N-Channel Enhancement Mode Power MOSFET

MTB015N10RI3

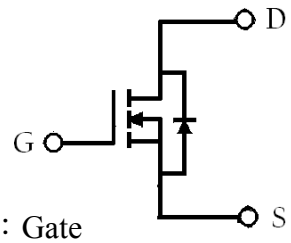
BV_{DSS}	**100V**
I_D@ V_{GS}=10V, T_C=25°C	**46A**
$R_{DS(ON)}$@V_{GS}=10V, I_D=20A	**13.5mΩ(typ)**
$R_{DS(ON)}$@V_{GS}=4.5V, I_D=20A	**16.0mΩ(typ)**

Features

- Simple Drive Requirement
- Repetitive Avalanche Rated
- Fast Switching Characteristic
- RoHS compliant package & Halogen-free package

Symbol

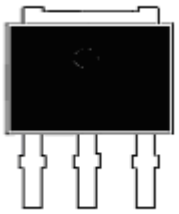
MTB015N10RI3



G：Gate
D：Drain
S：Source

Outline

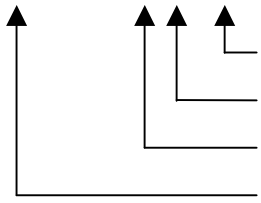
TO-251S



G D S

Ordering Information

Device	Package	Shipping
MTB015N10RI3-0-UA-G	TO-251S (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, unless otherwise noted)

Parameter	Symbol	Limits	Unit
Drain-Source Voltage	V_{DS}	100	V
Gate-Source Voltage	V_{GS}	±20	
Continuous Drain Current @ V_{GS}=10V, T_C=25°C	I_D	46	A
Continuous Drain Current @ V_{GS}=10V, T_C=100°C		29	
Pulsed Drain Current (Note 1)	I_{DM}	184	
Avalanche Current @ L=0.1mH	I_{AS}	46	
Avalanche Energy @ L=0.1mH, I_D=46A, R_G=25Ω (Note 3)	E_{AS}	106	mJ
Repetitive Avalanche Energy@ L=0.05mH (Note 2)	E_{AR}	6	
Total Power Dissipation @ T_C=25℃	P_D	62.5	W
Total Power Dissipation @ T_C=100℃		25	
Operating Junction and Storage Temperature Range	Tj, Tstg	-55~+150	°C

Note : 1. Pulse width limited by maximum junction temperature.
2. Duty cycle ≤ 1%.
3. 100% tested by conditions of L=0.1mH, V_{GS}=10V, I_{AS}=24A, V_{DD}=25V

Thermal Data

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-case, max	$R_{th,j-c}$	2	°C/W
Thermal Resistance, Junction-to-ambient, max	$R_{th,j-a}$	110	

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

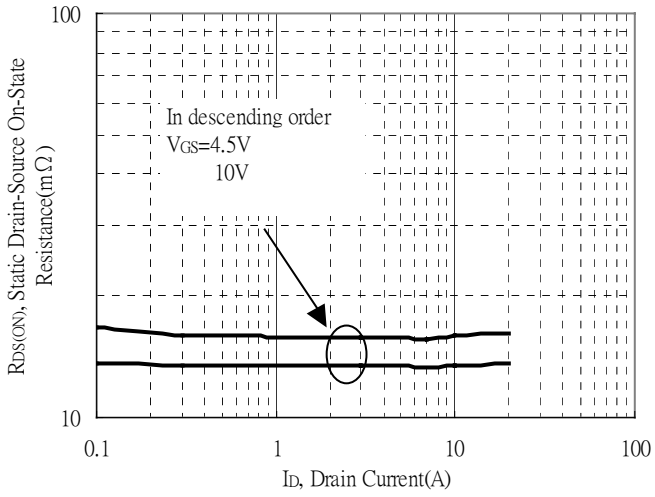
Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Static					
BV_{DSS}	100	-	-	V	V_{GS}=0V, I_D=250μA
$V_{GS(th)}$	1	-	3		V_{DS} = V_{GS}, I_D=250μA
I_{GSS}	-	-	±100	nA	V_{GS}=±20V, V_{DS}=0V
I_{DSS}	-	-	1	μA	V_{DS} =80V, V_{GS} =0V
	-	-	25		V_{DS} =80V, V_{GS} =0V, Tj=125°C
*$R_{DS(ON)}$	-	13.5	16.6	mΩ	V_{GS} =10V, I_D=20A
	-	16.0	22.5		V_{GS} =4.5V, I_D=20A
*G_{FS}	-	32.2	-	S	V_{DS} =10V, I_D=20A
Dynamic					
*Qg	-	54.4	-	nC	V_{DS}=80V, I_D=20A, V_{GS}=10V
*Qgs	-	7.7	-		
*Qgd	-	10.7	-		
*$t_{d(ON)}$	-	16.6	-	ns	V_{DS}=50V, I_D=20A, V_{GS}=10V, R_{GS}=1Ω
*tr	-	18	-		
*$t_{d(OFF)}$	-	59.6	-		
*t_f	-	6.6	-		

