

N-Channel MOSFET

Features:

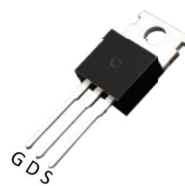
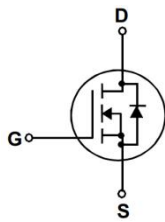
- ◆ RoHS Compliant
- ◆ Low ON Resistance
- ◆ Low Input Capacitance
- ◆ Low Miller Charge
- ◆ Low Input/Output Leakage

Applications:

Lithium - Ion Secondary Batteries
Load Switch
DC-DC converters and Off line UPS

$V_{DSS}(\text{Min.})$	60 V
$R_{DS(ON)}(\text{Typ.})$	3.0mΩ
I_D	160 A

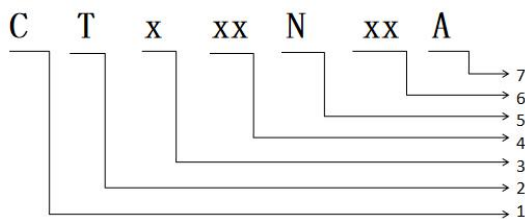
Schematic and Package Information:



TO-220CB
CSP03N06H

Marking on the body:

MV/LV MOSFET tube naming rules



- 1: CYS for short
- 2: T: Trench S: SGT
- 3: Package
F: TO-220F P: TO-220 D: TO-252
U: TO-251 W: TO-247S/3P E: SOP-8
G: DFN5*6 K: DFN3.3*3.3
- 4: $R_{DS(on)}$ Typ
- 5: N: N channel P: P channel
- 6: Maximum breakdown voltage (10% of BV_{dss})
- 7: Series no.

Absolute Maximum Ratings $T_C=25^\circ\text{C}$ unless otherwise specified

Parameter	Symbol	CSx03N06H	Units
		TO-220CB	
Drain-to-Source Voltage	V_{DSS}	60	V
Gate-to-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current	I_D	160	A
Pulsed Drain Current, $V_{GS}@10V$ (NOTE *1)	I_{DM}	480	A
Power Dissipation	P_D	83	W
Derating Factor above 25°C		168	
Single Pulse Avalanche Energy (L=0.5mH)	E_{AS}	169	mJ
Single Pulse Avalanche Current (L=0.5mH)	I_{AS}	26	A
Peak Diode Recovery dv/dt	dv/dt	5	V/ns
Maximum Temperature for Soldering	T_L	300	$^\circ\text{C}$
Operating Junction and Storage Temperature Range (NOTE *2)	T_J and T_{STG}	150, -55 to 150	

Thermal Resistance

Parameter	Symbol	Typ.	Units
		TO-220CB	
Junction to Case	$R_{\theta JC}$	1.8	$^{\circ}\text{C/W}$
Junction to Ambient	$R_{\theta JA}$	62	$^{\circ}\text{C/W}$

Electrical Characteristics $T_J=25^{\circ}\text{C}$ unless otherwise specified

Parameter	Symbol	Min.	Typ.	Max.	Units	Test Conditions
Drain-to-Source Breakdown Voltage	BV_{DSS}	60	--	--	V	$V_{GS}=0V, I_D=250\mu A$
Gate Threshold Voltage	$V_{GS(TH)}$	2.0	2.85	4.0	V	$V_{DS}=V_{GS}, I_D=250\mu A$
Static Drain-to-Source On-Resistance	$R_{DS(ON)}$	--	3.0	3.5	m Ω	$V_{GS}=10V, I_D=20A$
Drain-to-Source Leakage Current	I_{DSS}	--	--	1	uA	$V_{DS}=60V, V_{GS}=0V$ $T_J=25^{\circ}\text{C}$
		--	--	100		$V_{DS}=48V, V_{GS}=0V$ $T_J=125^{\circ}\text{C}$
Gate-to-Source Forward Leakage	I_{GSS}	--	--	+100	nA	$V_{GS}=+20V$
Gate-to-Source Reverse Leakage		--	--	-100		$V_{GS}=-20V$

