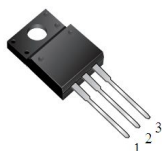


FEATURES

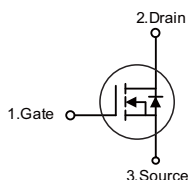
- 650V, 12A
- $R_{DS(ON)} = 0.67\Omega$ (Typ.) @ $V_{GS} = 10V$, $I_D = 6A$
- Fast Switching
- Improved dv/dt Capability
- 100% Avalanche Tested

APPLICATION

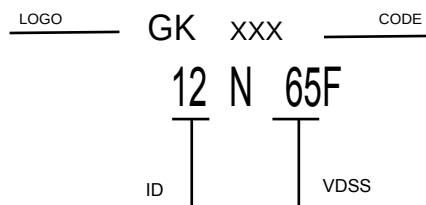
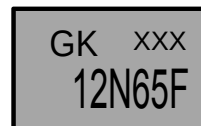
- Switch Mode Power Supply(SMPS)
- Uninterruptible Power Supply(UPS)
- Power Factor Correction (PFC)



ITO-220AB



V_{DSS} 650 V
 I_D 12 A
 $R_{DS(ON)}$ 0.67 Ω



MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS

ABSOLUTE MAXIMUM RATINGS ($T_C = 25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	12N65F	UNIT
Drain-Source Voltage	V_{DSS}	650	V
Gate-Source Voltage	V_{GSS}	± 30	
Continuous Drain Current	I_D	12	A
Pulsed Drain Current(Note1)	I_{DM}	48	
Single Pulse Avalanche Energy (Note 2)	E_{AS}	900	mJ
Avalanche Current(Note1)	I_{AR}	12	A
Repetitive Avalanche Energy (Note1)	E_{AR}	33	mJ
Reverse Diode dv/dt (Note 3)	dv/dt	5.5	V/ns
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 to +150	$^\circ\text{C}$
Maximum lead temperature for soldering purposes, 1/8" from case for 5 seconds	T_L	260	$^\circ\text{C}$
Mounting Torque	6-32 or M3 screw	10	lbf • in
		1.1	N • m

Electrical Characteristics (T_C=25°C unless otherwise specified)

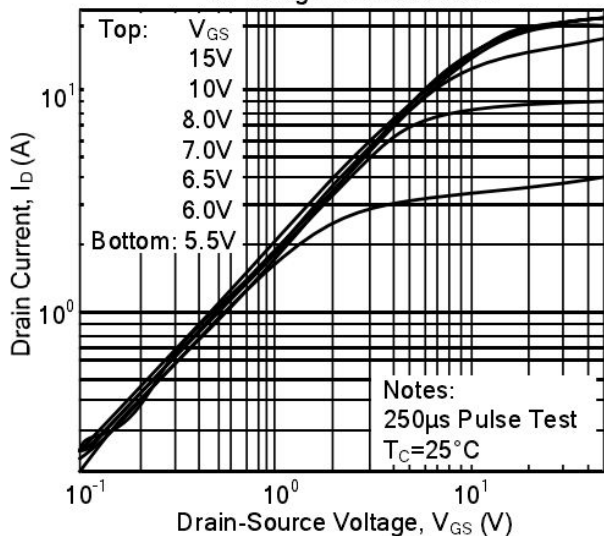
Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Off Characteristics						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V,I _D =250uA	650	—	—	V
Breakdown Temperature Coefficient	ΔBV _{DSS} /ΔT _J	Reference to 25℃ , I _D =250uA	—	0.6	—	V/℃
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =650V,V _{GS} =0V	—	—	1	μ A
Gate-Body Leakage Current,Forward	I _{GSSF}	V _{GS} =30V,V _{DS} =0V	—	—	10	μ A
Gate-Body Leakage Current,Reverse	I _{GSSR}	V _{GS} =-30V,V _{DS} =0V	—	—	-10	μ A
On Characteristics						
Gate-Source Threshold Voltage	V _{GS(th)}	V _{DS} =10V,I _D =250uA	2	—	4	V
Drain-Source On-State Resistance	R _{DS(on)}	V _{GS} =10V,I _D =6A	—	0.67	0.804	Ω
Dynamic Characteristics						
Input Capacitance	C _{iss}	V _{DS} =25V,V _{GS} =0V, f=1.0MHZ	—	2107	—	pF
Output Capacitance	C _{oss}		—	195	—	pF
Reverse Transfer Capacitance	C _{rss}		—	16	—	pF
Switching Characteristics						
Turn-On Delay Time	t _{d(on)}	V _{DD} =300V,I _D =12A, R _G =4.7Ω (Note4,5)	—	20	—	ns
Turn-On Rise Time	t _r		—	28	—	ns
Turn-Off Delay Time	t _{d(off)}		—	55	—	ns
Turn-Off Fall Time	t _f		—	30	—	ns
Total Gate Charge	Q _g	V _{DS} =480V,I _D =12A, V _{GS} =10V, (Note4,5)	—	58	—	nC
Gate-Source Charge	Q _{gs}		—	14	—	nC
Gate-Drain Charge	Q _{gd}		—	32	—	nC
Drain-Source Body Diode Charcteristics and Maximum Ratings						
Continuous Diode Forward Current	I _S		—	—	12	A
Pulsed Diode Forward Current	I _{SM}		—	—	48	A
Diode Forward Voltage	V _{SD}	I _S =12A,V _{GS} =0V	—	—	1.5	V
Reverse Recovery Time	t _{rr}	V _{GS} =0V,I _S =12A,	—	600	—	ns
Reverse Recovery Charge	Q _{rr}	dI _F /dt=100A/us, (Note4)	—	43	—	μ C

