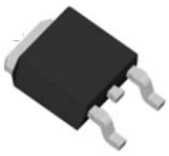
650V15A Power MOSFET

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 GSx15N65EF 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



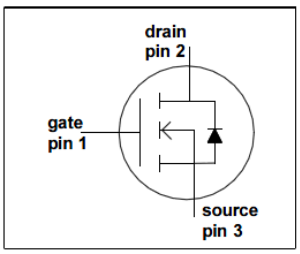
TO-252

Features

RDS(ON)=0.26Ω @VGS = 10V
VDS = 650V

PKG

GSA15N65E	GSD15N65E
TO-220F	TO-252



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

Symbol	Parameter	GSA15N65E	GSD15N65E	Unit
V_{DSS}	Drain-Source Voltage	650		V
I_D	Drain Current -Continuous (TC = 25°C) -Continuous (TC = 100°C)	15* 11*		A
I_{DM}	Drain Current - Pulsed	50		A
V_{GSS}	Gate-Source voltage	±30		V
E_{AS}	Single Pulsed Avalanche Energy	280		mJ
I_{AR}	Avalanche Current	2.3		A
E_{AR}	Repetitive Avalanche Energy	1.2		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°C)	35	100	W
T_J, T_{STG}	Operating and Storage Temperature Range	-55 to +150		°C
T_L	Max. Lead Temperature for Soldering Purpose, 1/8" from Case for 5 Seconds	300		°C

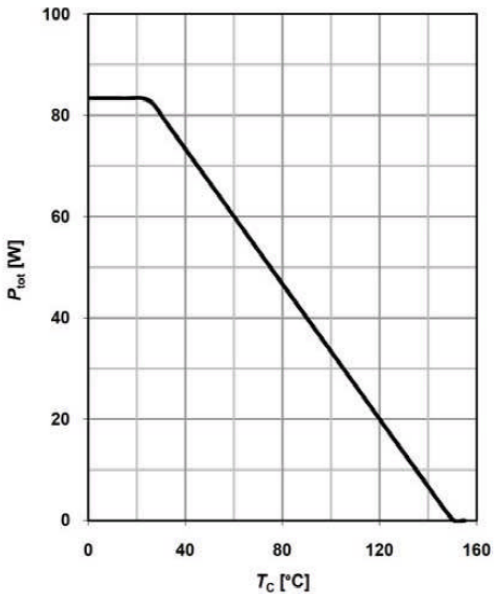
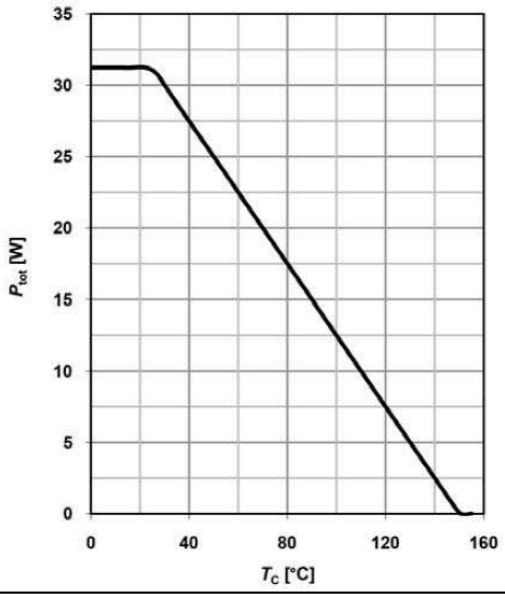
Thermal Characteristics

