N -Channel Logic Level Enhancement Mode Power MOSFET

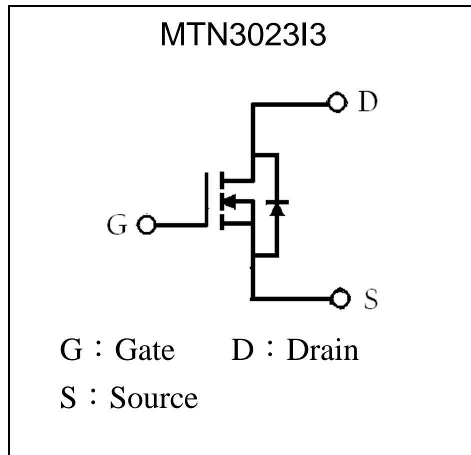
MTN3023I3

BV_{DSS}		30V
I_D @ V_{GS}=10V, T_C=25°C		30A
$R_{DSON(TYP)}$	V_{GS}=10V, I_D=20A	14mΩ
	V_{GS}=4.5V, I_D=10A	21mΩ

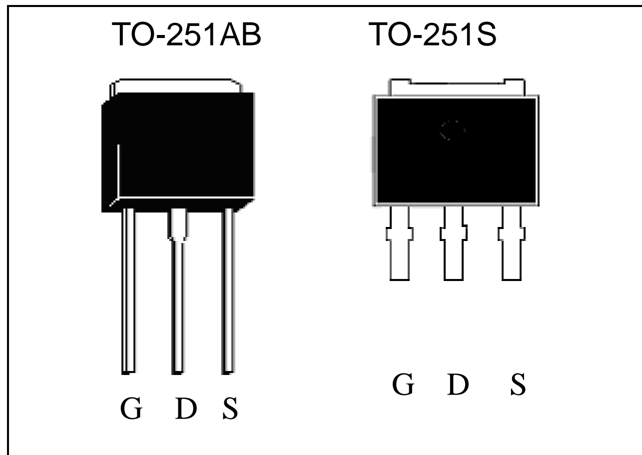
Features

- Low Gate Charge
- Simple Drive Requirement
- Pb-free lead plating package

Equivalent Circuit



Outline



Absolute Maximum Ratings (Tc=25°C, unless otherwise noted)

Parameter	Symbol	Limits	Unit
Drain-Source Voltage	V_{DS}	30	V
Gate-Source Voltage	V_{GS}	±20	
Continuous Drain Current @ V_{GS}=10V, T_C=25°C	I_D	30	A
Continuous Drain Current @ V_{GS}=10V,T_C=100°C		18	
Pulsed Drain Current *1	I_{DM}	100	
Total Power Dissipation @T_C=25℃	P_D	50	W
Total Power Dissipation @T_A=25℃		1.14	
Operating Junction and Storage Temperature Range	Tj, Tstg	-55~+150	°C

Note : *1. Pulse width limited by maximum junction temperature
*2. Duty cycle ≤ 1%

Thermal Data

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-case, max	$R_{th,j-c}$	2.5	°C/W
Thermal Resistance, Junction-to-ambient, max	$R_{th,j-a}$	110	°C/W

Electrical Characteristics (Tj=25°C, unless otherwise noted)

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Static					
BV_{DSS}	30	-	-	V	V_{GS}=0V, I_D=250μA
$\Delta BV_{DSS}/\Delta Tj$	-	0.02	-	V/℃	Reference to 25℃, I_D=1mA
$V_{GS(th)}$	1	-	2.5	V	$V_{DS}=V_{GS}$, I_D=250μA
I_{GSS}	-	-	±100	nA	V_{GS}=±20V, V_{DS}=0V
I_{DSS}	-	-	1	μA	V_{DS}=24V, V_{GS}=0V, Tj=25℃
	-	-	25	μA	V_{DS}=24V, V_{GS}=0V, Tj=70℃
*$R_{DS(ON)}$	-	14	20	mΩ	I_D=20A, V_{GS}=10V
	-	21	28		I_D=10A, V_{GS}=4.5V
*G_{FS}	-	13	-	S	V_{DS}=5V, I_D=15A
Dynamic					
Ciss	-	750	-	pF	V_{DS}=25V, V_{GS}=0V, f=1MHz
Coss	-	61	-		
Crss	-	52	-		
$t_{d(ON)}$	-	10	-	ns	V_{DS}=15V, I_D=1A, V_{GS}=10V, R_G=6Ω, R_D=15Ω
t_r	-	17	-	ns	
$t_{d(OFF)}$	-	36	-	ns	
t_f	-	18	-	ns	
Qg	-	22	-	nC	V_{DS}=15V, I_D=20A, V_{GS}=10V,
Qgs	-	4.2	-	nC	
Qgd	-	3.1	-	nC	

