

Features

- $R_{DS(on)} = 210 \text{ m}\Omega$ (Typ.) @ $V_{GS} = 10 \text{ V}$, $I_D = 10 \text{ A}$
- Low Gate Charge (Typ. 50 nC)
- Low C_{rss} (Typ. 27 pF)
- 100% Avalanche Aested
- Improve dv/dt Capability
- RoHS Compliant

Mechanical Data

Case : Molded plastic body

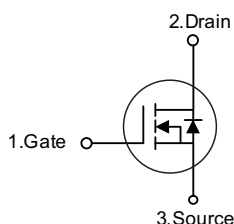
Terminals : Solder plated, solderable per MIL-STD-750, Method 2026

Polarity : As marked

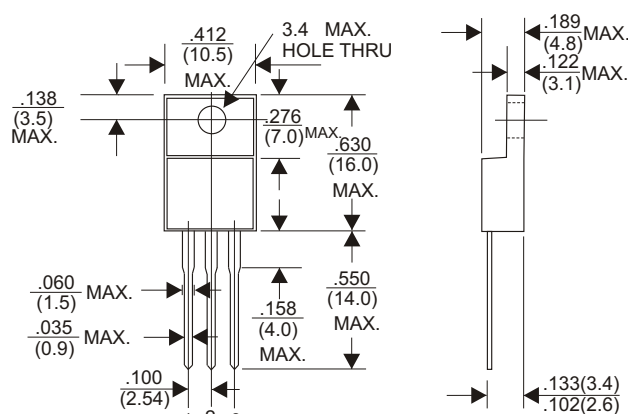
Mounting Position : Any

Application

- LCD/LED/PDP TV
- Lighting
- Uninterruptible Power Supply
- AC-DC Power Supply



ITO-220F (FULLY INSULATED)



Maximum Ratings And Electrical Characteristics

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

MOSFET Maximum Ratings $T_C = 25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	20N50F	Unit
V_{DSS}	Drain to Source Voltage	500	V
V_{GSS}	Gate to Source Voltage	± 30	V
I_D	Drain Current	- Continuous ($T_C = 25^\circ\text{C}$)	A
		- Continuous ($T_C = 100^\circ\text{C}$)	
I_{DM}	Drain Current	- Pulsed (Note 1)	A
E_{AS}	Single Pulsed Avalanche Energy	(Note 2)	mJ
I_{AR}	Avalanche Current	(Note 1)	A
E_{AR}	Repetitive Avalanche Energy	(Note 1)	mJ
dv/dt	Peak Diode Recovery dv/dt	(Note 3)	V/ns
P_D	Power Dissipation	($T_C = 25^\circ\text{C}$)	W
		- Derate above 25°C	W/°C
T_J, T_{STG}	Operating and Storage Temperature Range	-55 to +150	°C
T_L	Maximum Lead Temperature for Soldering Purpose, 1/8" from Case for 5 Seconds	300	°C

*Drain current limited by maximum junction temperature

Thermal Characteristics

Symbol	Parameter	20N50F	Unit
$R_{\theta JC}$	Thermal Resistance, Junction to Case, Max.	3.3	°C/W
$R_{\theta CS}$	Thermal Resistance, Case to Sink, Typ.	-	
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient, Max.	62.5	

20N50F

Electrical Characteristics

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
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Off Characteristics

BV_{DSS}	Drain to Source Breakdown Voltage	$I_D = 250\mu A$, $V_{GS} = 0V$, $T_J = 25^\circ C$	500	-	-	V
$\Delta BV_{DSS} / \Delta T_J$	Breakdown Voltage Temperature Coefficient	$I_D = 250\mu A$, Referenced to $25^\circ C$	-	0.7	-	V/ $^\circ C$
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = 500V$, $V_{GS} = 0V$	-	-	10	μA
		$V_{DS} = 400V$, $T_C = 125^\circ C$	-	-	100	
I_{GSS}	Gate to Body Leakage Current	$V_{GS} = \pm 30V$, $V_{DS} = 0V$	-	-	± 100	nA

On Characteristics

$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS} = V_{DS}$, $I_D = 250\mu A$	3.0	-	5.0	V
$R_{DS(on)}$	Static Drain to Source On Resistance	$V_{GS} = 10V$, $I_D = 10A$	-	0.22	0.26	Ω
g_{FS}	Forward Transconductance	$V_{DS} = 20V$, $I_D = 10A$	-	25	-	S

Dynamic Characteristics

C_{iss}	Input Capacitance	$V_{DS} = 25V$, $V_{GS} = 0V$ $f = 1MHz$	-	2550	3390	pF
C_{oss}	Output Capacitance		-	350	465	pF
C_{rss}	Reverse Transfer Capacitance		-	27	40	pF
$Q_{g(tot)}$	Total Gate Charge at 10V	$V_{DS} = 400V$, $I_D = 20A$ $V_{GS} = 10V$ (Note 4)	-	50	65	nC
Q_{gs}	Gate to Source Gate Charge		-	14	-	nC
Q_{gd}	Gate to Drain "Miller" Charge		-	20	-	nC

