N -Channel Logic Level Enhancement Mode Power MOSFET

MTN540J3

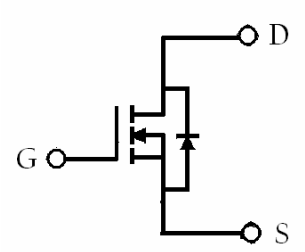
BV_{DSS}		100V
I_D		25A
$R_{DSON(TYP)}$	V_{GS}=10V, I_D=18A	49mΩ
	V_{GS}=4.5V, I_D=10A	48mΩ

Features

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

Equivalent Circuit

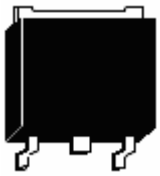
MTN540J3



G：Gate D：Drain
S：Source

Outline

TO-252(DPAK)



G D S

Ordering Information

Device	Package	Shipping
MTN540J3-0-T3-G	TO-252 (Pb-free lead plating and halogen-free package)	2500 pcs / Tape & Reel

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

Packing spec, T3 : 2500 pcs / tape & reel, 13” reel

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 @ T_C=25°C	I_D	25	A
Continuous Drain Current @ T_C=100°C	I_D	15	
Pulsed Drain Current *1	I_{DM}	100	
Avalanche Current	I_{AS}	16	
Avalanche Energy @ L=0.1mH, I_D=16A, R_G=25Ω	E_{AS}	12.8	mJ
Total Power Dissipation @T_C=25℃	Pd	56	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	$R_{th,j-c}$	2.2	°C/W
Thermal Resistance, Junction-to-ambient, max	$R_{th,j-a}$	110	°C/W

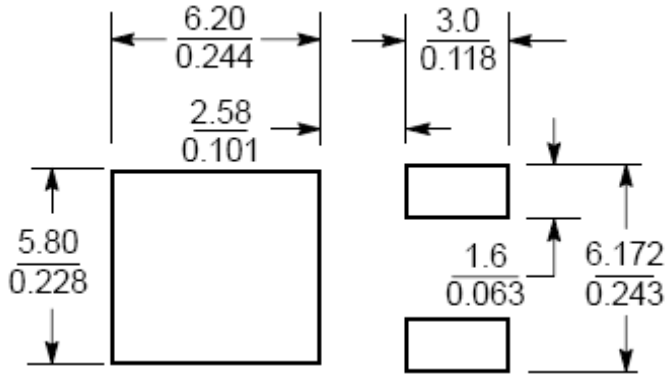
Characteristics (Tc=25°C, unless otherwise specified)

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Static					
BV_{DSS}	100	-	-	V	V_{GS}=0, I_D=250μA
$V_{GS(th)}$	1	1.7	2.5	V	V_{DS} =V_{GS}, I_D=250μA
I_{GSS}	-	-	±100	nA	V_{GS}=±20, V_{DS}=0
I_{DSS}	-	-	10	μA	V_{DS} =100V, V_{GS} =0
	-	-	250	μA	V_{DS} =100V, V_{GS} =0, T_J=125°C
$R_{DS(ON)}$ *1	-	49	60	mΩ	V_{GS} =10V, I_D=18A
	-	48	60	mΩ	V_{GS} =4.5V, I_D=10A
G_{FS} *1	-	20	-	S	V_{DS} =10V, I_D=18A
Dynamic					
Qg *1, 2	-	29	-	nC	I_D=18A, V_{DS}=80V, V_{GS}=10V
Qgs *1, 2	-	8	-		
Qgd *1, 2	-	10	-		
$t_{d(ON)}$ *1, 2	-	23	-	ns	V_{DS}=50V, I_D=18A, V_{GS}=10V, R_G=6Ω
tr *1, 2	-	5	-		
$t_{d(OFF)}$ *1, 2	-	50	-		
t_f *1, 2	-	8	-		

Ciss	-	3917	-	pF	V_{GS}=0V, V_{DS}=25V, f=1MHz
Coss	-	79.3	-		
Crss	-	50.7	-		
Source-Drain Diode					
I_S *1	-	-	25	A	
I_{SM} *3	-	-	100		
V_{SD} *1	-	-	1.3	V	I_F=I_S, V_{GS}=0V
trr	-	60	-	ns	I_F=25A, dI_F/dt=100A/μs
Qrr	-	122	-	nC	

