N-Channel Enhancement Mode Power MOSFET

MTN2N65CI3

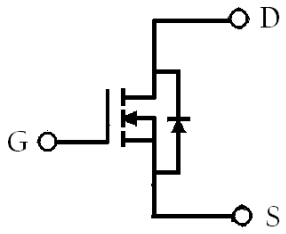
BV_{DSS}	**650V**
I_D @V_{GS}=10V, T_C=25°C	**2A**
I_D @V_{GS}=10V, T_C=100°C	**1.3A**
$R_{DS(ON)}$@V_{GS}=10V, I_D=1A	**4.5Ω(typ)**

Features

- Low On Resistance
- Simple Drive Requirement
- Low Gate Charge
- Fast Switching Characteristic
- Pb-free lead plating and halogen-free package

Symbol

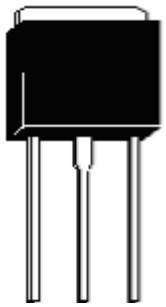
MTN2N65CI3



G：Gate D：Drain S：Source

Outline

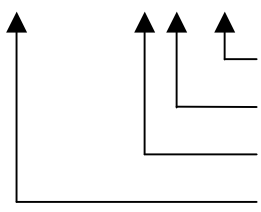
TO-251



G D S

Ordering Information

Device	Package	Shipping
MTN2N65CI3-0-UA-G	TO-251 (RoHS compliant and halogen-free package)	80 pcs/tube, 50 tubes/box



Environment friendly grade : S for RoHS compliant products, G for RoHS compliant and green compound products

Packing spec, UA : 80 pcs / tube, 50 tubes/box

Product rank, zero for no rank products

Product name

Absolute Maximum Ratings (T_C=25°C)

Parameter	Symbol	Limits	Unit
Drain-Source Voltage	V_{DS}	650	V
Gate-Source Voltage	V_{GS}	±30	
Continuous Drain Current	I_D	2.0	A
Continuous Drain Current @T_C=100°C		1.3	
Pulsed Drain Current @ V_{GS}=10V (Note 1)	I_{DM}	8.0	
Single Pulse Avalanche Current (Note 2)	I_{AS}	2	
Single Pulse Avalanche Energy @L=2mH, V_{GS}=10V, V_{DD}= 50V (Note 2)	E_{AS}	4	mJ
Repetitive Avalanche Energy (Note 1)	E_{AR}	2	
Maximum Temperature for Soldering @ Lead at 0.125 in(0.318mm) from case for 10 seconds	T_L	300	°C
Total Power Dissipation (T_A=25℃)	P_D	1.14	W
Total Power Dissipation (T_C=25℃)		44	W
Linear Derating Factor		0.35	W/°C
Operating Junction and Storage Temperature	Tj, Tstg	-55~+150	°C

Note : 1.Pulse width limited by maximum junction temperature.
2.100% testsed by conditions of I_{AS}=1A, V_{DD}=50V, L=2mH, V_{GS}=10V, starting T_J=+25℃.

Thermal Data

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-case, max	$R_{\theta JC}$	2.8	°C/W
Thermal Resistance, Junction-to-ambient, max	$R_{\theta JA}$	110	

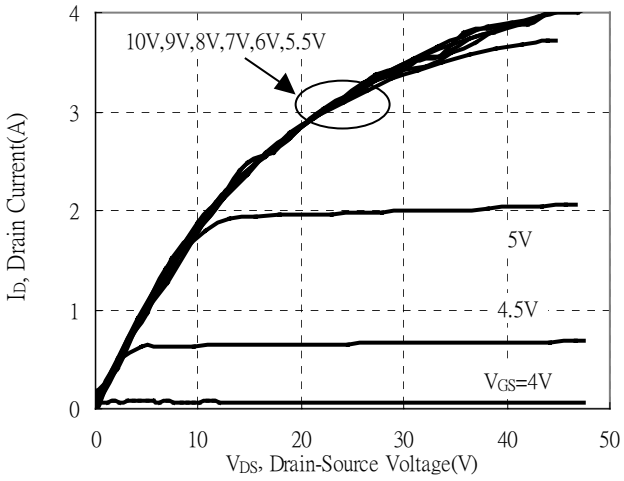
Characteristics (T_C=25°C, unless otherwise specified)

