CSx65R380A

N-Channel MOSFET

Features:

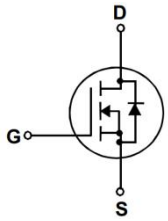
RoHS Compliant
Very low FOM $R_{DS(on)}$×Q_g
100% avalanche tested

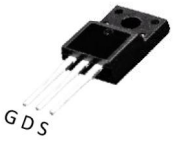
Applications:

- Switch Mode Power Supply (SMPS)
- Uninterruptible Power Supply (UPS)
- Power Factor Correction (PFC)

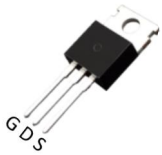
V_{DSS}(Min.)	650 V
$R_{DS(ON)}$(Typ.)	350mΩ
I_D	11 A

Schematic and Package Information:





TO-220F
CSF65R380A

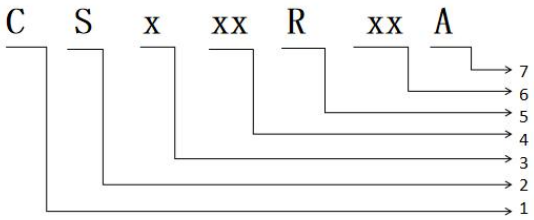


TO-220CB
CSP65R380A

TO-263
CSB65R380A

Marking on the body:

Cool MOSFET tube naming rules



1：CYS for short
2：S - Super junction MOS
3：Package
F：TO-220F P：TO-220CB D：TO-252
U：TO-251 W：TO-247S/3P B：TO-263
G：DFN5*6 K：DFN3.3*3.3 E：SOP-8
4：Maximum breakdown voltage (10% of BVdss)
5：R: RDS(on)
6：RDS(on) MAX
7：Series no.

Absolute Maximum Ratings T_C=25℃ unless otherwise specified

Parameter	Symbol	CSx65R380A		Units
		TO-220F	TO-220CB/263	
Drain-to-Source Voltage	V_{DSS}	650		V
Continuous Drain Current	I_D	11		A
Pulsed Drain Current, V_{GS}@10V (NOTE *1)	I_{DM}	31		A
Power Dissipation	P_D	30	82	W
Derating Factor above 25℃		0.25	0.62	W/℃
Gate-to-Source Voltage	V_{GS}	±20		V
Single Pulse Avalanche Energy（L=10mH）	E_{AS}	133		mJ
Peak Diode Recovery dv/dt	dv/dt	15		V/ns
Maximum Temperature for Soldering	T_L	150		℃
Operating Junction and Storage Temperature Range (NOTE *2)	T_J and T_{STG}	150，-55 to150		℃

Thermal Resistance

Parameter	Symbol	Typ.		Units
		TO-220F	TO-220CB/TO-263	
Junction to Case	$R_{\theta JC}$	4.1	1.5	℃/W
Junction to Ambient	$R_{\theta JA}$	80	62	℃/W

Electrical Characteristics TJ=25℃ unless otherwise specified

Parameter	Symbol	Min.	Typ.	Max.	Units	Test Conditions
Drain-to-Source Breakdown Voltage	BV_{DSS}	655	--	--	V	V_{GS}=0V, I_D=250μA
Gate Threshold Voltage	$V_{GS(TH)}$	2.0	2.9	4.0	V	V_{DS}=V_{GS},I_D=370μA
StaticDrain-to-Source On-Resistance	$R_{DS(ON)}$	--	350	380	mΩ	V_{GS}=10V, I_D=3.4A
Drain-to-Source Leakage Current	I_{DSS}	--	--	1	uA	V_{DS}=650V,V_{GS}=0V T_J=25℃
		--	--	100		V_{DS}=520V,V_{GS}=0V T_J=125℃
Gate-to-Source Forward Leakage	I_{GSS}	--	--	+100	nA	V_{GS}=+20V
Gate-to-Source Reverse Leakage		--	--	-100		V_{GS}= -20V
Gate Resistance	R_G	--	11	--	Ω	f =1.0MHz