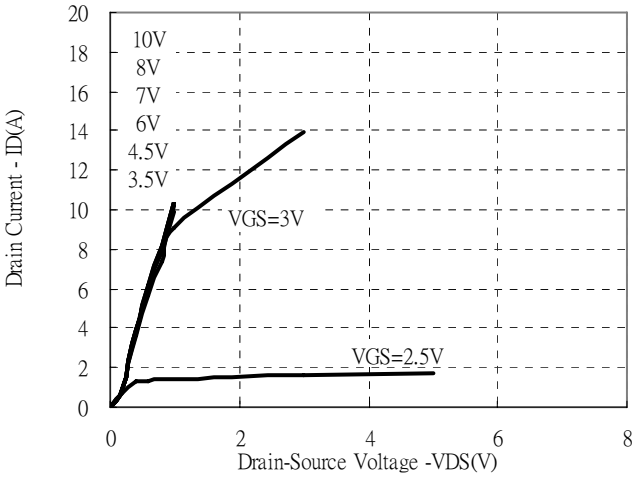
Note : *1.Pulse Test : Pulse Width ≤300μs, Duty Cycle≤2%
*2.Independent of operating temperature
*3.Pulse width limited by maximum junction temperature.

Recommended soldering footprint

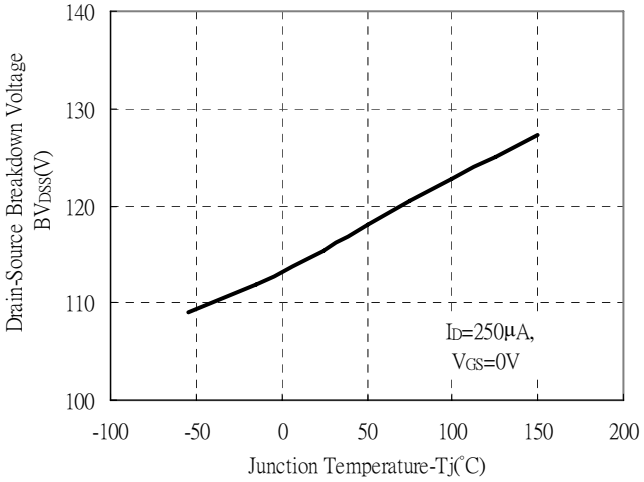


Typical Characteristics

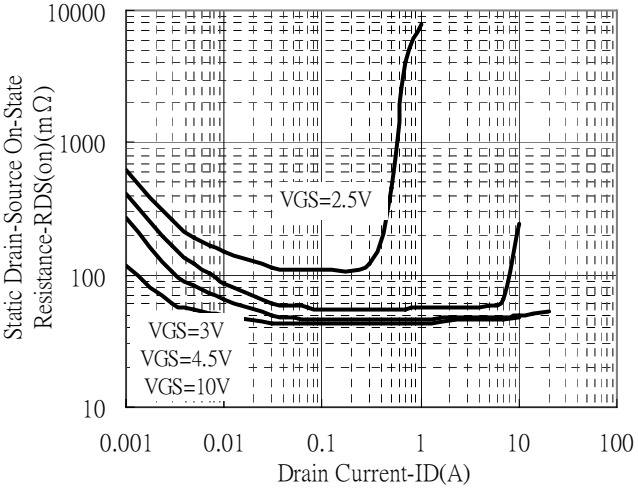
Typical Output Characteristics



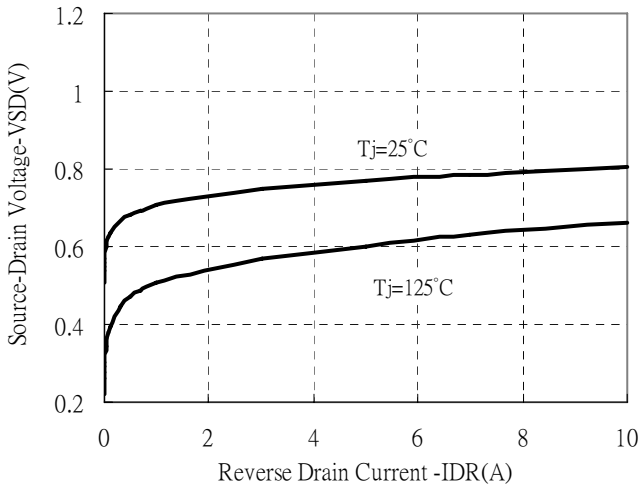
Brekdown Voltage vs Ambient Temperature



