N-Channel Enhancement Mode Power MOSFET

MTE1D5N06F7T

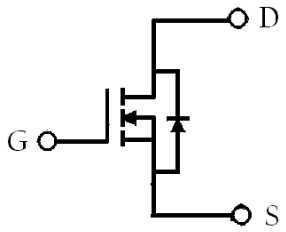
BV_{DSS}	60V
I_D @V_{GS}=10V, T_C=25°C	172A
$R_{DSON(TYP)}$ @ V_{GS}=10V, I_D=50A	1.3mΩ

Features

- Simple Drive Requirement
- Fast Switching Characteristic
- RoHS compliant package

Symbol

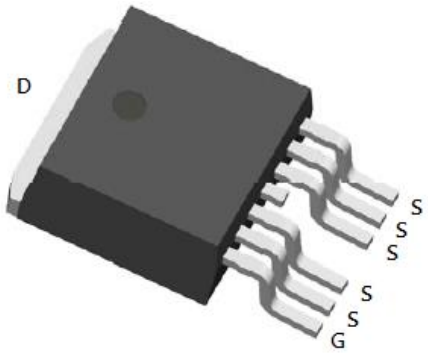
MTE1D5N06F7T



G：Gate D：Drain S：Source

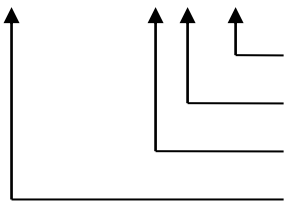
Outline

TO-263-7L-4C



Ordering Information

Device	Package	Shipping
MTE1D5N06F7T-0-T7-X	TO-263-7L-4C (Pb-free lead plating and RoHS compliant package)	800 pcs / Tape & Reel



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

Packing spec, T7 : 800 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}	60	V
Gate-Source Voltage		V_{GS}	±30	
Continuous Drain Current @ T_C=25°C(silicon limit)		I_D	235	A
Continuous Drain Current @ T_C=100°C(silicon limit)			166	
Continuous Drain Current @ T_C=25°C(package limit)	(Note 1)		172	
Pulsed Drain Current	(Note 3)	I_{DM}	800	
Continuous Drain Current @ T_A=25°C	(Note 2)	I_{DSM}	26.0	
Continuous Drain Current @ T_A=70°C	(Note 2)		20.8	
Avalanche Current @L=0.1mH	(Note 3)	I_{AS}	100	
Avalanche Energy @ L=1mH, I_D=66A, V_{DD}=50V	(Note 4)	E_{AS}	2178	mJ
Power Dissipation	T_C=25°C (Note 1)	P_D	250	W
	T_C=100°C (Note 1)		125	
Power Dissipation	T_A=25°C (Note 2)	P_{DSM}	2	
	T_A=70°C (Note 2)		1.3	
Operating Junction and Storage Temperature		Tj, Tstg	-55~+175	°C

Thermal Data

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-case, max	$R_{\theta JC}$	0.6	°C/W
Thermal Resistance, Junction-to-ambient, max, (Note 2)	$R_{\theta JA}$	62.5	

Note : 1.The power dissipation P_D is based on $T_{J(MAX)}$=175°C, using junction-to-case thermal resistance, and is more useful in setting the upper dissipation limit for cases where additional heatsinking is used.

2.The value of $R_{\theta JA}$ is measured with the device mounted on 1 in² FR-4 board with 2 oz. copper, in a still air environment with T_A=25°C. The power dissipation P_{DSM} is based on $R_{\theta JA}$ and the maximum allowed junction temperature of 150°C. The value in any given application depends on the user's specific board design, and the maximum temperature of 175°C may be used if the PCB allows it.

3. Pulse width limited by junction temperature $T_{J(MAX)}$=175°C. Ratings are based on low frequency and low duty cycles to keep initial T_J=25°C.

4. 100% tested by conditions of L=1mH, I_{AS}=30A, V_{GS}=10V, V_{DD}=30V.

5. The static characteristics are obtained using <300μs pulses, duty cycle 0.5% maximum.

6. The $R_{\theta JA}$ is the sum of thermal resistance from junction to case $R_{\theta JC}$ and case to ambient.

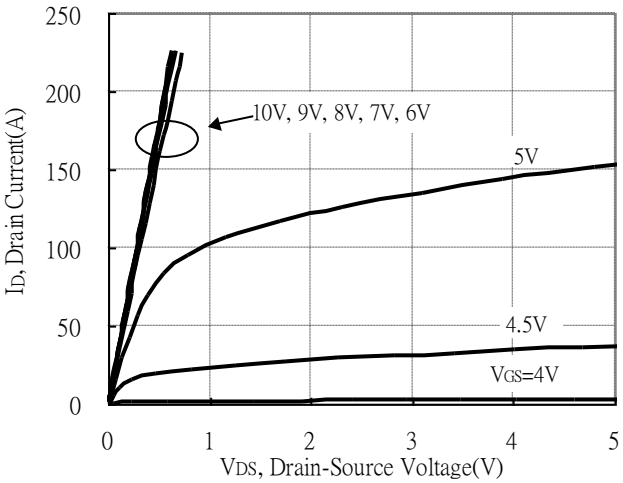
Characteristics (T_C=25°C, unless otherwise specified)

