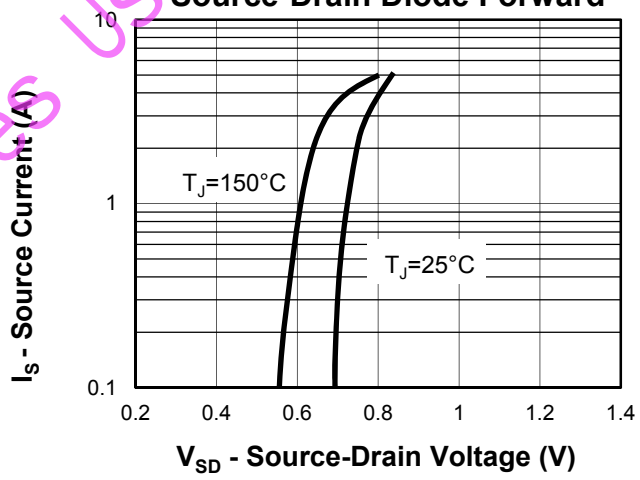
Drain-Source On Resistance



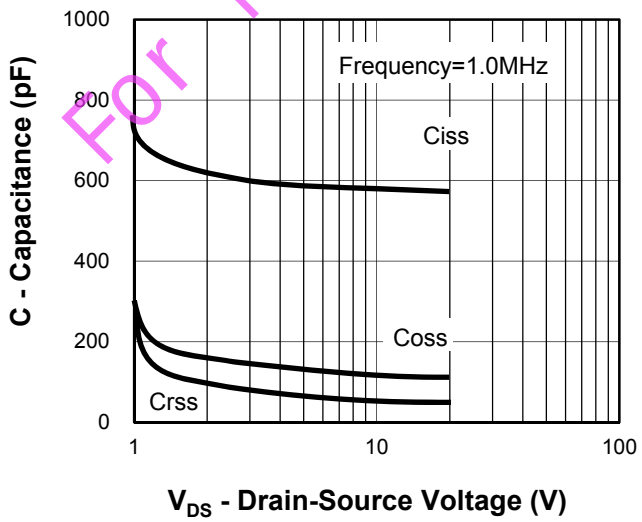
Drain-Source On Resistance



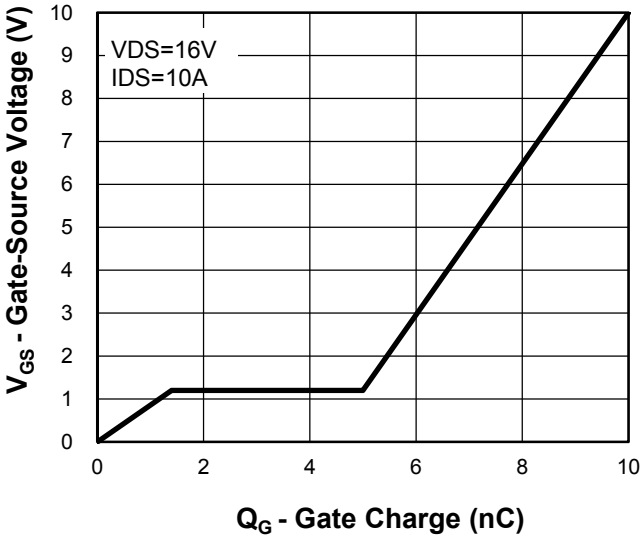
Source-Drain Diode Forward



Capacitance

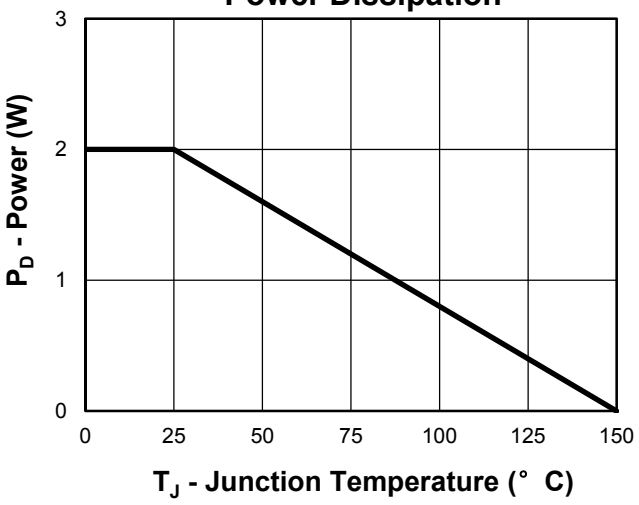


Gate Charge

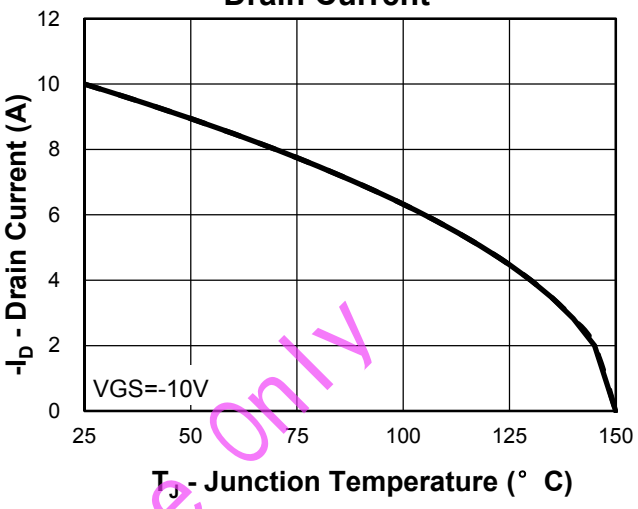


Typical Characteristics(P-Channel)