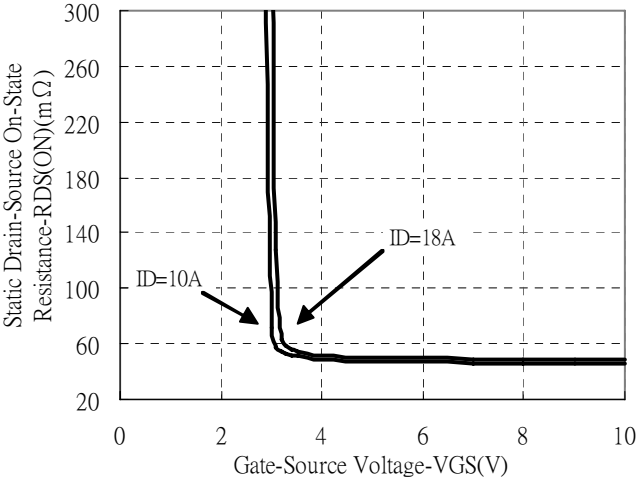
Static Drain-Source On-State resistance vs Drain Current



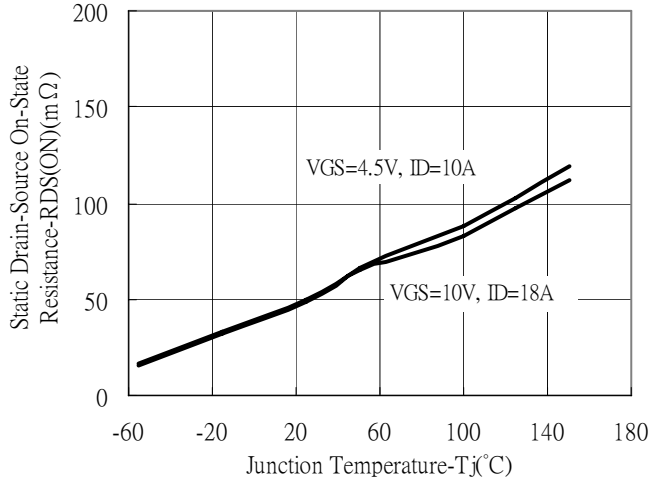
Reverse Drain Current vs Source-Drain Voltage



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

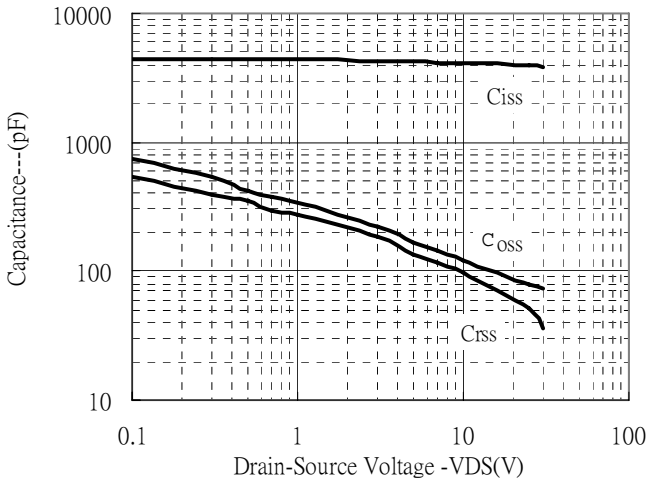


Drain-Source On-State Resistance vs Junction Tempearture

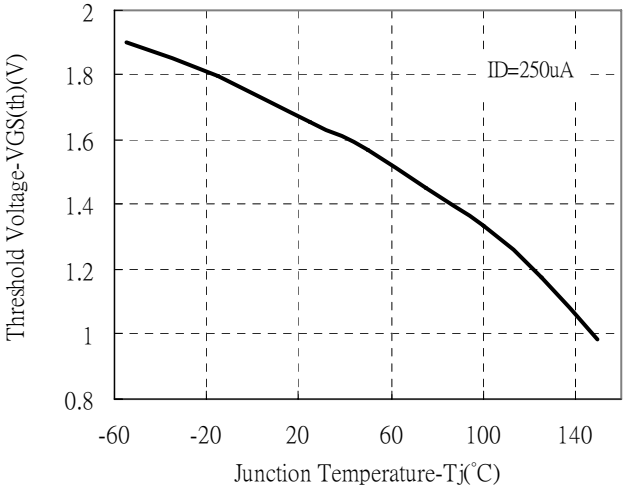


Typical Characteristics(Cont.)