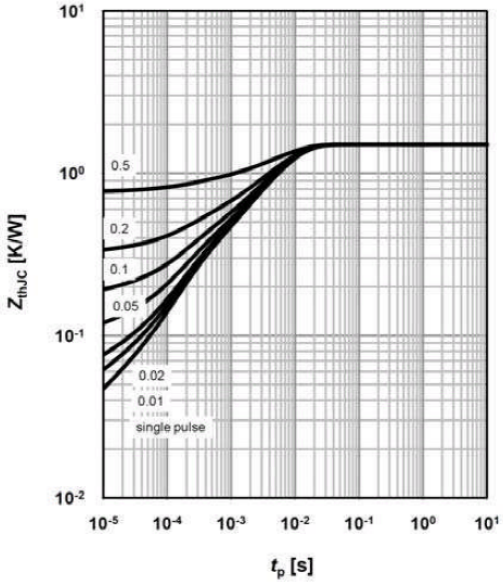
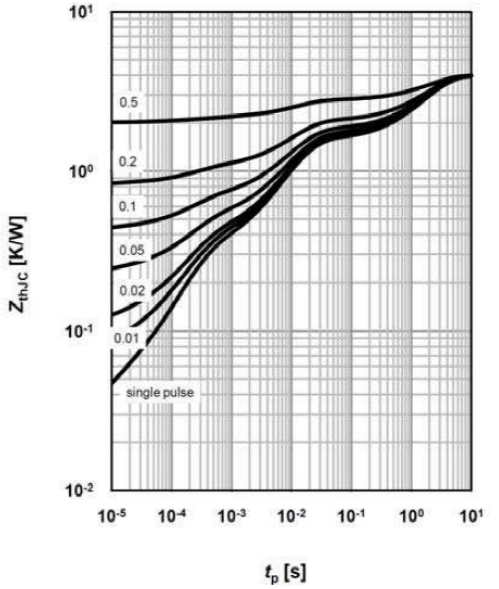
Symbol	Parameter	GSA15N65E	GSD15N65E	Unit
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	4.0	1.3	℃/W
$R_{\theta CS}$	Thermal Resistance, Case-to-Sink Typ.	--	0.5	℃/W
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	80	62	℃/W

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

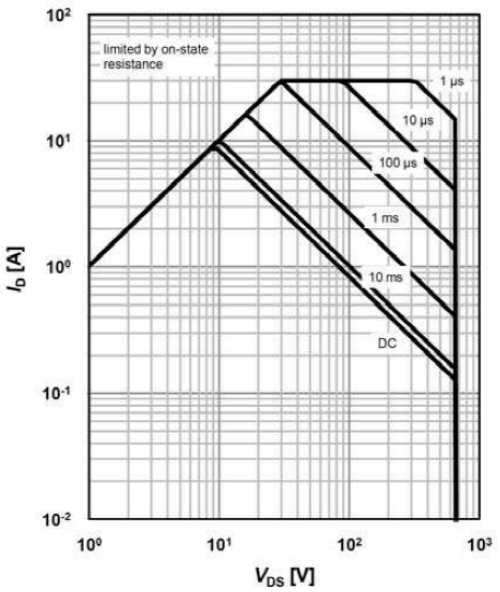
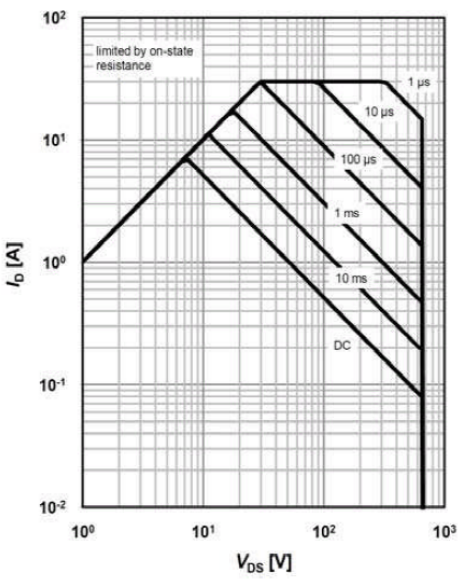
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Off Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS} = 0V, I_D = 250μA, T_J = 25℃	650	--	--	V
		V_{GS} = 0V, I_D = 250μA, T_J = 150℃	--	700	--	V
$\Delta BV_{DSS}/\Delta T_J$	Breakdown Voltage Temperature Coefficient	I_D = 250μA, Referenced 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 = 7.5A	--	0.24	0.26	Ω
g_{FS}	Forward Transconductance	V_{DS} = 40V, I_D = 7.5A	--	16	--	S
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS} = 25V, V_{GS} = 0V, f = 1.0MHz	--	820	-	pF
C_{oss}	Output Capacitance		--	25	-	pF
C_{rss}	Reverse Transfer Capacitance		--	2.2	--	pF
Switching Characteristics						
$t_{d(on)}$	Turn-On Delay Time	V_{DD} = 400V, I_D = 7.5A R_G = 20Ω (Note 4)	--	19	--	ns
t_r	Turn-On Rise Time		--	14	--	ns
$t_{d(off)}$	Turn-Off Delay Time		--	150	--	ns
t_f	Turn-Off Fall Time		--	11	--	ns
Q_g	Total Gate Charge	V_{DS} = 400V, I_D = 7.5A V_{GS} = 10V (Note 4)	--	36	--	nC
Q_{gs}	Gate-Source Charge		--	5.3	--	nC
Q_{gd}	Gate-Drain Charge		--	22	--	nC
Drain-Source Diode Characteristics and Maximum Ratings						
I_S	Maximum Continuous Drain-Source Diode Forward Current		--	--	15	A
I_{SM}	Maximum Pulsed Drain-Source Diode Forward Current		--	--	40	A
V_{SD}	Drain-Source Diode Forward Voltage	V_{GS} = 0V, I_S = 7.5A	--	0.9	1.5	V
t_{rr}	Reverse Recovery Time	V_{GS} = 0V, I_S = 7.5A dI_F/dt =100A/μs	--	330	--	ns
Q_{rr}	Reverse Recovery Charge		--	3.9	--	μC