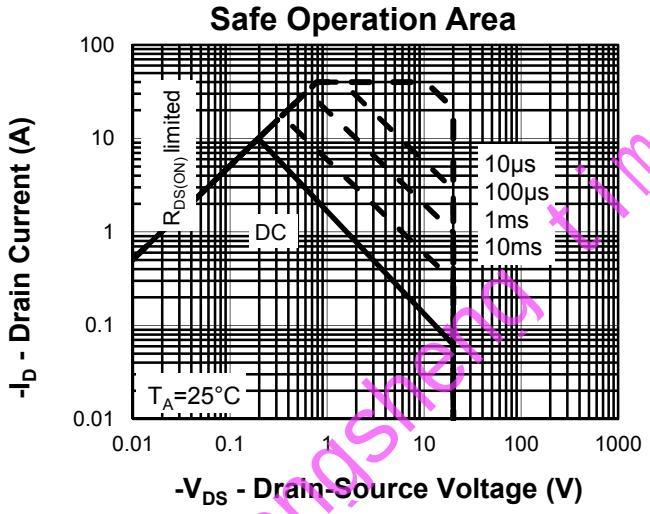
Power Dissipation



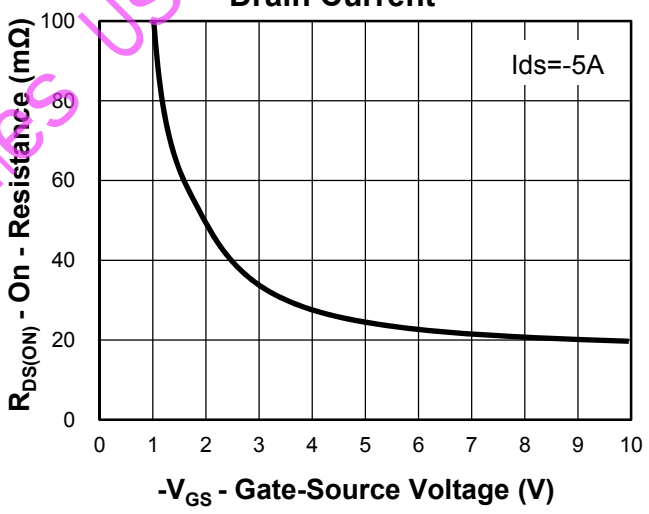
Drain Current



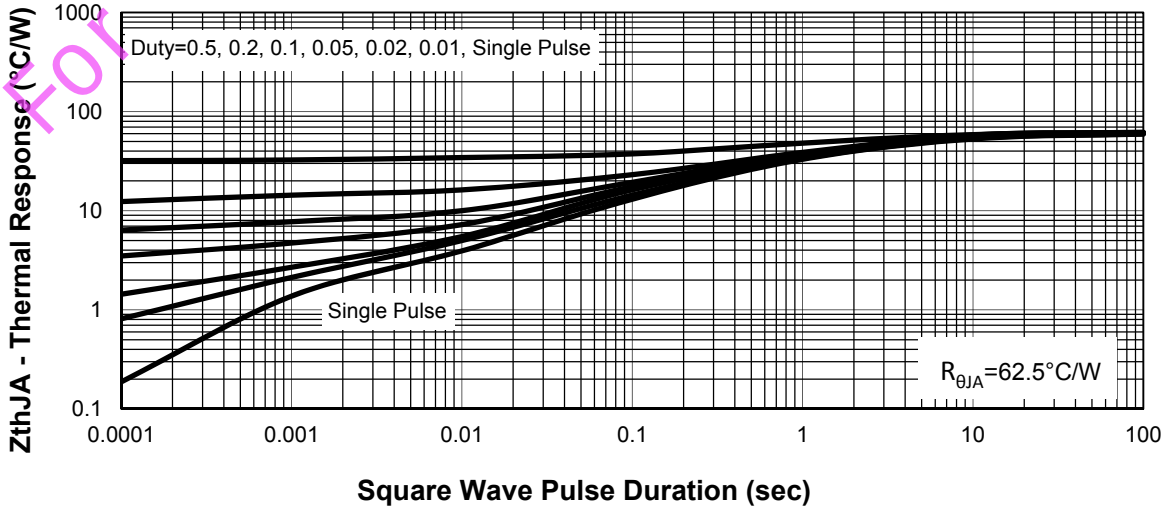
Safe Operation Area