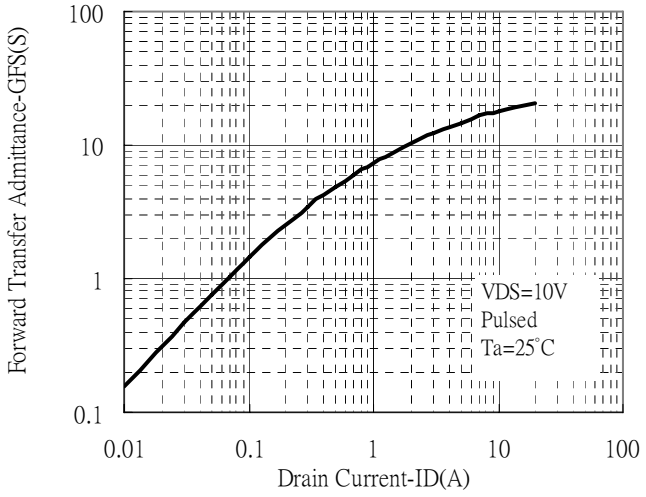
Capacitance vs Drain-to-Source Voltage



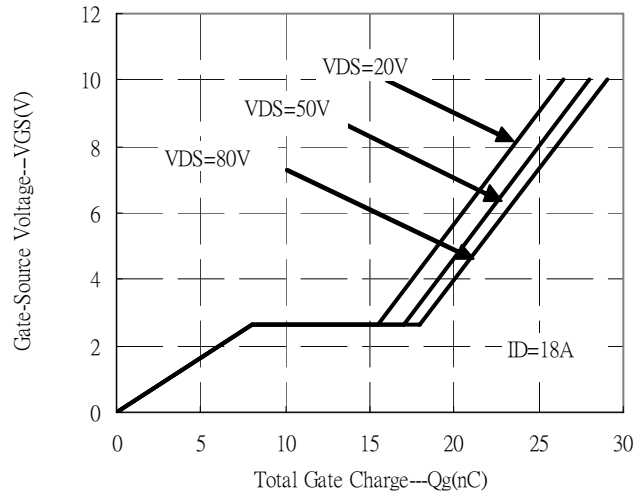
Threshold Voltage vs Junction Tempearture



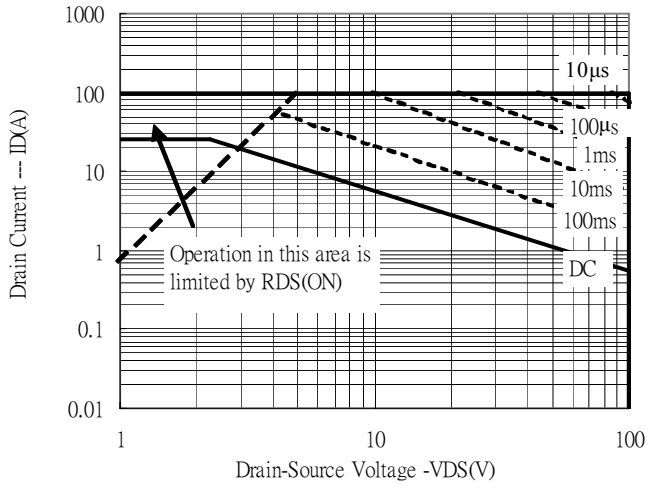
Forward Transfer Admittance vs Drain Current