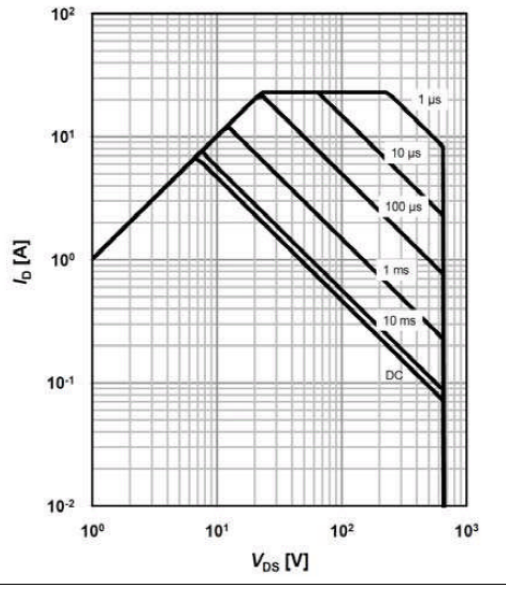
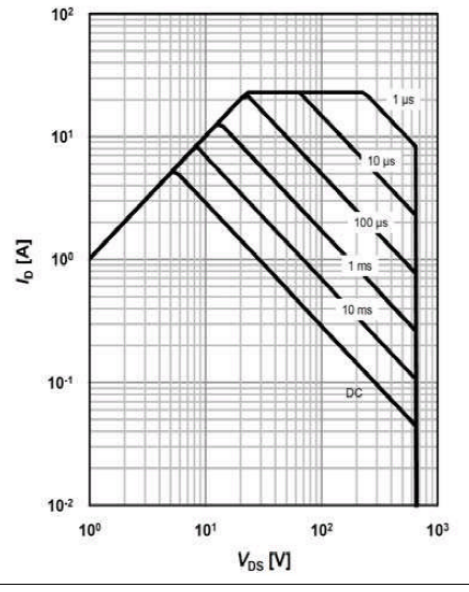
Typical Performance Characteristics