*Pulse Test : Pulse Width ≤300μs, Duty Cycle≤2%

Source Drain Diode

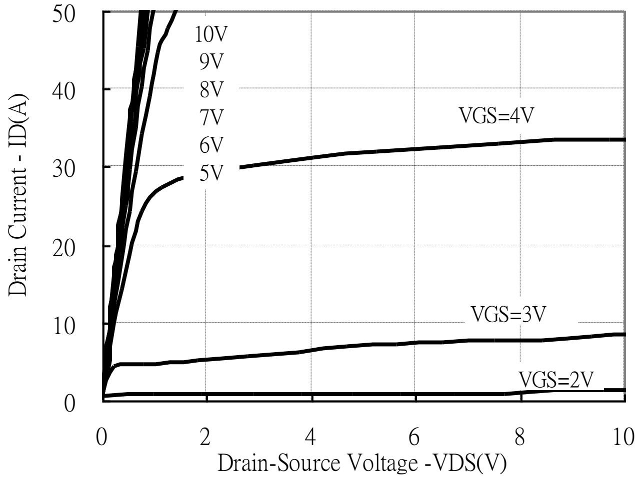
Symbol	Min.	Typ.	Max.	Unit	Test Conditions
*V_{SD}	-	-	1.3	V	I_S=15A,V_{GS}=0V
*T_{rr}	-	10	-	ns	I_S=20A,V_{GS}=0V, dI/dt=100A/μs
Q_{rr}	-	21	-	nC	

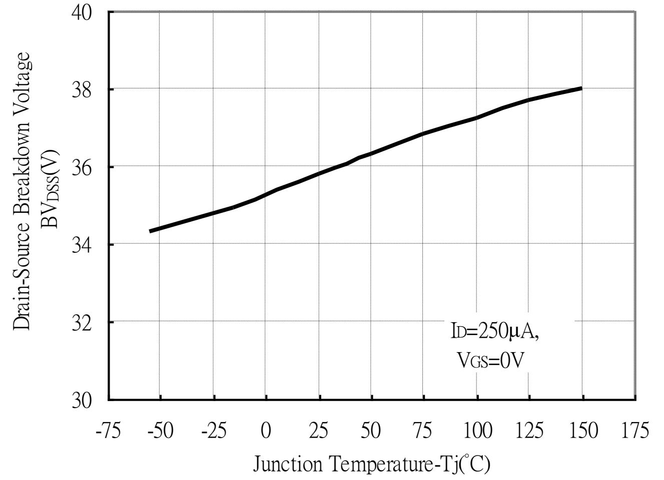
*Pulse Test : Pulse Width ≤300μs, Duty Cycle≤2%

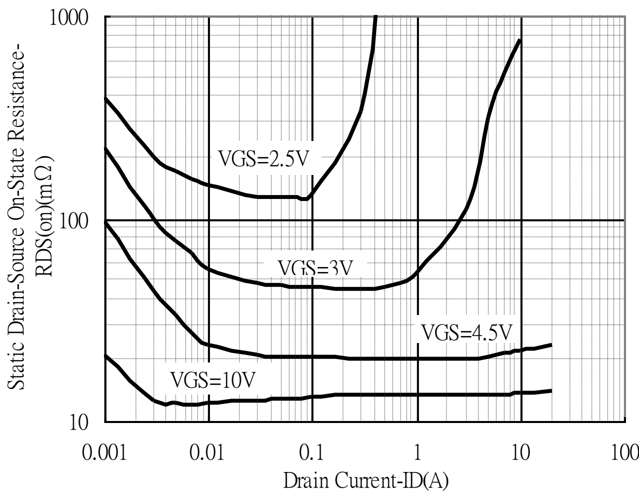
Ordering Information

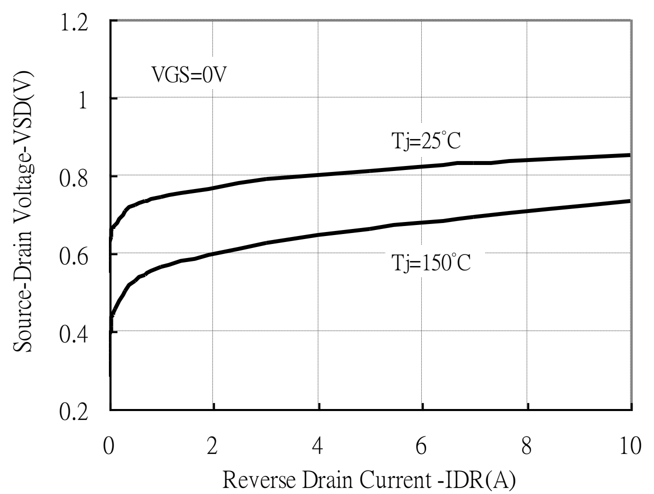
Device	Package	Shipping
MTN3023I3B-0-UB-G	TO-251AB (RoHS compliant and halogen-free package)	80 pcs / tube, 50 tubes / box
MTN3023I3S-0-UB-G	TO-251S (RoHS compliant and halogen-free package)	80 pcs / tube, 50 tubes / box

