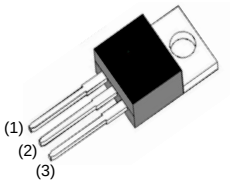
28N50(F)

28A N-Channel Power MOSFET

Features

- $R_{DS(on)}$ = 0.24Ω (Max) @ V_{GS} = 10V, I_D = 14 A
- Low Gate Charge (Typ. 50 nC)
- Low C_{rss} (Typ. 27 pF)
- 100% Avalanche Aested
- Improve dv/dt Capability
- RoHS Compliant



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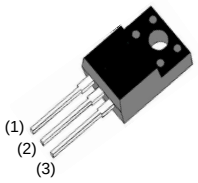

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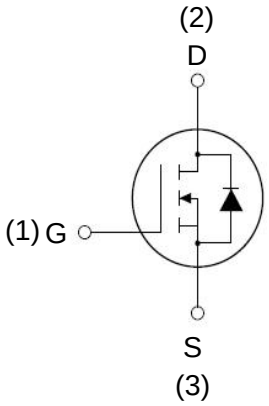
Mechanical Data

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

Application

- LED power supplies
- Cell Phone Charger
- Standby Power



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%.

MOSFET Maximum Ratings T_C = 25°C unless otherwise noted

Symbol	Parameter		28N50	28N50F	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°C)	28	28*	A
		- Continuous (T_C = 100°C)			
I_{DM}	Drain Current	- Pulsed (Note 1)	80	80*	A
E_{AS}	Single Pulsed Avalanche Energy	(Note 2)	1110		mJ
I_{AR}	Avalanche Current	(Note 1)	20		A
E_{AR}	Repetitive Avalanche Energy	(Note 1)	25		mJ
dv/dt	Peak Diode Recovery dv/dt	(Note 3)	20		V/ns
P_D	Power Dissipation	(T_C = 25°C)	300	50	W
		- Derate above 25°C	2.0	0.3	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	28N50	28N50F	Unit
$R_{\theta JC}$	Thermal Resistance, Junction to Case, Max.	0.5	3.3	°C/W
$R_{\theta CS}$	Thermal Resistance, Case to Sink, Typ.	0.5	-	
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient, Max.	62.5	62.5	

Electrical Characteristics

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
Off Characteristics						
BV_{DSS}	Drain to Source Breakdown Voltage	I_D = 250μA, V_{GS} = 0V, T_J = 25°C	500	-	-	V
ΔBV_{DSS} / ΔT_J	Breakdown Voltage Temperature Coefficient	I_D = 250μA, Referenced to 25°C	-	0.7	-	V/°C
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 500V, V_{GS} = 0V	-	-	1	μA
			-	-	-	
I_{GSS}	Gate to Body Leakage Current	V_{GS} = ±30V, V_{DS} = 0V	-	-	±100	nA
On Characteristics						
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS} = V_{DS}, I_D = 250μA	2.0	-	4.0	V
$R_{DS(on)}$	Static Drain to Source On Resistance	V_{GS} = 10V, I_D = 14A	-	0.20	0.24	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 = 25Ω (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 dI_F/dt = 100A/μs	-	154	-	ns
Q_{rr}	Reverse Recovery Charge		-	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 = 25Ω, Starting T_J = 25°C
3. I_{SD} ≤20A, di/dt ≤ 200A/μs, V_{DD} ≤ BV_{DSS}, Starting T_J = 25°C
4. Essentially Independent of Operating Temperature Typical Characteristics