Power dissipation Non FullPAK	Power dissipation FullPAK
	
$P_{tot} = f(T_C)$	$P_{tot} = f(T_C)$

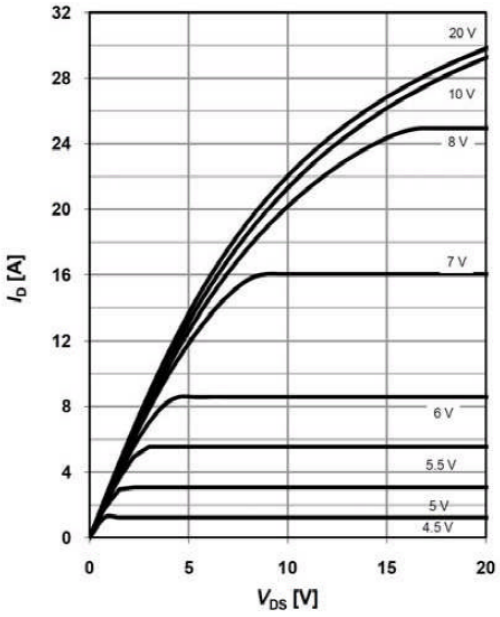
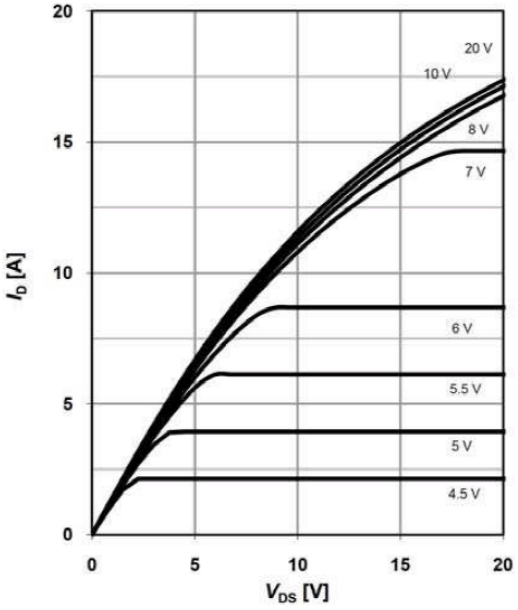
Max. transient thermal impedance Non FullPAK	Max. transient thermal impedance FullPAK
	
$Z_{(thJC)}$=f(tp); parameter: D=t_p/T	$Z_{(thJC)}$=f(tp); parameter: D=t_p/T

Typical Performance Characteristics

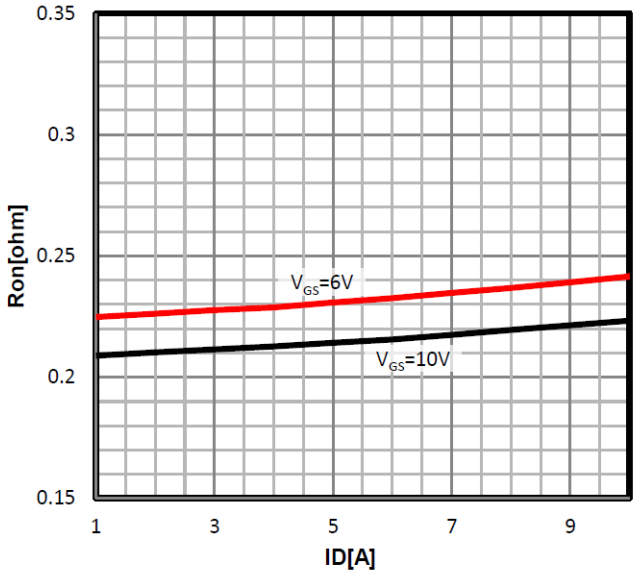
Safe operating area T_C=25 °C Non FullPAK	Safe operating area T_C=25 °C FullPAK
	
I_D=f(V_{DS}); T_C=25 °C; V_{GS} > 7V; D=0; parameter t_p	I_D=f(V_{DS}); T_C=25 °C; V_{GS} > 7V; D=0; parameter t_p

Safe operating area T_C=80 °C Non FullPAK	Safe operating area T_C=80 °C FullPAK
	
I_D=f(V_{DS}); T_C=80 °C; V_{GS} > 7V; D=0; parameter t_p	I_D=f(V_{DS}); T_C=80 °C; V_{GS} > 7V; D=0; parameter t_p

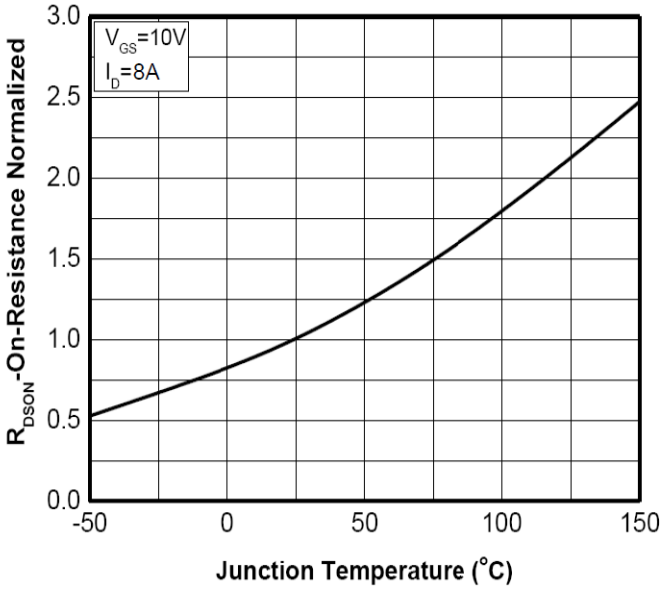
Typical Performance Characteristics

Typ. output characteristics T_C=25 °C	Typ. output characteristics T_j=125 °C
	
I_D=f(V_{DS}); T_j=25 °C; parameter: V_{GS}	I_D=f(V_{DS}); T_j=125 °C; parameter: V_{GS}