Dynamic Characteristics Essentially independent of operating temperature

Parameter	Symbol	Min.	Typ.	Max.	Units	Test Conditions
Input Capacitance	C_{iss}	--	990	--	pF	V_{GS}=0V,V_{DS}=400V f =1MHz
Output Capacitance	C_{oss}	--	25	--		
Reverse Transfer Capacitance	C_{rss}	--	2.5	--		
Total Gate Charge	Q_g	--	22.6	--	nC	I_D=4.8A,V_{DD}=520V V_{GS} = 10V
Gate-to-Source Charge	Q_{gs}	--	4.6	--		
Gate-to-Drain (“Miller”) Charge	Q_{gd}	--	6.4	--		
Turn-on Delay Time	$t_{d(ON)}$	--	28	--	ns	V_{DD}=325V, I_D=4.8A, V_G=10V R_G=25Ω
Rise Time	t_{rise}	--	20	--		
Turn-Off Delay Time	$t_{d(OFF)}$	--	114	--		
Fall Time	T_{fall}	--	17	--		

Source-Drain Diode Characteristics Tc=25℃ unless otherwise specified

Parameter	Symbol	Min.	Typ.	Max.	Units	Test Conditions
Continuous Drain-Source Diode Forward Current	I_S	--	--	11	A	T_C=25℃
Pulsed Drain-Source Diode Forward Current	I_{SM}	--	--	31		
Diode Forward Voltage	V_{SD}	--	--	1.3	V	I_{SD}=4.8A, V_{GS}=0V
Reverse Recovery Time	t_{rr}	--	250	--	ns	I_F= I_S di/dt=100A/us
Reverse Recovery Charge	Q_{rr}	--	2600	--	nC	

Notes:
1. T_J = +25℃ to +150℃.I_{AS}=1.8A,V_{DD}=50V,R_G=25Ω
2. Repetitive rating; pulse width limited by maximum junction temperature.
3. Pulse width < 300μs; duty cycle < 2%.