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Static					
BV_{DSS}	650	-	-	V	V_{GS}=0V, I_D=250μA, Tj=25℃
$\Delta BV_{DSS}/\Delta Tj$	-	0.7	-	V/°C	Reference to 25°C, I_D=250μA
$V_{GS(th)}$	2.0	-	4.0	V	V_{DS} = V_{GS}, I_D=250μA
*G_{FS}	-	2.3	-	S	V_{DS} =15V, I_D=1A
I_{GSS}	-	-	±100	nA	V_{GS}=±30V
I_{DSS}	-	-	1	μA	V_{DS} =650V, V_{GS} =0V
	-	-	10		V_{DS} =520V, V_{GS} =0V, T_C=125°C
*$R_{DS(ON)}$	-	4.5	5.8	Ω	V_{GS} =10V, I_D=1A
Dynamic					
*Qg	-	7.8	11.7	nC	I_D=2A, V_{DD}=520V, V_{GS}=10V
*Qgs	-	2.3	-		
*Qgd	-	2.4	-		
*$t_{d(ON)}$	-	5.4	10.8	ns	V_{DD}=325V, I_D=1.8A, V_{GS}=10V, R_G=25Ω
*tr	-	3.2	6.4		
*$t_{d(OFF)}$	-	8.6	17.2		
*t_f	-	5.6	11.2		
Ciss	-	268	402	pF	V_{GS}=0V, V_{DS}=25V, f=1MHz
Coss	-	32	48		
Crss	-	11	16		
Rg	-	3.7	-	Ω	f=1MHz
Source-Drain Diode					
*I_S	-	-	2	A	
*I_{SM}	-	-	8		
*V_{SD}	-	0.8	1.5	V	I_S=1A, V_{GS}=0V
*trr	-	286	-	ns	V_{GS}=0V, I_F=1.8A, dI_F/dt=100A/μs
*Qrr	-	760	-	nC	

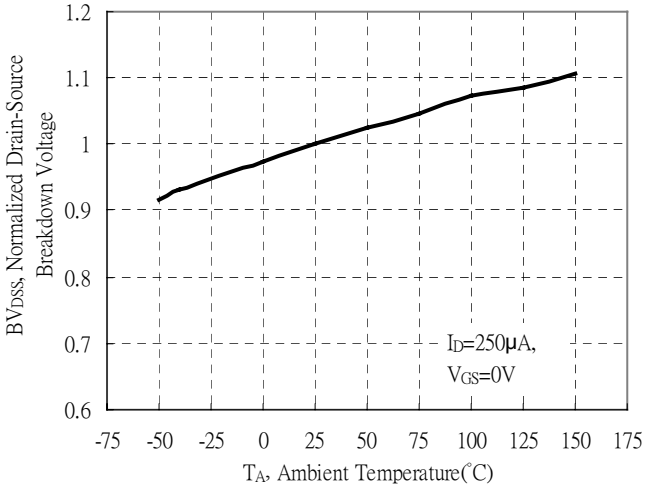
*Pulse Test : Pulse Width ≤300μs, Duty Cycle≤2%