Notes

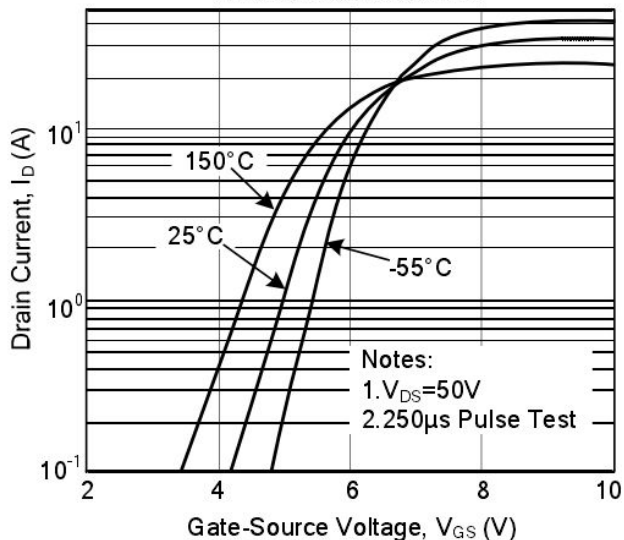
1. Repetitive Rating; pulse width limited by maximum junction temperature.
2. V_{DD}=50V, L=12.5mH, R_g=25 Ω, I_{AS}=12A, starting T_J=25°C.
3. I_{SD} ≤ I_D, dI/dt=200A/us, V_{DD} ≤ BV_{DSS}, starting T_J=25°C.
4. Pulse width ≤ 300us; duty cycle ≤ 2%.
5. Repetitive rating; pulse width limited by maximum junction temperature.