Typical Characteristics

Figure 1. Typical Output Characteristics

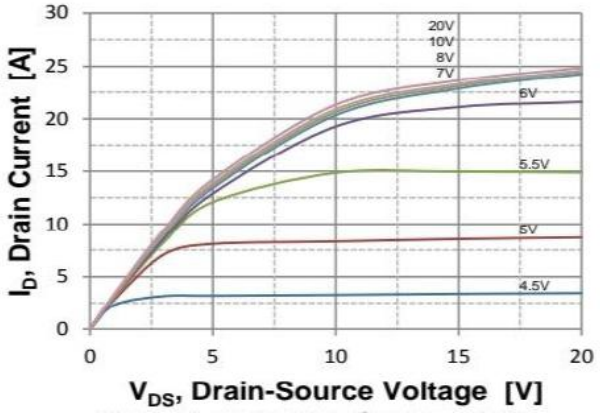


Figure 2. Body Diode Forward Voltage

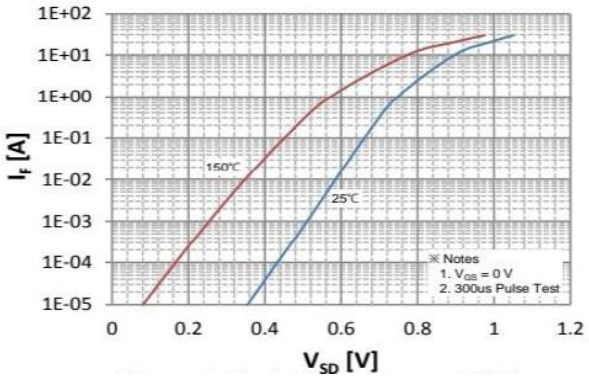


Figure 3. **On-Resistance vs. Drain Current**

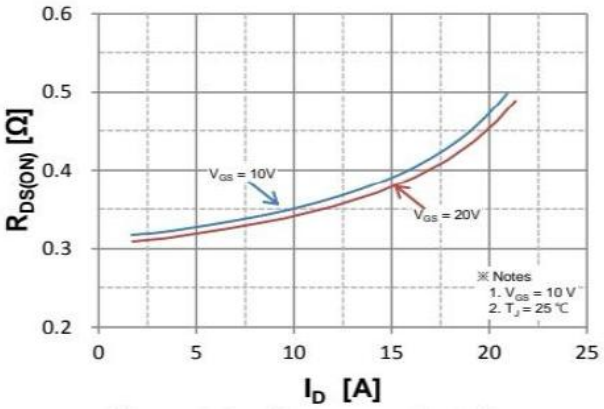


Figure 4. **Threshold Voltage vs. Junction Temperature**

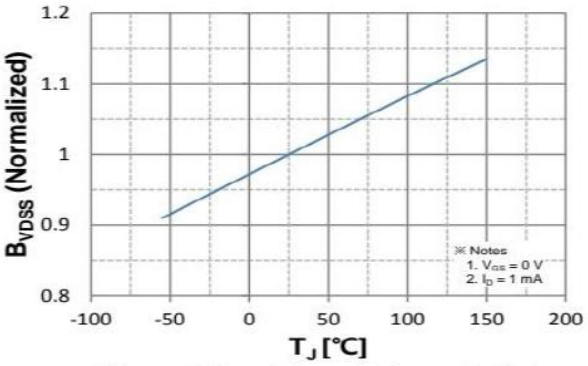


Figure 5. **Transfer Characteristics**

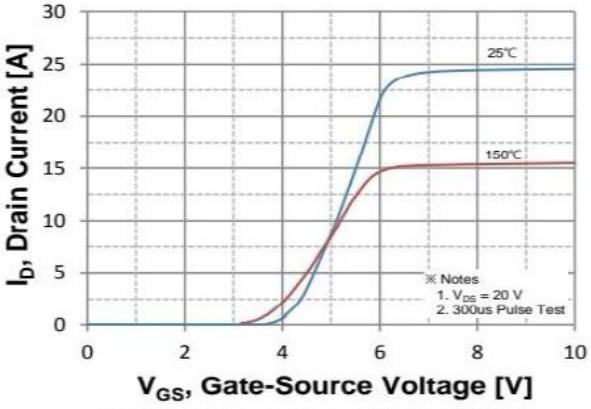


