



HCF65R580

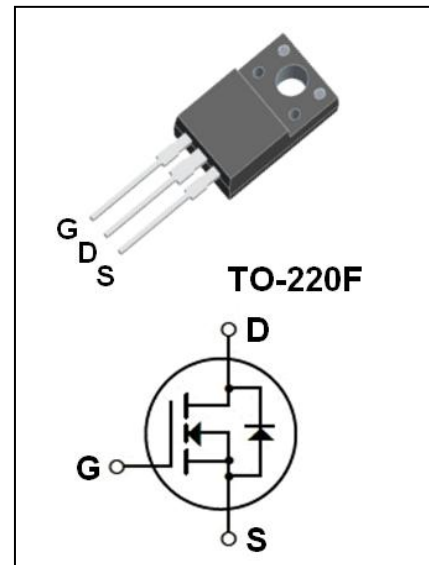
650V N-Channel Super Junction Power MOSFET

●Features:

- 8.0A, 650V, $R_{DS(on)(Typ)} = 520m\Omega @ V_{GS}=10V$
- Ultra Low Gate Charge
- Ultra Low C_{rss}
- 100% Avalanche Tested
- Fast Switching
- Improved dv/dt Capability

●Application:

- High Frequency Switching Mode Power Supply
- Active Power Factor Correction



Absolute Maximum Ratings ($T_c=25^\circ C$ unless otherwise noted)

Symbol	Parameter	Value	Unit
V_{DSS}	Drain-Source Voltage	650	V
V_{GSS}	Gate-Source Voltage	± 30	V
I_D	Drain Current	- Continuous ($T_c=25^\circ C$)	8.0*
		- Continuous ($T_c=100^\circ C$)	5.2*
I_{DM}	Drain Current - Pulsed (Note1)	24*	A
P_D	Power Dissipation ($T_c = 25^\circ C$) - Derate above $25^\circ C$	30.2	W
		0.23	W/ $^\circ C$
E_{AS}	Single Pulsed Avalanche Energy (Note2)	150	mJ
I_{AR}	Avalanche Current (Note1)	4	A
E_{AR}	Repetitive Avalanche Energy, t_{AR} limited by T_{jmax} (Note1)	0.33	mJ
dv/dt	Drain Source voltage slope, $V_{DS} \leq 480V$	50	V/ns
dv/dt	Reverse diode dv/dt, $V_{DS} \leq 480V, I_{SD} \leq I_D$	15	V/ns
T_j	Operating Junction Temperature	150	$^\circ C$
T_{stg}	Storage Temperature Range	-55 to +150	$^\circ C$

* Drain Current Limited by Maximum Junction Temperature.

Thermal Characteristics

Symbol	Parameter	Max	Unit
$R_{\theta JC}$	Thermal Resistance, Junction to Case	4.35	$^\circ C / W$
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	80	$^\circ C / W$