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Static					
BV_{DSS}	60	-	-	V	V_{GS}=0V, I_D=250μA
$V_{GS(th)}$	2.0	-	4.0		V_{DS} = V_{GS}, I_D=250μA
G_{FS}	-	48	-	S	V_{DS} =10V, I_D=20A
I_{GSS}	-	-	±100	nA	V_{GS}=±30V, V_{DS}=0V
I_{DSS}	-	-	1	μA	V_{DS} =48V, V_{GS} =0V
	-	-	25		V_{DS} =48V, V_{GS} =0V, Tj=125°C
*$R_{DS(ON)}$	-	1.3	1.6	mΩ	V_{GS} =10V, I_D=50A
Dynamic					
*Qg	-	256	-	nC	I_D=20A, V_{DS}=30V, V_{GS}=10V
*Qgs	-	42	-		
*Qgd	-	90.4	-		
*$t_{d(ON)}$	-	61.8	-	ns	V_{DS}=30V, I_D=20A, V_{GS}=10V, R_G=1Ω
*tr	-	44.2	-		
*$t_{d(OFF)}$	-	136.8	-		
*t_f	-	31.6	-		
Ciss	-	12243	-	pF	V_{GS}=0V, V_{DS}=30V, f=1MHz
Coss	-	911	-		
Crss	-	343	-		
Rg	-	1.2	-	Ω	f=1MHz
Source-Drain Diode					
*I_S	-	-	172	A	
*I_{SM}	-	-	800		
*V_{SD}	-	0.75	1.2	V	I_S=20A, V_{GS}=0V
*trr	-	43.9	-	ns	I_F=20A, V_{GS}=0V, dI_F/dt=100A/μs
*Qrr	-	66.2	-	nC	

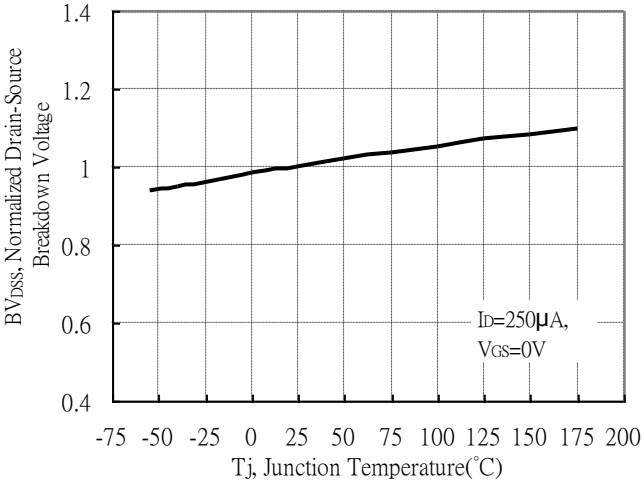
*Pulse Test : Pulse Width ≤300μs, Duty Cycle≤2%