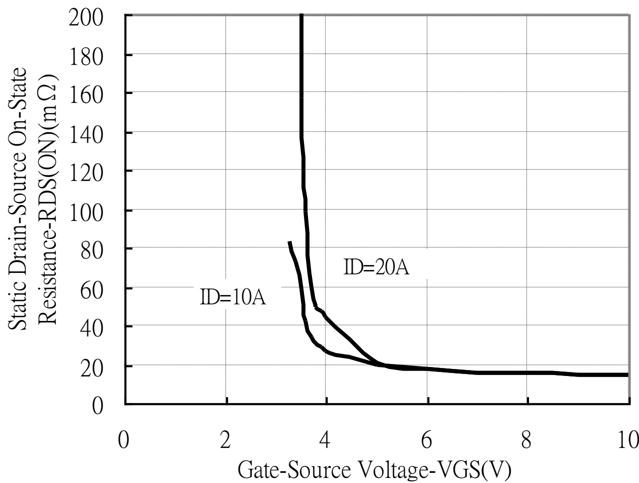
Typical Characteristics

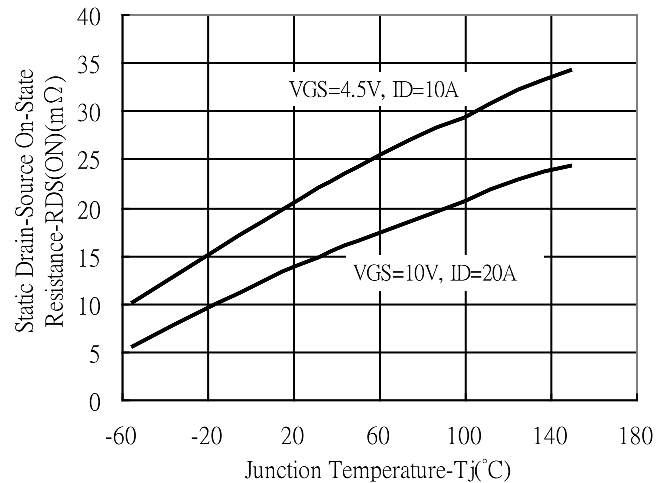




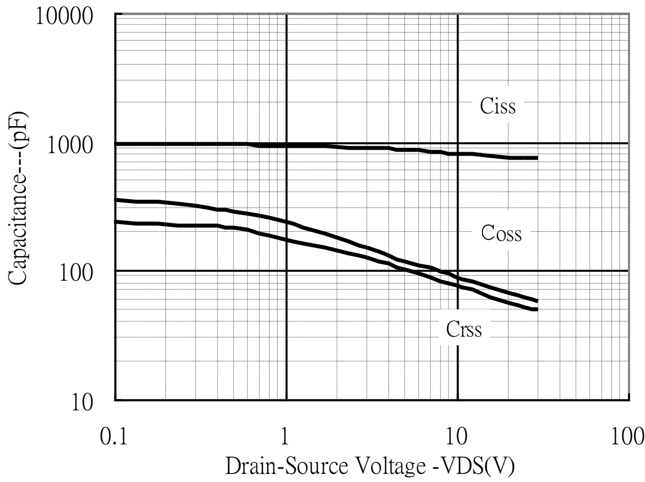


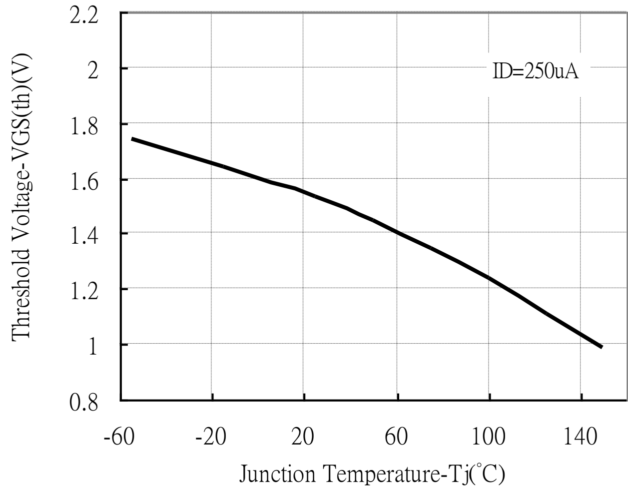


