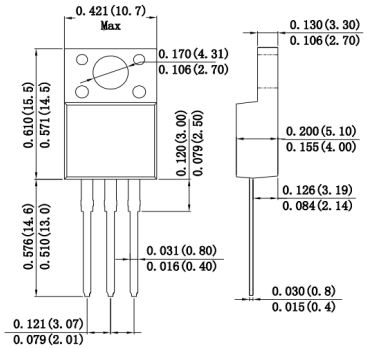
13N50F

13A N-Channel Power MOSFET

ITO-220AB

Features

- 100% UIS and R_g tested
- Advanced planar process



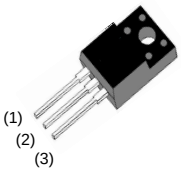
Note: Dimensions in inches and (millimeters)

Mechanical Data

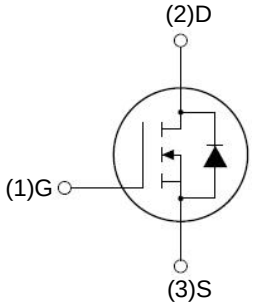
Case : Molded plastic body
Terminals : Solder plated, solderable per MIL-STD-750,Method 2026
Polarity : As marked
Mounting Position : Any

Application

- Power Supply
- AC/DC LED Lighting



ITO-220AB



Schematic diagram

Maximum Ratings And Electrical Characteristics

Ratings at 25℃ ambient temperature unless otherwise specified. Single phase half-wave 60Hz,resistive or inductive load, for capacitive load current derate by 20%.

ABSOLUTE MAXIMUM RATINGS (T_A = 25°C unless otherwise noted)				
PARAMETER		**SYMBOL**	**Limit**	**UNIT**
Drain-Source Voltage		V_{DS}	500	V
Gate-Source Voltage		V_{GS}	±30	V
Continuous Drain Current (Note 1)	T_C = 25°C	I_D	13	A
	T_C = 100°C		8	
Pulsed Drain Current (Note 2)		I_{DM}	52	A
Total Power Dissipation @ T_C = 25°C		P_{DTOT}	57	W
Single Pulse Avalanche Energy (Note 3)		E_{AS}	608	mJ
Single Pulse Avalanche Current (Note 3)		I_{AS}	7.8	A
Operating Junction and Storage Temperature Range		T_J, T_{STG}	- 55 to +150	°C

THERMAL PERFORMANCE			
PARAMETER	**SYMBOL**	**Limit**	**UNIT**
Junction to Case Thermal Resistance	$R_{\Theta JC}$	2.2	°C/W
Junction to Ambient Thermal Resistance	$R_{\Theta JA}$	62	°C/W

Thermal Performance Note: $R_{\Theta JA}$ is the sum of the junction-to-case and case-to-ambient thermal resistances. The case-thermal reference is defined at the solder mounting surface of the drain pins. $R_{\Theta JA}$ is guaranteed by design while $R_{\Theta CA}$ is determined by the user's board design.

ELECTRICAL SPECIFICATIONS (T_A = 25°C unless otherwise noted)						
PARAMETER	**CONDITIONS**	**SYMBOL**	**MIN**	**TYP**	**MAX**	**UNIT**
Static						
Drain-Source Breakdown Voltage	V_{GS} = 0V, I_D = 250μA	BV_{DSS}	500	--	--	V
Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = 250μA	$V_{GS(TH)}$	2.5	3	3.8	V
Gate Body Leakage	V_{GS} = ±30V, V_{DS} = 0V	I_{GSS}	--	--	±100	nA
Zero Gate Voltage Drain Current	V_{DS} = 500V, V_{GS} = 0V	I_{DSS}	--	--	1	μA
Drain-Source On-State Resistance (Note 4)	V_{GS} = 10V, I_D = 3.3A	$R_{DS(on)}$	--	0.37	0.48	Ω
Dynamic (Note 5)						
Total Gate Charge	V_{DS} = 400V, I_D = 6.5A, V_{GS} = 10V	Q_g	--	39	--	nC
Gate-Source Charge		Q_{gs}	--	10	--	
Gate-Drain Charge		Q_{gd}	--	12	--	
Input Capacitance	V_{DS} = 50V, V_{GS} = 0V, f = 1.0MHz	C_{iss}	--	1877	--	pF
Output Capacitance		C_{oss}	--	128	--	
Reverse Transfer Capacitance		C_{rss}	--	7	--	
Gate Resistance		R_g	--	1.1	2.2	Ω
Switching (Note 6)						
Turn-On Delay Time	V_{DD} = 250V, R_G = 5Ω, I_D = 6.5A, V_{GS} = 10V	$t_{d(on)}$	--	11	--	ns
Turn-On Rise Time		t_r	--	21	--	
Turn-Off Delay Time		$t_{d(off)}$	--	32	--	
Turn-Off Fall Time		t_f	--	22	--	
Source-Drain Diode						
Body-Diode Continuous Forward Current		I_S	--	--	13	A
Body-Diode Pulsed Current		I_{SM}	--	--	52	A
Forward Voltage (Note 4)	I_S = 6.5A, V_{GS} = 0V	V_{SD}	--	--	1.2	V
Reverse Recovery Time	I_S = 6.5A, dI_F/dt = 100A/μs	t_{rr}	--	282	--	ns
Reverse Recovery Charge		Q_{rr}	--	2.9	--	μC