Switching Characteristics

$t_{d(on)}$	Turn-On Delay Time	$V_{DD} = 250V$, $I_D = 20A$ $R_G = 25\Omega$ (Note 4)	-	45	100	ns
t_r	Turn-On Rise Time		-	120	250	ns
$t_{d(off)}$	Turn-Off Delay Time		-	100	210	ns
t_f	Turn-Off Fall Time		-	60	130	ns

Drain-Source Diode Characteristics

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	-	-	1.5	V
t _{rr}	Reverse Recovery Time	V _{GS} = 0V, I _{SD} = 20A	-	154	-	ns
Q _{rr}	Reverse Recovery Charge	dI _F /dt = 100A/μs	-	0.5	-	μC

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature
2. $L = 5mH$, $I_{AS} = 20A$, $V_{DD} = 50V$, $R_G = 25\Omega$, Starting $T_J = 25^\circ C$
3. $I_{SD} \leq 20A$, $di/dt \leq 200A/\mu s$, $V_{DD} \leq BV_{DSS}$, Starting $T_J = 25^\circ C$
4. Essentially Independent of Operating Temperature Typical Characteristics

RATING AND CHARACTERISTIC CURVES (20N50F)

Figure 1. On-Region Characteristics

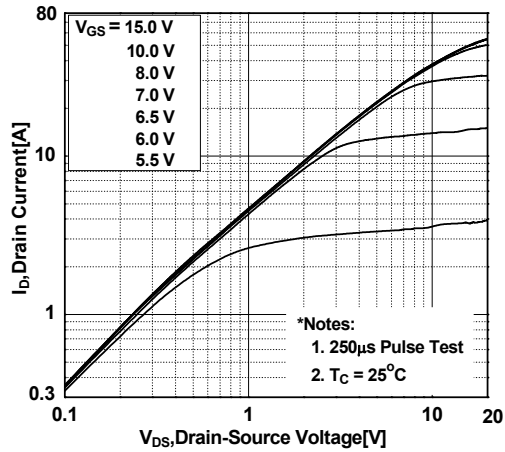


Figure 2. Transfer Characteristics

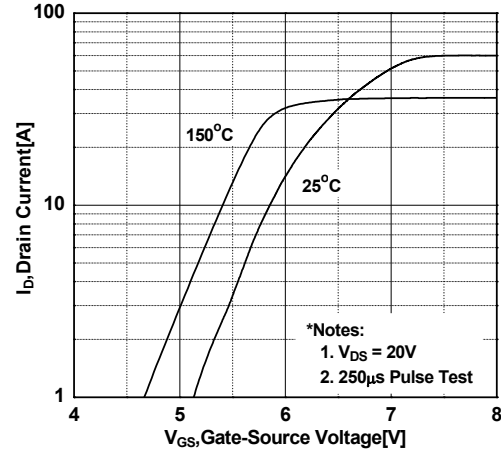


Figure 3. On-Resistance Variation vs. Drain Current and Gate Voltage

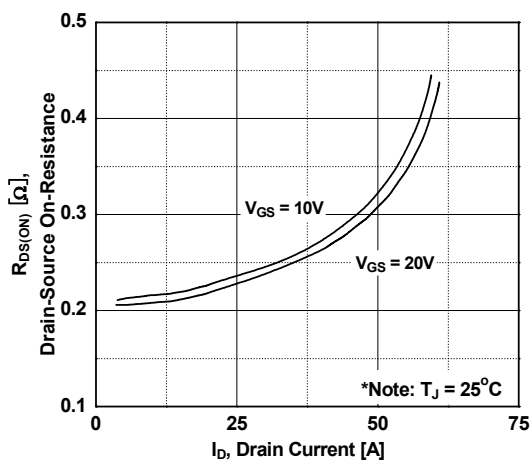


Figure 4. Body Diode Forward Voltage Variation vs. Source Current and Temperature