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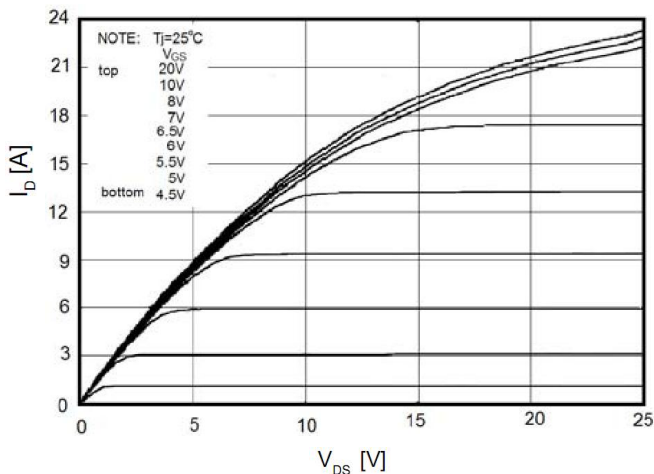
Electrical Characteristics (Tc=25°C unless otherwise noted)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
Off Characteristics						
BV _{DSS}	Drain-source Breakdown Voltage	V _{GS} =0V, I _D =250μA	650	--	--	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =650V, V _{GS} =0V	--	--	1	μA
		V _{DS} =650V, Tc=125°C	--	--	100	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	2.0	--	4.0	V
R _{DS(on)}	Static Drain-Source On-Resistance	V _{GS} =10 V, I _D =4.0A	--	520	580	mΩ
g _{FS}	Forward Transconductance	V _{DS} =20 V, I _D =4.0A	--	5.6	--	S
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{DS} =50V, V _{GS} =0V, f=1.0MHz	--	560	--	pF
C _{oss}	Output Capacitance		--	49	--	pF
C _{rss}	Reverse Transfer Capacitance		--	3.2	--	pF
Q _g	Total Gate Charge	V _{DS} = 480V, I _D = 8 A, V _{GS} = 10 V	--	14.2	--	nC
Q _{gs}	Gate-Source Charge		--	2.7	--	nC
Q _{gd}	Gate-Drain Charge		--	5.3	--	nC
R _G	Intrinsic gate resistance	f=1MHz open drain		2		Ω
Switching Characteristics						
t _{d(on)}	Turn-On Delay Time	V _{DD} = 380V, I _D = 4 A, R _G =12 Ω, V _{GS} =10 V	--	5.8	--	ns
t _r	Turn-On Rise Time		--	3.7	--	ns
t _{d(off)}	Turn-Off Delay Time		--	52	--	ns
t _f	Turn-Off Fall Time		--	6.3	--	ns
Drain-Source Diode Characteristics and Maximum Ratings						
I _{SD}	Maximum Continuous Drain-Source Diode Forward Current		--	--	8	A
I _{SDM}	Maximum Pulsed Drain-Source Diode Forward Current		--	--	24	A
V _{SD}	Drain-Source Diode Forward Voltage	T _J = 25°C , V _{GS} =0V, I _{SD} =8.0A	--	--	1.2	V
t _{rr}	Reverse Recovery Time	T _J = 25°C , I _F =8.0A, dI _F /dt=100A/μs	--	213	--	ns
Q _{rr}	Reverse Recovery Charge		--	2.1	--	μC
I _{rrm}	Peak Reverse Recovery Current		--	20	--	A

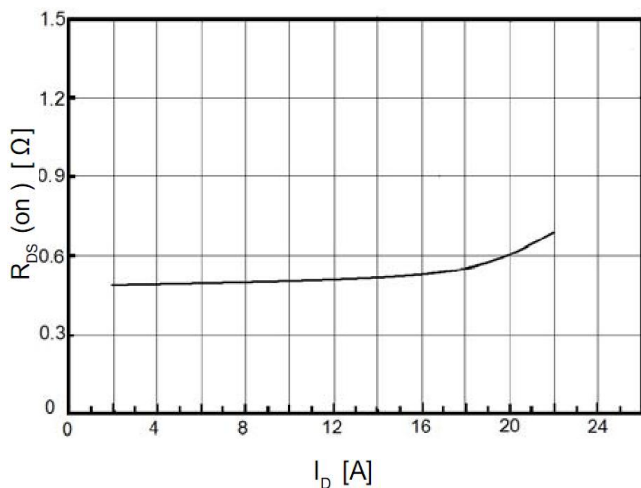
Notes:

- 1、Repetitive Rating:Pulse Width Limited by Maximum Junction Temperature.
- 2、T_J = 25°C , V_{DD} = 50V, V_G =10V, R_G = 25 Ω.

