P-Channel Enhancement Mode Power MOSFET

MTP425I3

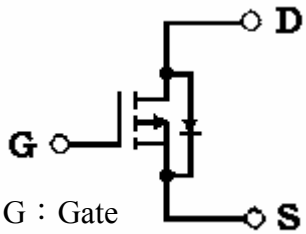
BV_{DSS}	**-30V**
I_D	**-50A**
$R_{DS(ON)}$@V_{GS}=-10V, I_D=-10A	**10mΩ(typ)**
$R_{DS(ON)}$@V_{GS}=-5V, I_D=-7A	**14mΩ(typ)**

Features

- Single Drive Requirement
- Low On-resistance
- Fast switching Characteristic
- Pb-free lead plating package

Symbol

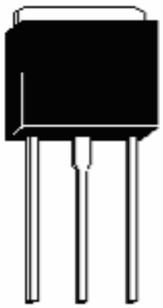
MTP425I3



G：Gate
D：Drain
S：Source

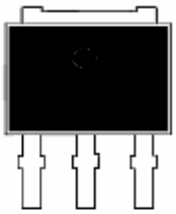
Outline

TO-251AB



G D S

TO-251S



G D S

Absolute Maximum Ratings (Ta=25°C)

Parameter		Symbol	Limits	Unit
Drain-Source Voltage		V_{DS}	-30	V
Gate-Source Voltage		V_{GS}	±25	
Continuous Drain Current @V_{GS}=-10V, T_C=25°C		I_D	-50	A
Continuous Drain Current @V_{GS}=-10V, T_C=100°C			-32	
Continuous Drain Current @V_{GS}=-10V, T_A=25°C			-11	
Continuous Drain Current @V_{GS}=-10V, T_A=100°C			-7	
Pulsed Drain Current		I_{DM}	-100 *1	
Power Dissipation	T_C=25℃	P_D	50 *4	W
	T_C=100℃		20 *4	
	T_A=25℃		2.5	
	T_A=100℃		1.0	
Single Pulse Avalanche Energy		E_{AS}	30 *2	mJ
Single Pulse Avalanche Current		I_{AS}	-11	A
Operating Junction and Storage Temperature		Tj, Tstg	-55~+150	°C

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	$R_{th,j-a}$	50 *3	°C/W

Note : *1. Pulse width limited by safe operating area.
*2 . Tj=25°C, V_{DD}=-15V, L=0.5mH, R_G=25Ω.
*3 . The value of $Rth_{,j-a}$ is measured with the device mounted on 1 in^2 FR-4 board with 2 oz. copper, in a still air environment with T_A=25°C. The value in any given application depends on the user's specific board design.
*4 . The power dissipation P_D is more useful in setting the upper dissipation limit for cases where additional heatsinking is used. It is used to determined the current rating, when this rating falls below the package limit.

Characteristics (Tj=25°C, unless otherwise specified)

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Static					
BV_{DSS}	-30	-	-	V	V_{GS}=0, I_D=-250μA
$V_{GS(th)}$	-1.0	-1.5	-2.5	V	V_{DS} = V_{GS}, I_D=-250μA
G_{FS}	-	20	-	S	V_{DS} =-5V, I_D=-10A
I_{GSS}	-	-	±100	nA	V_{GS}=±25
I_{DSS}	-	-	-1	μA	V_{DS} =-30V, V_{GS} =0
I_{DSS}	-	-	-5		V_{DS} =-24V, V_{GS} =0, Tj=55°C
*$R_{DS(ON)}$	-	9.7	13	mΩ	V_{GS} =-10V, I_D=-10A
*$R_{DS(ON)}$	-	14	18		V_{GS} =-5V, I_D=-7A
Dynamic					
*Qg	-	32	-	nC	I_D=-25A, V_{DS}=-15V, V_{GS}=-10V
*Qgs	-	11.3	-		
*Qgd	-	8.4	-		
*$t_{d(ON)}$	-	17	-	ns	V_{DS}=-15V, V_{GS}=-10V, R_G=6Ω, I_D=-1A
*tr	-	10	-		
*$t_{d(OFF)}$	-	85	-		
*t_f	-	23	-		
Ciss	-	2825	-	pF	V_{GS}=0V, V_{DS}=-15V, f=1MHz
Coss	-	248	-		
Crss	-	191	-		
Source-Drain Diode					
*V_{SD}	-	-0.75	-1.2	V	I_S=-3A, V_{GS}=0V
*I_S	-	-	-50	A	
*trr	-	26	-	ns	I_S=-25A, V_{GS}=0, dI/dt=100A/μs
*Qrr	-	18	-	nC	