Typical Characteristics

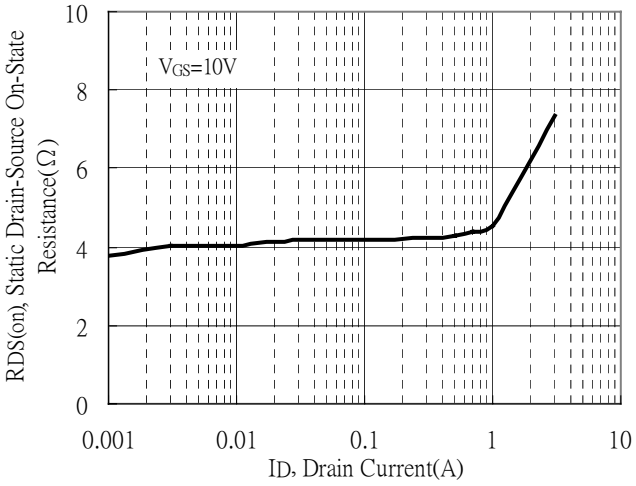
Typical Output Characteristics



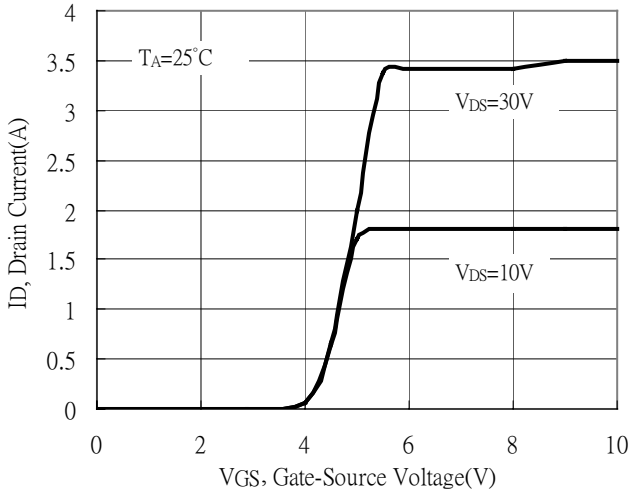
Brekdown Voltage vs Ambient Temperature



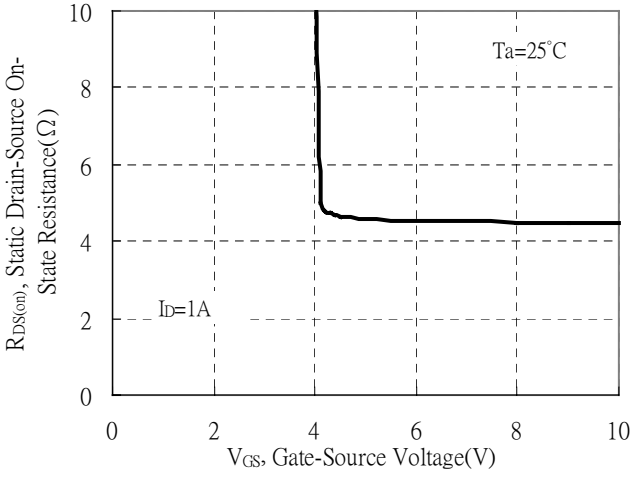
Static Drain-Source On-State resistance vs Drain Current