RATING AND CHARACTERISTIC CURVES

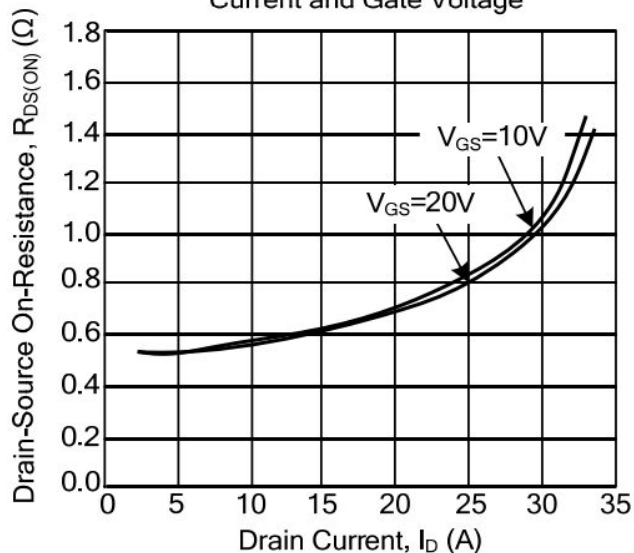
On-Resign Characteristics



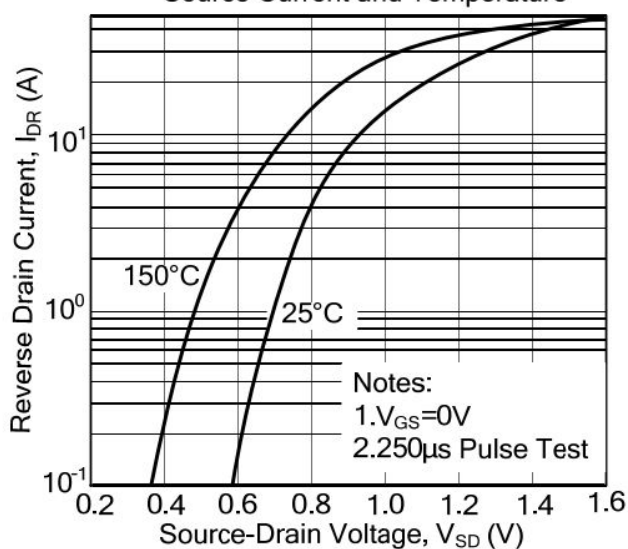
Transfer Characteristics



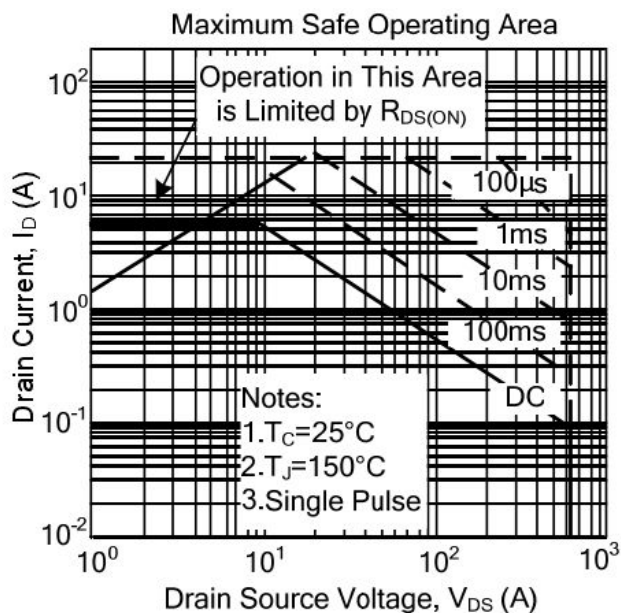
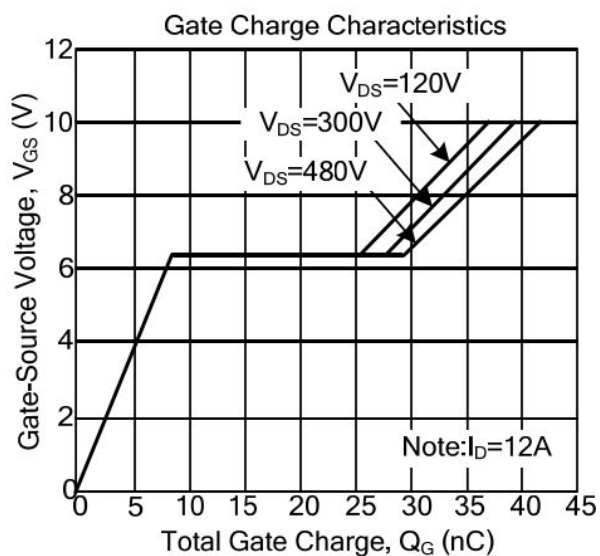
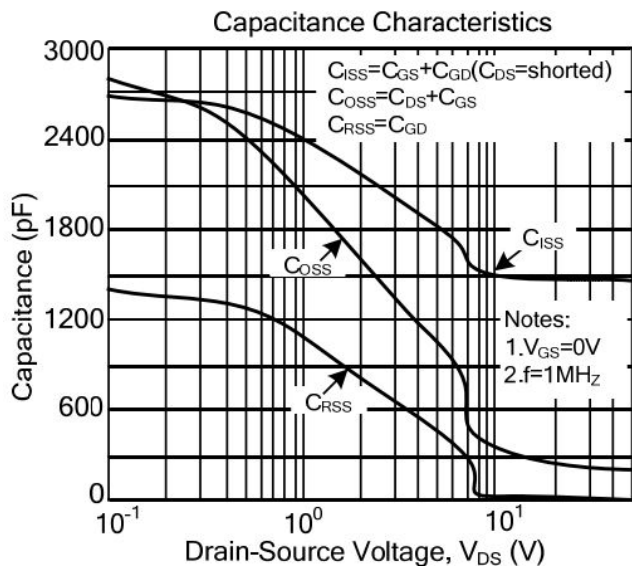
On-Resistance Variation vs. Drain Current and Gate Voltage