Typical Performance Characteristics

Figure 1. On-Region Characteristics

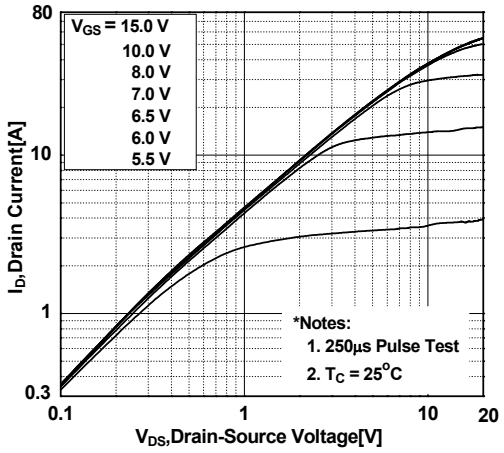


Figure 2. Transfer Characteristics

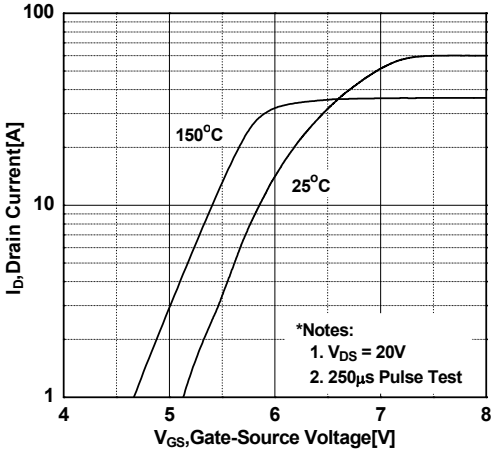


Figure 3. On-Resistance Variation vs. Drain Current and Gate Voltage

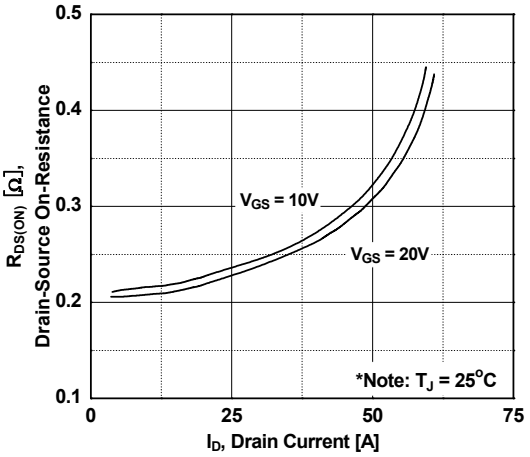


Figure 4. Body Diode Forward Voltage Variation vs. Source Current and Temperature

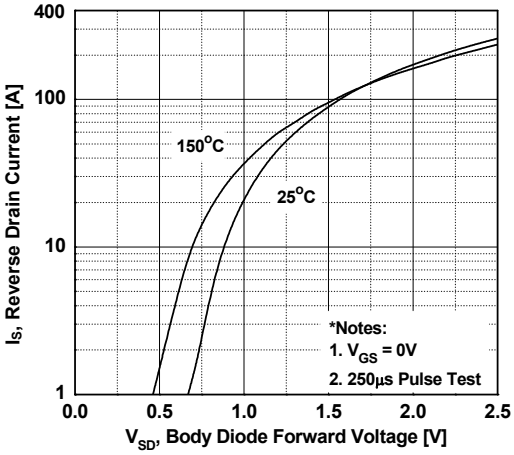


Figure 5. Capacitance Characteristics

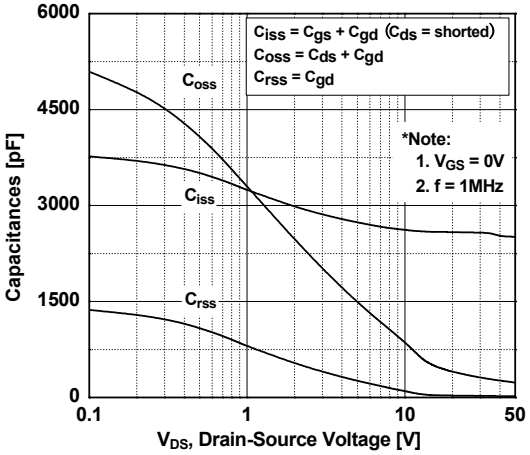
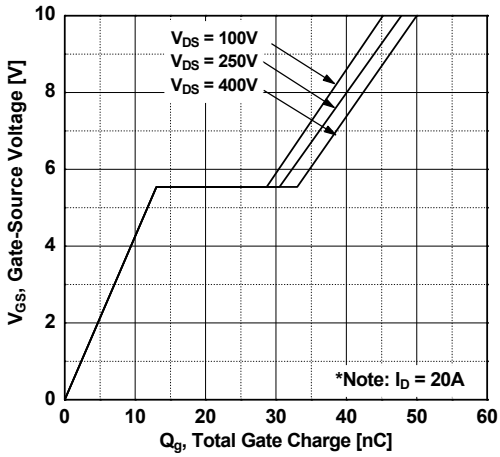