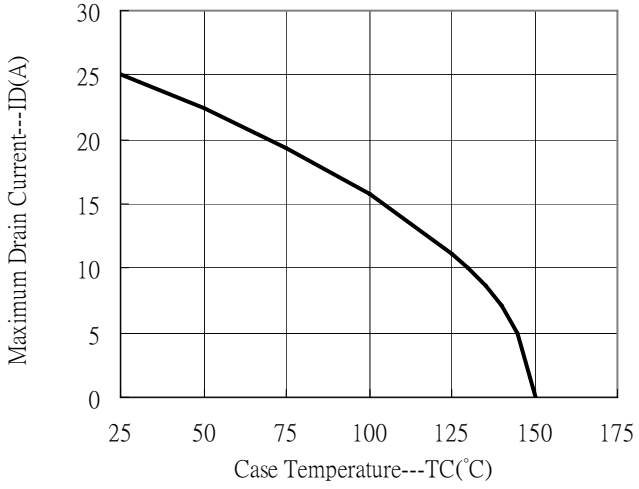
Gate Charge Characteristics



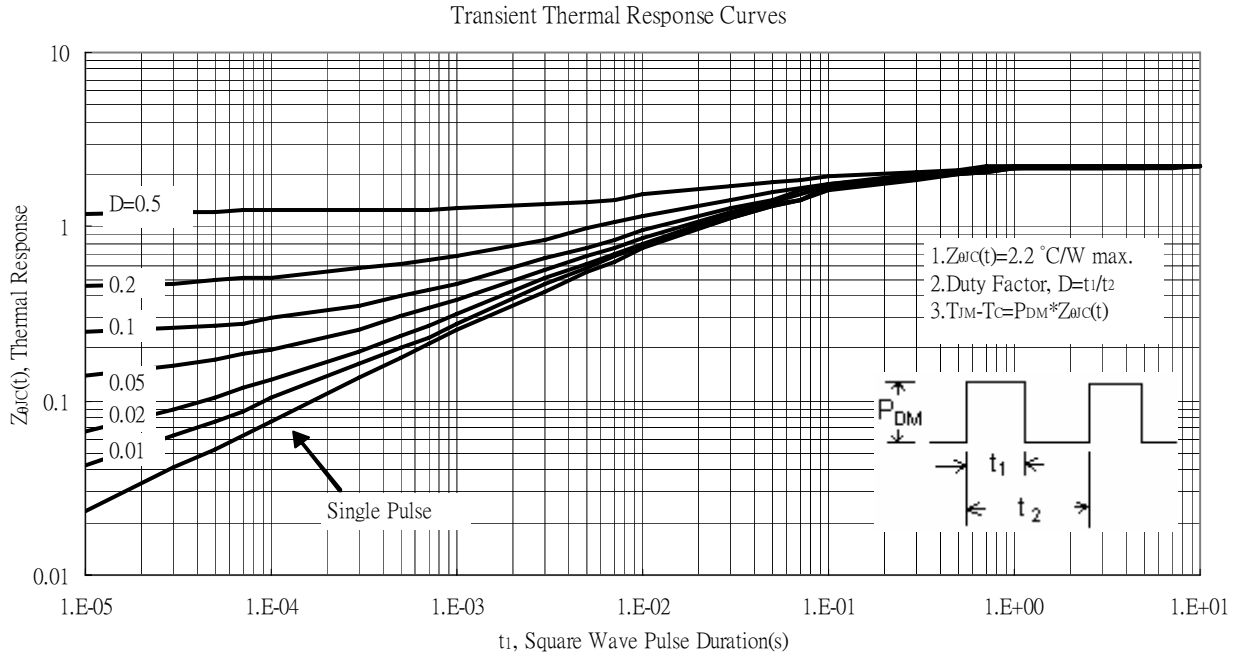
Maximum Safe Operating Area