Ciss	-	2652	-	pF	V_{DS}=50V, V_{GS}=0V, f=1MHz
Coss	-	179	-		
Crss	-	18	-		
Rg	-	1	-	Ω	f=1MHz
Source-Drain Diode					
*I_S	-	-	46	A	
*I_{SM}	-	-	184		
*V_{SD}	-	0.85	1.2	V	I_S=20A, V_{GS}=0V
*trr	-	30	-	ns	I_F=20A, V_{GS}=0V, dI_F/dt=100A/μs
*Qrr	-	39	-	nC	

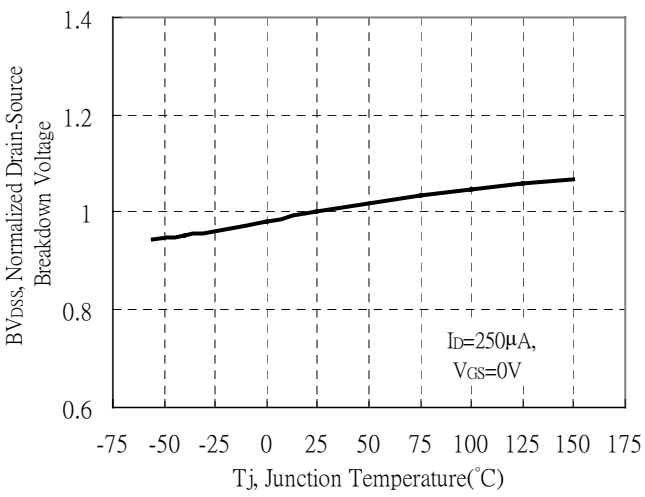
*Pulse Test : Pulse Width ≤300μs, Duty Cycle≤2%

Typical Characteristics

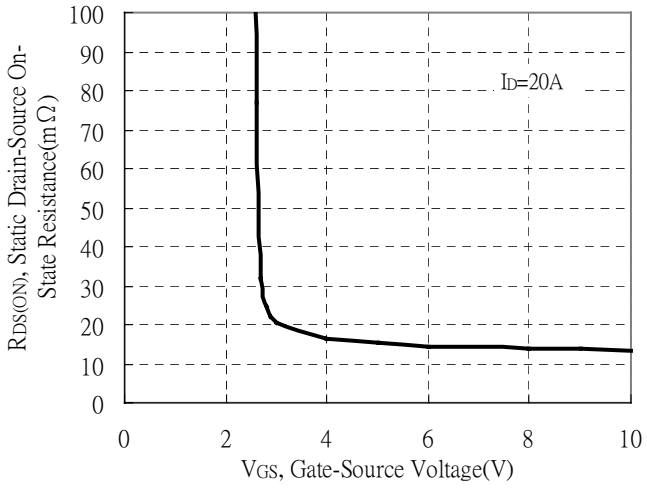
Static Drain-Source On-State resistance vs Drain Current