Figure 6. Gate Charge Characteristics



Typical Performance Characteristics (Continued)

Figure 7. Breakdown Voltage Variation vs. Temperature

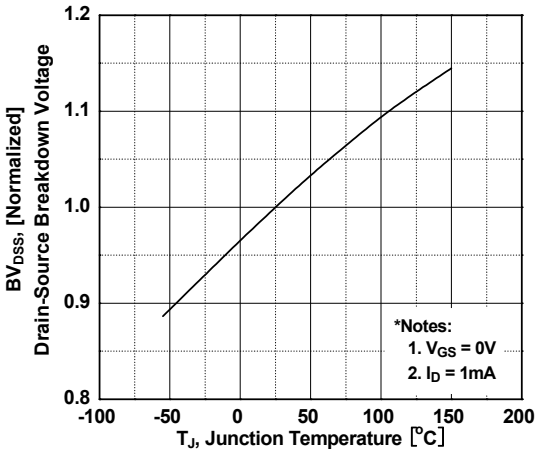


Figure 8. Maximum Safe Operating Area - 28N50

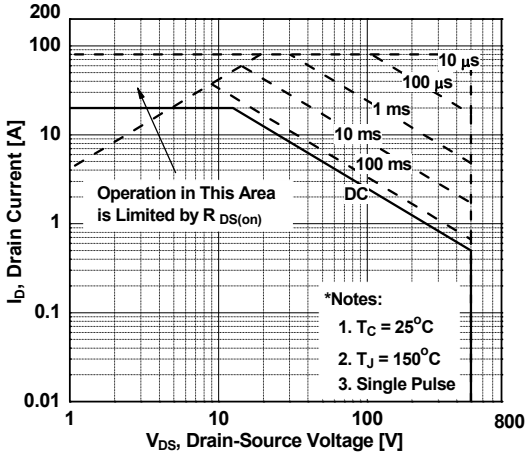


Figure 9. Maximum Safe Operating Area - 28N50F

