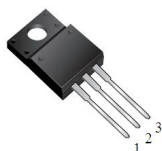


FEATURES

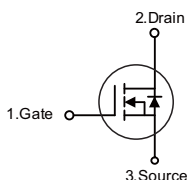
- 650V, 20A
- $R_{DS(ON)} = 0.35\Omega$ (Typ.) @ $V_{GS} = 10V$, $I_D = 10A$
- Fast Switching
- Improved dv/dt Capability
- 100% Avalanche Tested

APPLICATION

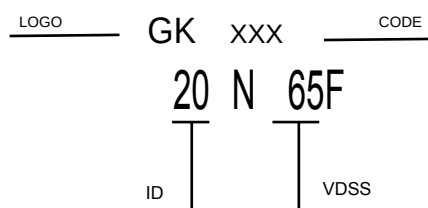
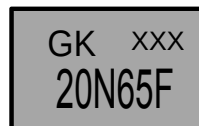
- Switch Mode Power Supply(SMPS)
- Uninterruptible Power Supply(UPS)
- Power Factor Correction (PFC)



ITO-220AB



V_{DSS} 650 V
 I_D 20 A
 $R_{DS(ON)}$ 0.35 Ω



MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS

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

Parameter		Symbol	20N65F		Units
Drain-Source Voltage		V_{DSS}	650		V
Gate-Source Voltage		V_{GSS}	± 30		V
Continuous Drain Current	$T_C = 25^\circ\text{C}$	I_D	20		A
	$T_C = 100^\circ\text{C}$		13		A
Pulsed Drain Current ^{note1}		I_{DM}	80		A
Single Pulsed Avalanche Energy ^{note2}		E_{AS}	1350		mJ
Power Dissipation	$T_C = 25^\circ\text{C}$	P_D	167	416	W
Thermal Resistance, Junction to Case		$R_{\theta JC}$	0.75	0.3	$^\circ\text{C/W}$
Thermal Resistance, Junction to Ambient		$R_{\theta JA}$	60	60	$^\circ\text{C/W}$
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +150		$^\circ\text{C}$

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

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
Off Characteristic						
V _{(BR)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, T _J = 25℃	-	-	1	μA
I _{GSS}	Gate to Body Leakage Current	V _{DS} =0V, V _{GS} = ±30V	-	-	±100	nA
On Characteristics						
V _{GS(th)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _D =250μA	2	3	4	V
R _{DS(on)}	Static Drain-Source on-Resistance note3	V _{GS} =10V, I _D =10A	-	0.35	0.45	Ω
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{DS} = 25V, V _{GS} = 0V, f = 1.0MHz	-	2978	-	pF
C _{oss}	Output Capacitance		-	291	-	pF
C _{rss}	Reverse Transfer Capacitance		-	40	-	pF
Q _g	Total Gate Charge	V _{DD} = 520V, I _D = 20A, V _{GS} = 10V	-	80	-	nC
Q _{gs}	Gate-Source Charge		-	12	-	nC
Q _{gd}	Gate-Drain(“Miller”) Charge		-	34	-	nC
Switching Characteristics						
t _{d(on)}	Turn-on Delay Time	V _{DD} = 325V, I _D =20A, R _G = 25Ω	-	37	-	ns
t _r	Turn-on Rise Time		-	66	-	ns
t _{d(off)}	Turn-off Delay Time		-	175	-	ns
t _f	Turn-off Fall Time		-	84	-	ns
Drain-Source Diode Characteristics and Maximum Ratings						
I _S	Maximum Continuous Drain to Source Diode Forward Current		-	-	20	A
I _{SM}	Maximum Pulsed Drain to Source Diode Forward Current		-	-	80	A
V _{SD}	Drain to Source Diode Forward Voltage	V _{GS} = 0V, I _{SD} = 20A	-	-	1.4	V
t _{rr}	Reverse Recovery Time	V _{GS} =0V, I _S =20A, di/dt=100A/μs	-	450	-	ns
Q _{rr}	Reverse Recovery Charge		-	7.1	-	μC