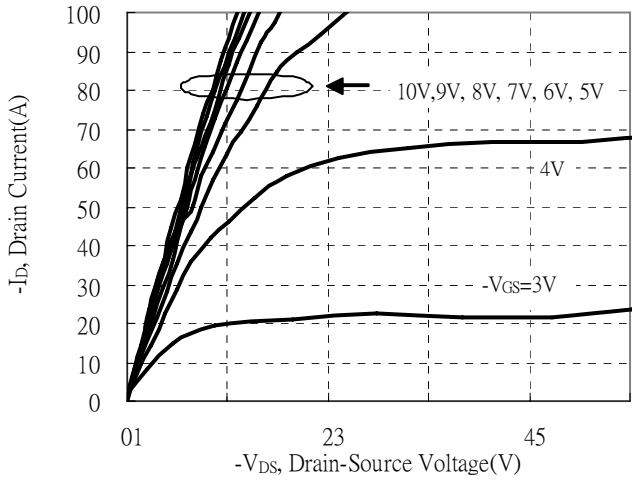
*Pulse Test : Pulse Width ≤300μs, Duty Cycle≤2%

Ordering Information

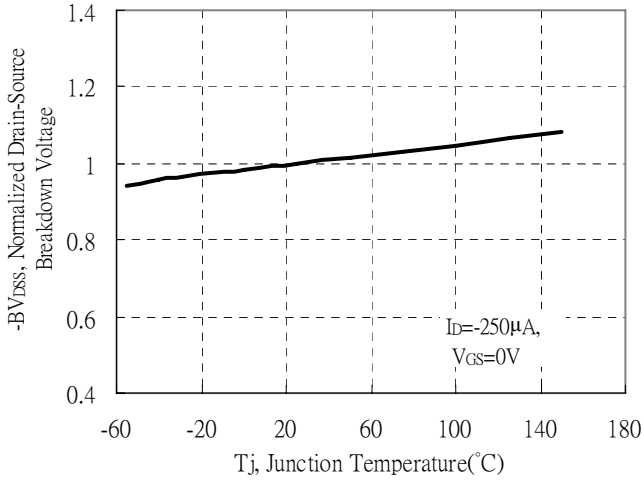
Device	Package	Shipping
MTP425I3B-0-UB-G	TO-251AB (Pb-free lead plating and halogen-free package)	80 pcs / tube, 50 tubes / box
MTP425I3S-0-UB-G	TO-251S (Pb-free lead plating and halogen-free package)	80 pcs / tube, 50 tubes / box