Drain Current

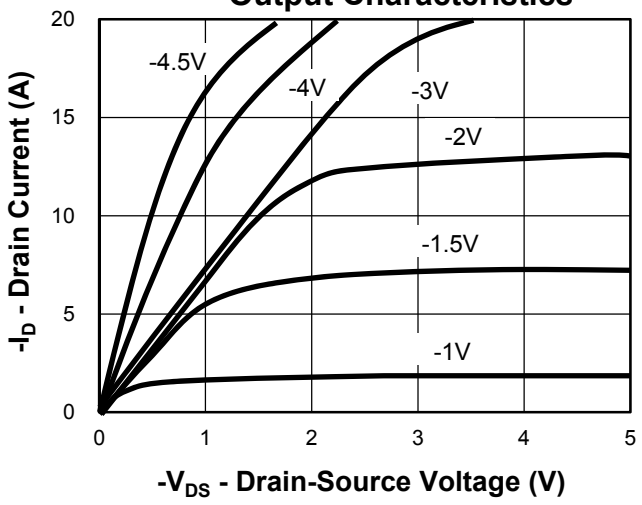


Thermal Transient Impedance

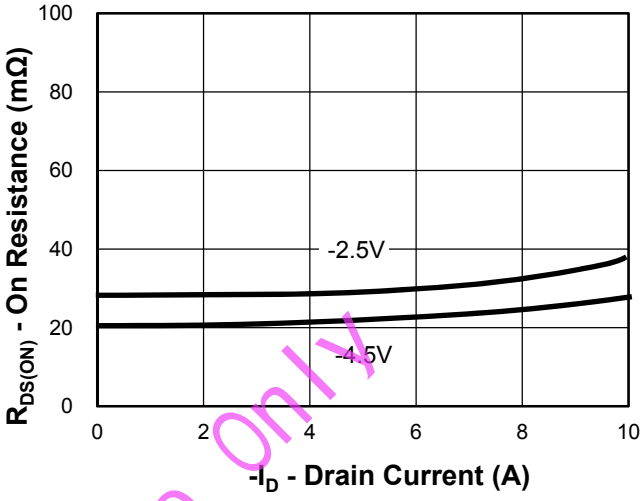


Typical Characteristics(P-Channel)