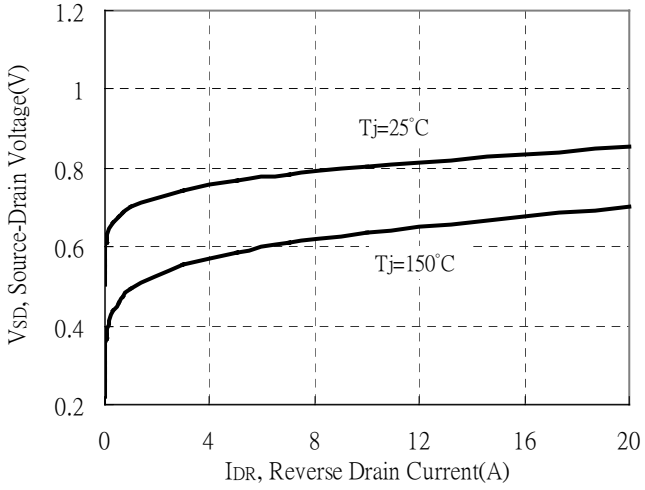
Brekdown Voltage vs Ambient Temperature



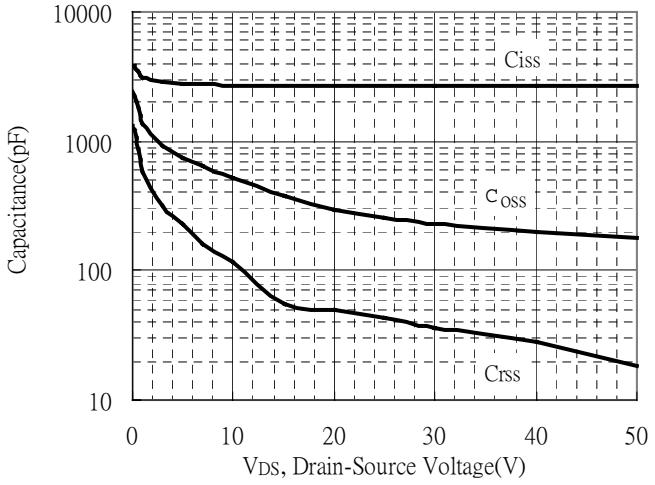
Static Drain-Source On-State Resistance vs Gate-Source Voltage



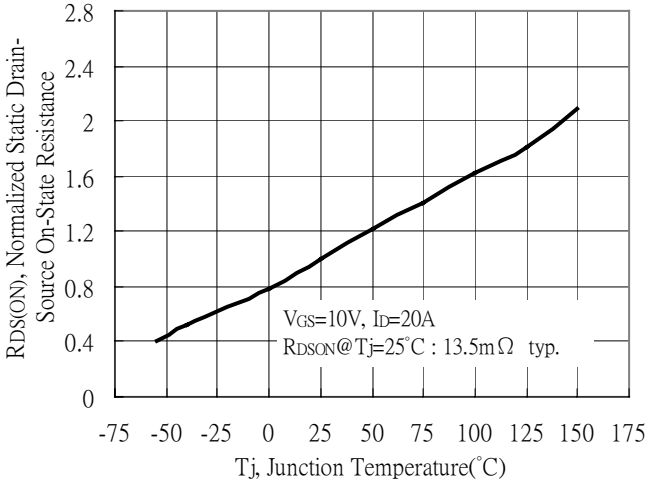
Reverse Drain Current vs Source-Drain Voltage



Capacitance vs Drain-to-Source Voltage

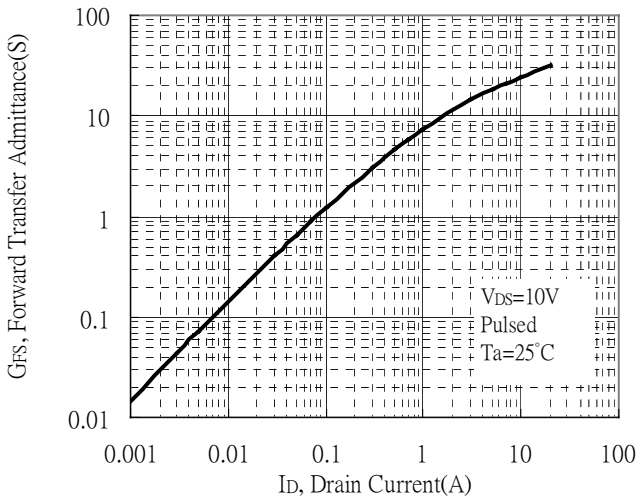


Drain-Source On-State Resistance vs Junction Tempearture

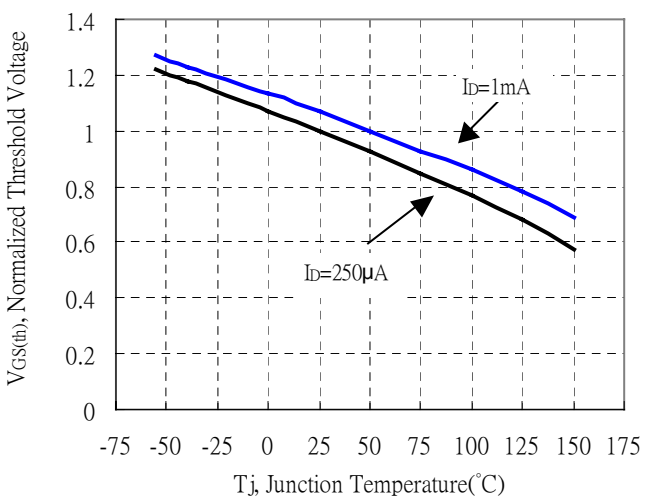


Typical Characteristics(Cont.)