Typical Characteristics

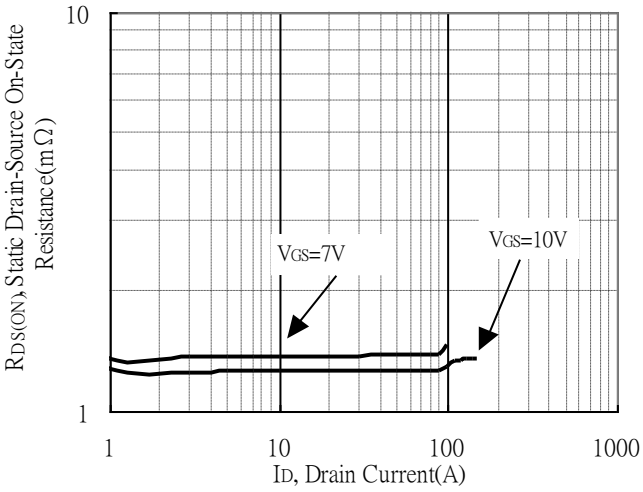
Typical Output Characteristics



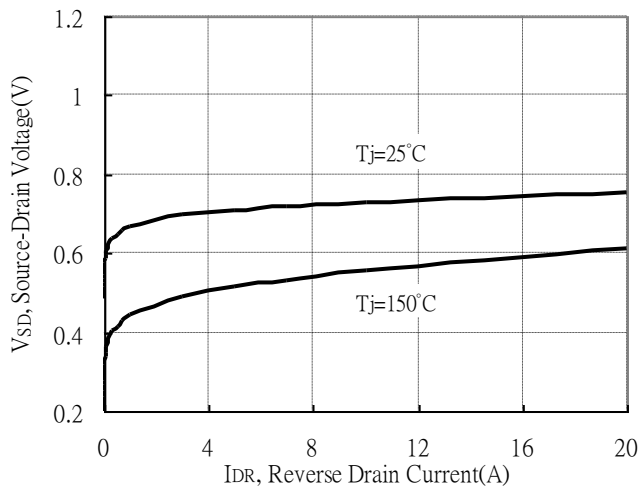
Brekdown Voltage vs Ambient Temperature



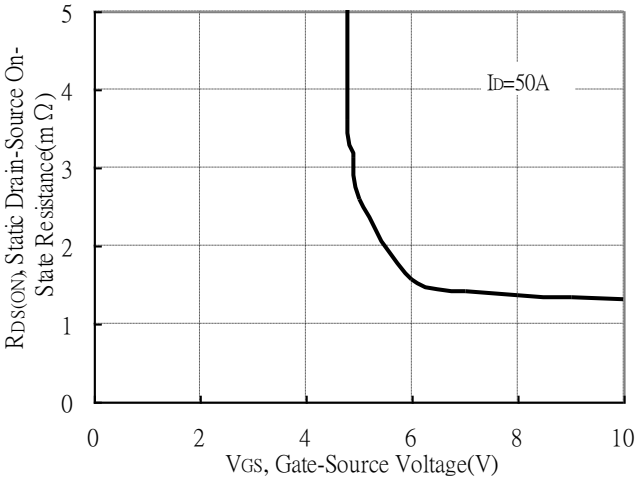
Static Drain-Source On-State resistance vs Drain Current



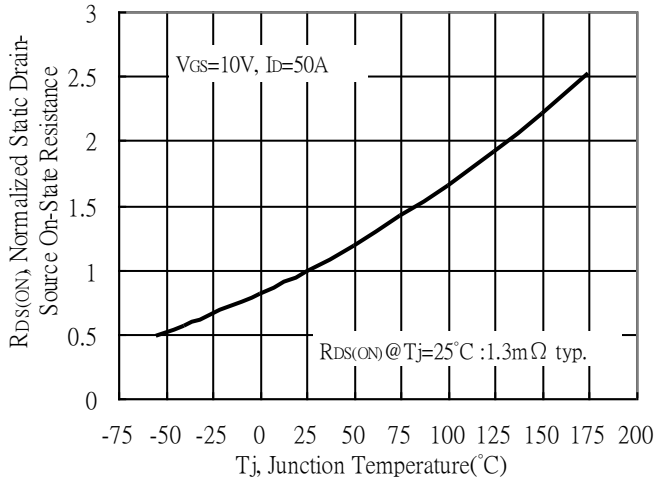
Reverse Drain Current vs Source-Drain Voltage



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

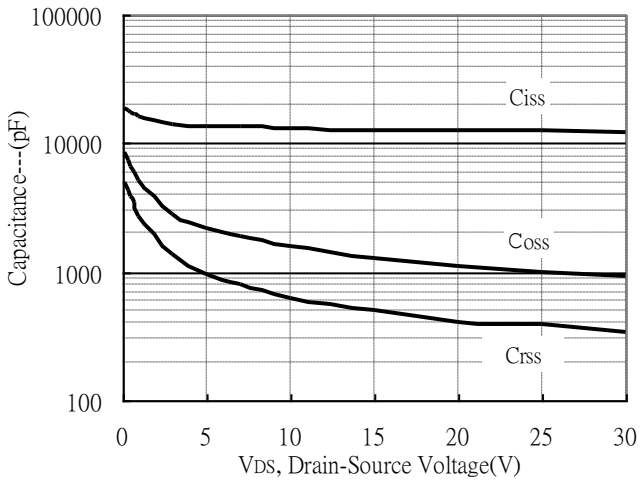


Drain-Source On-State Resistance vs Junction Tempearture

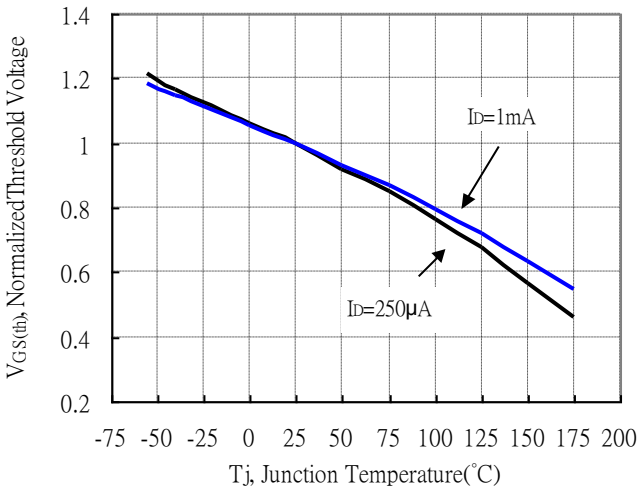


Typical Characteristics(Cont.)