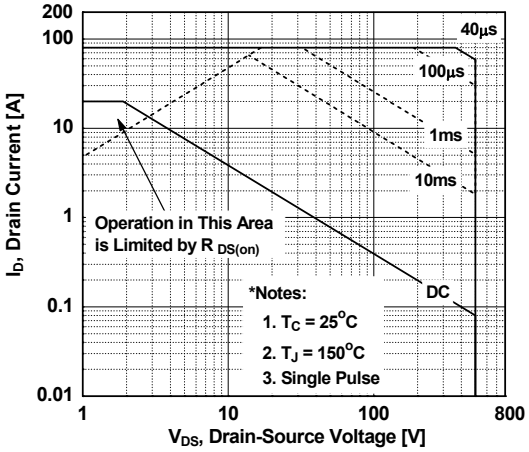


Figure 10. Maximum Drain Current vs. Case Temperature

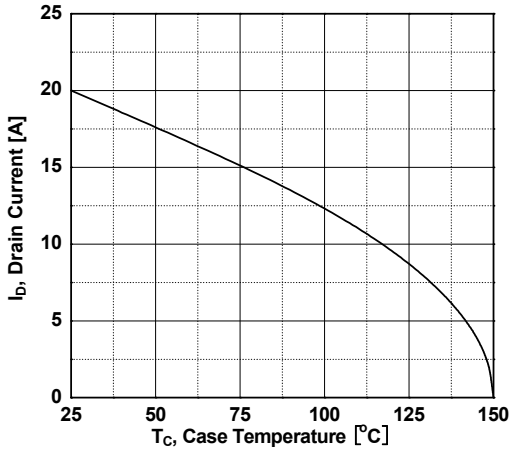
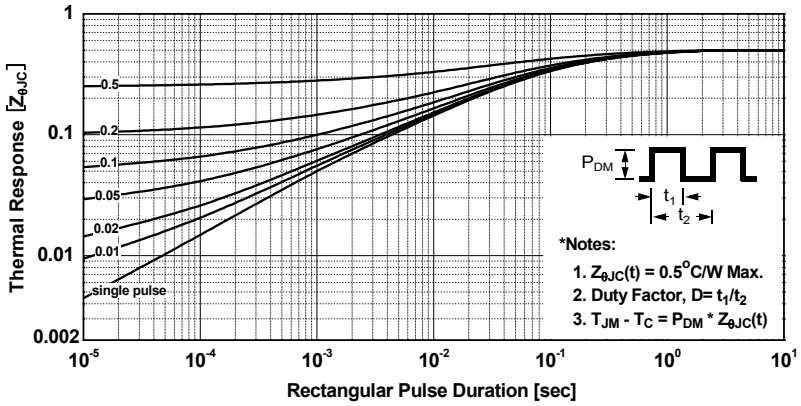
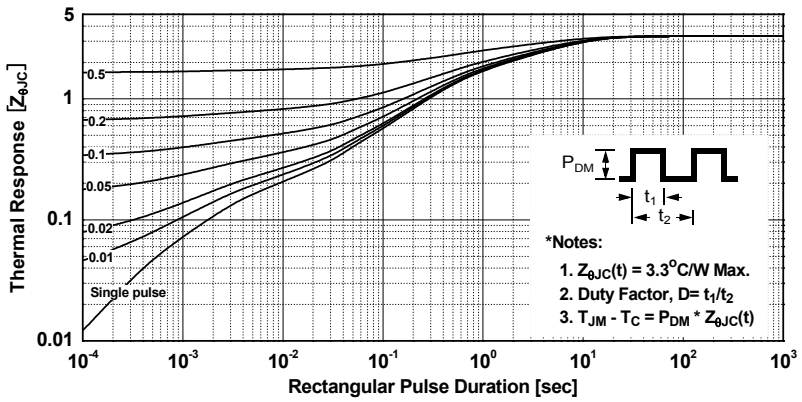


Figure 11. Transient Thermal Response Curve - 28N50

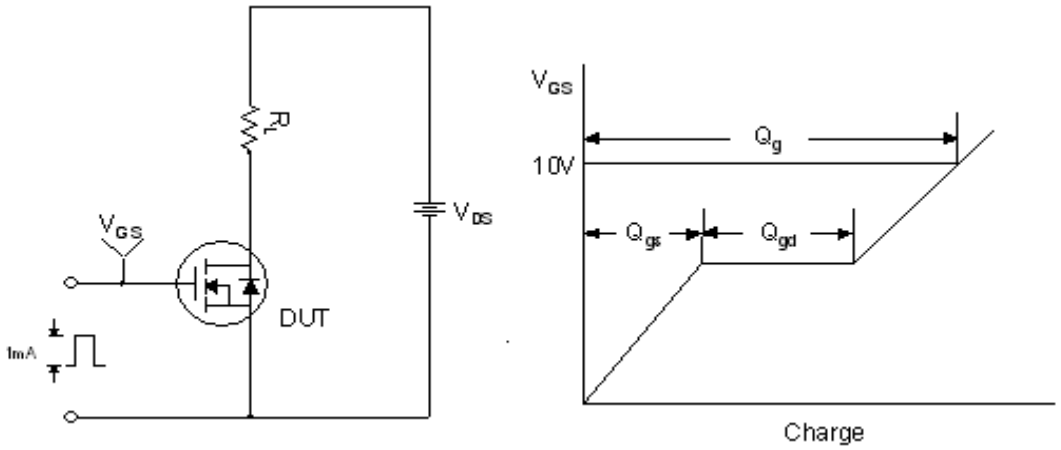


Typical Performance Characteristics (Continued)