Dynamic Characteristics Essentially independent of operating temperature

Parameter	Symbol	Min.	Typ.	Max.	Units	Test Conditions
Input Capacitance	C_{iss}	--	4380	--	pF	$V_{GS}=0V, V_{DS}=30V$ $f=1.0\text{MHz}$
Output Capacitance	C_{oss}	--	807	--		
Reverse Transfer Capacitance	C_{rss}	--	30.9	--		
Total Gate Charge	Q_g	--	50	--	nC	$I_D=20A, V_D=30V$ $V_{GS}=10V$
Gate-to-Source Charge	Q_{gs}	--	15	--		
Gate-to-Drain ("Miller") Charge	Q_{gd}	--	2.5	--		
Turn-on Delay Time	$t_{d(ON)}$	--	12	--	ns	$V_D=30V, I_D=20A,$ $V_G=10V R_G=3\Omega$
Rise Time	t_{rise}	--	4	--		
Turn-Off Delay Time	$t_{d(OFF)}$	--	50	--		
Fall Time	T_{fall}	--	6	--		

Source-Drain Diode Characteristics $T_c=25^{\circ}\text{C}$ unless otherwise specified

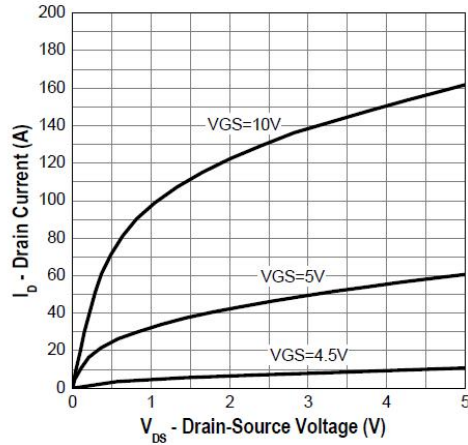
Parameter	Symbol	Min.	Typ.	Max.	Units	Test Conditions
Diode Forward Voltage	V_{SD}	--	--	1.3	V	$I_{SD}=1A, V_{GS}=0V$
Reverse Recovery Time	t_{rr}	--	22	--	ns	$I_F=20A$ $di/dt=100A/us$
Reverse Recovery Charge	Q_{rr}	--	120	--	nC	

Notes:

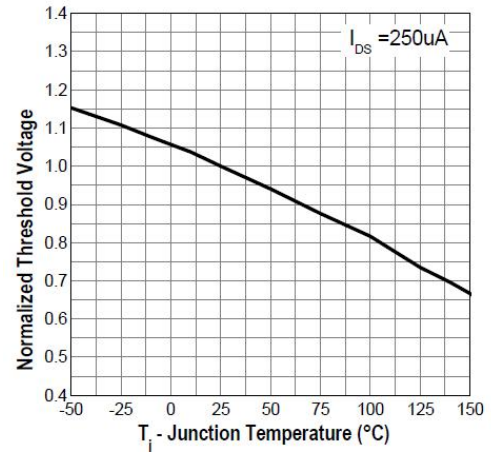
- $T_J = +25^{\circ}\text{C}$ to $+150^{\circ}\text{C}$.
- Repetitive rating; pulse width limited by maximum junction temperature.
- Pulse width $< 300\mu s$; duty cycle $< 2\%$.