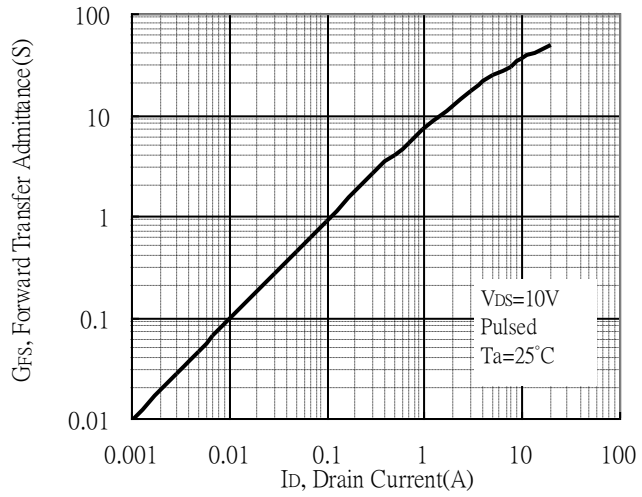
Capacitance vs Drain-to-Source Voltage



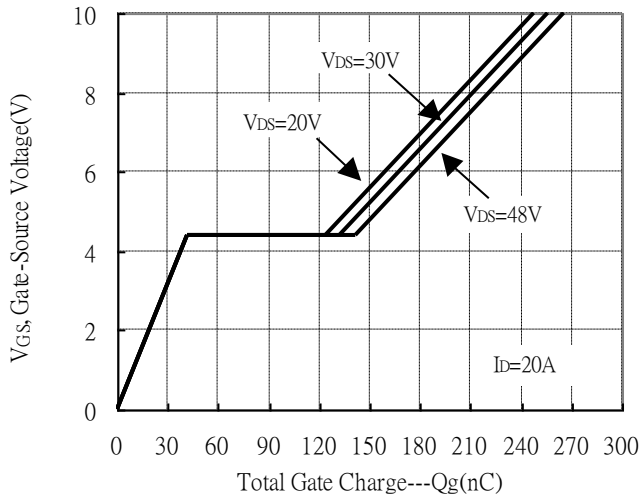
Threshold Voltage vs Junction Tempearture



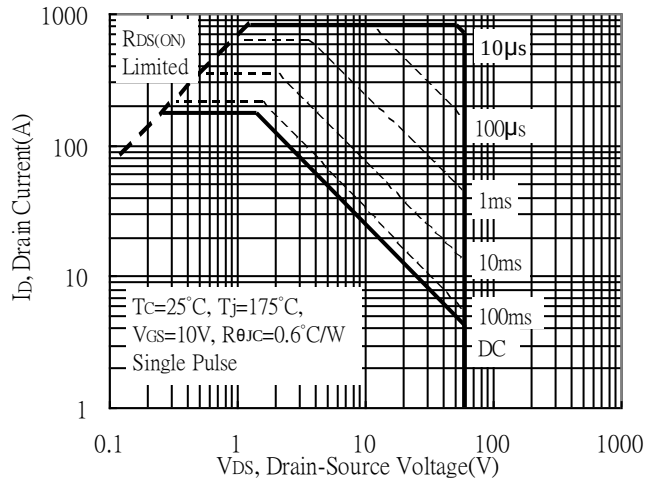
Forward Transfer Admittance vs Drain Current