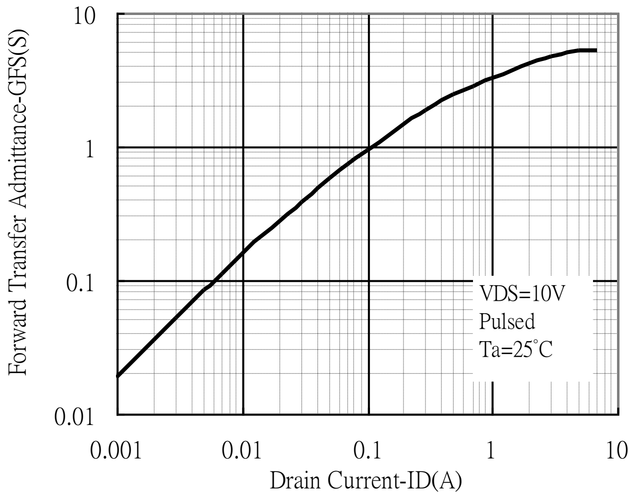


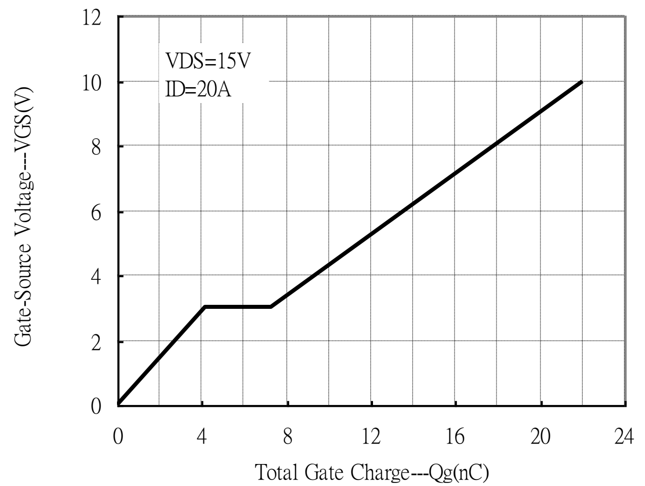


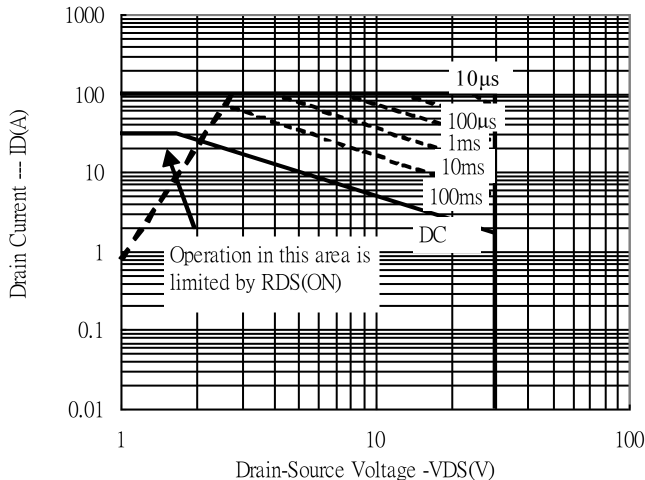
Typical Characteristics(Cont.)