Typical Characteristics

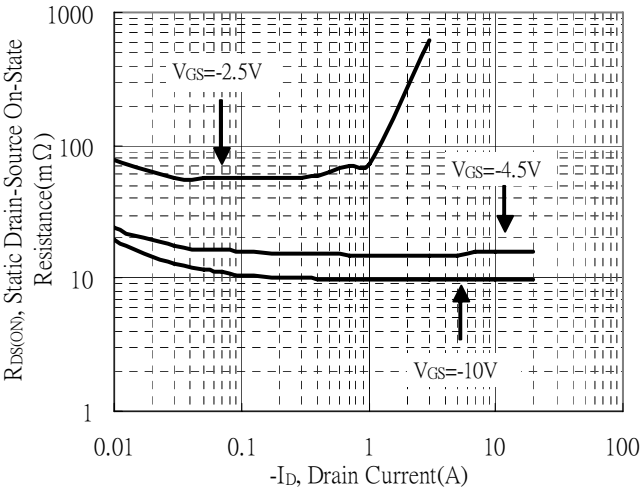
Typical Output Characteristics



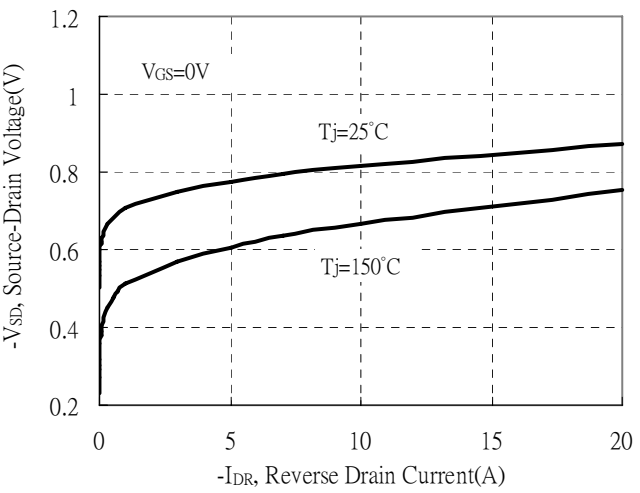
Brekdown Voltage vs Ambient Temperature



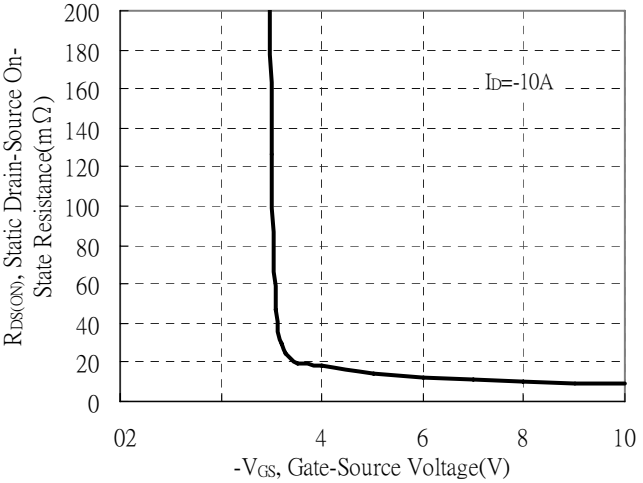
Static Drain-Source On-State resistance vs Drain Current



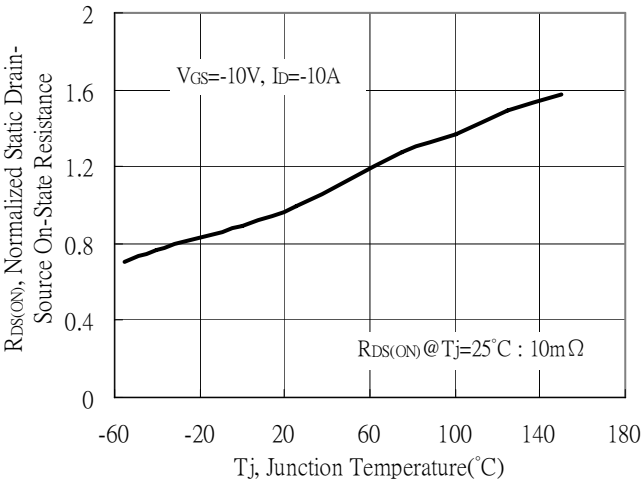
Reverse Drain Current vs Source-Drain Voltage



