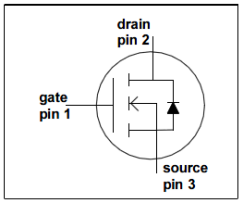
650V 18A Power MOSFET

■Description

XCH Semiconductor(XCH)has series Multi-EPI Super-Junction power MOSFET platforms for voltage up 500V to 1000 volts, bothwith design service and manufacturing capability, including cell,termination design and simulation.

The GSx07N65E is a Low voltage N channel Multi-EPI Super-Junction power MOSFET sample with advanced technology to have better characteristics, such as fast switchingtime. low Ciss and Crss. low on resistance and excell entavalanche characteristics.

TO-220F



■ Features

RDS(ON)=0.25Ω @VGS = 10V

VDS = 650V

■Absolute Maximum Ratings (TC = 25˚C, unless otherwise specified)

Symbol	Parameter	GSA18N65E	Unit
V_{DSS}	Drain-Source Voltage	650	V
I_D	Drain Current -Continuous (TC = 25℃) -Continuous (TC = 100℃)	18* 13*	A
I_{DM}	Drain Current - Pulsed	55	A
V_{GSS}	Gate-Source voltage	±30	V
E_{AS}	Single Pulsed Avalanche Energy	320	mJ
I_{AR}	Avalanche Current	3	A
E_{AR}	Repetitive Avalanche Energy	2	mJ
dv/dt	Peak Diode Recovery dv/dt	15	V/ns
dVds/dt	Drain Source voltage slope (Vds=480V)	50	V/ns
P_D	Power Dissipation (TC = 25℃)	35	W
T_J, T_{STG}	Operating and Storage Temperature Range	-55 to +150	℃
T_L	Max. Lead Temperature for Soldering Purpose, 1/8" from Case for 5 Seconds	300	℃

■Thermal Characteristics

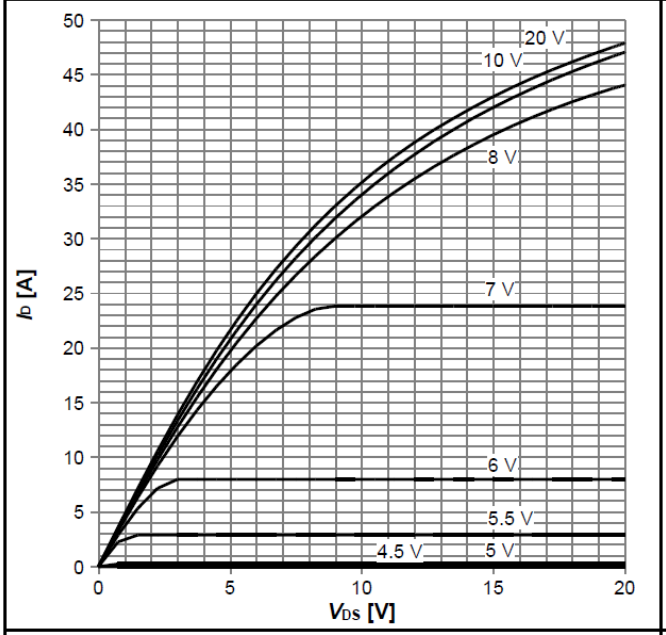
Symbol	Parameter	GSA18N65E	Unit
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	1.2	℃/W
$R_{\theta CS}$	Thermal Resistance, Case-to-Sink Typ.	0.5	℃/W
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	62	℃/W