Typ. drain-source on-state resistance

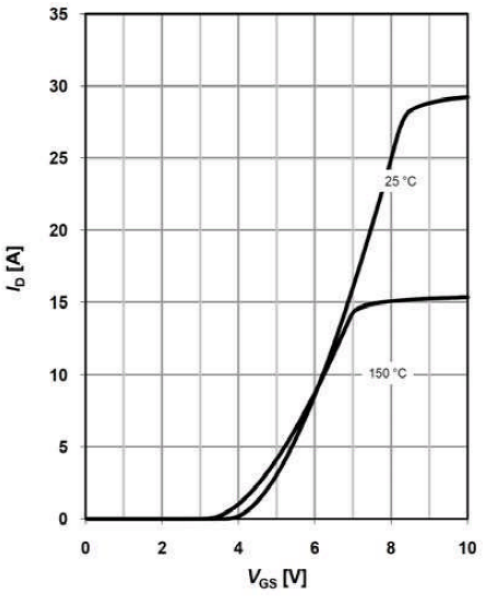


Normalized on resistance vs temperature



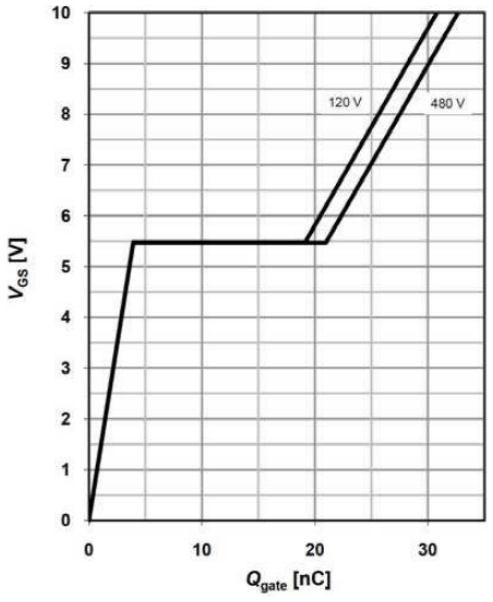
Typical Performance Characteristics

Typ. transfer characteristics



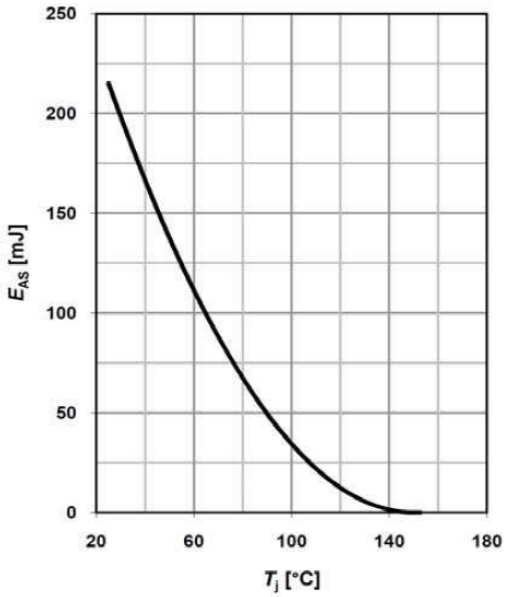
I_D=f(V_{GS}); V_{DS}=20V

Typ. gate charge



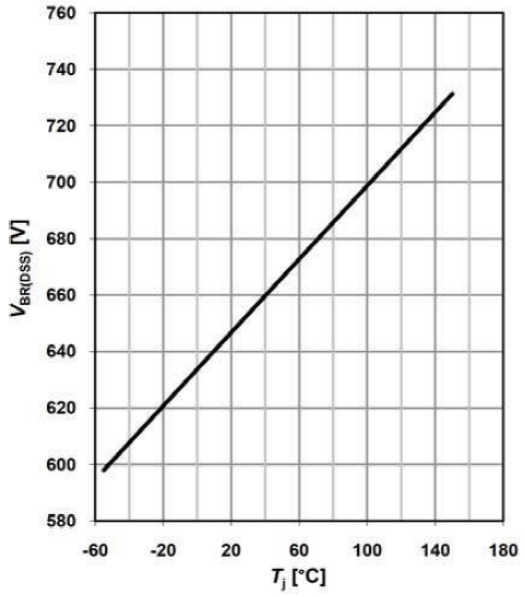
V_{GS}=f(Q_{gate}), I_D=4.9 A pulsed

Avalanche energy