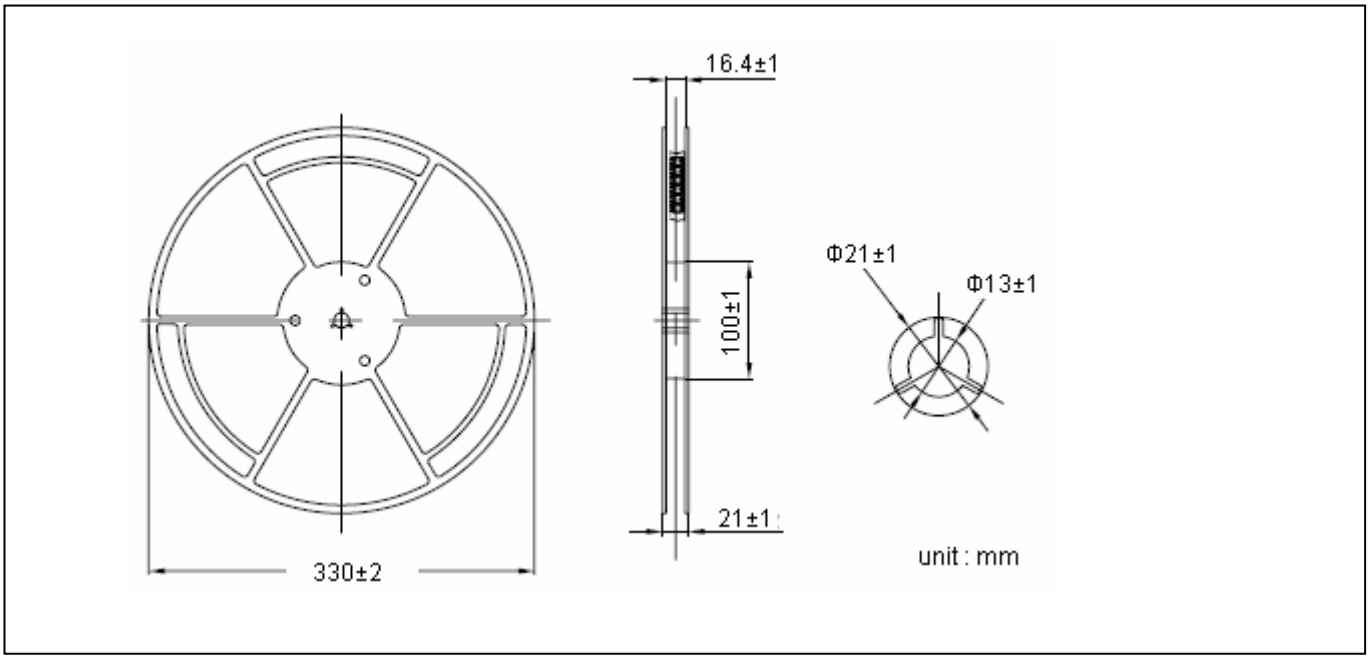
Maximum Drain Current vs Case Temperature



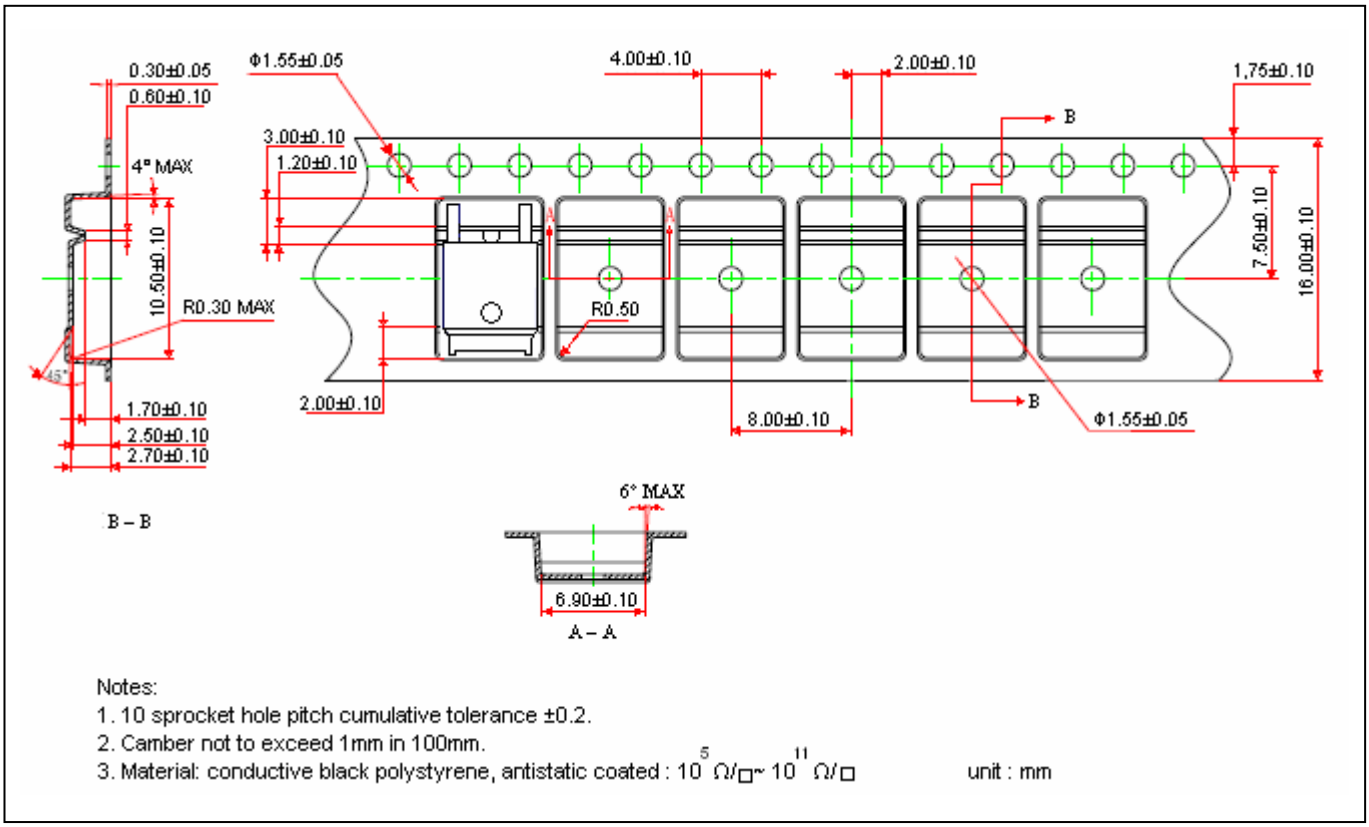
Typical Characteristics(Cont.)