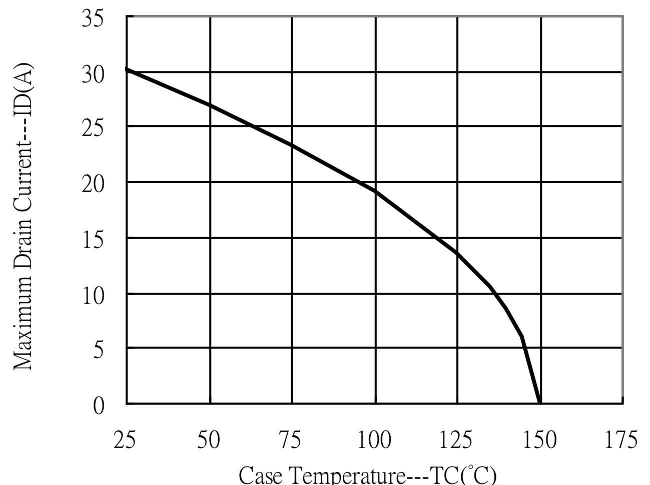




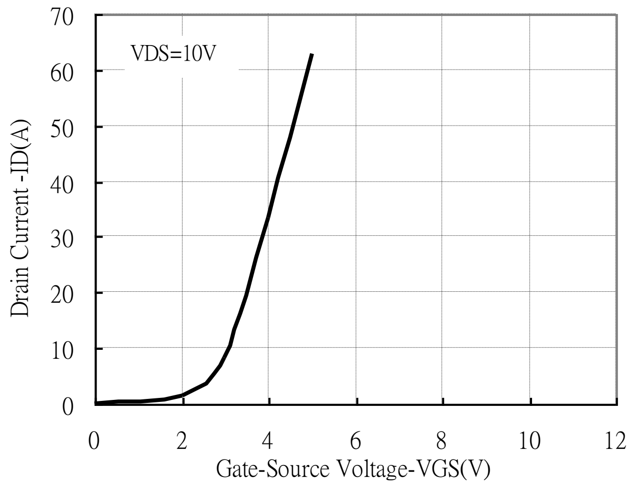


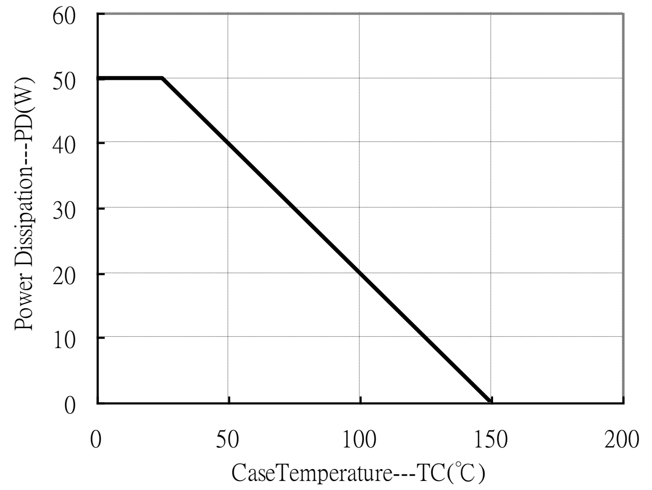


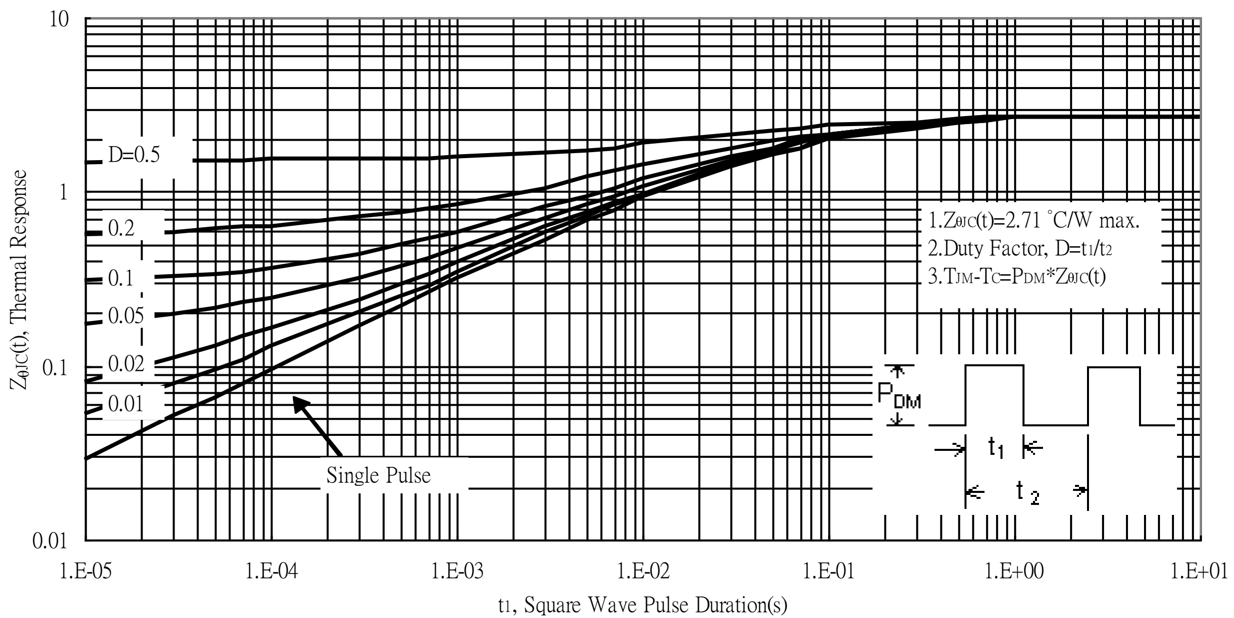




Typical Characteristics(Cont.)