Typical Characteristics

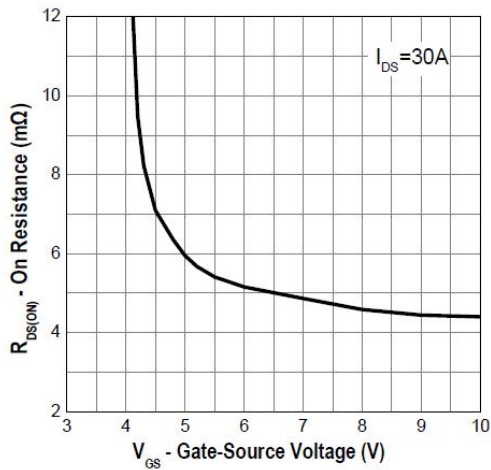
Output Characteristics



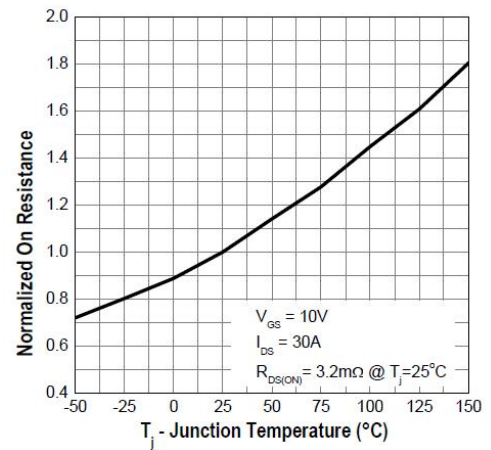
Gate Threshold Voltage



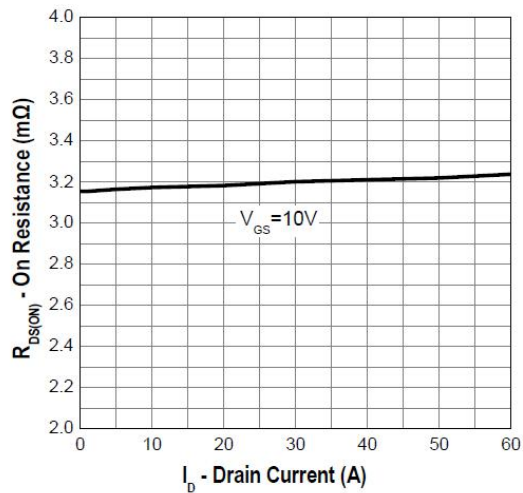
Gate-Source On Resistance



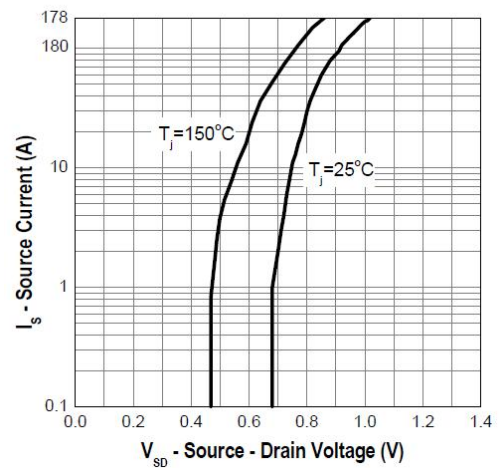
Drain-Source On Resistance



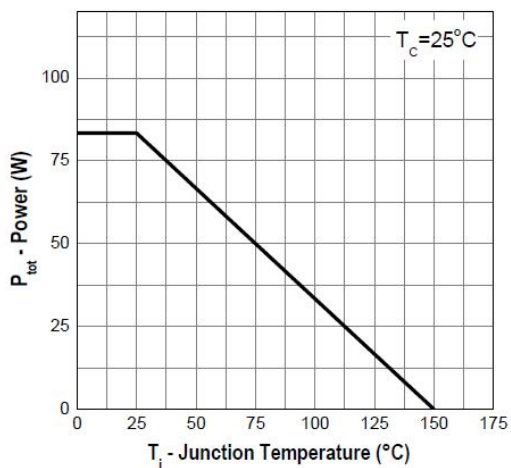
Drain-Source On Resistance



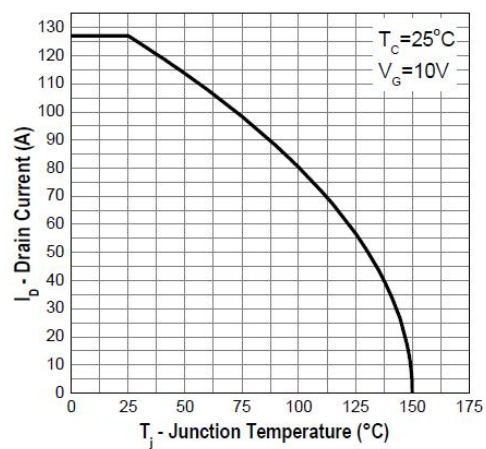