■ Electrical Characteristics (TJ=25° C unless otherwise specified)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Off Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS} = 0V, I_D = 250μA, T_J = 25℃	650	--	--	V
		V_{GS} = 0V, I_D = 250μA, T_J = 150℃	--	700	--	V
$\Delta BV_{DSS}/\Delta T_J$	Breakdown Voltage Temperature Coefficient	I_D = 250μA, Referenced to 25℃	--	0.6	--	V/℃
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 650V, V_{GS} = 0V -T_J = 150℃	--	-- 10	1 -	μA μA
I_{GSSF}	Gate-Body Leakage Current, Forward	V_{GS} = 30V, V_{DS} = 0V	--	--	100	nA
I_{GSSR}	Gate-Body Leakage Current, Reverse	V_{GS} = -30V, V_{DS} = 0V	--	--	-100	nA
On Characteristics						
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = 250μA	2.5	--	4.5	V
$R_{DS(on)}$	Static Drain-Source On-Resistance	V_{GS} = 10V, I_D = 9A	--	0.22	0.25	Ω
g_{FS}	Forward Transconductance	V_{DS} = 40V, I_D = 9A	--	16	--	S
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS} = 25V, V_{GS} = 0V, f = 1.0MHz	--	1230	-	pF
C_{oss}	Output Capacitance		--	30	-	pF
C_{rss}	Reverse Transfer Capacitance		--	2.6	--	pF
Switching Characteristics						
$t_{d(on)}$	Turn-On Delay Time	V_{DD} = 400V, I_D =9A R_G = 20Ω (Note 4)	--	20	--	ns
t_r	Turn-On Rise Time		--	17	--	ns
$t_{d(off)}$	Turn-Off Delay Time		--	170	--	ns
t_f	Turn-Off Fall Time		--	13	--	ns
Q_g	Total Gate Charge	V_{DS} = 400V, I_D = 9A V_{GS} = 10V (Note 4)	--	42	--	nC
Q_{gs}	Gate-Source Charge		--	6	--	nC
Q_{gd}	Gate-Drain Charge		--	29	--	nC
Drain-Source Diode Characteristics and Maximum Ratings						
I_S	Maximum Continuous Drain-Source Diode Forward Current		--	--	18	A
I_{SM}	Maximum Pulsed Drain-Source Diode Forward Current		--	--	42	A
V_{SD}	Drain-Source Diode Forward Voltage	V_{GS} = 0V, I_S = 9A	--	0.9	1.5	V
t_{rr}	Reverse Recovery Time	V_{GS} = 0V, I_S = 9A dI_F/dt =100A/μs	--	380	--	ns
Q_{rr}	Reverse Recovery Charge		--	4.5	--	μC