Notes:1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature

2. I_{AS} =16A, V_{DD} = 50V, R_G = 25 Ω, Starting T_J = 25°C

3. Pulse Test: Pulse Width≤350μs, Duty Cycle≤1%

RATING AND CHARACTERISTIC CURVES

Figure1: Output Characteristics

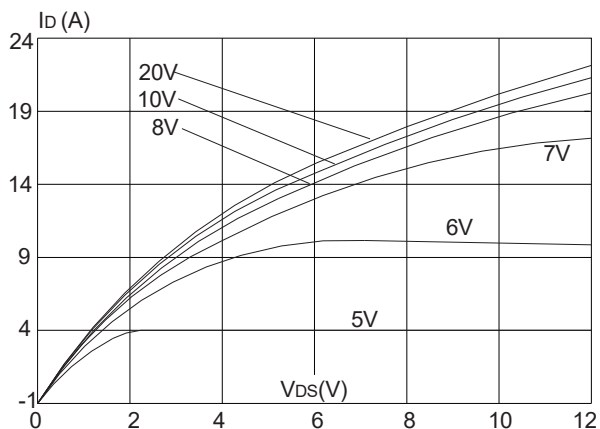


Figure 2: Typical Transfer Characteristics

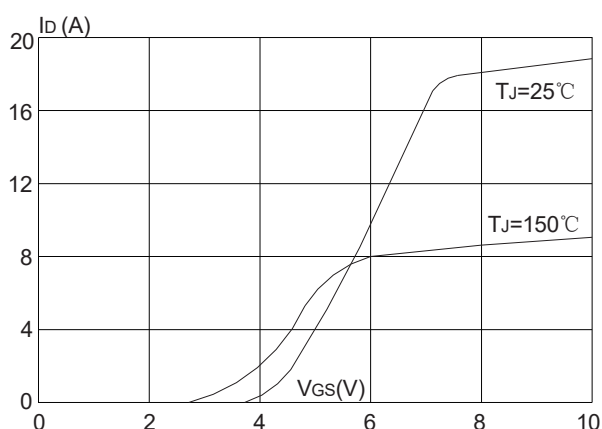


Figure 3: On-resistance vs. Drain Current

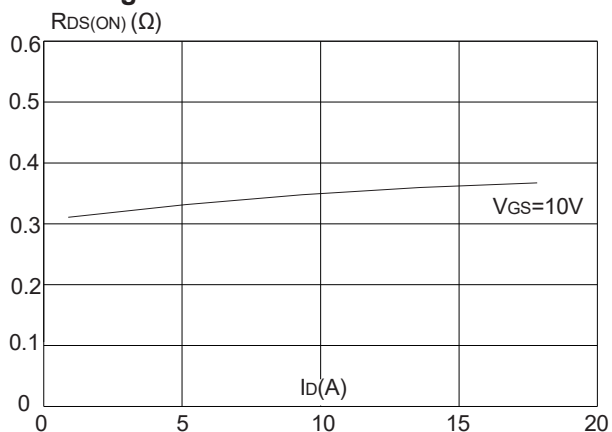


Figure 4: Body Diode Characteristics

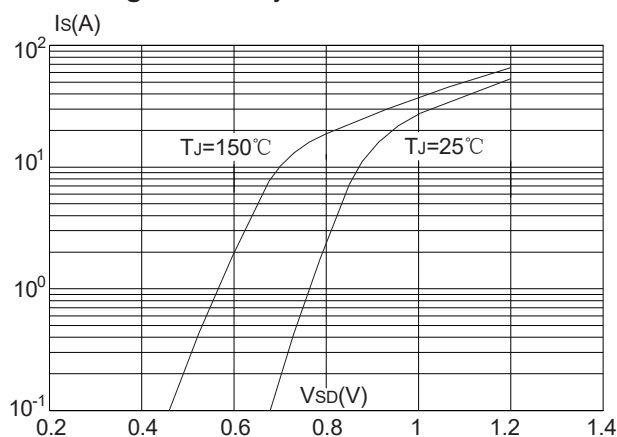


Figure 5: Gate Charge Characteristics

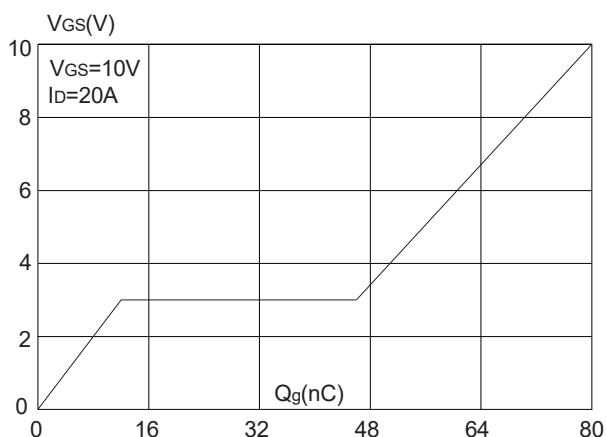
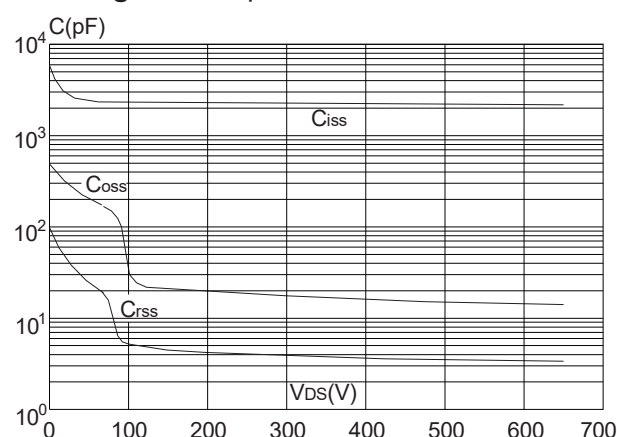