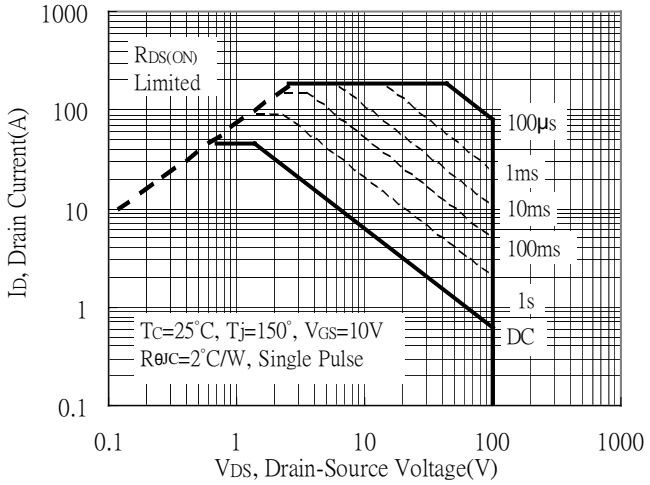
Forward Transfer Admittance vs Drain Current



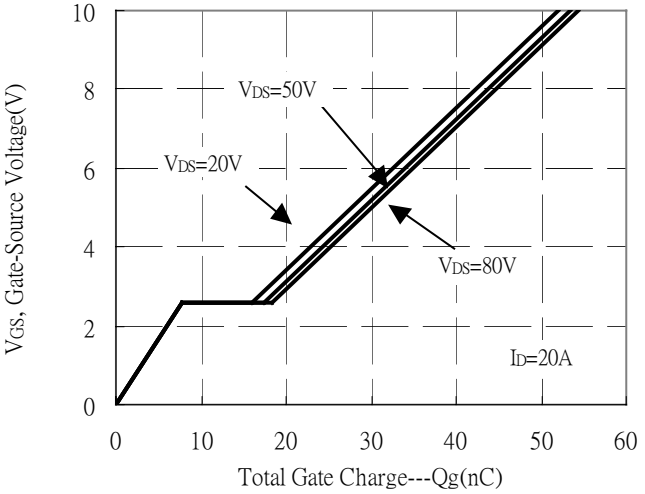
NormalizedThreshold Voltage vs Junction Tempearture