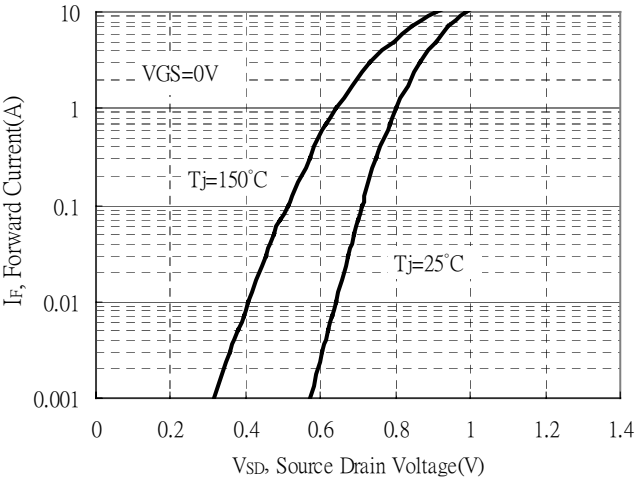
Drain Current vs Gate-Source Voltage



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

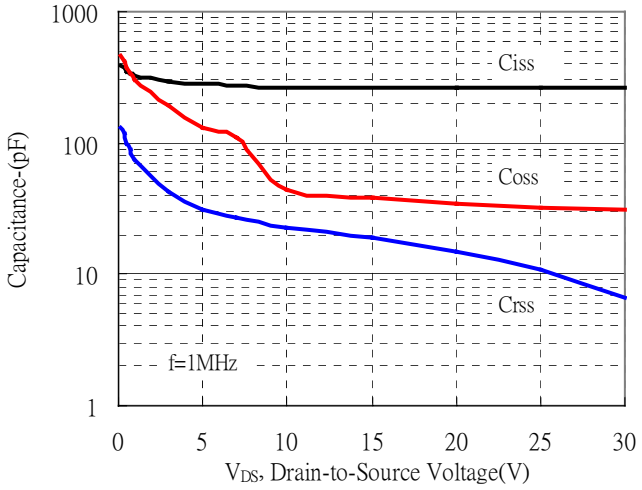


Forward Drain Current vs Source-Drain Voltage

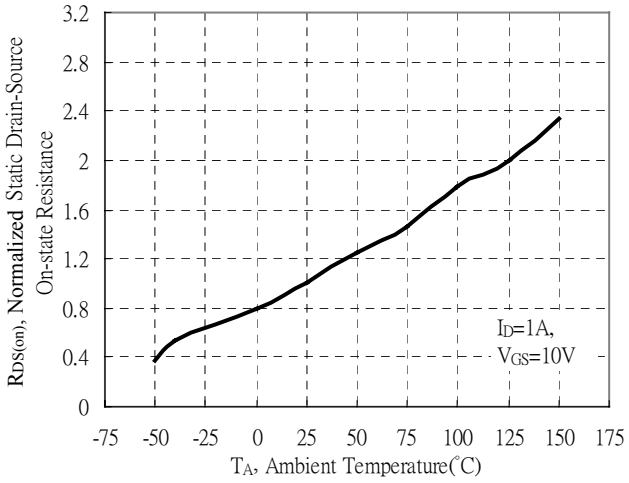


Typical Characteristics(Cont.)

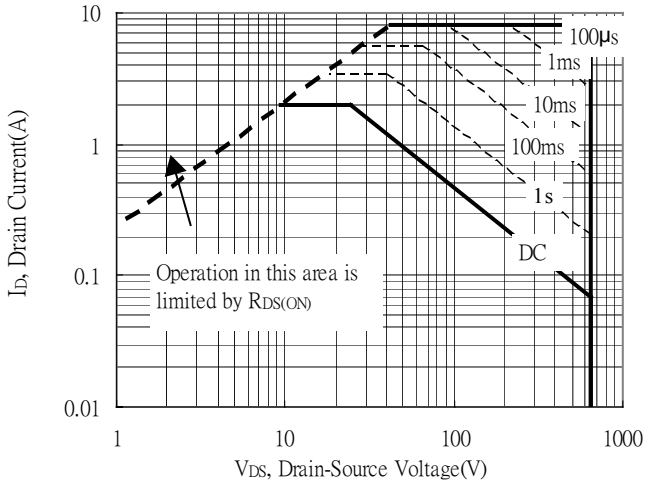
Capacitance vs Reverse Voltage



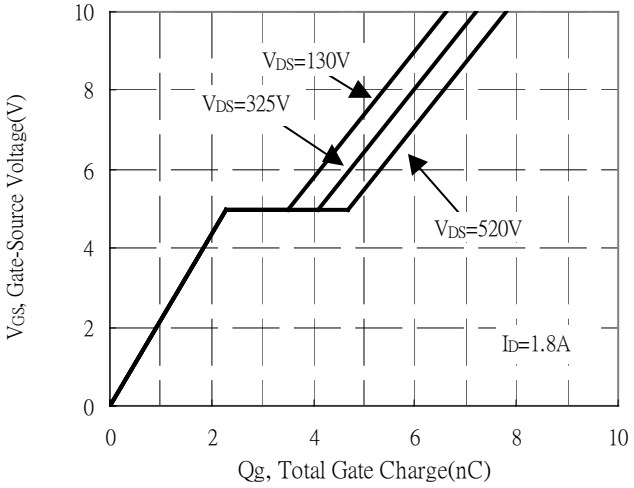
Static Drain-Source On-resistance vs Ambient Temperature