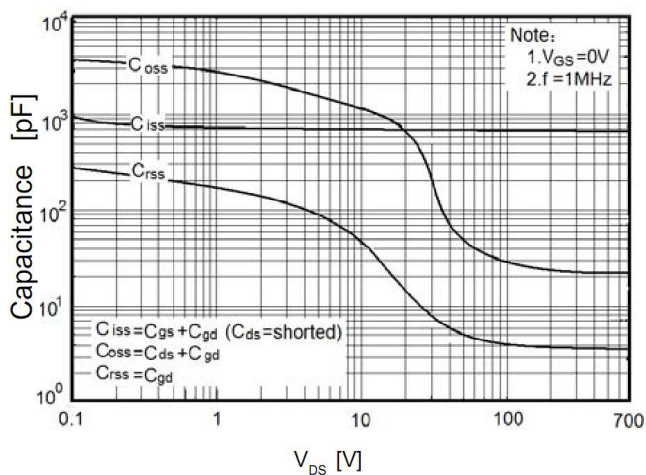
On-Regin Characteristics



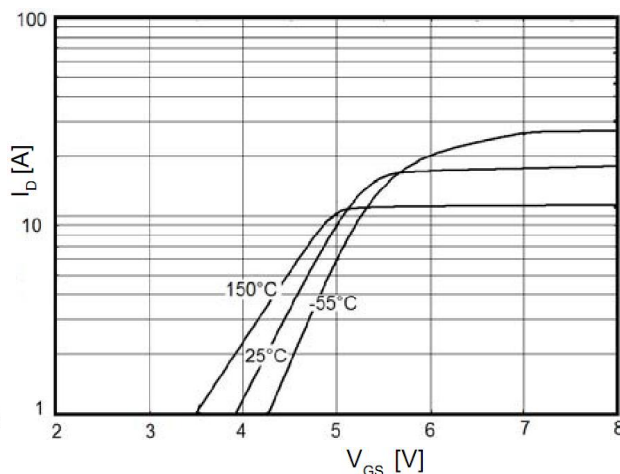
On-Resistance Variation vs. Drain Current and Gate Voltage



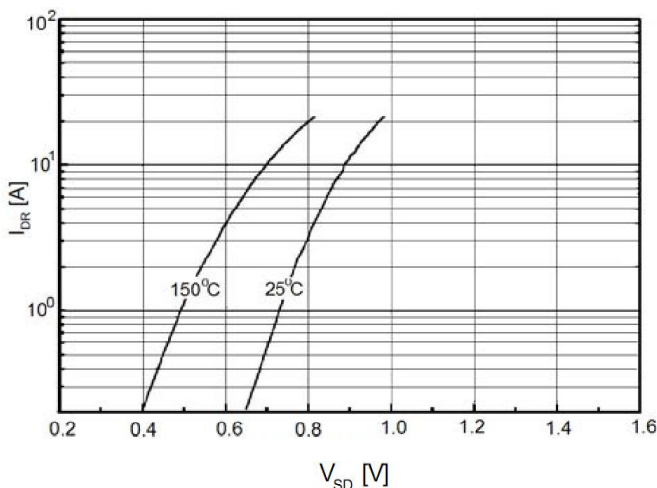
Capacitance Characteristics



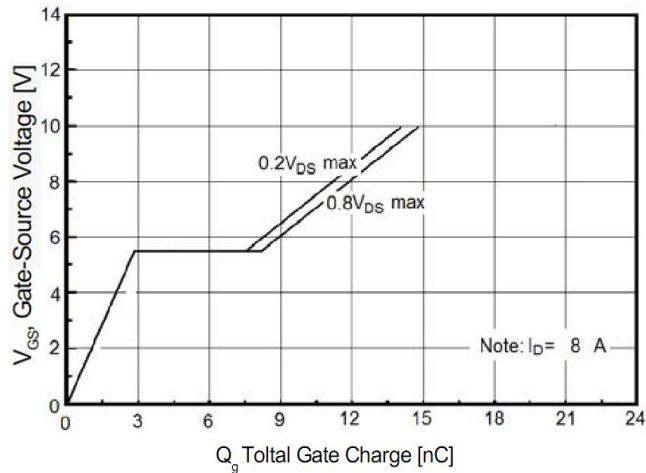
Transfer Characteristics



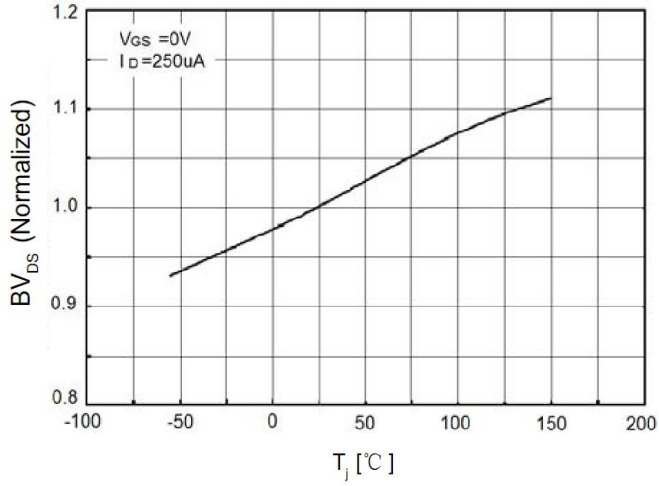
Body Diode Forward Voltage Variation vs. Source Current and Temperature