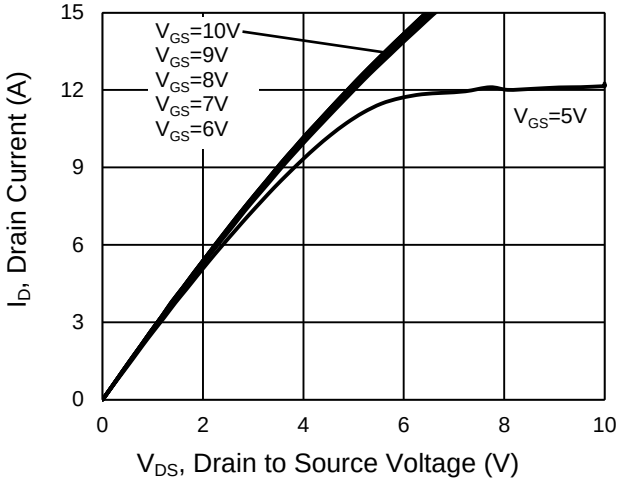
Notes:

1. Current limited by package
2. Pulse width limited by the maximum junction temperature
3. L = 20mH, I_{AS} = 7.8A, V_{DD} = 50V, R_G = 25Ω, Starting T_J = 25°C
4. Pulse test: PW ≤ 300μs, duty cycle ≤ 2%
5. For DESIGN AID ONLY, not subject to production testing.
6. Switching time is essentially independent of operating temperature.

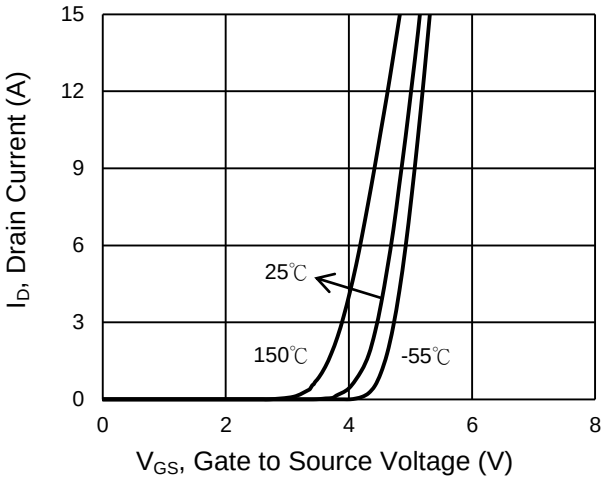
CHARACTERISTICS CURVES

(T_C = 25°C unless otherwise noted)