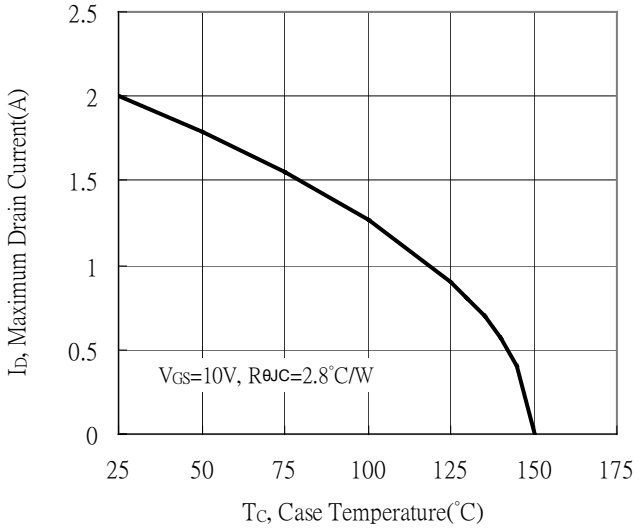
Maximum Safe Operating Area



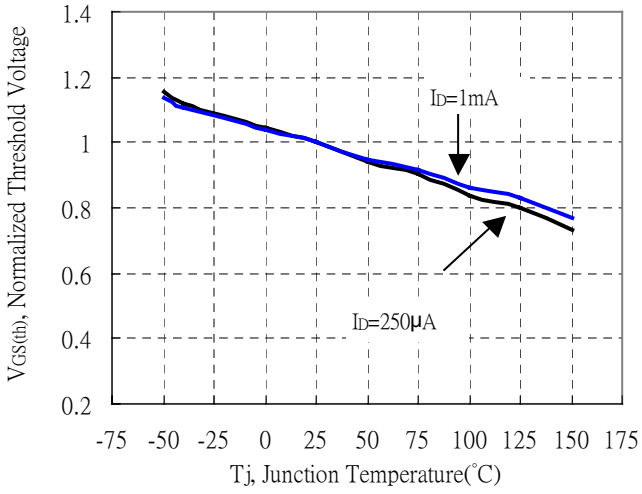
Gate Charge Characteristics



Maximum Drain Current vs Case Temperature

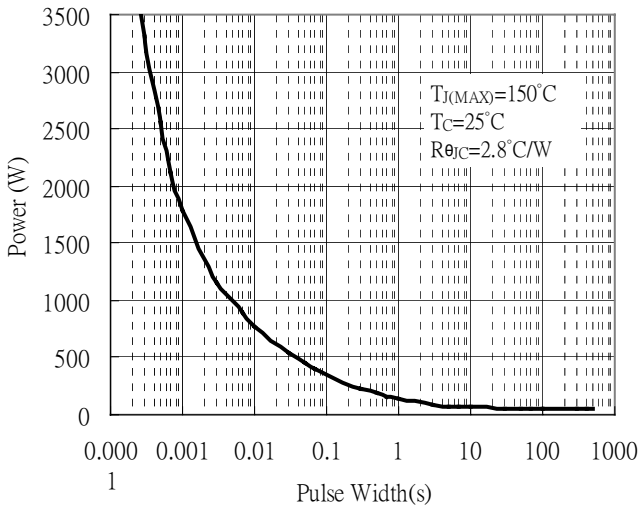


Threshold Voltage vs Junction Tempearture

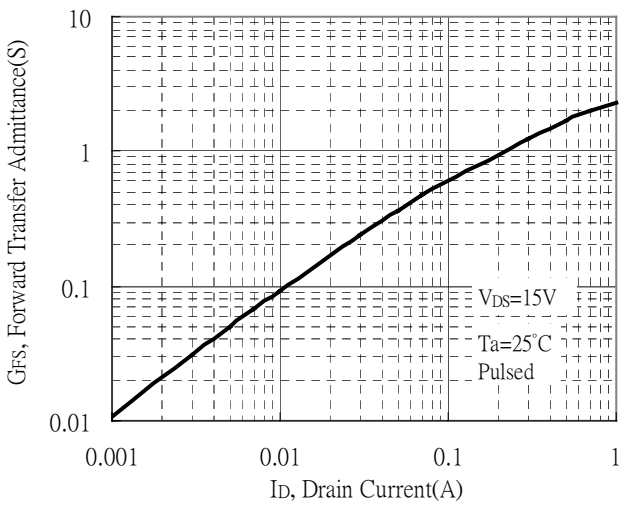


Typical Characteristics(Cont.)