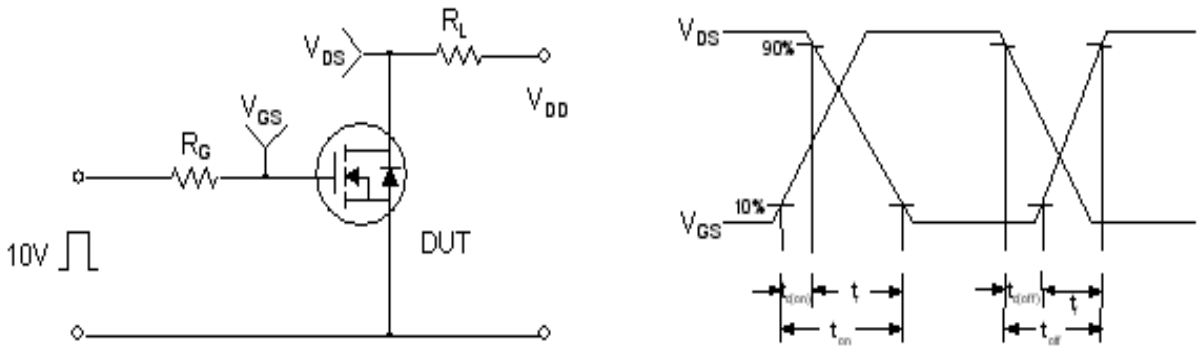
Figure 12. Transient Thermal Response Curve - 28N50F



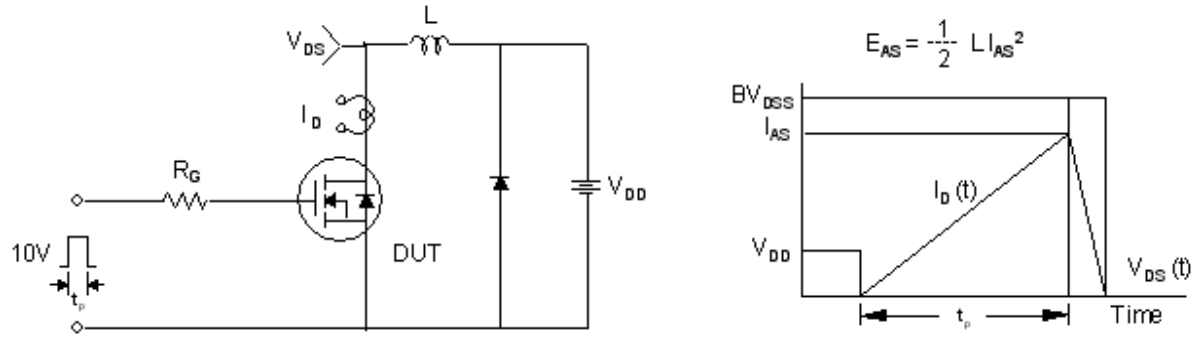
Gate Charge Test Circuit & Waveform



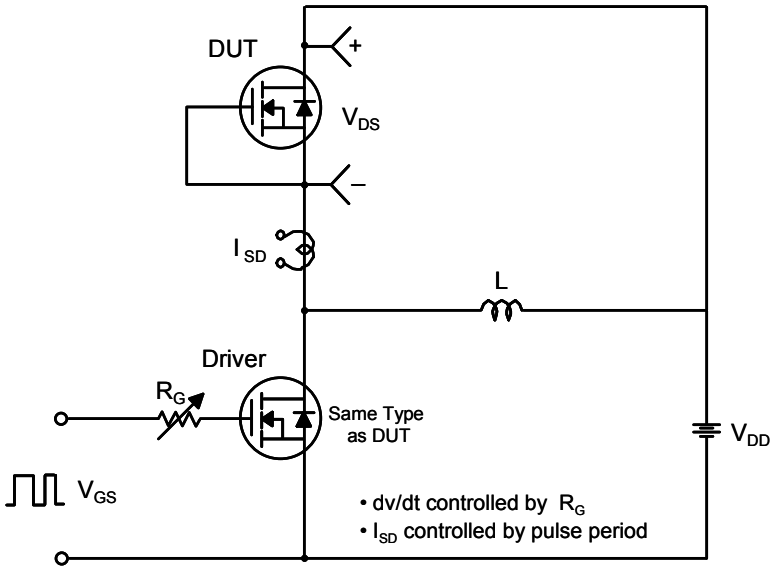
Resistive Switching Test Circuit & Waveforms