Figure 6: Capacitance Characteristics



RATING AND CHARACTERISTIC CURVES

Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

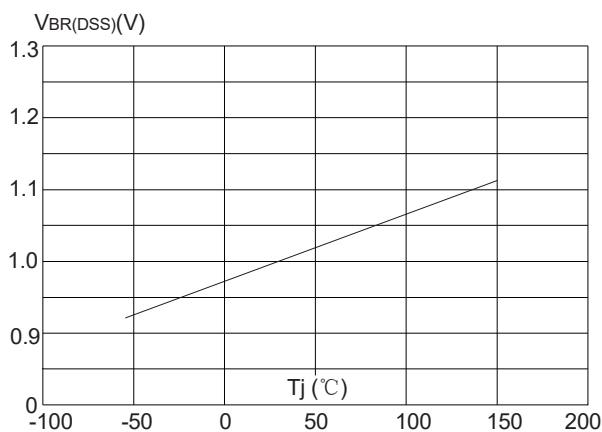


Figure 8: Normalized on Resistance vs. Junction Temperature

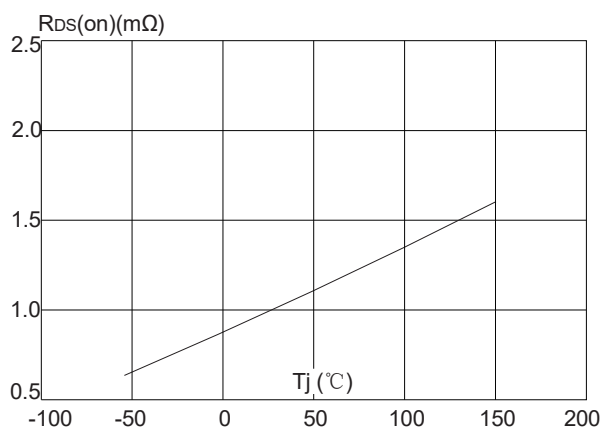


Figure 9: Maximum Safe Operating Area

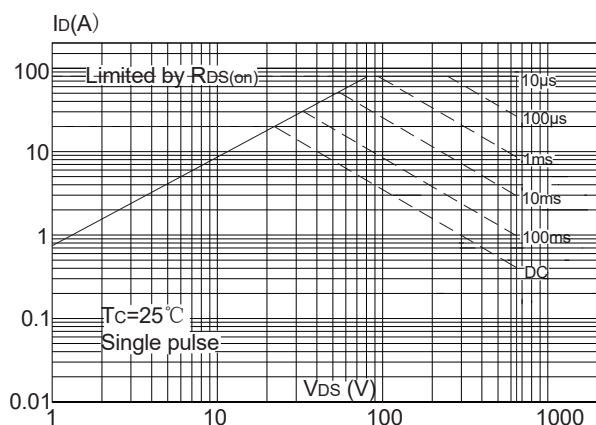


Figure 10: Maximum Continuous Drain Current vs. Case Temperature