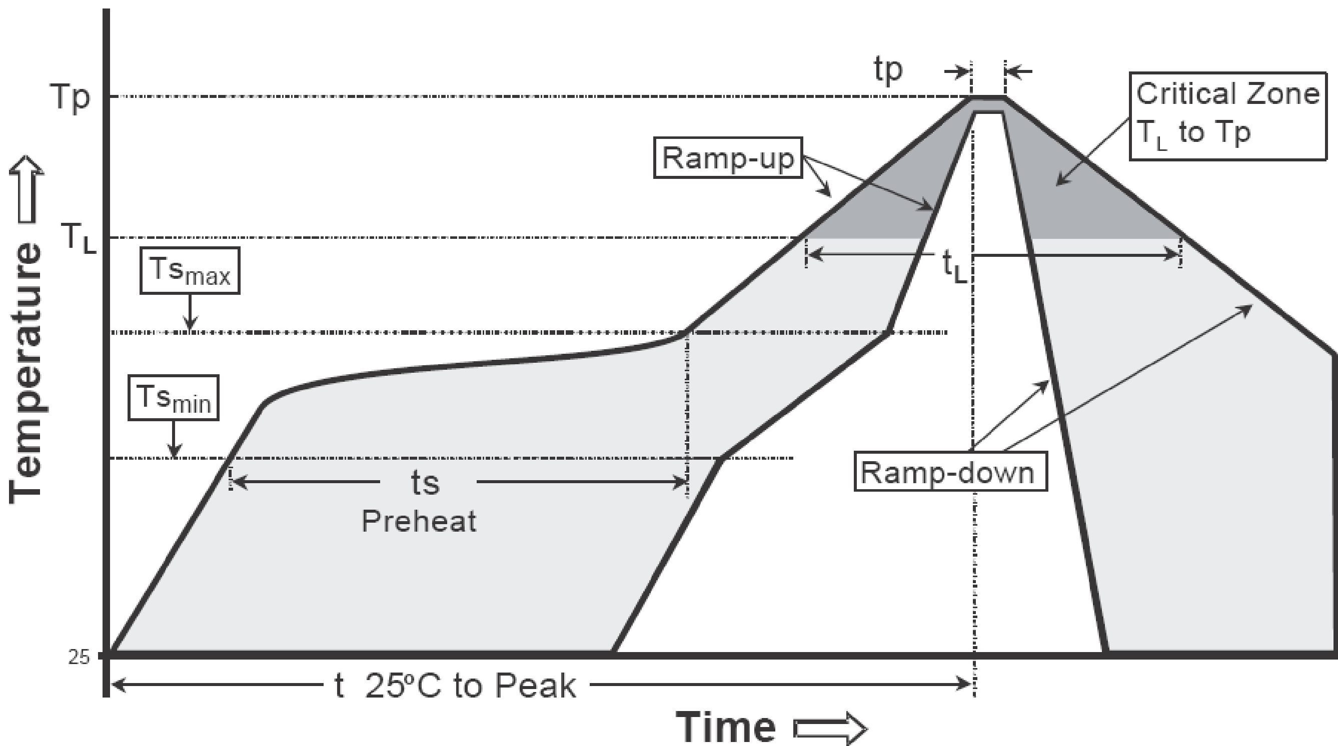




Recommended wave soldering condition

Product	Peak Temperature	Soldering Time
Pb-free devices	260 +0/-5 °C	5 +1/-1 seconds