Static Drain-Source On-State Resistance vs Gate-Source Voltage

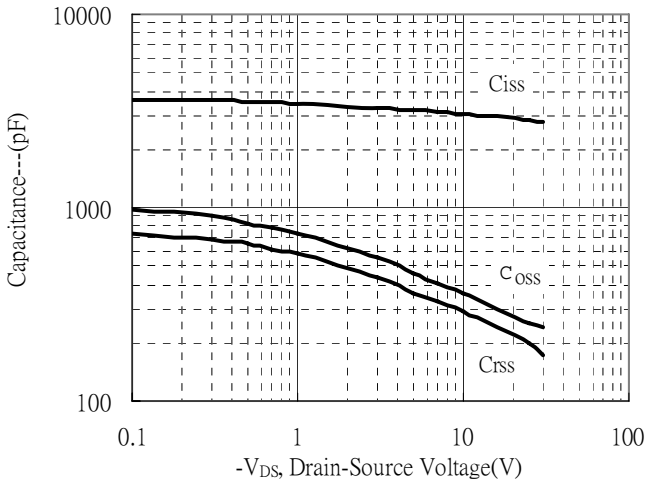


Drain-Source On-State Resistance vs Junction Tempearture

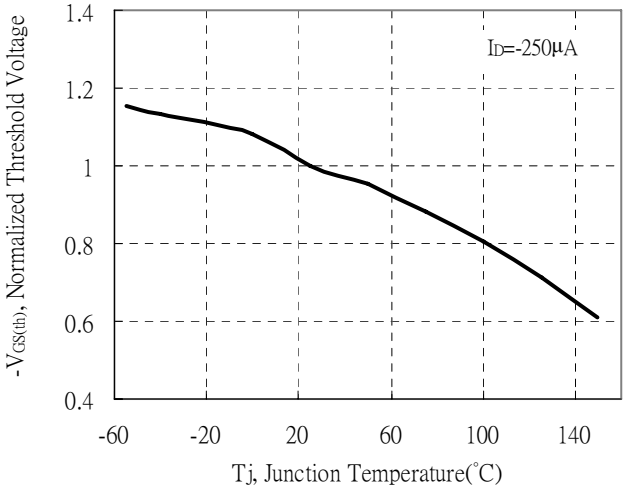


Typical Characteristics(Cont.)

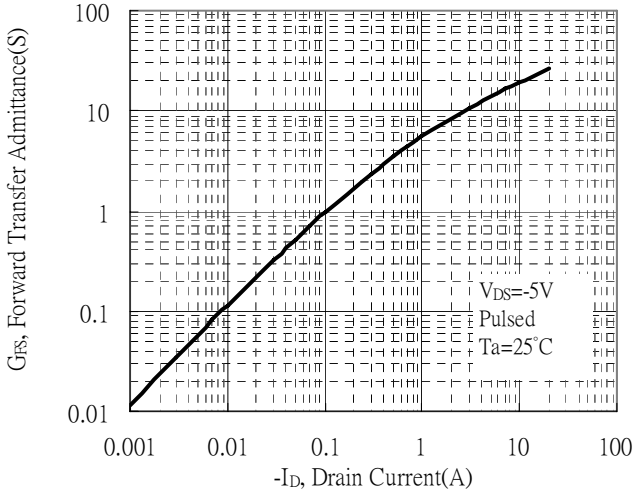
Capacitance vs Drain-to-Source Voltage



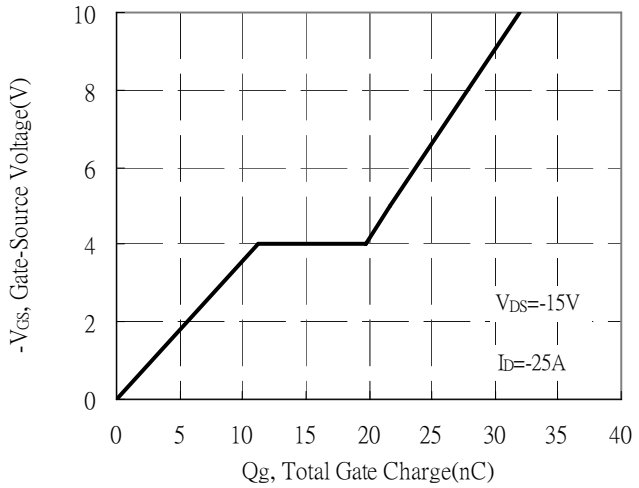
Threshold Voltage vs Junction Tempearture