E_{AS}=f(T_j); I_D=1.8 A; V_{DD}=50 V

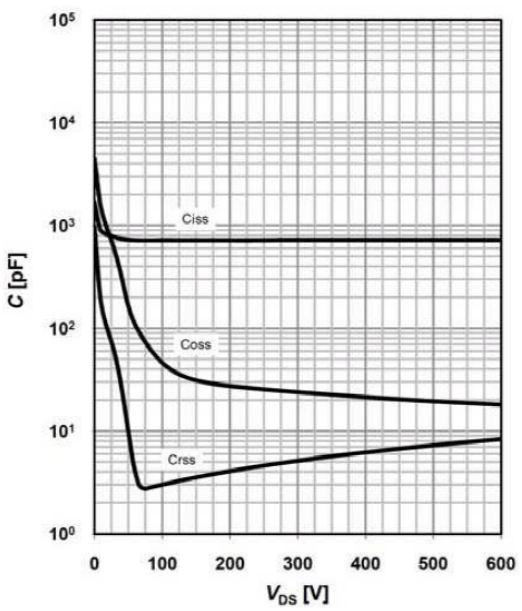
Drain-source breakdown voltage



$V_{BR(DSS)}$=f(T_j); I_D=1.0 mA

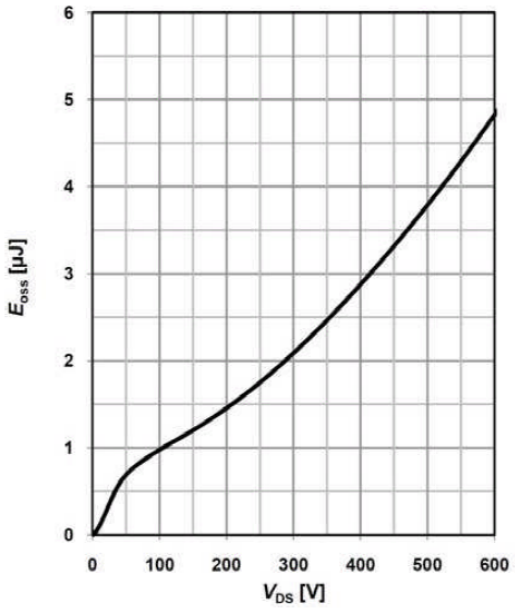
Typical Performance Characteristics

Typ. capacitances



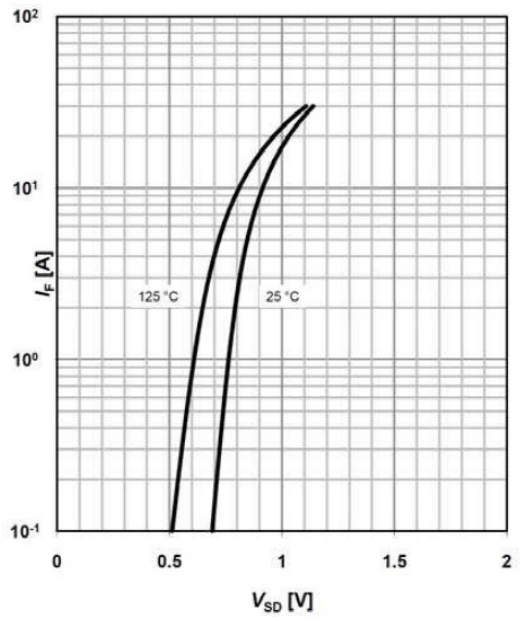
C=f(V_{DS}); V_{GS}=0 V; f=1 MHz

Typ. C_{oss} stored energy



E_{oss}=f(V_{DS})

Forward characteristics of reverse diode



I_F=f(V_{SD}); parameter: T_j