Figure 6. On-Resistance vs. Temperature

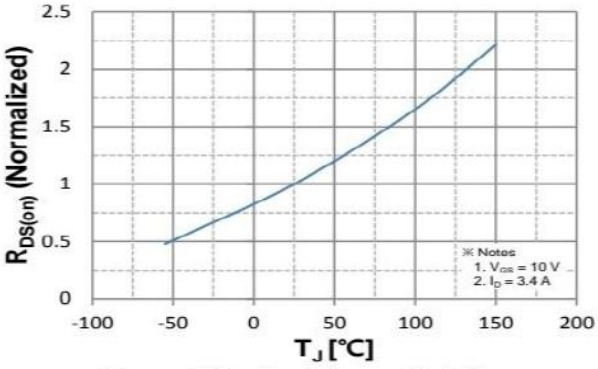


Figure 7. Capacitance

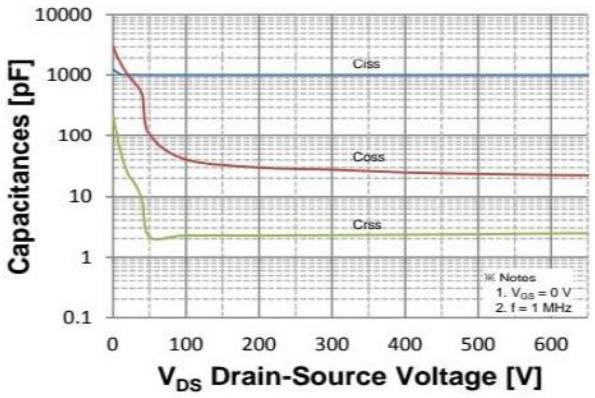


Figure 8. Gate Charge

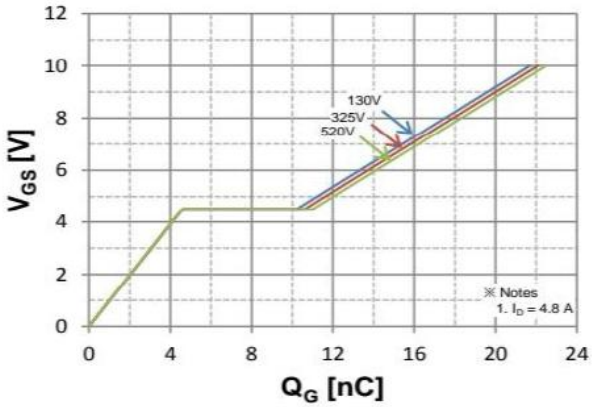


Figure 9. Safe operation area for

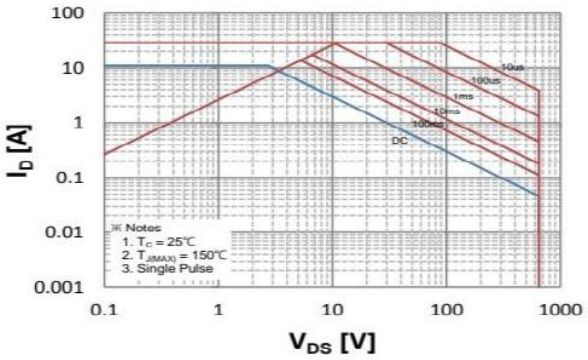


Figure 10. Drain Current vs. Case Temperature

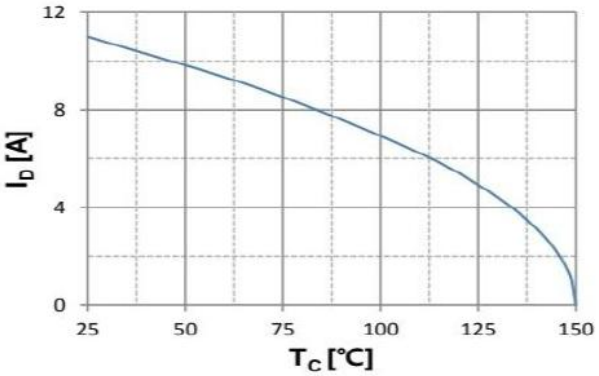
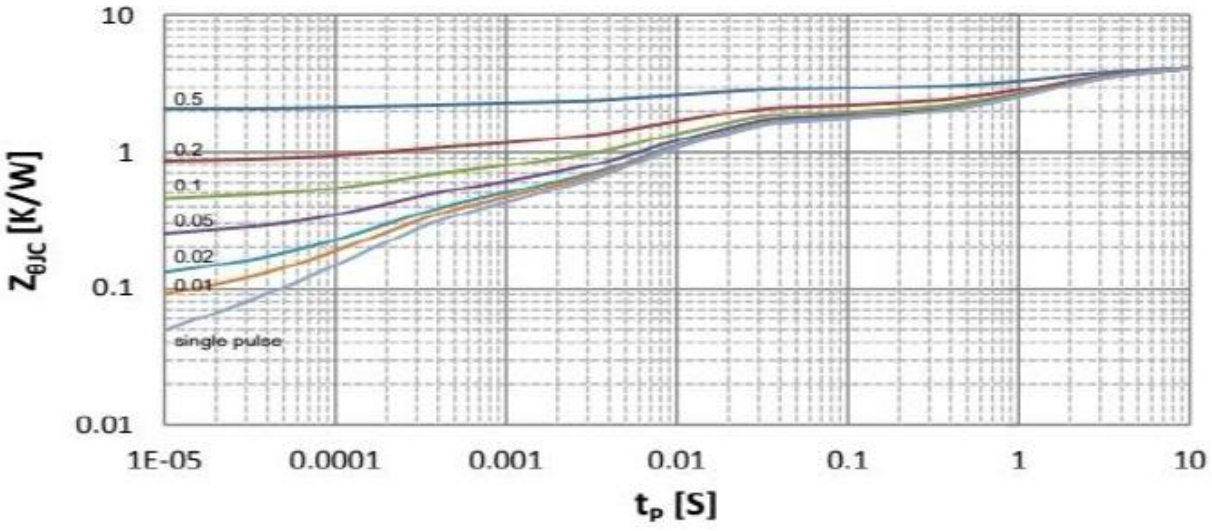
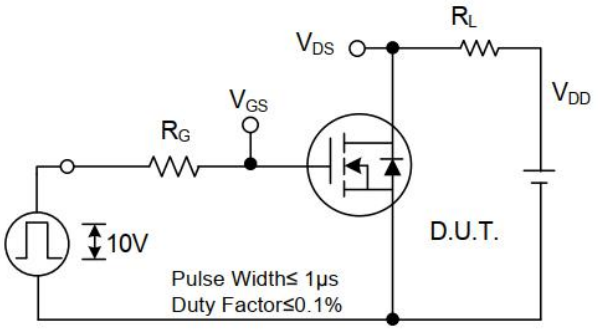