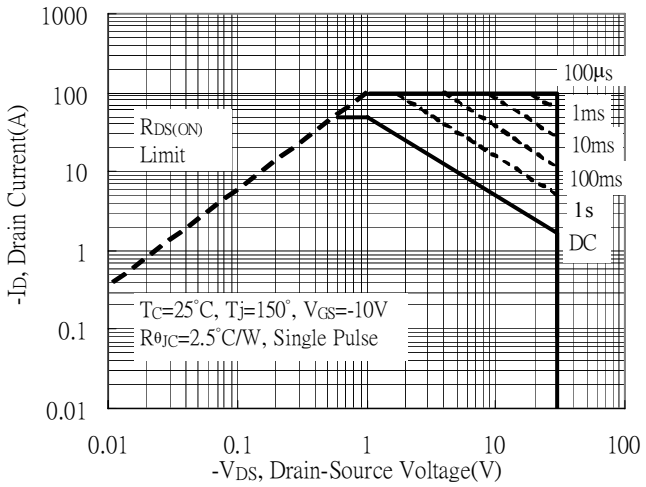
Forward Transfer Admittance vs Drain Current



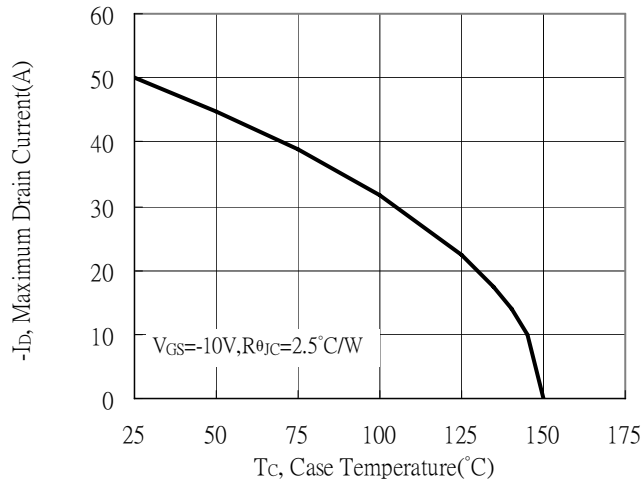
Gate Charge Characteristics



Maximum Safe Operating Area

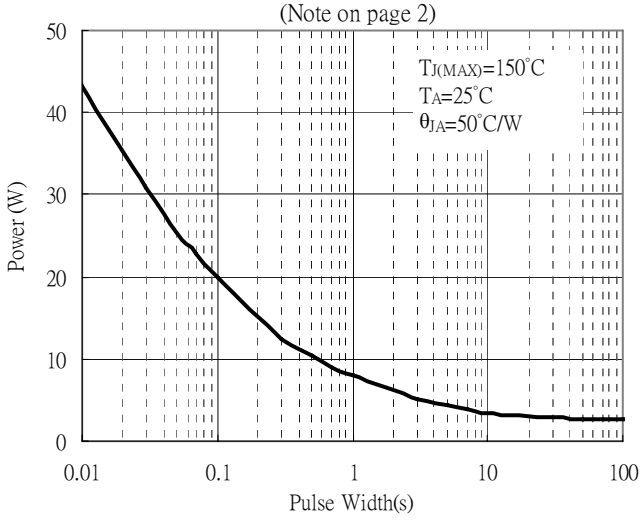