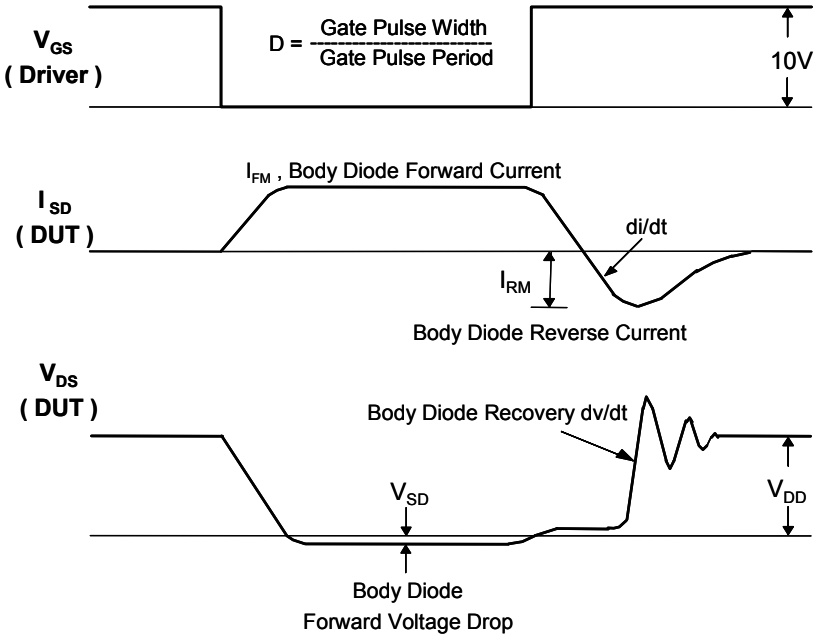


Unclamped Inductive Switching Test Circuit & Waveforms



Peak Diode Recovery dv/dt Test Circuit & Waveforms





Outline Drawing

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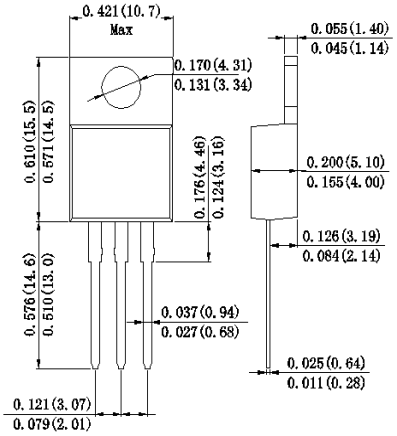
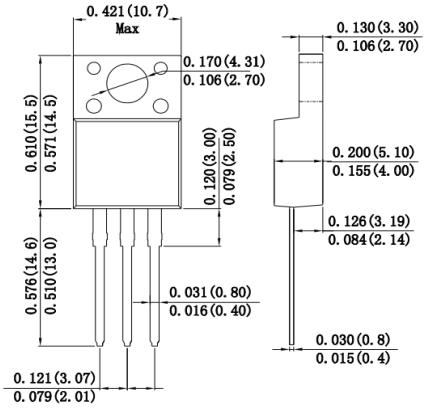
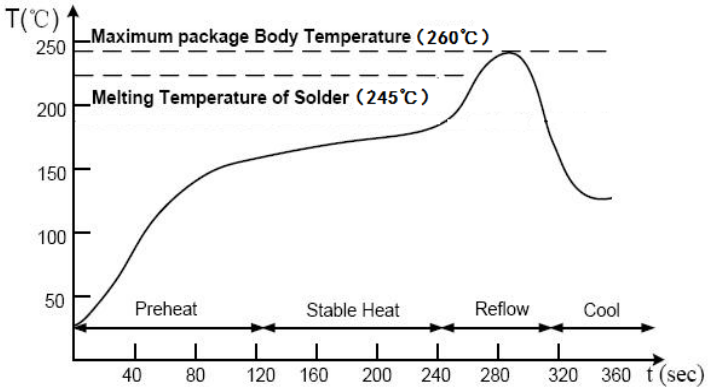


ITO-220AB



Note: Dimensions in inches and (millimeters)

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 260°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

Package Specifications

Package	Tube (mm)	Q'TY/Tube (Kpcs)	Box Size (mm)	QTY/Box (Kpcs)	Carton Size (mm)	Q'TY/Carton (Kpcs)
TO-220AB	525*31.9*6.4	0.05	545*150*45	1.0	575*245*170	5.0
ITO-220AB	525*31.9*6.4	0.05	545*150*45	1.0	575*245*170	5.0