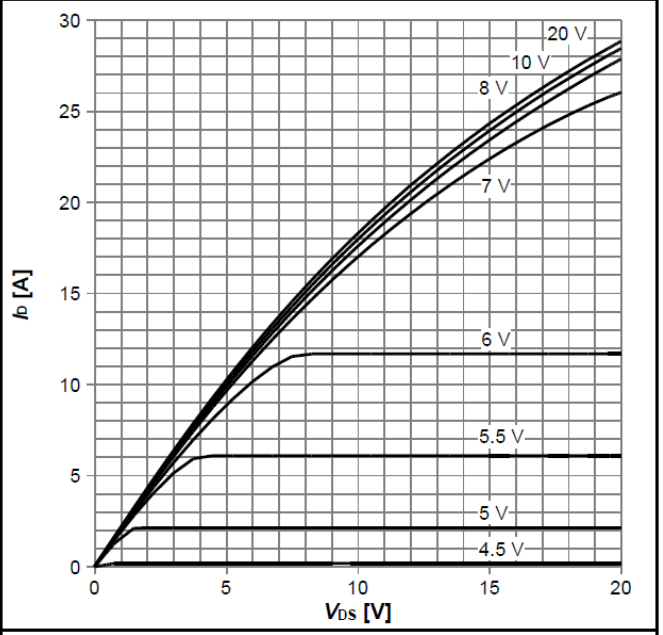
Typical Performance Characteristics

Diagram : Typ. output characteristics



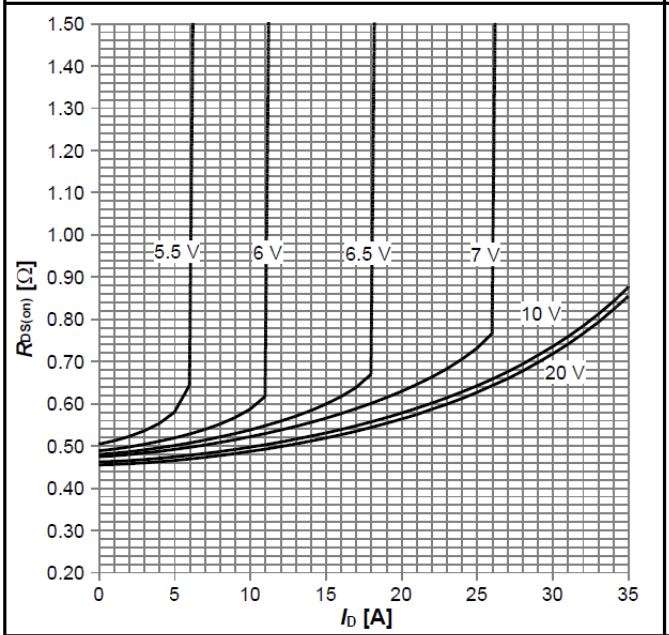
$I_D=f(V_{DS})$; $T_j=25$ °C; parameter: V_{GS}

Diagram : Typ. output characteristics



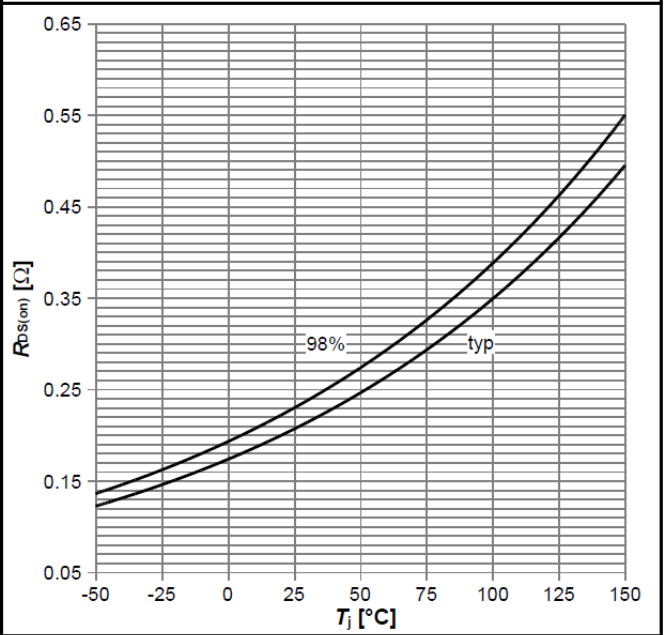
$I_D=f(V_{DS})$; $T_j=125$ °C; parameter: V_{GS}

Diagram : Typ. drain-source on-state resistance



$R_{DS(on)}=f(I_D)$; $T_j=125$ °C; parameter: V_{GS}

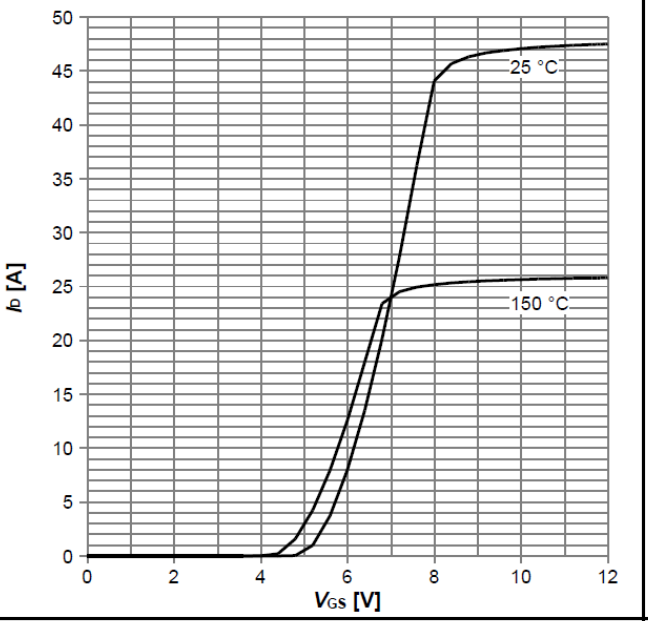
Diagram : Drain-source on-state resistance



