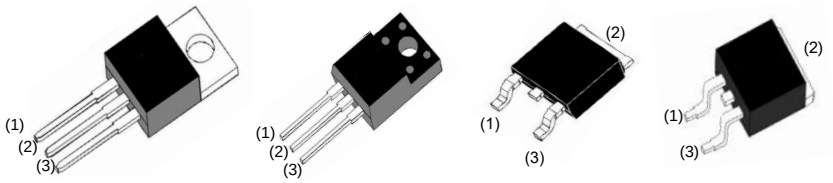
Features

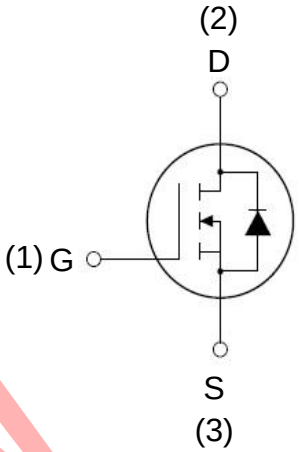
- New technology for high voltage device
- Low on-resistance and low conduction losses
- Small package
- Ultra Low Gate Charge cause lower driving requirements
- 100% Avalanche Tested
- ROHS compliant



TO-220AB	ITO-220AB	TO-252	TO-263
7N65	7N65F	7N65D	7N65B

Mechanical Data

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



Schematic diagram

Application

- LED power supplies
- Cell Phone Charger
- Standby Power

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%.

Table 1. Absolute Maximum Ratings (T_C=25℃)

Parameter	Symbol	7N65(B)(D)	7N65F	Unit
Drain-Source Voltage (V_{GS}=0V)	V_{DS}	650		V
Gate-Source Voltage (V_{DS}=0V) AC (f>1 Hz)	V_{GS}	±30		V
Continuous Drain Current at Tc=25°C	$I_{D\ (DC)}$	7	7*	A
Continuous Drain Current at Tc=100°C	$I_{D\ (DC)}$			A
Pulsed drain current **(Note 1)**	$I_{DM\ (pluse)}$	28	28*	A
Maximum Power Dissipation(Tc=25℃) Derate above 25°C	P_D	60 0.48	31.4 0.25	W W/°C
Single pulse avalanche energy **(Note 2)**	E_{AS}	101		mJ
Avalanche current **(Note 1)**	I_{AR}	1.5		A
Repetitive Avalanche energy , t_{AR} limited by T_{jmax} **(Note 1)**	E_{AR}	0.28		mJ

Parameter	Symbol	7N65(B)(D)	7N65F	Unit
Drain Source voltage slope, V_{DS} ≤480 V,	dv/dt	50		V/ns
Reverse diode dv/dt， V_{DS} ≤480 V,I_{SD}<I_D	dv/dt	15		V/ns
Operating Junction and Storage Temperature Range	T_J,T_{STG}	-55...+150		℃

* limited by maximum junction temperature

Table 2. Thermal Characteristic

Parameter	Symbol	7N65(B)(D)	7N65F	Unit
Thermal Resistance，Junction-to-Case（Maximum）	R_{thJC}	2.08	3.98	℃ /W
Thermal Resistance，Junction-to-Ambient （Maximum）	R_{thJA}	62	80	℃ /W