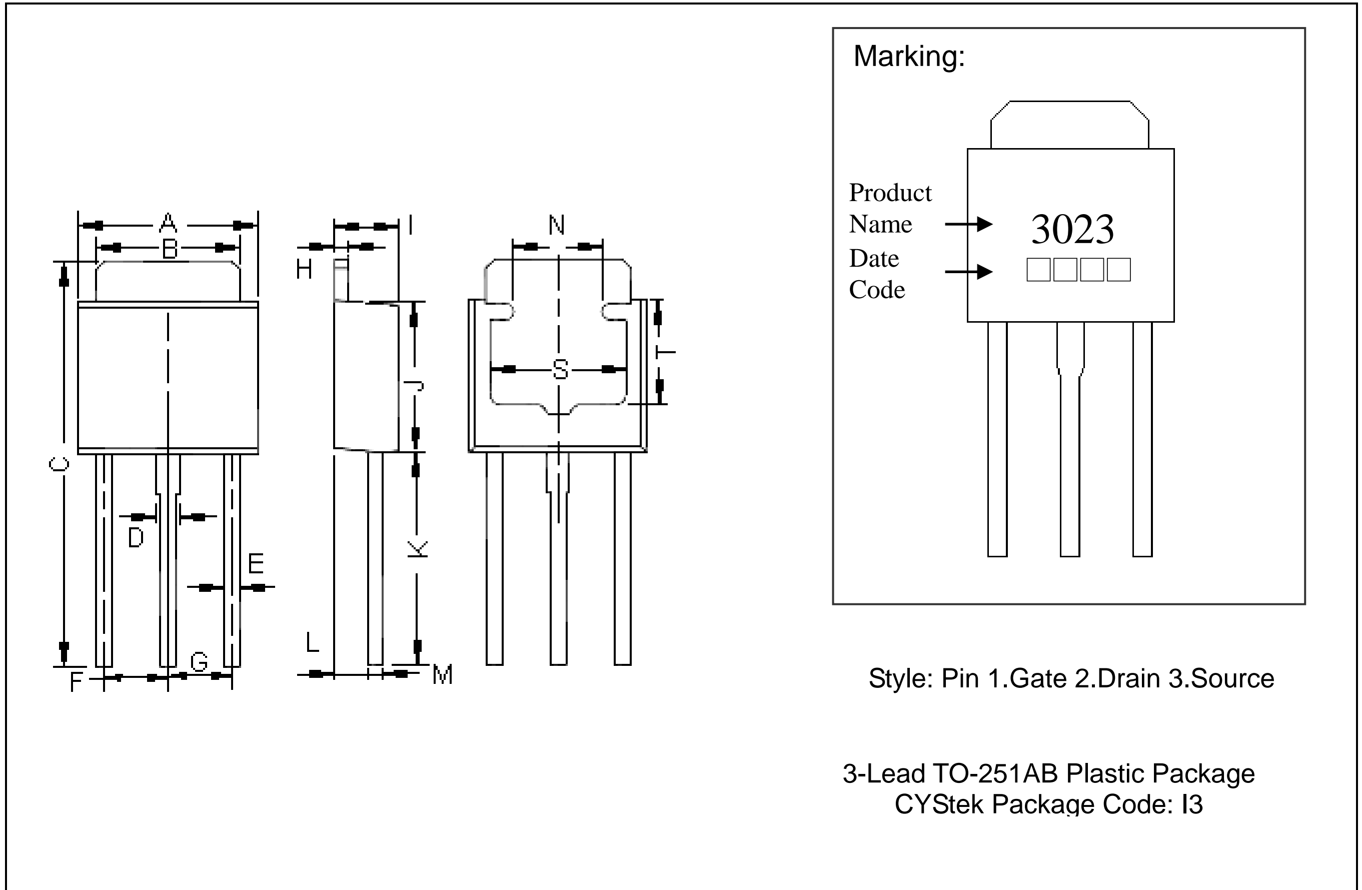
Recommended temperature profile for IR reflow



Profile feature	Sn-Pb eutectic Assembly	Pb-free Assembly
Average ramp-up rate (Tsmax to Tp)	3°C/second max.	3°C/second max.
Preheat −Temperature Min(Ts min) −Temperature Max(Ts max) −Time(ts min to ts max)	100°C 150°C 60-120 seconds	150°C 200°C 60-180 seconds
Time maintained above: −Temperature (T_L) − Time (t_L)	183°C 60-150 seconds	217°C 60-150 seconds
Peak Temperature(T_P)	240 +0/-5 °C	260 +0/-5 °C
Time within 5°C of actual peak temperature(tp)	10-30 seconds	20-40 seconds
Ramp down rate	6°C/second max.	6°C/second max.
Time 25 °C to peak temperature	6 minutes max.	8 minutes max.

Note : All temperatures refer to topside of the package, measured on the package body surface.