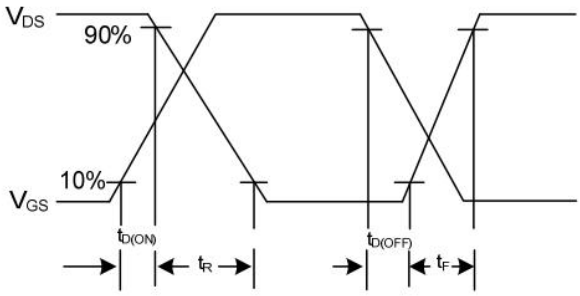
Figure 11. Transient Thermal Response Curve



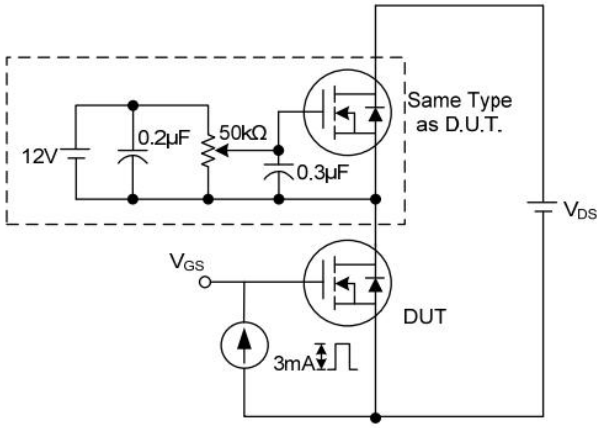
Test Circuits and Waveform



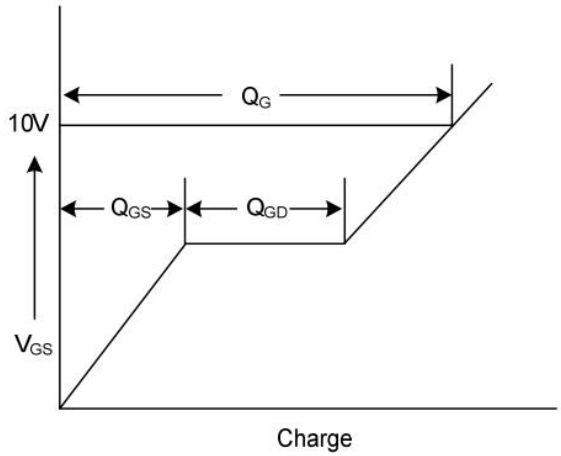
Switching Test Circuit



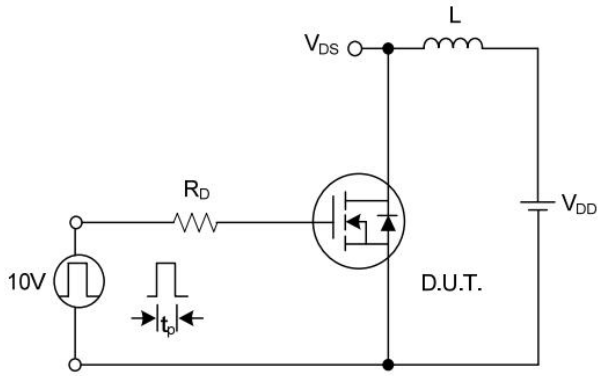
Switching Waveforms



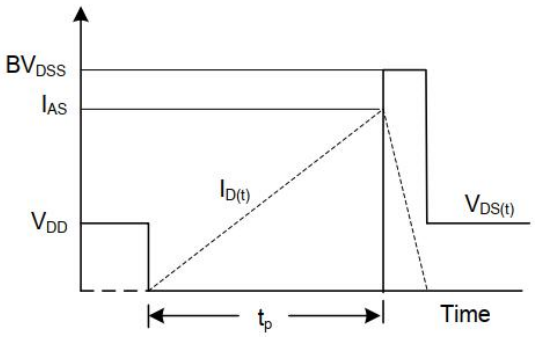
Gate Charge Test Circuit



Gate Charge Waveform



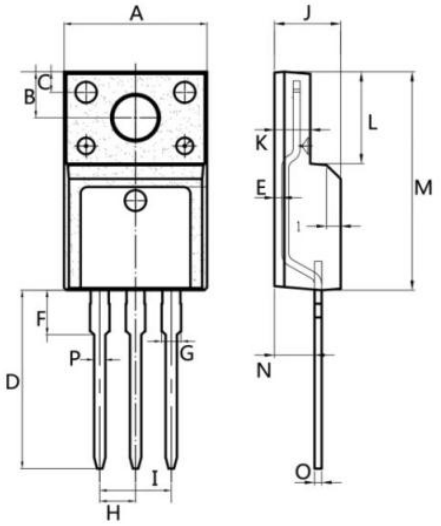
Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

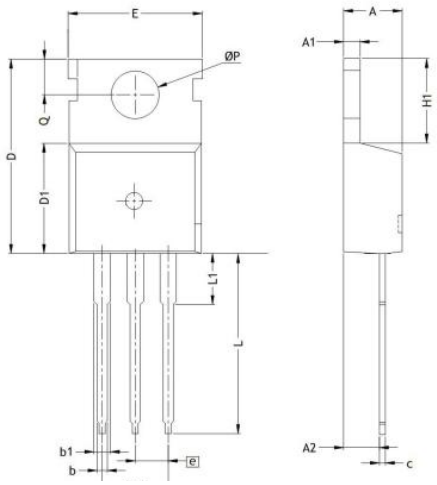
PACKAGE MECHANICAL DATA（Unit：mm）：

TO-220F



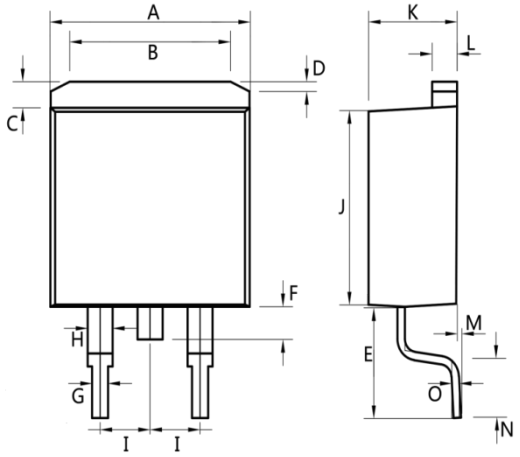
DIM	Min.	Max.
A	9.9	10.3
B	2.9	3.5
C	1.15	1.45
D	12.75	13.45
E	0.55	0.75
F	3.1	3.5
G	1.25	1.45
H	Typ 2.54	
I	Typ 5.08	
J	4.55	4.75
K	2.4	2.7
L	6.35	6.75
M	15.0	16.0
N	2.75	3.15
O	0.45	0.60
P	0.7	0.9
All Dimensions in millimeter		

TO-220CB



DIM	Min.	Max.
A	4.25	4.65
A1	1.25	1.35
A2	2.35	2.55
b	0.7	0.9
b1	1.15	1.75
c	0.45	0.6
D	14.35	15.95
D1	8.8	9.5
E	9.9	10.3
e	Typ 2.54	
e1	Typ 5.08	
H1	6.3	6.5
L	12.85	13.5
L1	2.85	3.25
Q	2.7	2.9
ΦP	3.5	3.9
All Dimensions in millimeter		

TO-263



DIM	Min.	Max.
A	10.1	10.2
B	7.4	7.6
C	1.3	1.5
D	0.55	0.75
E	5.0	6.0
F	1.4	1.6
G	0.78	0.86
H	1.2	1.3
I	Typ 2.54	
J	8.4	8.6
K	4.45	4.55
L	1.25	1.35
M	0.02	0.1
N	2.4	2.8
O	0.36	0.4
All Dimensions in millimeter		

Statement:

- We reserve the right to change the manual without prior notice! Customers should obtain the latest version of the information before placing an order, and verify that the relevant information is complete and up-to-date.
- Any semiconductor product has the possibility of failure or failure under specific conditions. The buyer has the responsibility to comply with safety standards and take safety measures when using Silan product for system design and complete machine manufacturing, so as to avoid the occurrence of personal injury or property loss caused by potential failure risk!
- Product promotion will never end, our company will wholeheartedly provide customers with more excellent products!