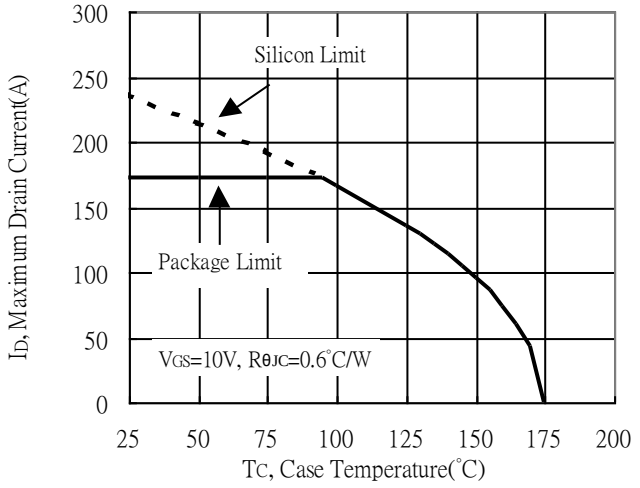
Gate Charge Characteristics



Maximum Safe Operating Area

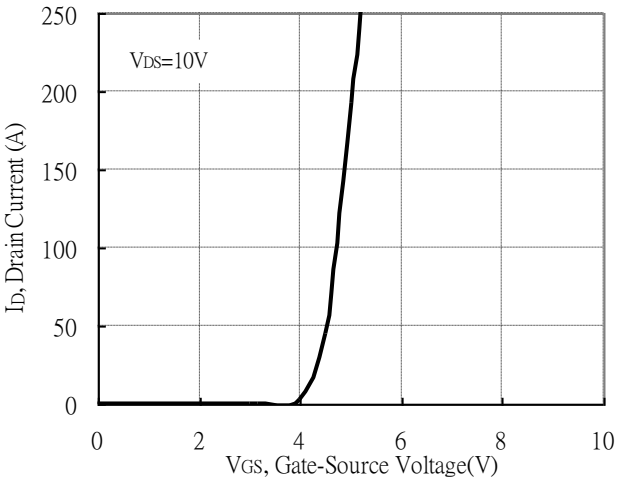


Maximum Drain Current vs Case Temperature

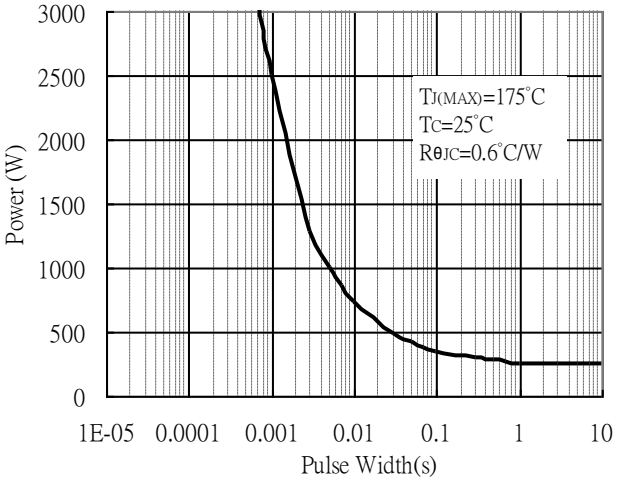


Typical Characteristics(Cont.)