Body Diode Forward Voltage Variation vs. Source Current and Temperature

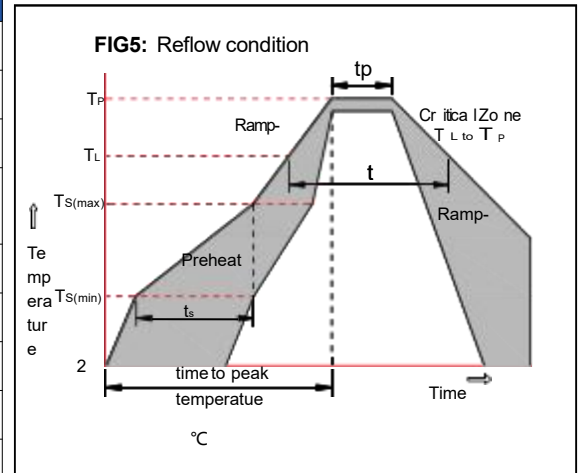


RATING AND CHARACTERISTIC CURVES

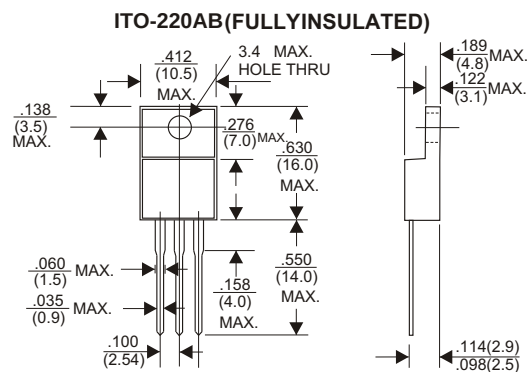


Soldering parameters

Reflow Condition		Pb-Free assembly (see as below)
Pre Heat	-Temperature Min ($T_{s(min)}$)	+150 °C
	-Temperature Max($T_{s(max)}$)	+200 °C
	-Time (Min to Max) (ts)	60-180 secs.
Average ramp up rate (Liquid us Temp (T_L) to peak)		3 °C/sec. Max
$T_{s(max)}$ to T_L - Ramp-up Rate		3 °C/sec. Max
Reflow	-Temperature(T_L)(Liquid us)	+217 °C
	-Temperature(t_L)	60-150 secs.
Peak Temp (T_P)		+260(+0/-5) °C
Time within 5 °C of actual Peak Temp (t_P)		30 secs. Max
Ramp-down Rate		6 °C/sec. Max
Time 25 °C to Peak Temp (T_P)		8 min. Max
Do not exceed		+260 °C



Package Dimensions & Suggested Pad Layout



Dimensions in inches and (millimeters)