TO-251AB Dimension



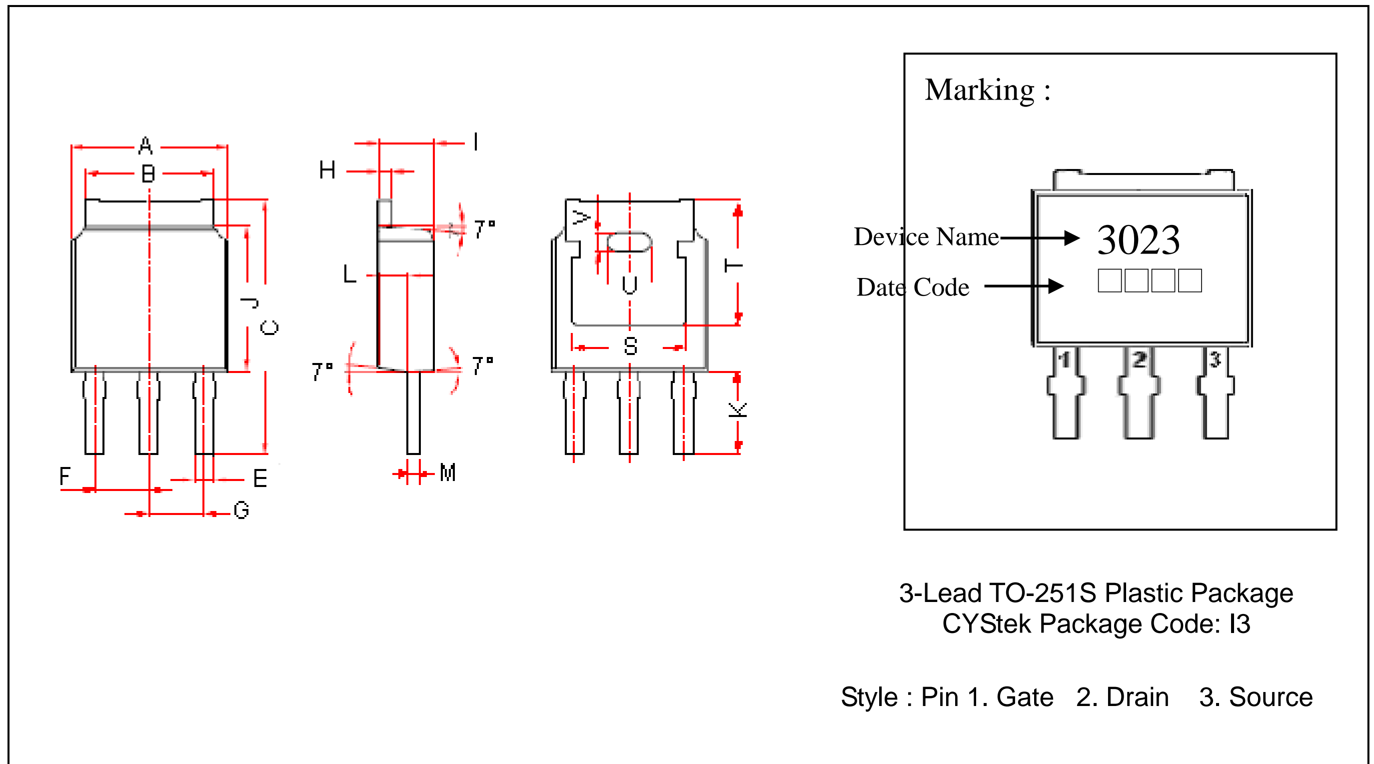
DIM	Inches		Millimeters		DIM	Inches		Millimeters	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.2500	0.2618	6.35	6.65	I	0.0866	0.0945	2.20	2.40
B	0.2047	0.2126	5.20	5.40	J	0.2126	0.2244	5.40	5.70
C	0.5709	0.5866	14.50	14.90	K	0.2992	0.3071	7.60	7.80
D	0.0276	0.0354	0.70	0.90	L	0.0453	0.0492	1.15	1.25
E	0.0199	0.0276	0.50	0.70	M	0.0169	0.0228	0.43	0.58
F	0.0886	0.0925	2.25	2.35	N	0.1181 REF		3.00 REF	
G	0.0886	0.0925	2.25	2.35	S	0.1969 REF		5.00 REF	
H	0.0169	0.0228	0.43	0.58	T	0.1496 REF		3.80 REF	

Notes: 1.Controlling dimension: millimeters.
2.Maximum lead thickness includes lead finish thickness, and minimum lead thickness is the minimum thickness of base material.
3.If there is any question with packing specification or packing method, please contact your local CYStek sales office.

Material:

- Lead: Pure tin plated.
- Mold Compound: Epoxy resin family, flammability solid burning class: UL94V-0.

TO-251S Dimension



3-Lead TO-251S Plastic Package
CYStek Package Code: I3

Style : Pin 1. Gate 2. Drain 3. Source

*: Typical

DIM	Inches		Millimeters		DIM	Inches		Millimeters	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.2559	0.2638	6.50	6.70	J	0.2362	0.2441	6.00	6.20
B	0.2020	0.2126	5.13	5.46	K	0.1299	0.1457	3.30	3.70
C	0.4094	0.4331	10.40	11.00	L	0.0358	0.0437	0.91	1.11
E	0.0280	0.0319	0.71	0.81	M	0.0181	0.0220	0.46	0.56
F	0.0858	0.0941	2.18	2.39	S	0.1902	REF	4.83	REF
G	0.0858	0.0941	2.18	2.39	T	0.2106	REF	5.35	REF
H	0.0181	0.0220	0.46	0.56	U	0.0701	REF	1.78	REF
I	0.0902	0.0937	2.29	2.38	V	0.0299	REF	0.76	REF

Notes: 1.Controlling dimension: inch.
2.Maximum lead thickness includes lead finish thickness, and minimum lead thickness is the minimum thickness of base material.
3.If there is any question with packing specification or packing method, please contact your local CYStek sales office.

Material:

- Lead: Pure tin plated
- Mold Compound: Epoxy resin family, flammability solid burning class: UL94V-0

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