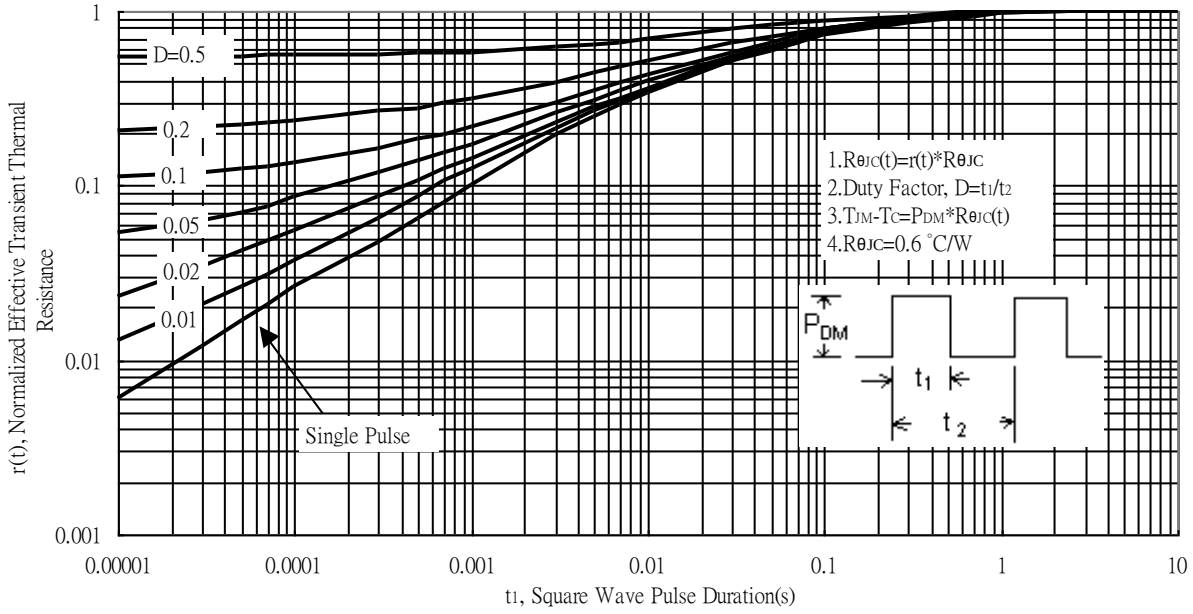
Typical Transfer Characteristics



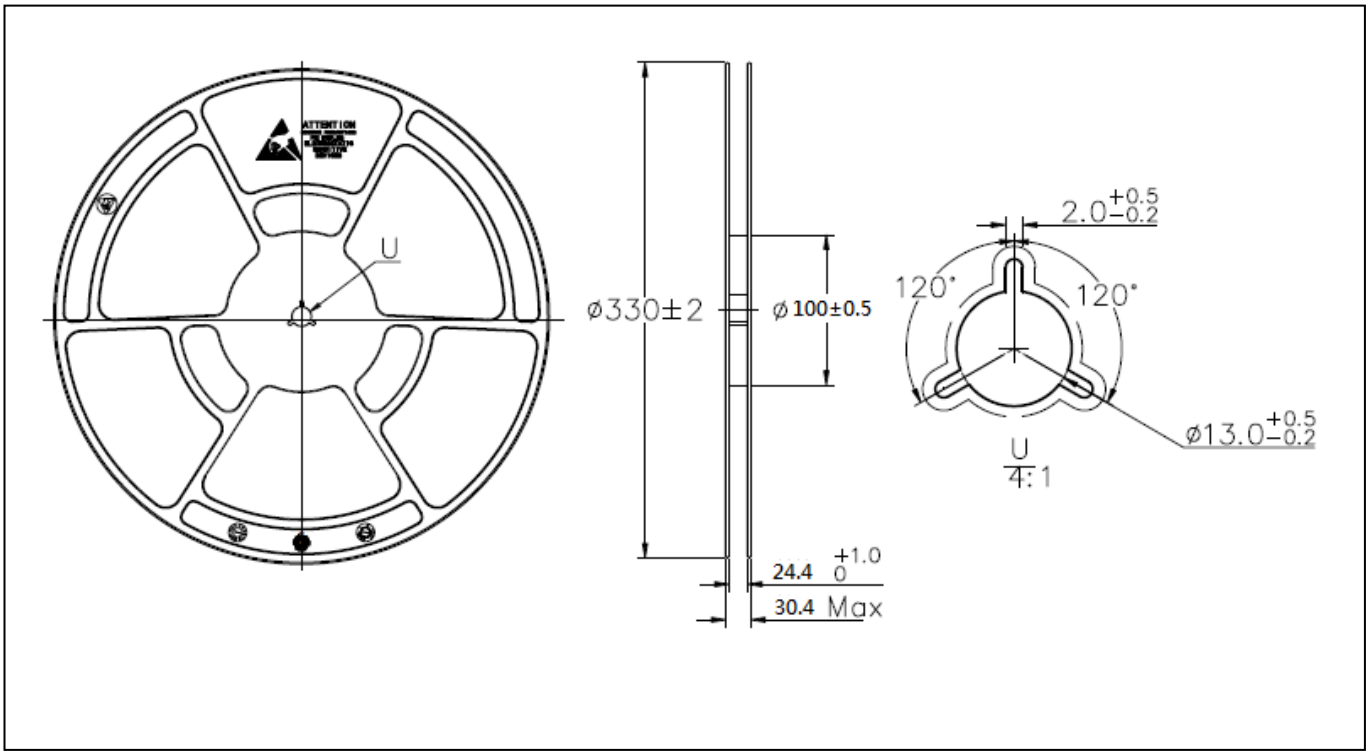
Single Pulse Maximum Power Dissipation



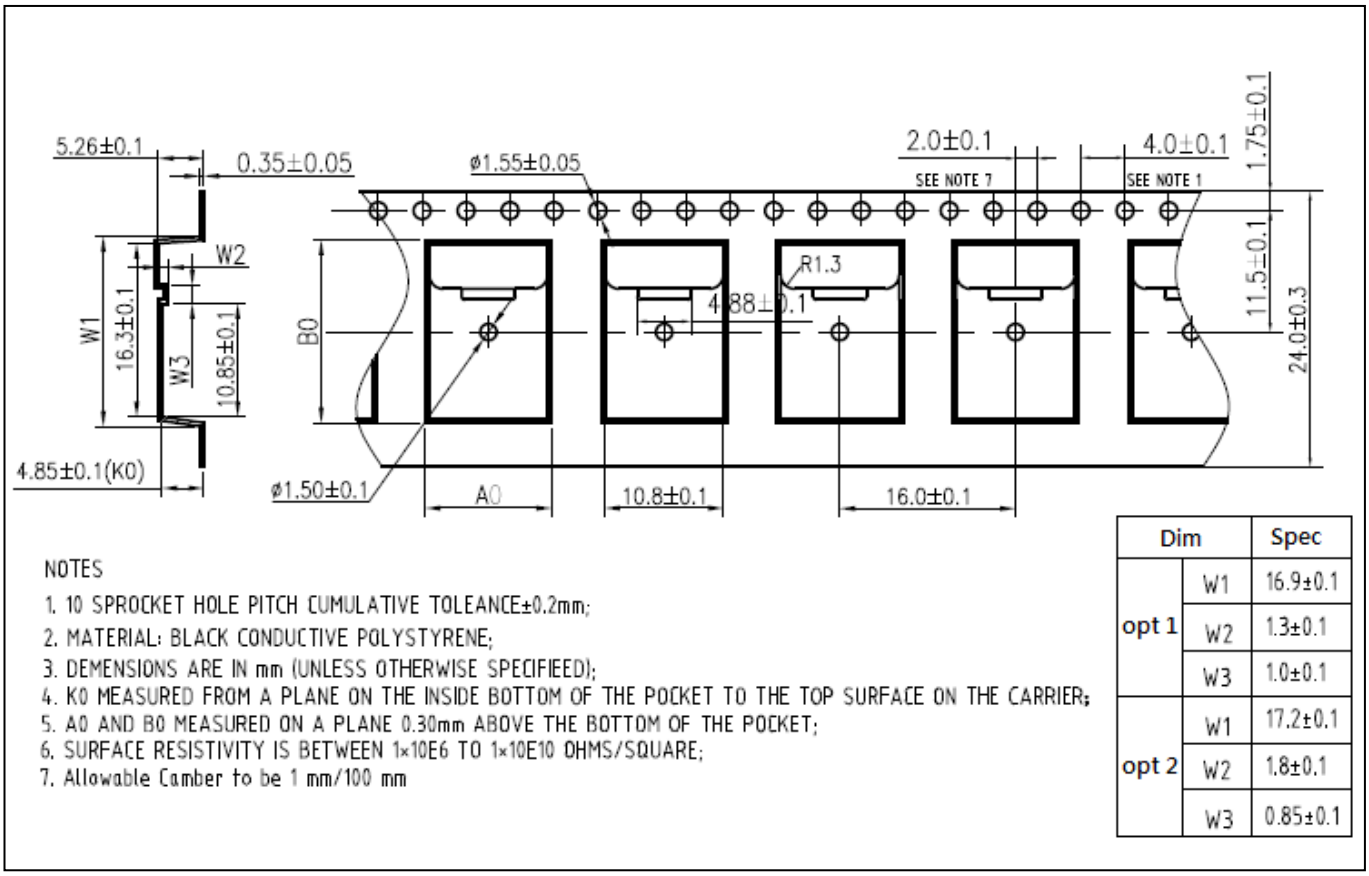
Transient Thermal Response Curves



Reel Dimension



Carrier Tape Dimension



NOTES

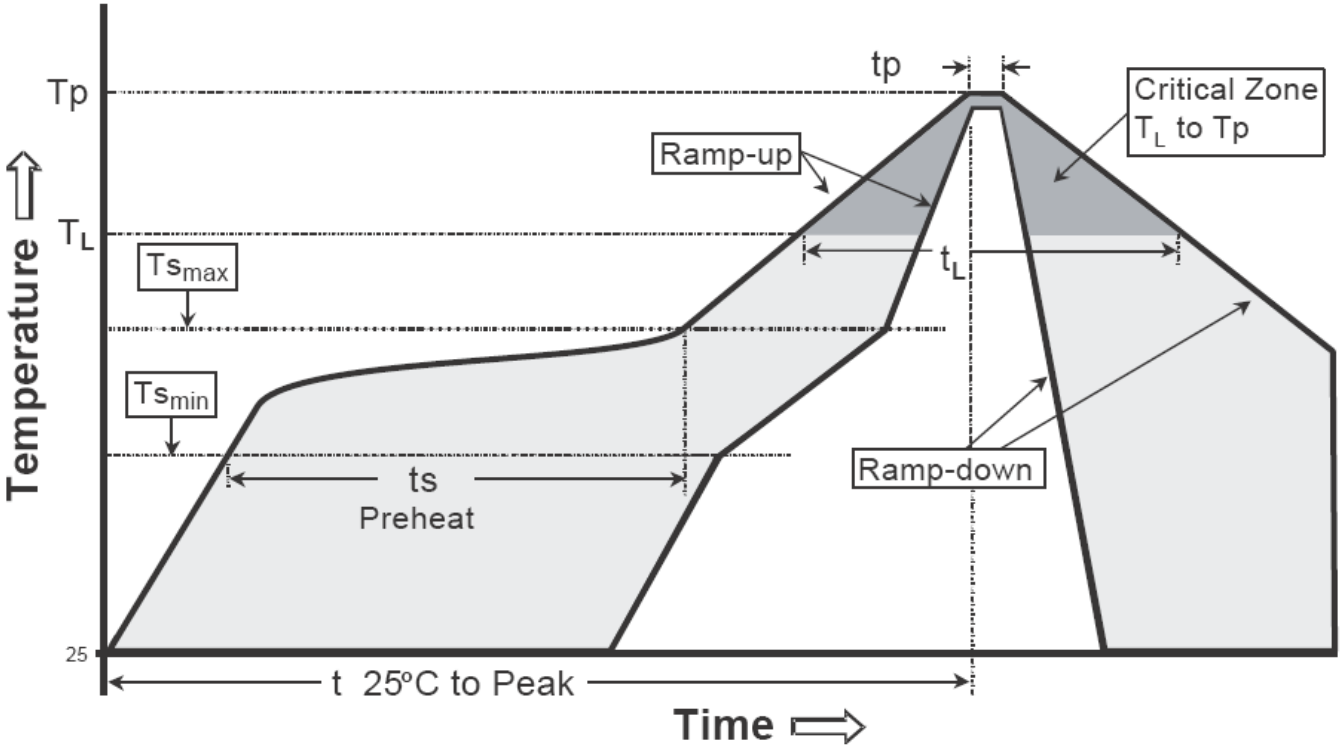
1. 10 SPROCKET HOLE PITCH CUMULATIVE TOLEANCE±0.2mm;
2. MATERIAL: BLACK CONDUCTIVE POLYSTYRENE;
3. DEMENSIONS ARE IN mm (UNLESS OTHERWISE SPECIFIEED);
4. K0 MEASURED FROM A PLANE ON THE INSIDE BOTTOM OF THE POCKET TO THE TOP SURFACE ON THE CARRIER;
5. A0 AND B0 MEASURED ON A PLANE 0.30mm ABOVE THE BOTTOM OF THE POCKET;
6. SURFACE RESISTIVITY IS BETWEEN 1×10E6 TO 1×10E10 OHMS/SQUARE;
7. Allowable Camber to be 1 mm/100 mm