Source-Drain Diode Forward



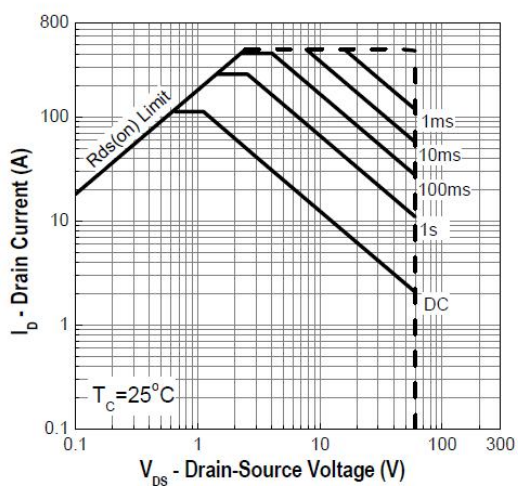
Power Dissipation



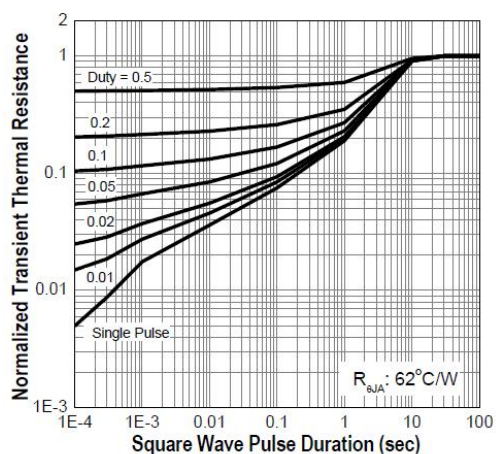
Drain Current



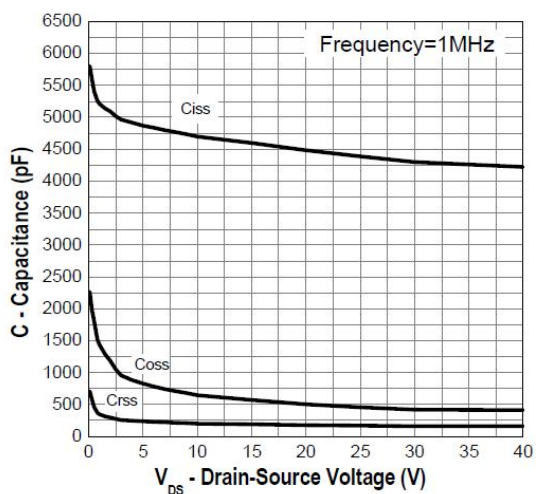
Safe Operation Area



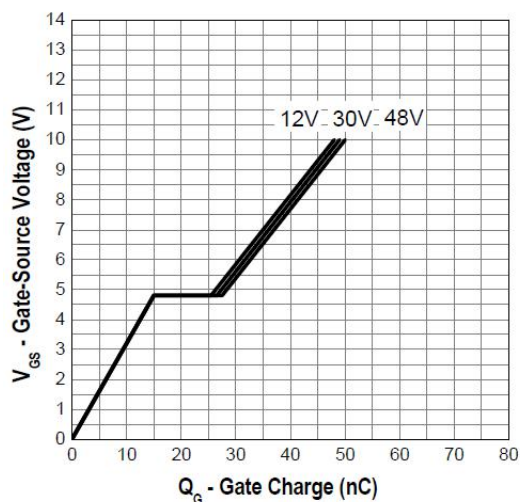
Transient Thermal Impedance



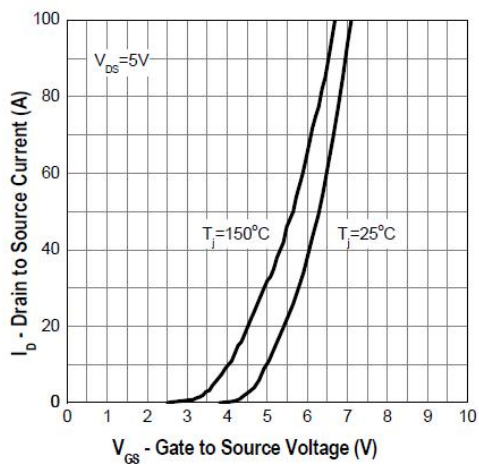
Capacitance



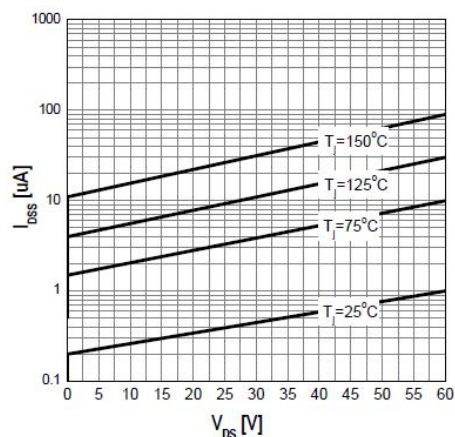
Gate Charge



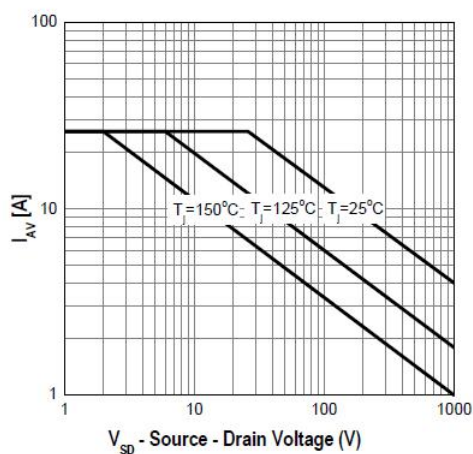