Table 3. Electrical Characteristics (TA=25℃unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
On/off states						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V I_D=250μA	650			V
Zero Gate Voltage Drain Current(Tc=25℃)	I_{DSS}	V_{DS}=650V,V_{GS}=0V				μA
Zero Gate Voltage Drain Current(Tc=125℃)	I_{DSS}	V_{DS}=650V,V_{GS}=0V				μA
Gate-Body Leakage Current	I_{GSS}	V_{GS}=±30V,V_{DS}=0V			±80	nA
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS},I_D=250μA	2.0		4.0	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=3.5A		1.212	1.45[3]	Ω
Dynamic Characteristics						
Input Capacitance	C_{lss}	V_{DS}=50V,V_{GS}=0V, F=1.0MHz		435		pF
Output Capacitance	C_{oss}			28		pF
Reverse Transfer Capacitance	C_{rss}			3.3		pF
Total Gate Charge	Q_g	V_{DS}=480V,I_D=7A, V_{GS}=10V		11		nC
Gate-Source Charge	Q_{gs}			3.5		nC
Gate-Drain Charge	Q_{gd}			5		nC
Switching times						
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=380V,I_D=3.5A, R_G=4.7Ω,V_{GS}=10V		8		nS
Turn-on Rise Time	t_r			7		nS
Turn-Off Delay Time	$t_{d(off)}$			58	75	nS
Turn-Off Fall Time	t_f			9	15	nS
Source- Drain Diode Characteristics						
Source-drain current(Body Diode)	I_{SD}	T_C=25°C			7	A
Pulsed Source-drain current(Body Diode)	I_{SDM}				28	A
Forward On Voltage	V_{SD}	Tj=25°C,I_{SD}=7A,V_{GS}=0V		0.9	1.2	V
Reverse Recovery Time	t_{rr}	Tj=25°C,I_F=3.5A,di/dt=100A/μs		210		nS
Reverse Recovery Charge	Q_{rr}			0.85		uC
Peak Reverse Recovery Current	I_{rrm}			8		A

Notes 1.Repetitive Rating: Pulse width limited by maximum junction temperature

2. Tj=25℃,VDD=50V,VG=10V, R_G=25Ω

3. $R_{DS(on)}$ CP test results, typical, is 1.212Ω @V_{GS}=10V, I_D=1A

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS (curves)