Maximum Drain Current vs CaseTemperature

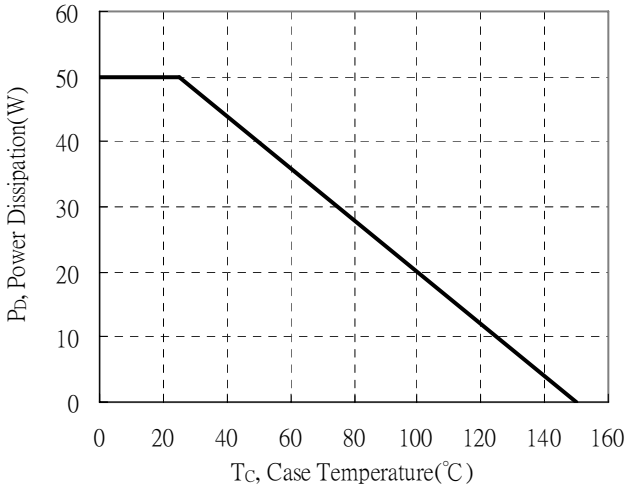


Typical Characteristics(Cont.)

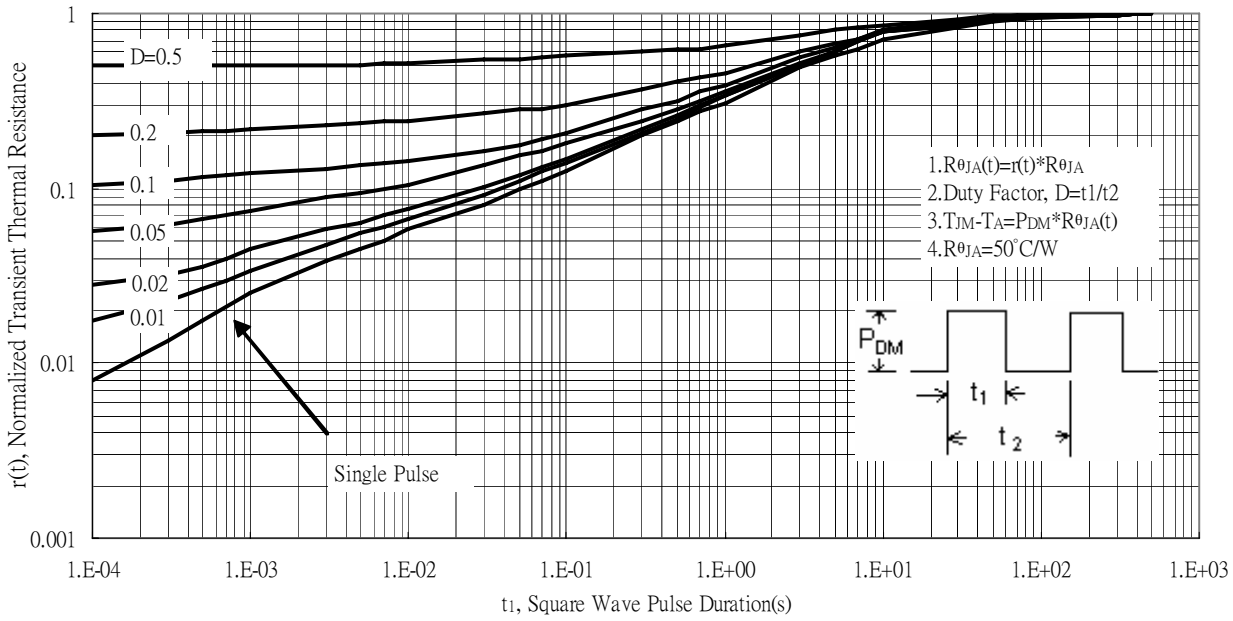
Single Pulse Power Rating, Junction to Ambient
(Note on page 2)