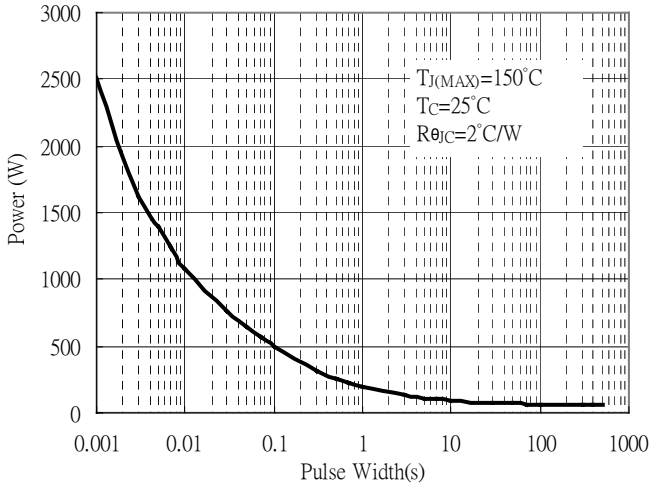
Maximum Safe Operating Area



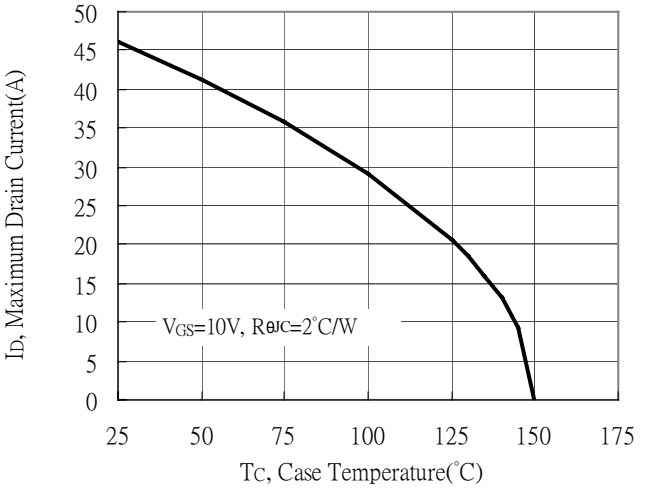
Gate Charge Characteristics



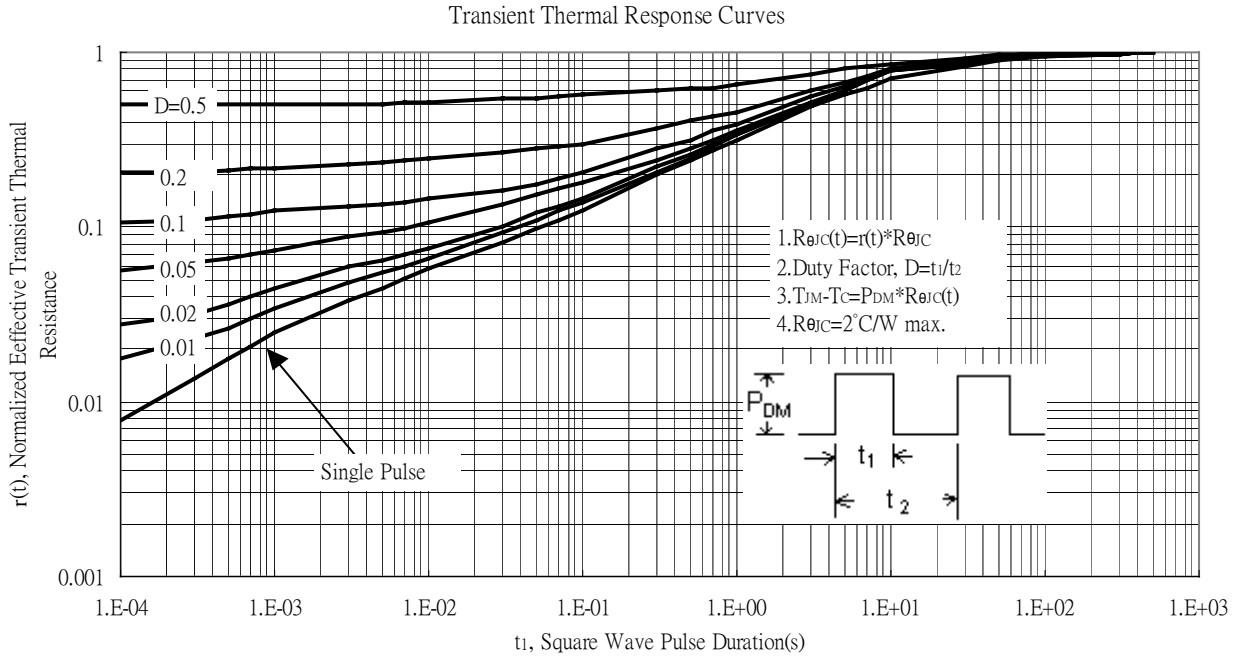
Single Pulse Maximum Power Dissipation



Maximum Drain Current vs Case Temperature



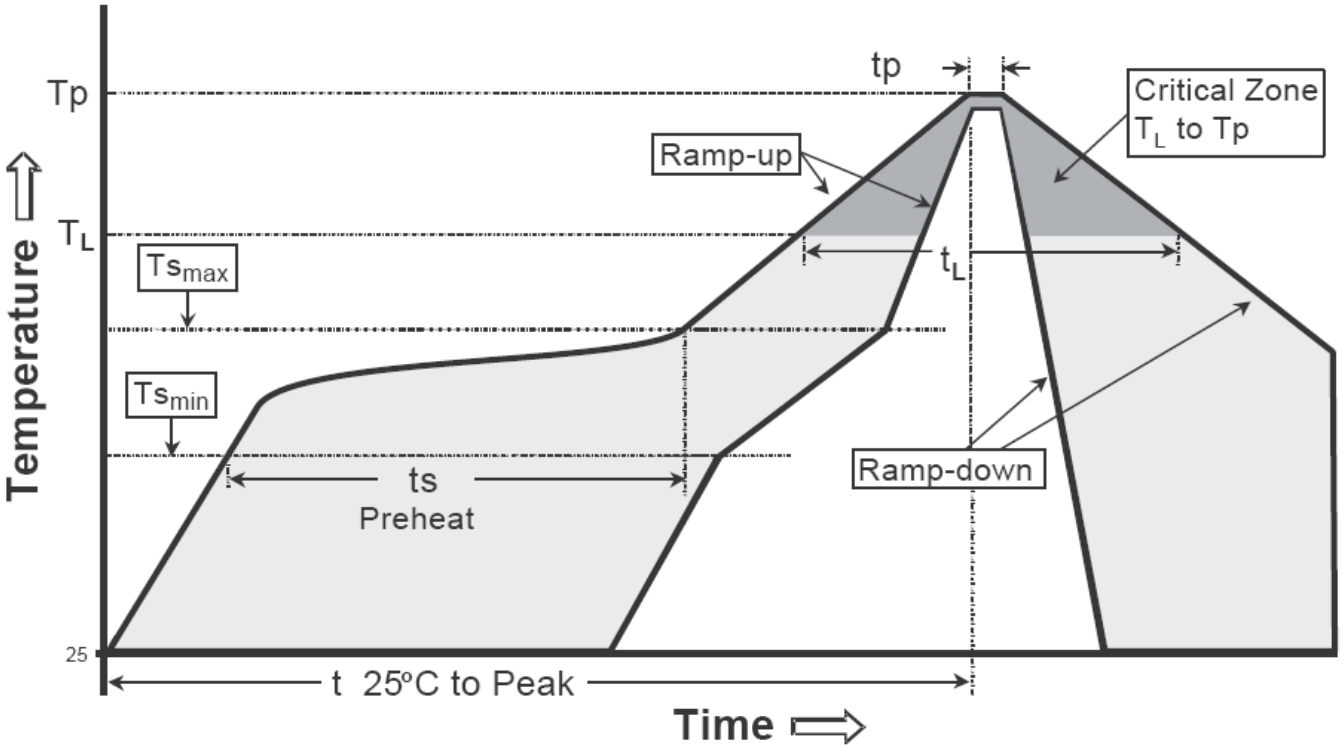
Typical Characteristics(Cont.)



Recommended wave soldering condition

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

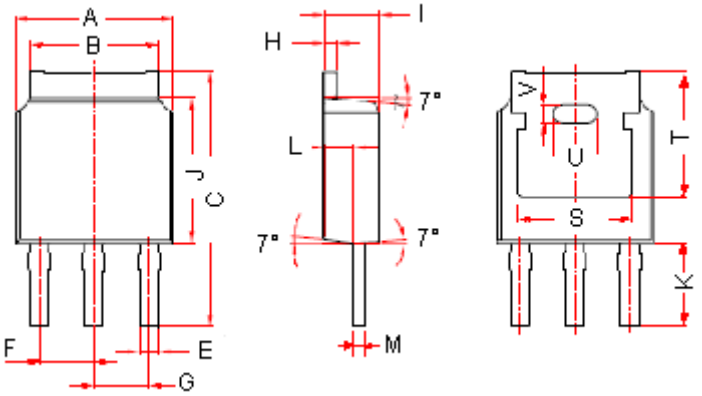
Recommended temperature profile for IR reflow



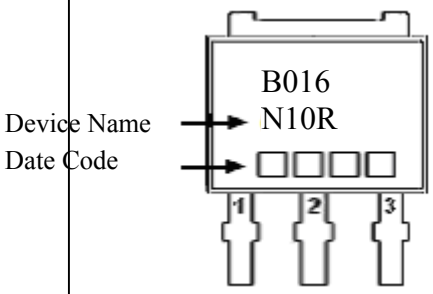
Profile feature	Sn-Pb eutectic Assembly	Pb-free Assembly
Average ramp-up rate (Tsmax to Tp)	3°C/second max.	3°C/second max.
Preheat −Temperature Min(T_S min) −Temperature Max(T_S max) −Time($t_{s\ min}$ to $t_{s\ max}$)	 100°C 150°C 60-120 seconds	 150°C 200°C 60-180 seconds
Time maintained above: −Temperature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



Marking :



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

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

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