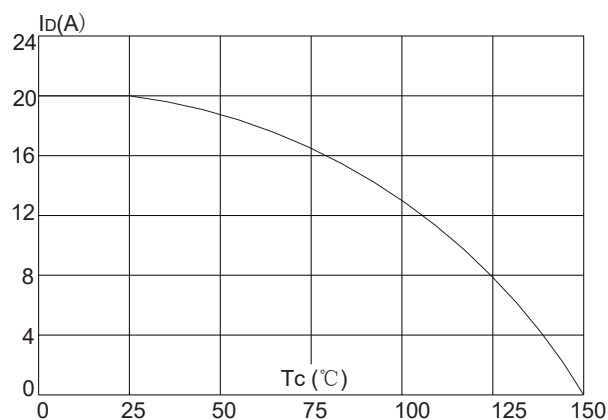


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Case (TO-220F)

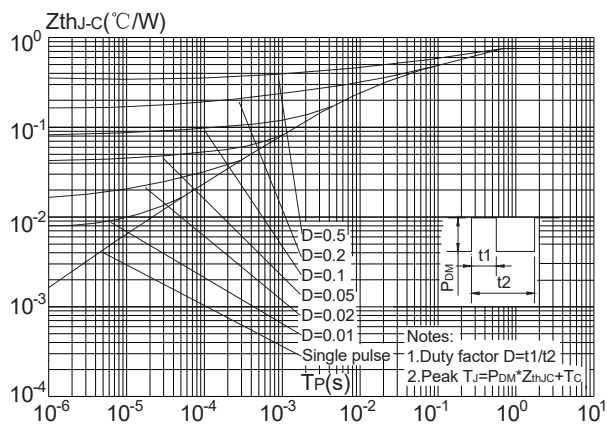
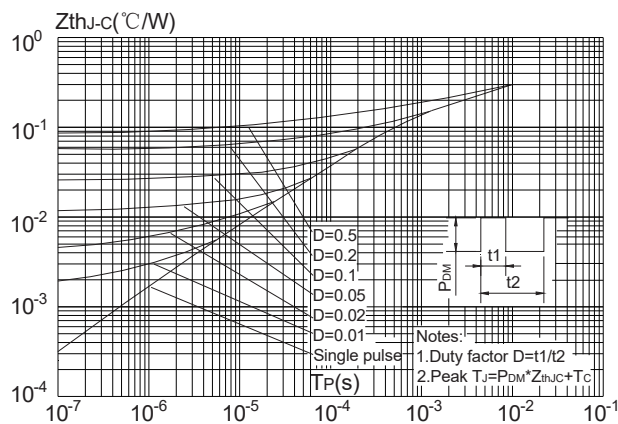
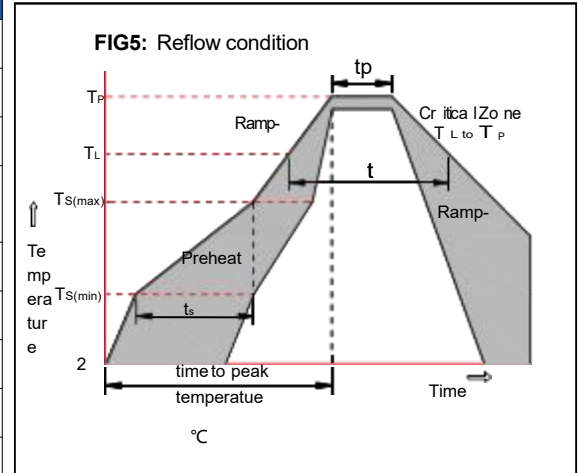


Figure.12: Maximum Effective Transient Thermal Impedance, Junction-to-Case (TO-247,TO-3P)

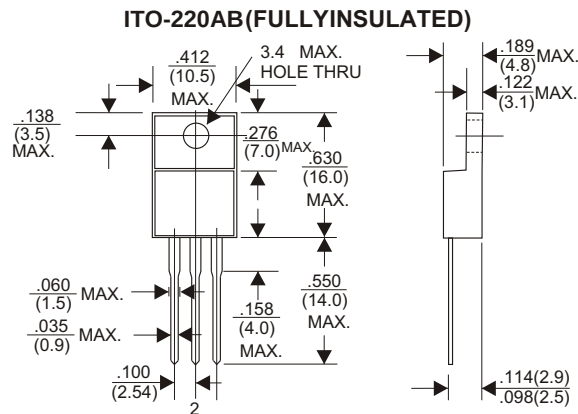


Soldering parameters

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)