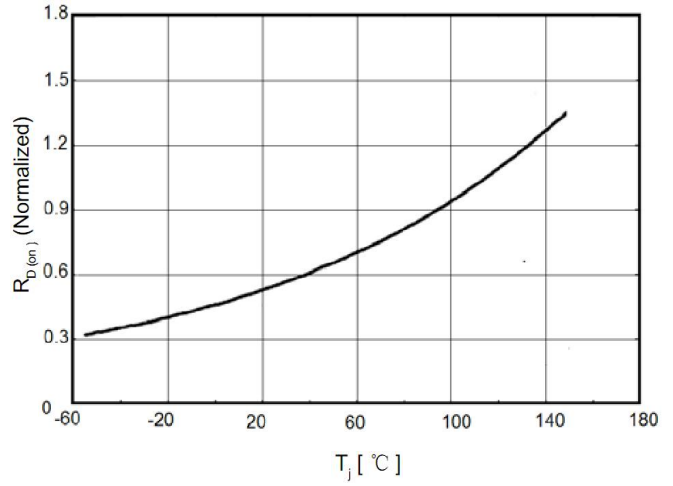
Gate Charge Characteristics



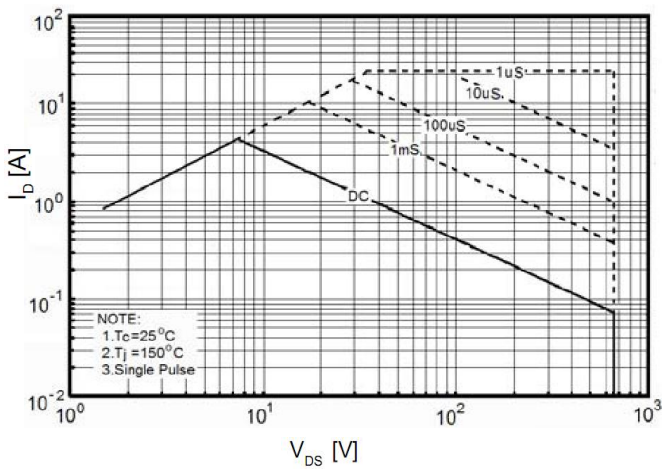
Breakdown Voltage Variation vs. Temperature



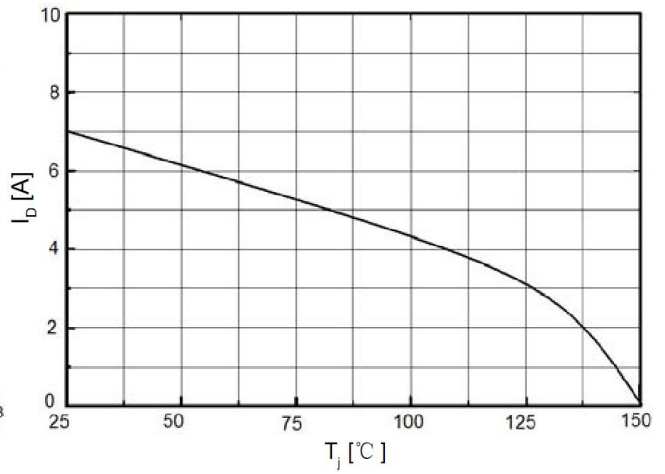
On-Resistance Variation vs. Temperature



Maximum Safe Operating Area



Maximum Drain Current Vs. Case Temperature



TO-220F Package Dimensions

UNIT: mm

SYMBOL	min	nom	max	SYMBOL	min	nom	max
A	9.80		10.60	D		2.54	
A1		7.00		D1	1.15		1.55
A2	2.90		3.40	D2	0.60		1.00
A3	9.10		9.90	D3	0.20		0.50
B1	15.40		16.40	E	2.24		2.84
B2	4.35		4.95	E1		0.70	
B3	6.00		7.40	E2		1.0×45°	
C	3.00		3.70	E3	0.35		0.65
C1	15.00		17.00	E4	2.30		3.30
C2	8.80		10.80	α (度)		30°	