Figure1. Safe operating area

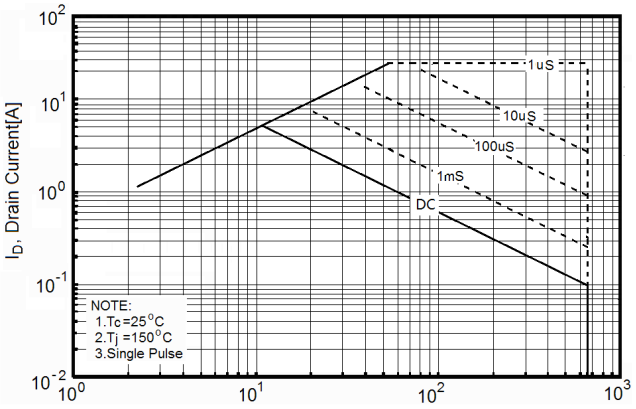


Figure2. Safe operating area for ITO-220AB

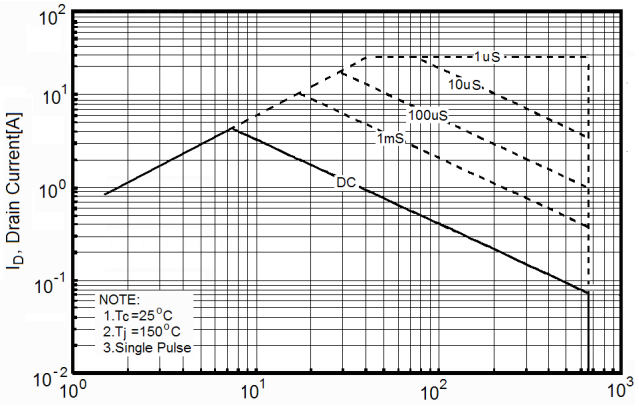


Figure3. Source-Drain Diode Forward Voltage

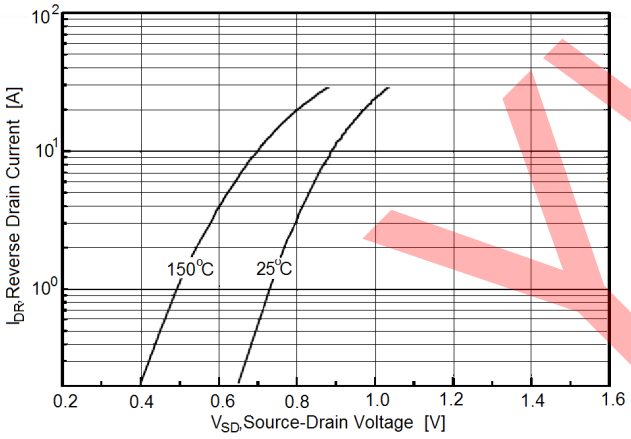


Figure4. Output characteristics

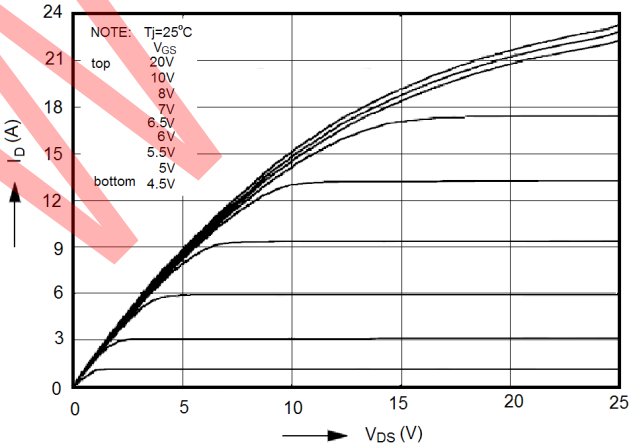


Figure5. Transfer characteristics

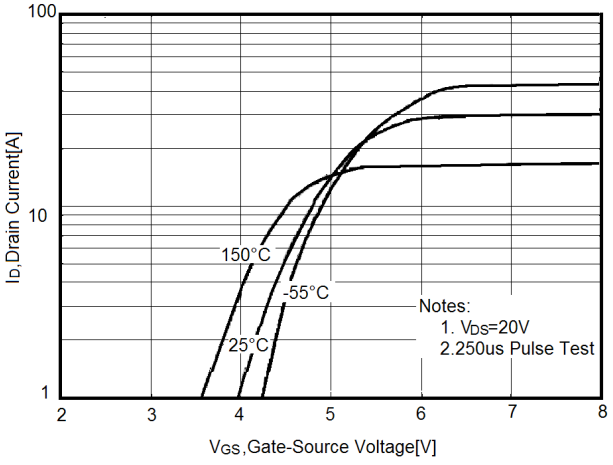