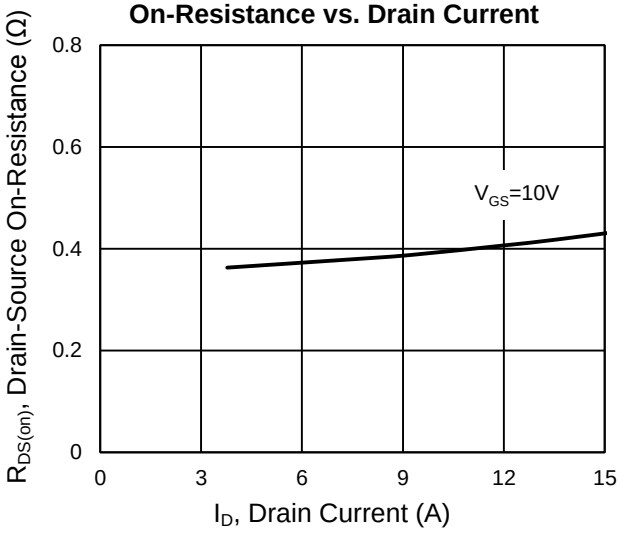
Output Characteristics



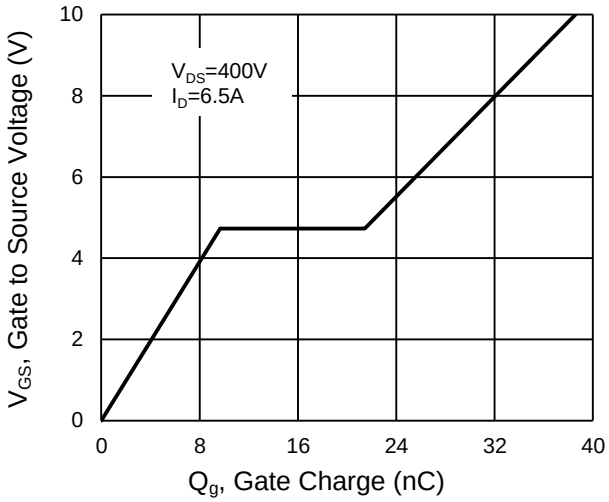
Transfer Characteristics



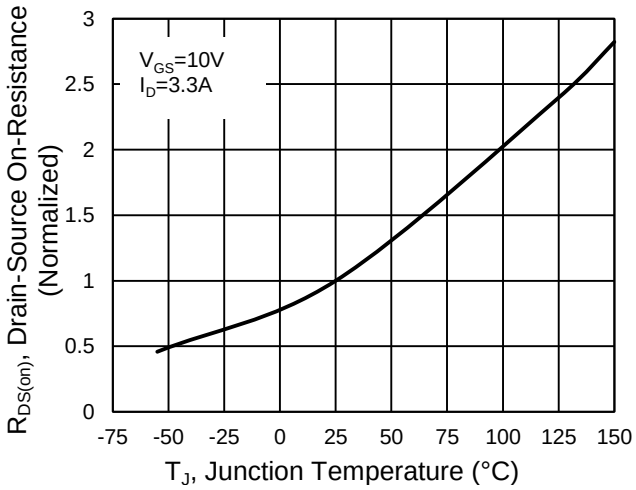
On-Resistance vs. Drain Current



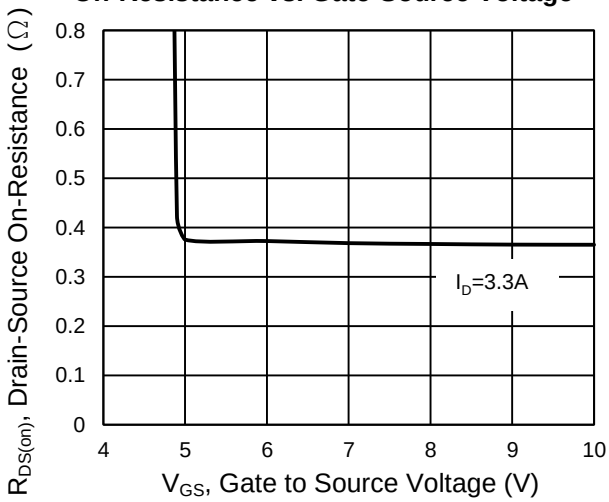