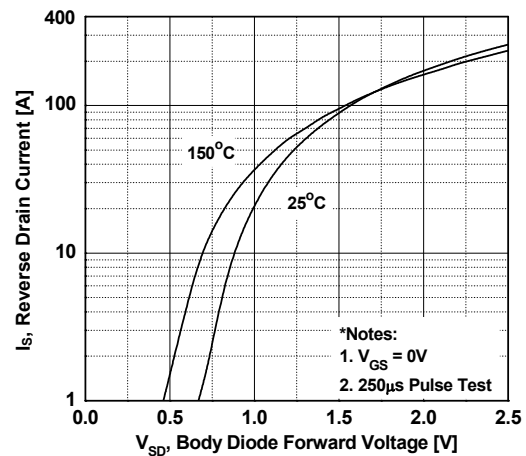


Figure 5. Capacitance Characteristics

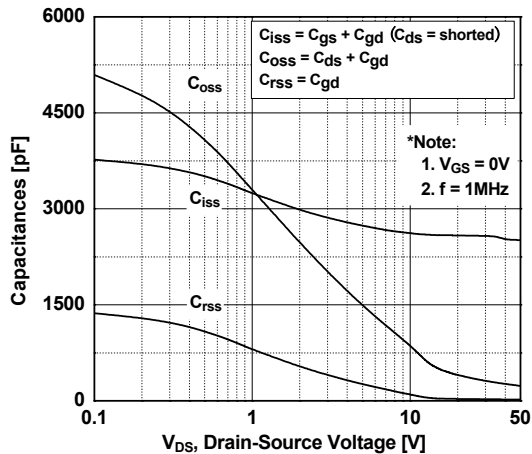
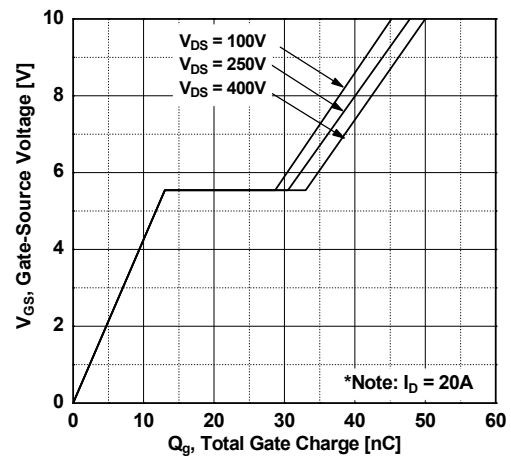


Figure 6. Gate Charge Characteristics



RATING AND CHARACTERISTIC CURVES (20N50F)

Figure 7. Breakdown Voltage Variation vs. Temperature

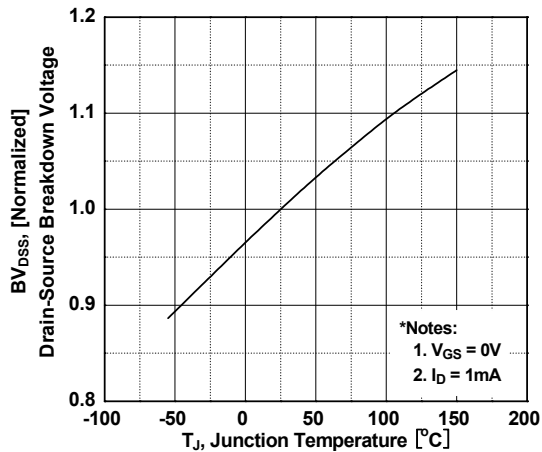


Figure 8. Maximum Safe Operating Area - 20N50

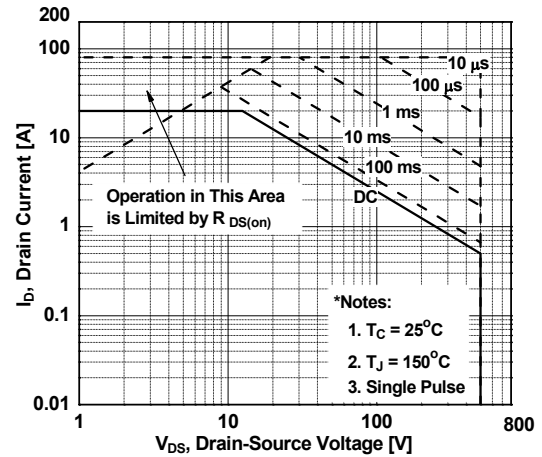


Figure 9. Maximum Safe Operating Area - 20N50F

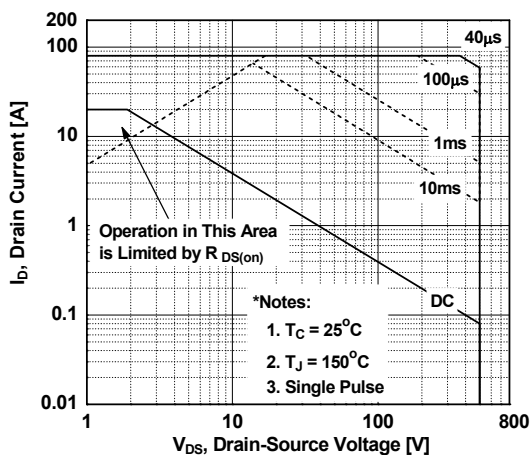


Figure 10. Maximum Drain Current vs. Case Temperature

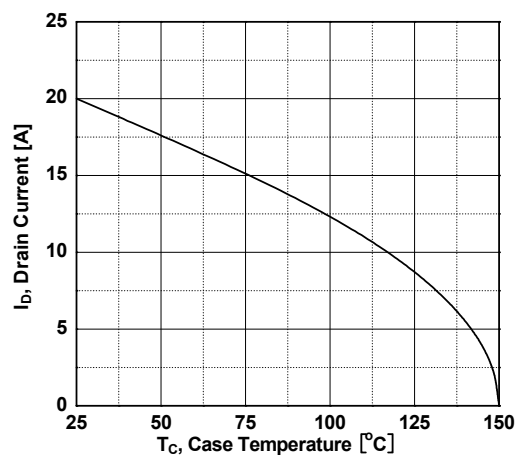


Figure 11. Transient Thermal Response Curve - 20N50