Figure6. Static drain-source on resistance

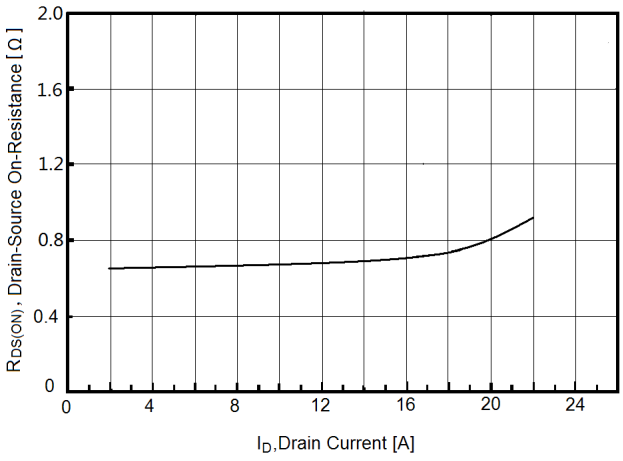


Figure7. $R_{DS(ON)}$ vs Junction Temperature

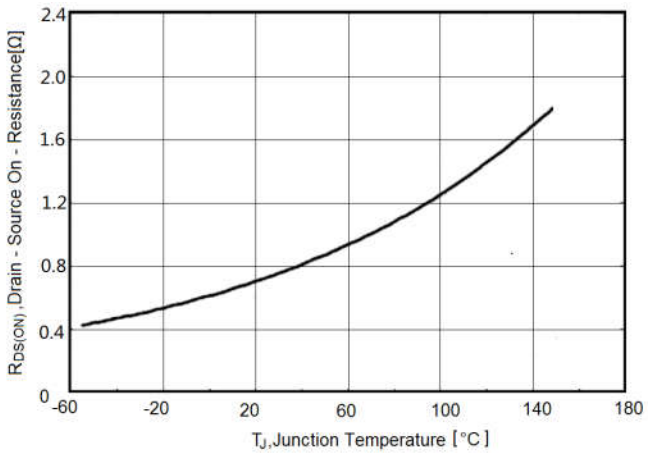


Figure8. BV_{DSS} vs Junction Temperature

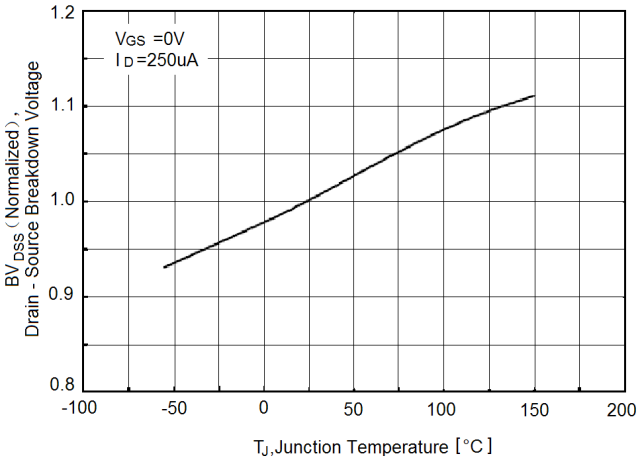


Figure9. Maximum I_D vs Junction Temperature

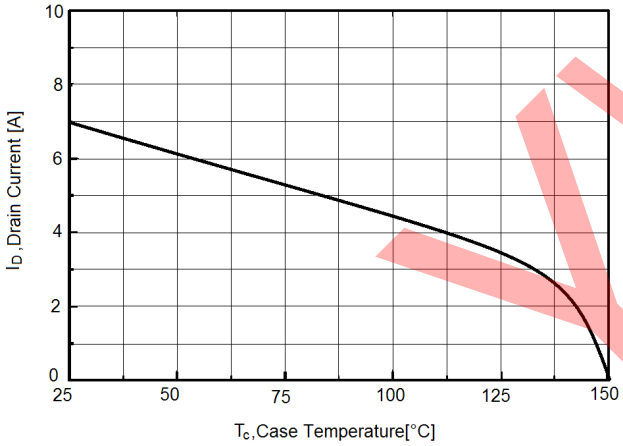


Figure10. Capacitance