Power Derating Curve



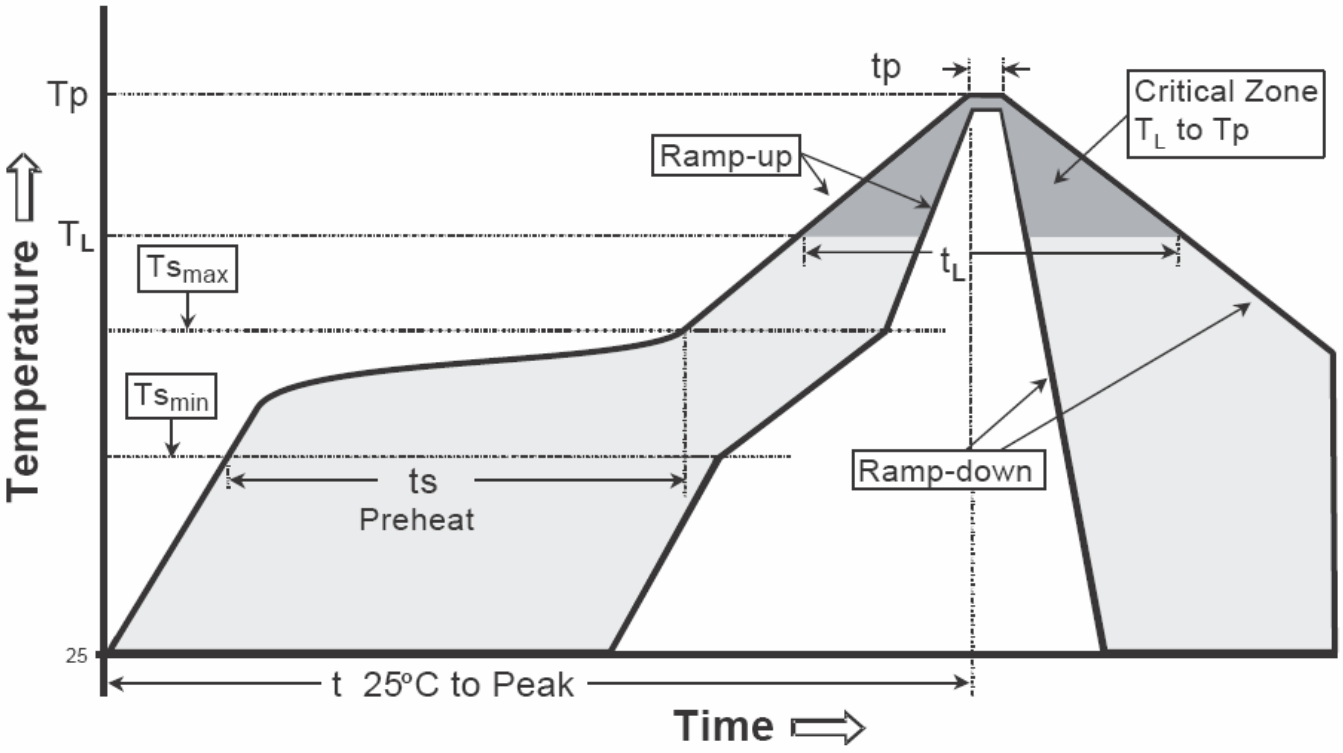
Transient Thermal Response Curves



Recommended wave soldering condition

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

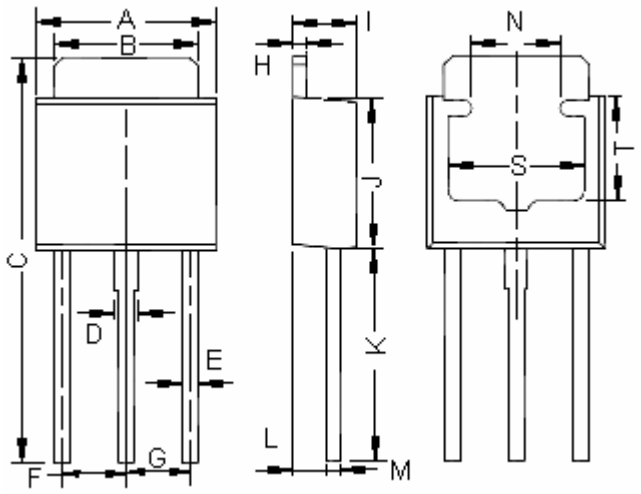
Recommended temperature profile for IR reflow