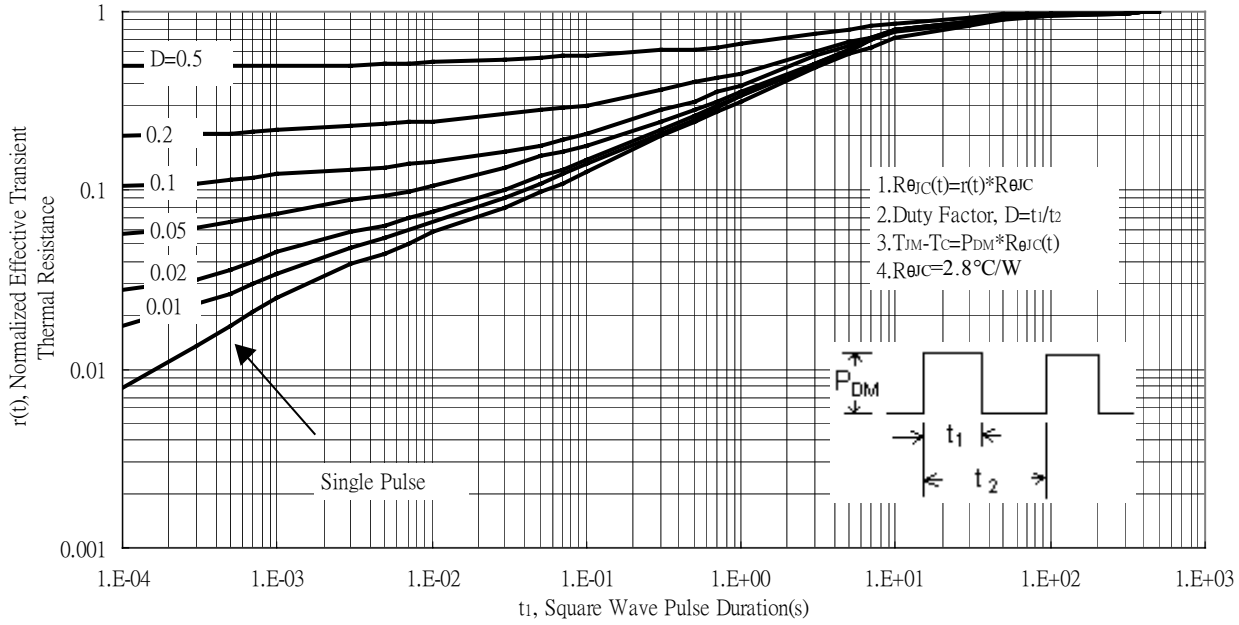
Single Pulse Power Rating, Junction to Case