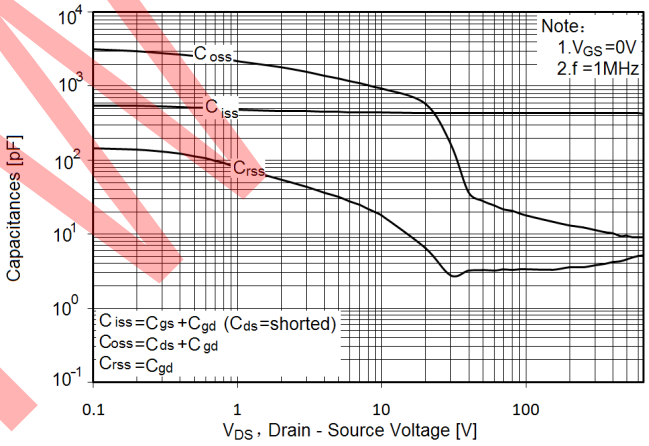


Figure11. Gate charge waveforms

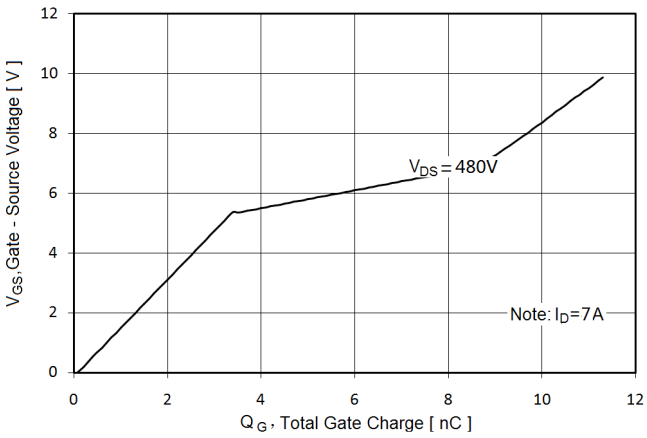


Figure12. Transient Thermal Impedance

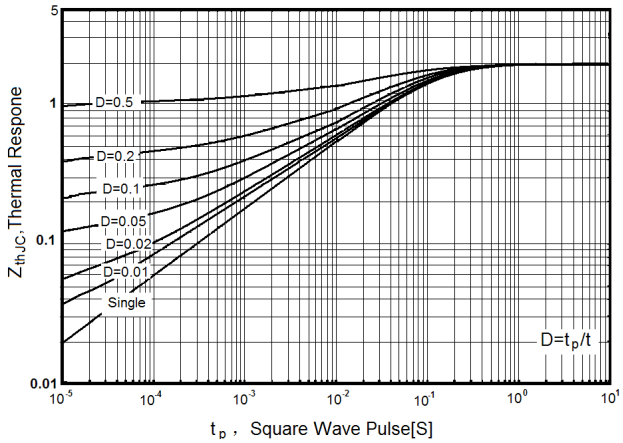
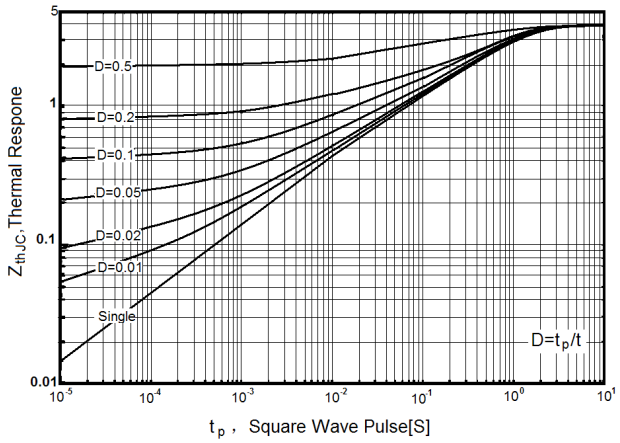
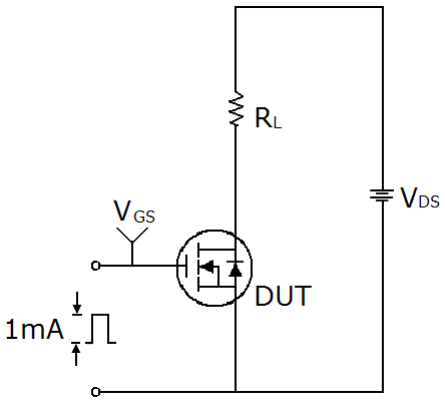


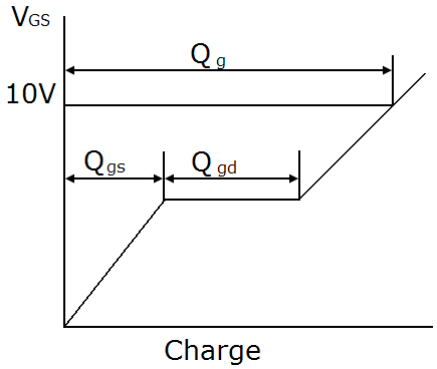
Figure13. Transient Thermal Impedance for ITO-220AB