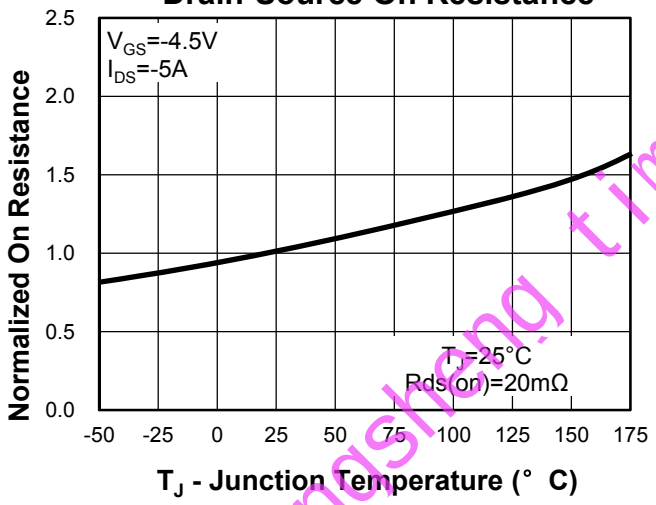
Output Characteristics



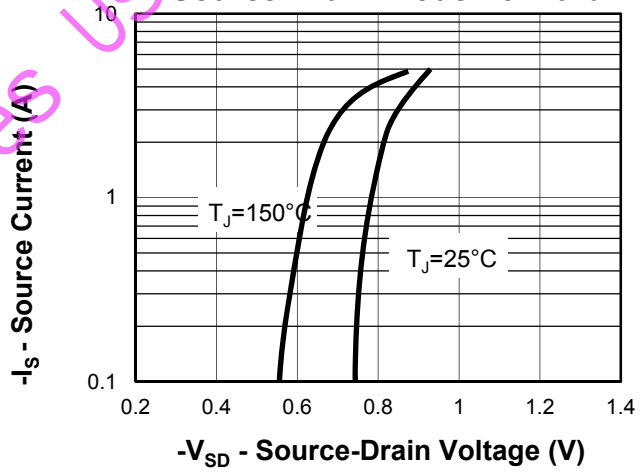
Drain-Source On Resistance



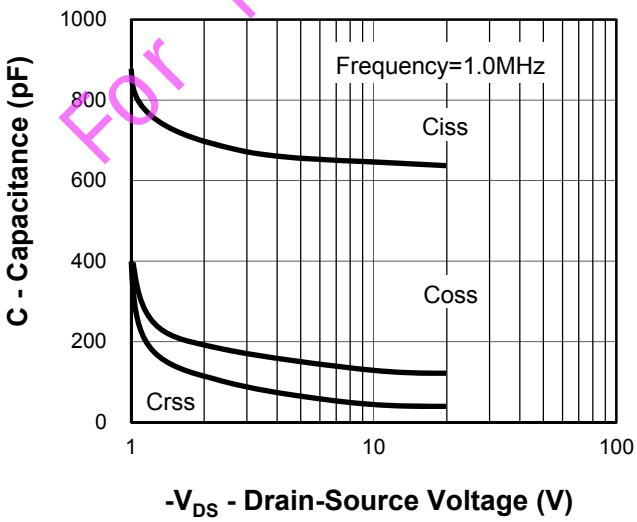
Drain-Source On Resistance



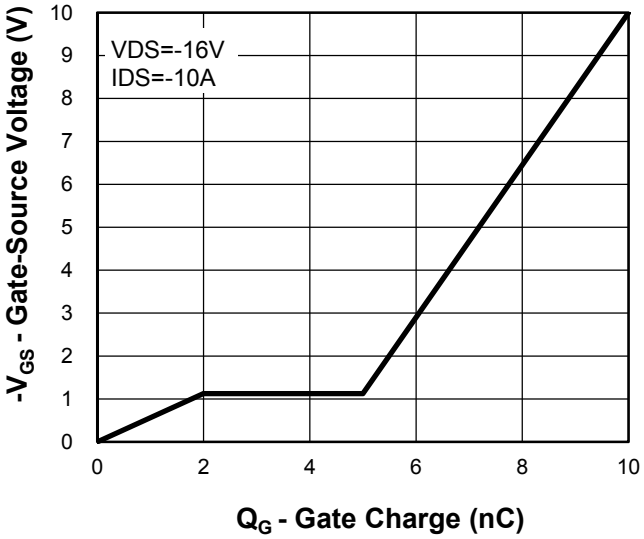
Source-Drain Diode Forward



Capacitance

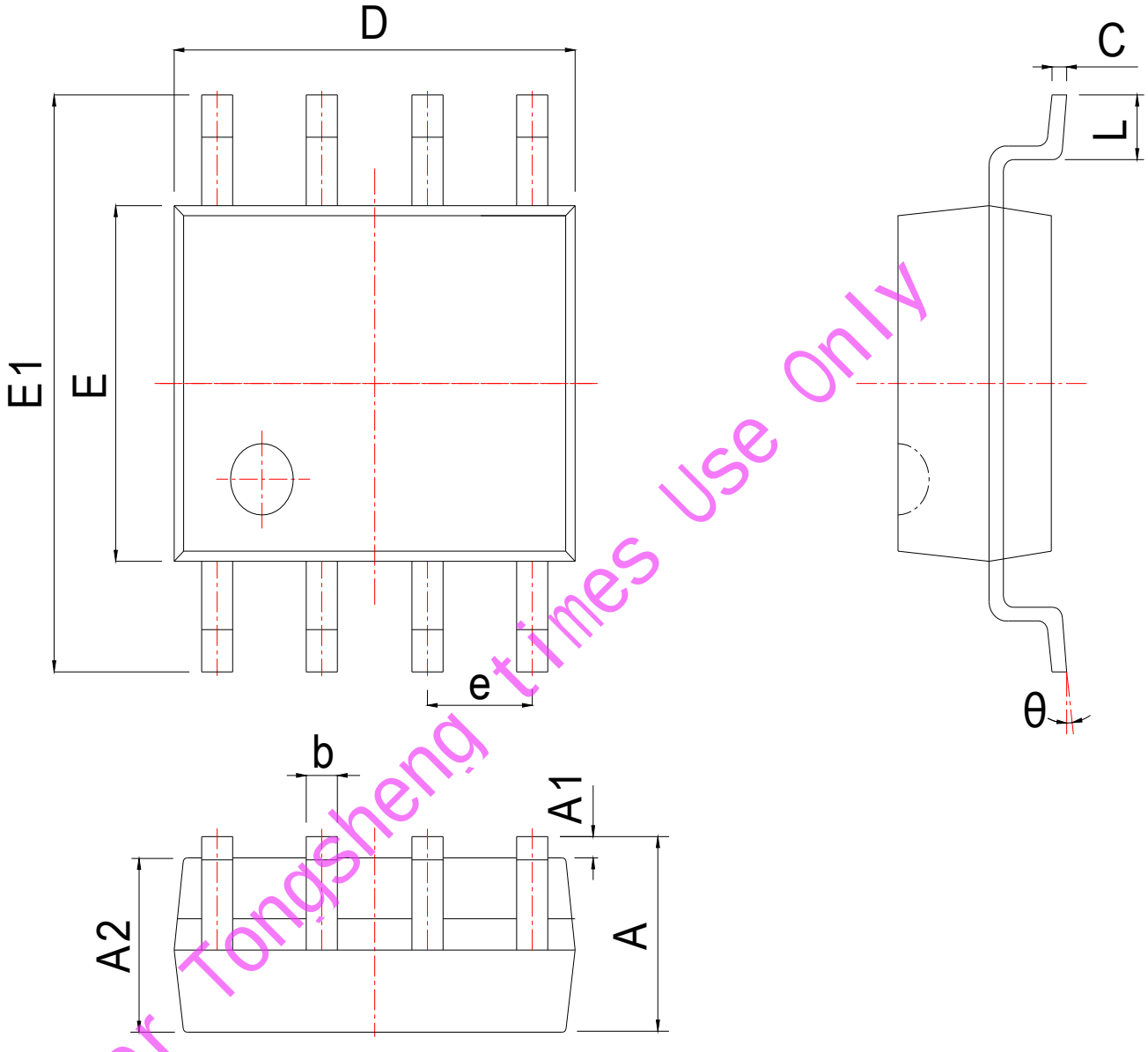


Gate Charge



Package Information

SOP-8



SYMBOL	MM			INCH		
	MIN	NOM	MAX	MIN	NOM	MAX
A	1.300	1.525	1.750	0.051	0.060	0.069
A1	0.050	0.150	0.250	0.002	0.006	0.010
A2	1.350	1.450	1.550	0.053	0.057	0.061
b	0.330	0.420	0.510	0.013	0.017	0.020
c	0.170	0.210	0.250	0.007	0.008	0.010
D	4.700	4.900	5.100	0.185	0.193	0.201
E	3.800	3.900	4.000	0.150	0.154	0.157
E1	5.800	6.000	6.200	0.228	0.236	0.244
e	1.270 BSC			0.050 BSC		
L	0.400	0.835	1.270	0.016	0.033	0.050
θ	0°		8°	0°		8°

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