Gate-Source Voltage vs. Gate Charge



On-Resistance vs. Junction Temperature



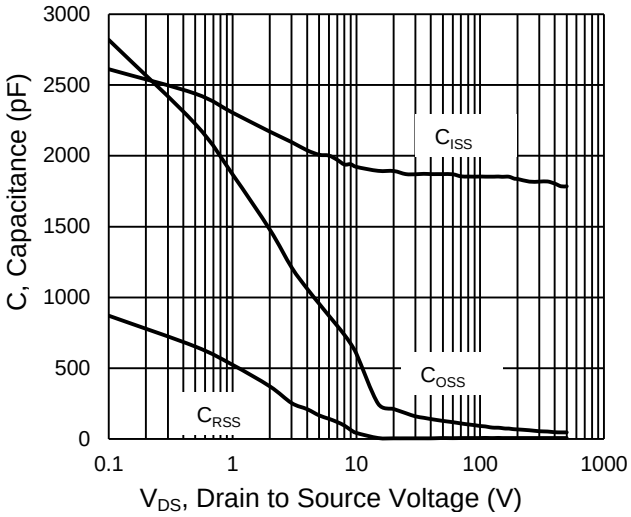
On-Resistance vs. Gate-Source Voltage



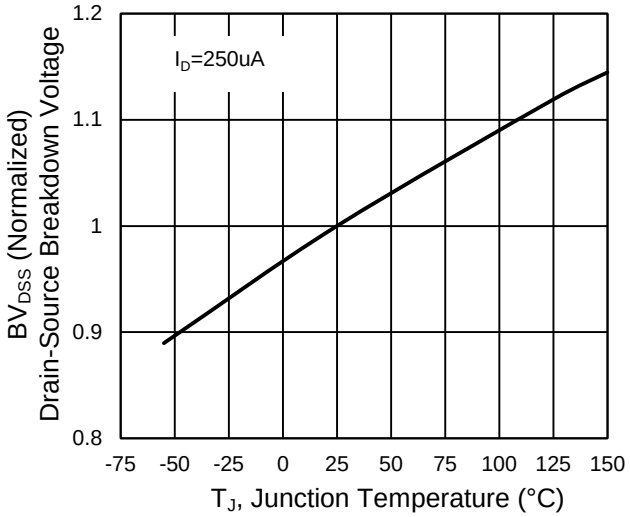
CHARACTERISTICS CURVES

(T_C = 25°C unless otherwise noted)