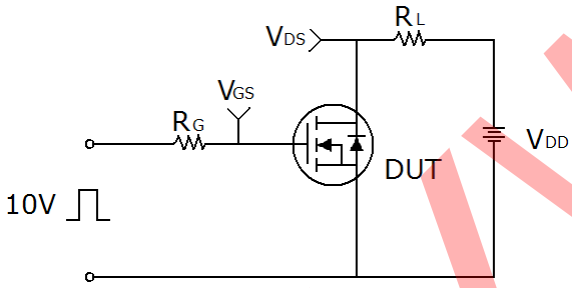
Test circuit

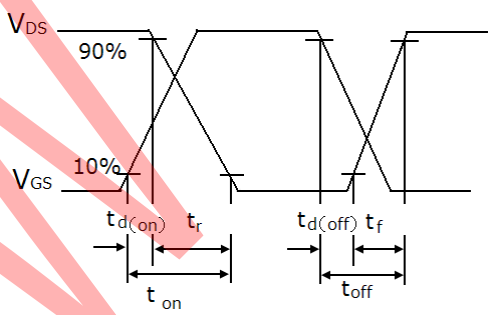
1）Gate charge test circuit & Waveform



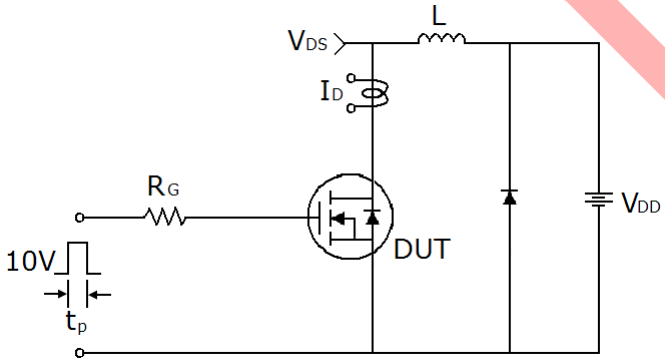


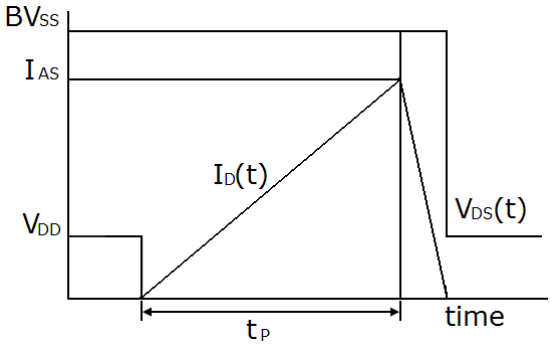
2）Switch Time Test Circuit:





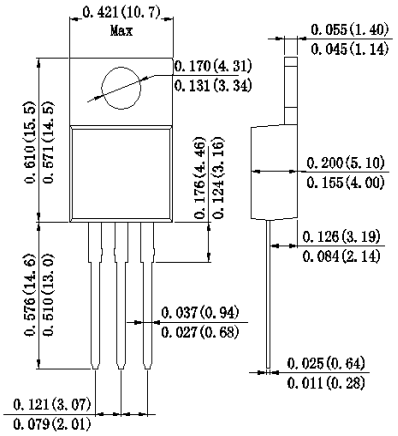
3）Unclamped Inductive Switching Test Circuit & Waveforms