Reel Dimension



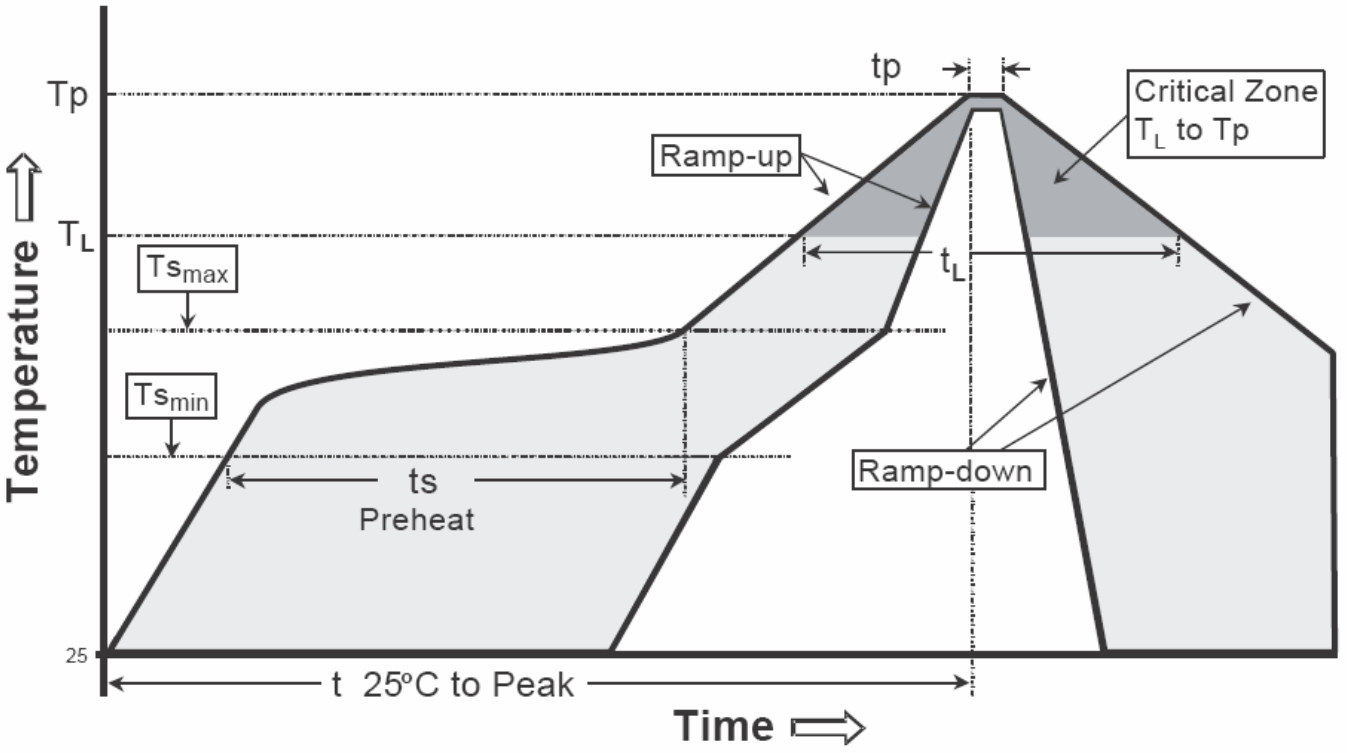
Carrier Tape Dimension



Recommended wave soldering condition

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

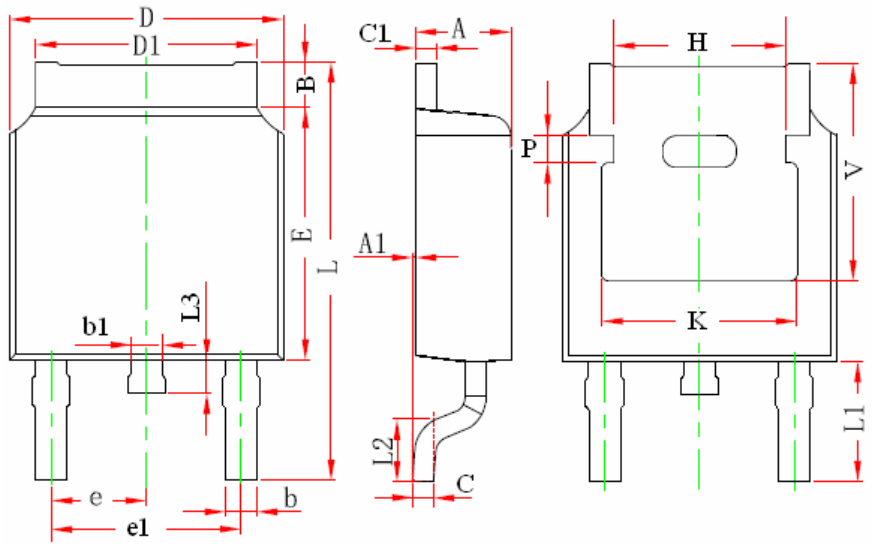
Recommended temperature profile for IR reflow

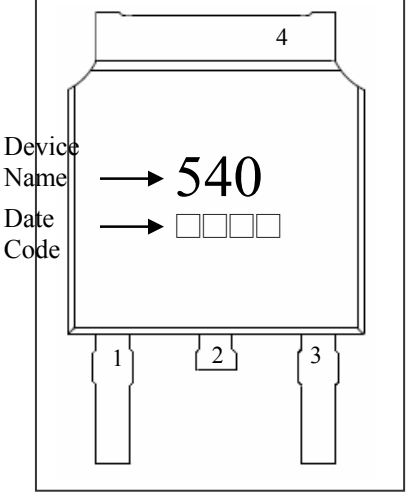


Profile feature	Sn-Pb eutectic Assembly	Pb-free Assembly
Average ramp-up rate (Tsmax to Tp)	3°C/second max.	3°C/second max.
Preheat −Temperature Min(T_S min) −Temperature Max(T_S max) −Time($t_{s\ min}$ to $t_{s\ max}$)	 100°C 150°C 60-120 seconds	 150°C 200°C 60-180 seconds
Time maintained above: −Temperature (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-252 Dimension





3-Lead TO-252 Plastic Surface Mount Package
CYStek Package Code: J3

Style: Pin 1.Gate 2.Drain 3.Source 4.Drain

DIM	Inches		Millimeters		DIM	Inches		Millimeters	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.087	0.094	2.200	2.400	e	0.086	0.094	2.186	2.386
A1	0.000	0.005	0.000	0.127	e1	0.172	0.188	4.372	4.772
B	0.039	0.048	0.990	1.210	H	0.163	REF	4.140	REF
b	0.026	0.034	0.660	0.860	K	0.190	REF	4.830	REF
b1	0.026	0.034	0.660	0.860	L	0.386	0.409	9.800	10.400
C	0.018	0.023	0.460	0.580	L1	0.114	REF	2.900	REF
C1	0.018	0.023	0.460	0.580	L2	0.055	0.067	1.400	1.700
D	0.256	0.264	6.500	6.700	L3	0.024	0.039	0.600	1.000
D1	0.201	0.215	5.100	5.460	P	0.026	REF	0.650	REF
E	0.236	0.244	6.000	6.200	V	0.211	REF	5.350	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.

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