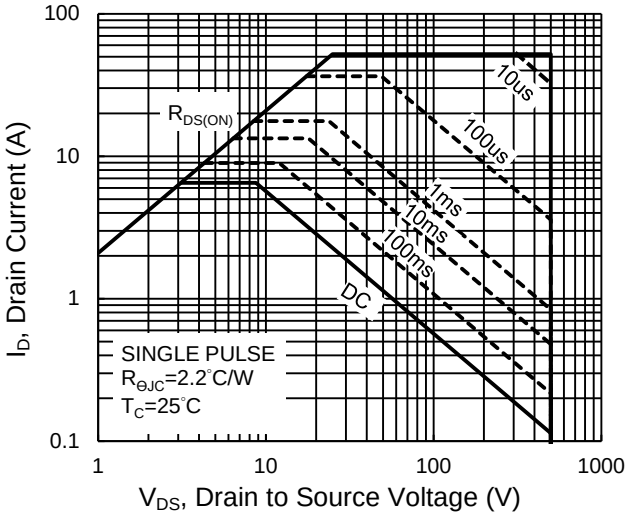
Capacitance vs. Drain-Source Voltage



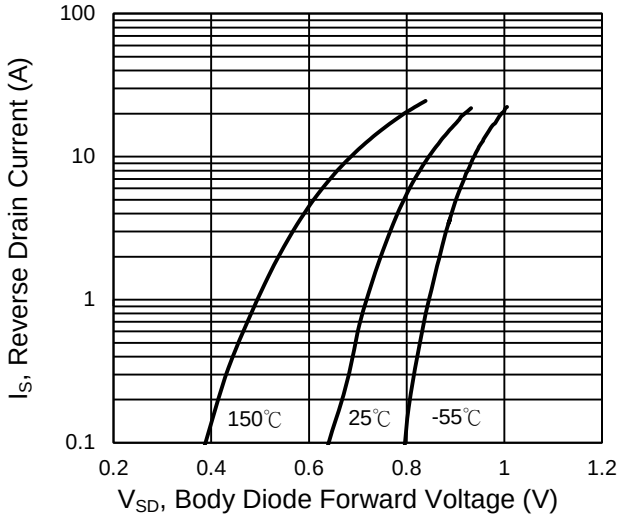
BV_{DSS} vs. Junction Temperature



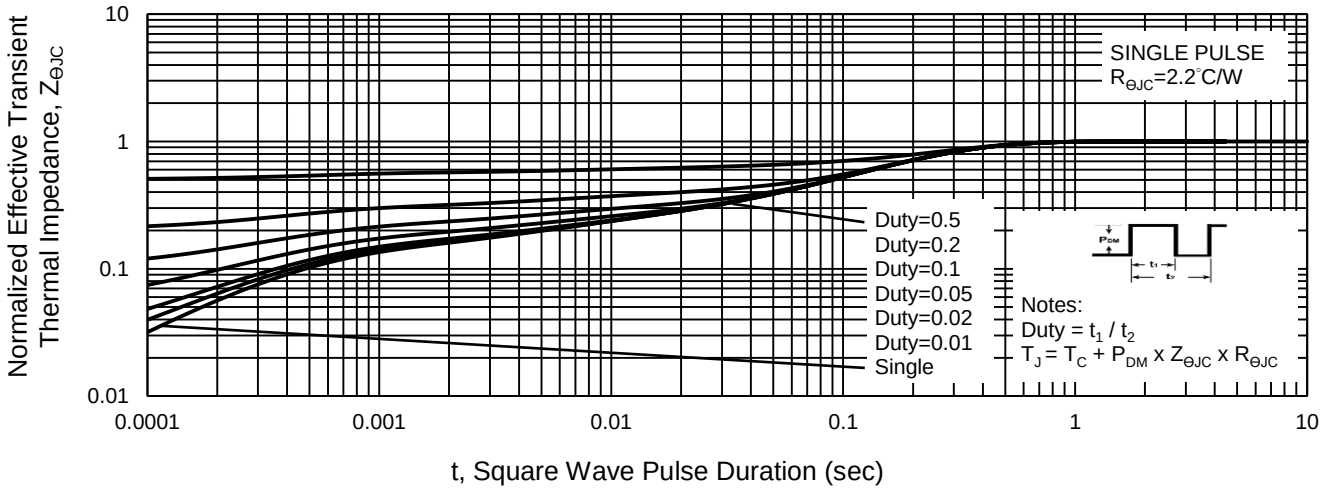
Maximum Safe Operating Area, Junction-to-Case



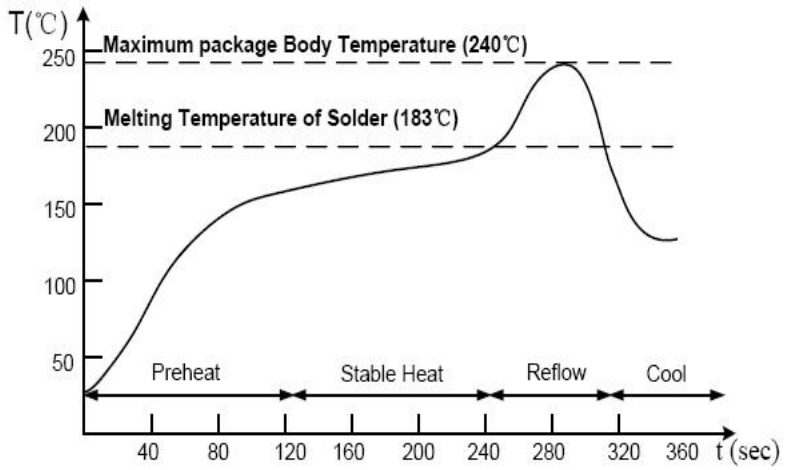
Source-Drain Diode Forward Current vs. Voltage



Normalized Thermal Transient Impedance, Junction-to-Case



Suggested Soldering Temperature Profile



Note

- Recommended reflow methods: IR, vapor phase oven, hot air oven, wave solder.
- The device can be exposed to a maximum temperature of 265°C for 10 seconds.
- Devices can be cleaned using standard industry methods and solvents.
- If reflow temperatures exceed the recommended profile, devices may not meet the performance requirements.

Package Information

Tube Package

Package	Tube (mm)	Q'TY/Tube (Kpcs)	Box Size (mm)	QTY/Box (Kpcs)	Carton Size (mm)	Q'TY/Carton (Kpcs)
ITO	525*31.9*6.4	0.05	545*150*45	1.0	575*245*170	5.0