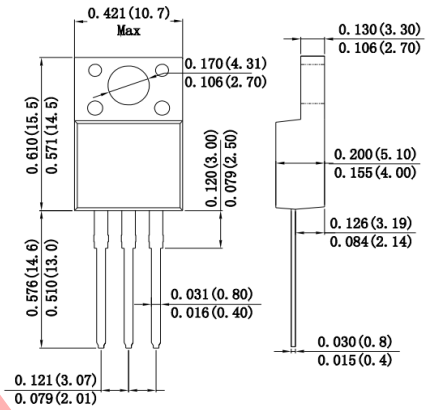


Outline Drawing

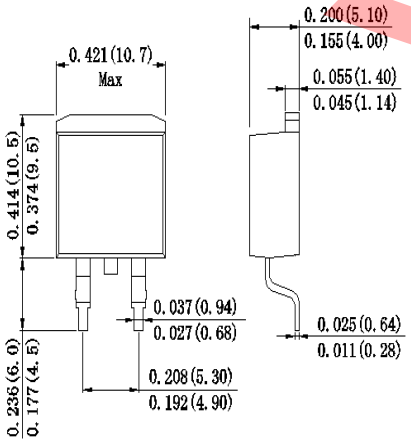
TO-220AB



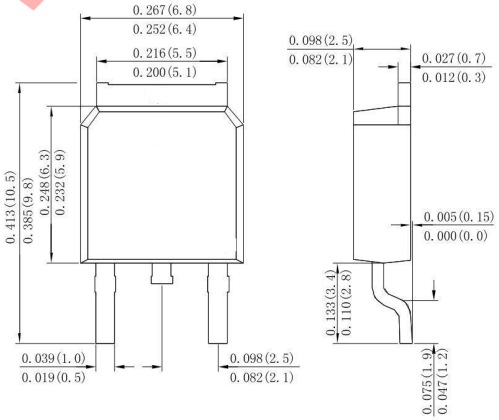
ITO-220AB



TO-263

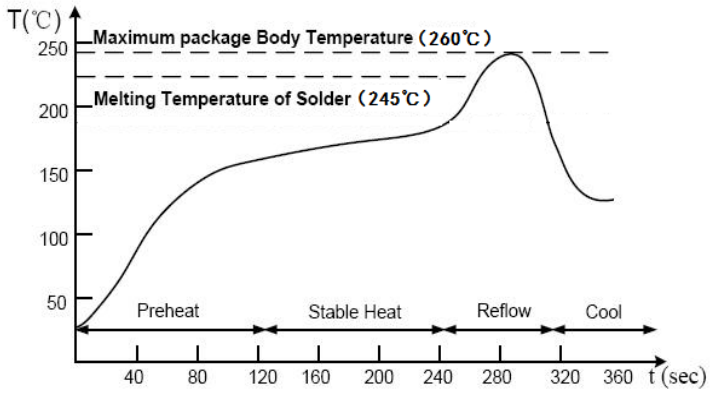


TO-252



Note: Dimensions in inches and (millimeters)

Suggested Soldering Temperature Profile



Note

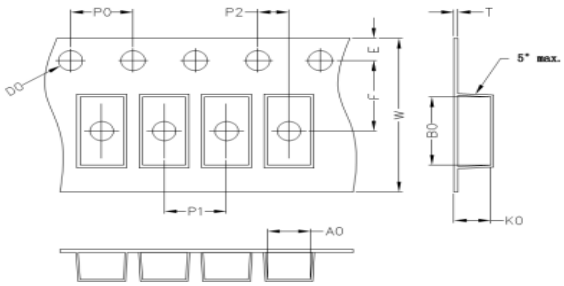
- Recommended reflow methods: IR, vapor phase oven, hot air oven, wave solder.
- The device can be exposed to a maximum temperature of 260°C for 10 seconds.
- Devices can be cleaned using standard industry methods and solvents.
- If reflow temperatures exceed the recommended profile, devices may not 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

Carrier Dimension(mm)(TO-252)(TO-263)



TO-252

A0	B0	K0	D0	E	F
6.90	10.5	2.70	1.55	1.75	7.50
P0	**P1**	**P2**	**T**	**W**	**Tolerance**
4.0	8.0	2.0	0.30	16	0.1

TO-263

A0	B0	K0	D0	E	F
10.5	15.55	4.90	1.50	1.75	11.5
P0	**P1**	**P2**	**T**	**W**	**Tolerance**
4.0	16.0	2.0	0.4	24	0.1

Package	Reel Size	Reel DIA. (mm)	Q'TY/Reel (Kpcs)	Box Size (mm)	QTY/Box (Kpcs)	Carton Size (mm)	Q'TY/Carton (Kpcs)
TO-252	13'	330	2.5	340	5.0	360*360*360	40
TO-263	13'	330	0.8	340	0.8	360*360*360	6.4