Typical Transfer Characteristics



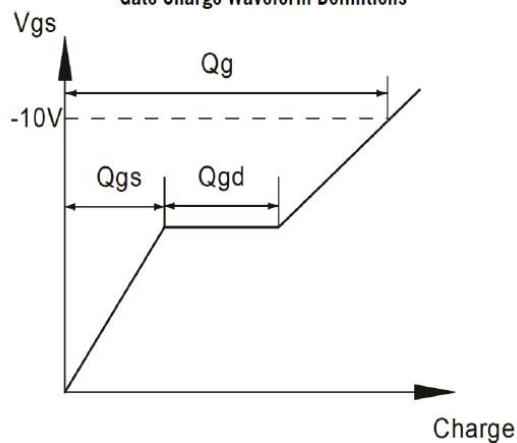
Drain-Source Leakage Current



Avalanche Characteristics

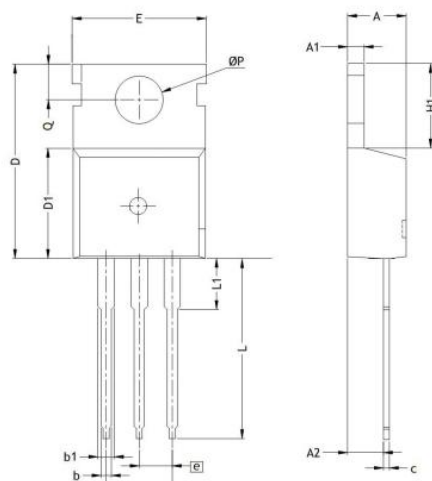


Gate Charge Waveform Definitions



PACKAGE MECHANICAL DATA (Unit: mm):

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		

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!
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