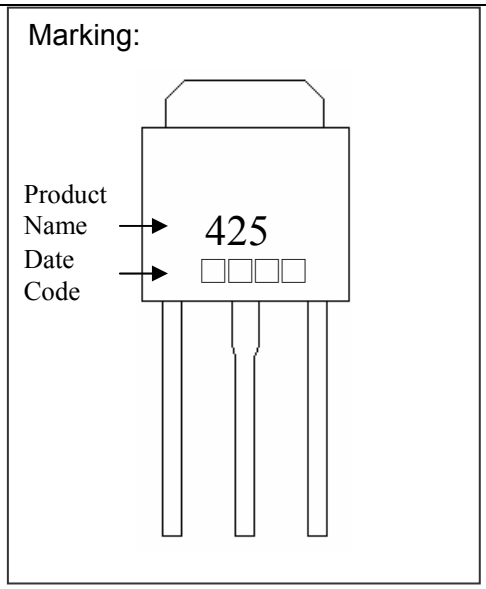


Profile feature	Sn-Pb eutectic Assembly	Pb-free Assembly
Average ramp-up rate (Tsmax to Tp)	3°C/second max.	3°C/second max.
Preheat −Temperature Min(T_S min) −Temperature Max(T_S max) −Time($t_{s\ min}$ to $t_{s\ max}$)	 100°C 150°C 60-120 seconds	 150°C 200°C 60-180 seconds
Time maintained above: −Temperature (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





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

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

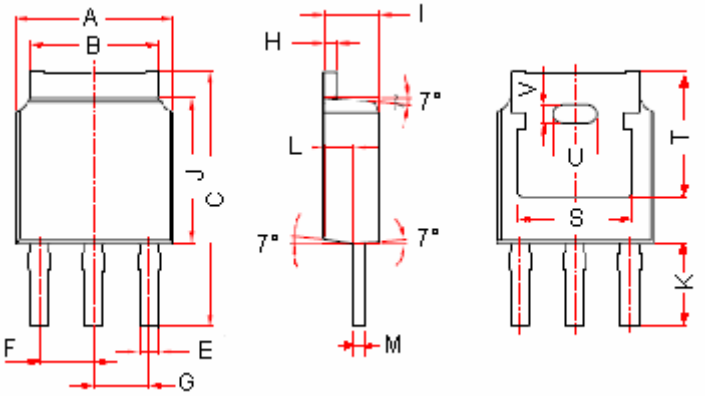
DIM	Inches		Millimeters		DIM	Inches		Millimeters	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.2500	0.2618	6.35	6.65	I	0.0866	0.0945	2.20	2.40
B	0.2047	0.2126	5.20	5.40	J	0.2126	0.2244	5.40	5.70
C	0.5709	0.5866	14.50	14.90	K	0.2992	0.3071	7.60	7.80
D	0.0276	0.0354	0.70	0.90	L	0.0453	0.0492	1.15	1.25
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	

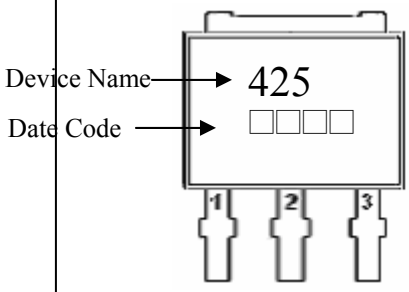
Notes: 1.Controlling dimension: millimeters.
2.Maximum lead thickness includes lead finish thickness, and minimum lead thickness is the minimum thickness of base material.
3.If there is any question with packing specification or packing method, please contact your local CYStek sales office.

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