$R_{DS(on)}=f(T_j)$; $I_D=6.4$ A; $V_{GS}=10$ V

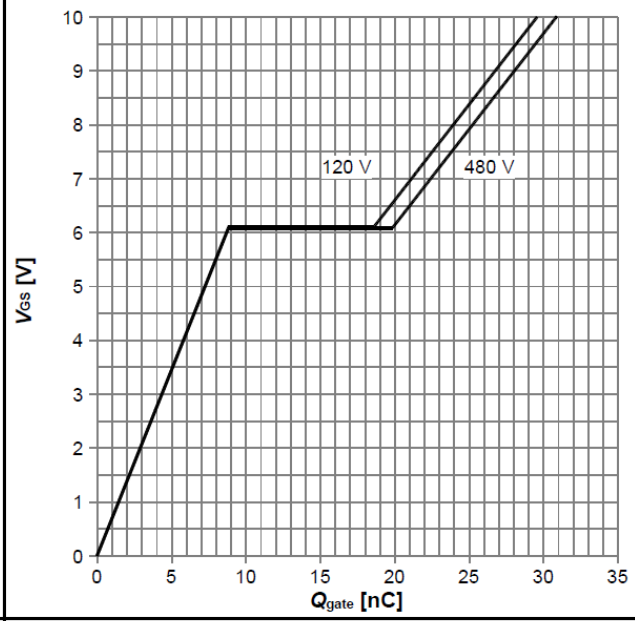
Typical Performance Characteristics

Diagram : Typ. transfer characteristics



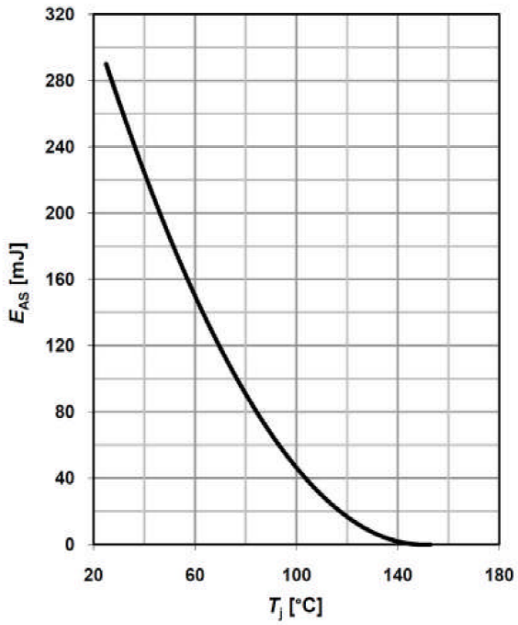
I_D=f(V_{GS}); V_{DS}=20V; parameter: T_j

Diagram : Typ. gate charge



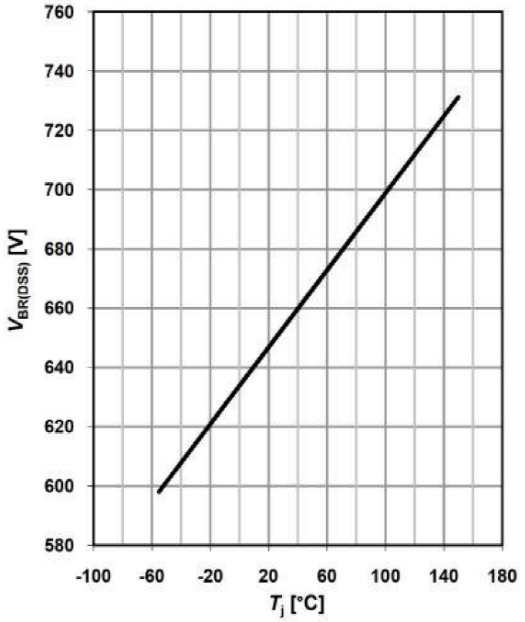
V_{GS}=f(Q_{gate}); I_D=8.0 A pulsed; parameter: V_{DD}

Avalanche energy



E_{AS}=f(T_j); I_D=2.4 A; V_{DD}=50 V

Drain-source breakdown voltage



$V_{BR(DSS)}$=f(T_j); I_D=0.25 mA