Forward Transfer Admittance vs Drain Current



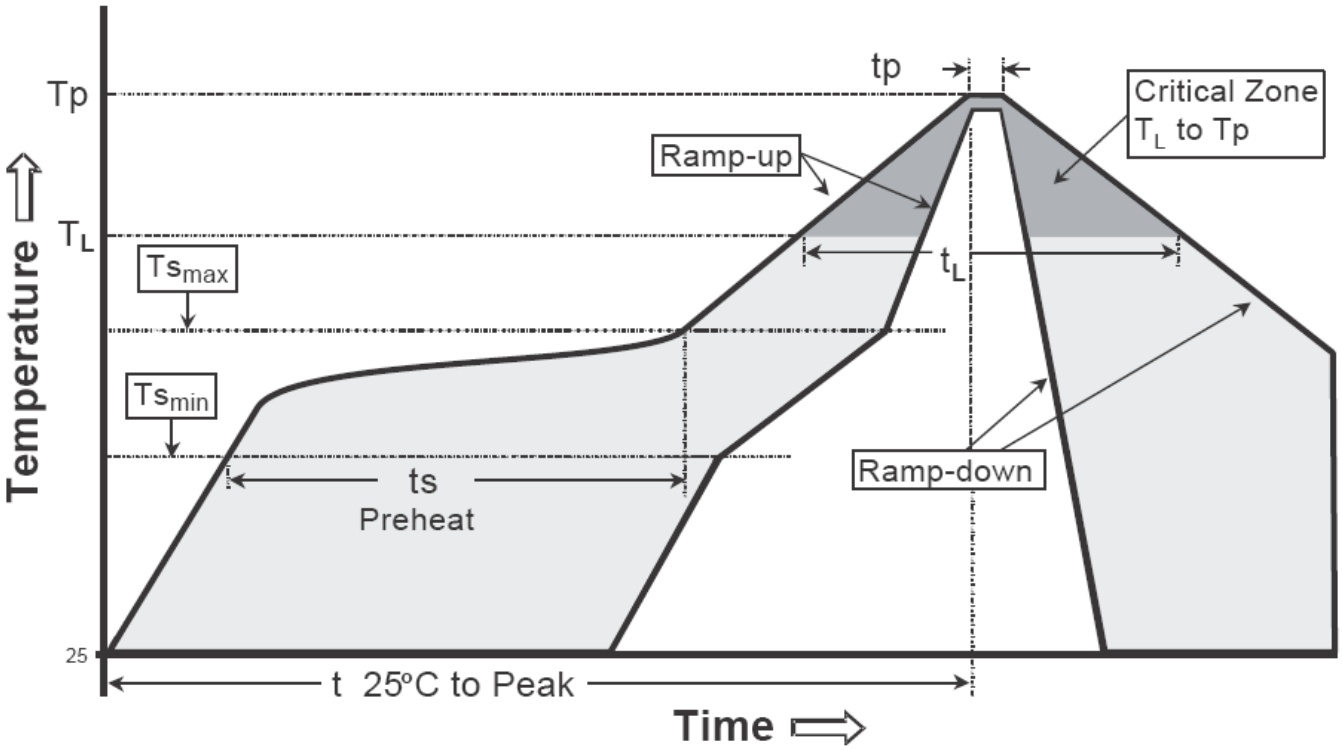
Transient Thermal Response Curves



Recommended wave soldering condition

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

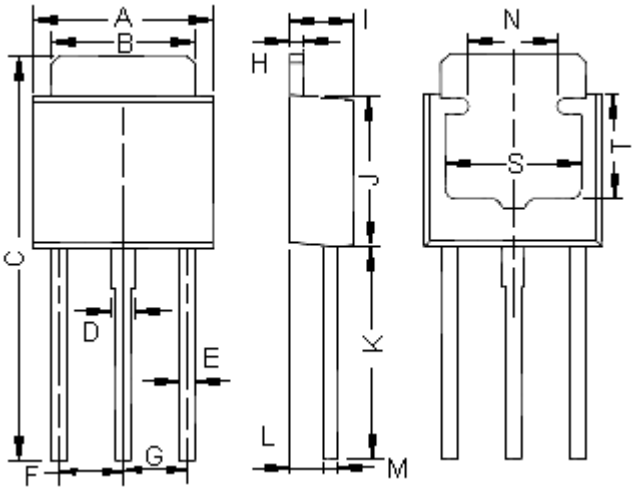
Recommended temperature profile for IR reflow

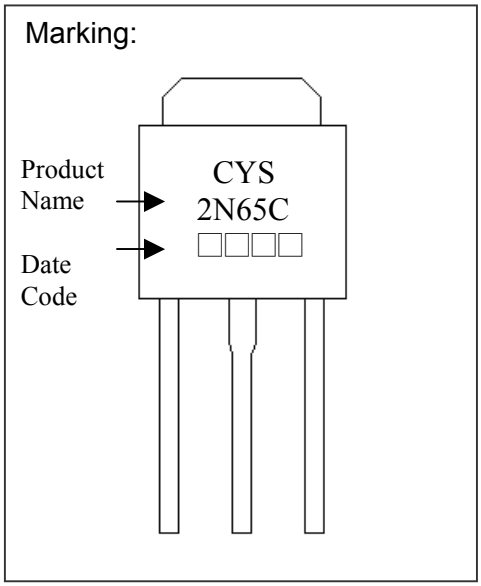


Profile feature	Sn-Pb eutectic Assembly	Pb-free Assembly
Average ramp-up rate (Tsmax to Tp)	3°C/second max.	3°C/second max.
Preheat −Temperature Min(T_S min) −Temperature Max(T_S max) −Time(ts min to ts max)	 100°C 150°C 60-120 seconds	 150°C 200°C 60-180 seconds
Time maintained above: −Temperature (T_L) − 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-251 Dimension





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

3-Lead TO-251 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