Dim		Spec
opt 1	W1	16.9±0.1
	W2	1.3±0.1
	W3	1.0±0.1
opt 2	W1	17.2±0.1
	W2	1.8±0.1
	W3	0.85±0.1

Recommended wave soldering condition

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

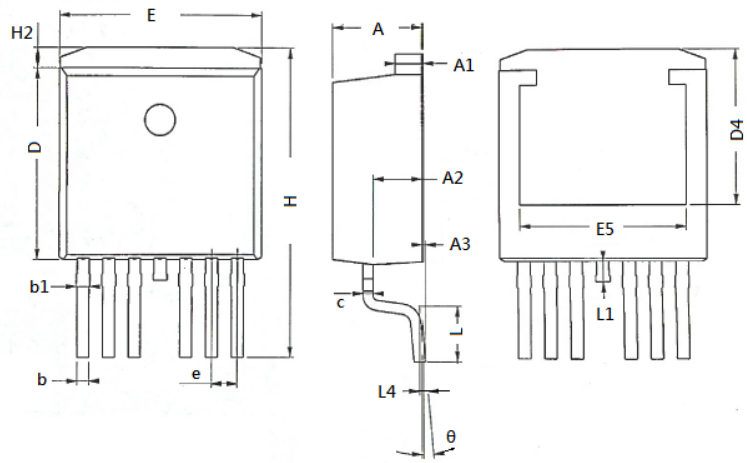
Recommended temperature profile for IR reflow



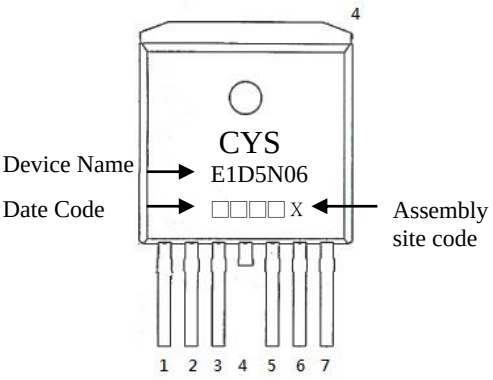
Profile feature	Sn-Pb eutectic Assembly	Pb-free Assembly
Average ramp-up rate (Tsmax to Tp)	3°C/second max.	3°C/second max.
Preheat −Temperature Min(T_S min) −Temperature Max(T_S max) −Time($t_{s\ min}$ to $t_{s\ max}$)	 100°C 150°C 60-120 seconds	 150°C 200°C 60-180 seconds
Time maintained above: −Temperature (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-263-7L-4C Dimension



Marking :



7-Lead Plastic Surface Mounted TO-263-7L Package
CYStek Package Code : F7T

Style : Pin 1. Gate
Pin 2, 3, 5, 6, 7 : Source
Pin 4. Drain

Date Code : (From left to right)
First Code : Year code, the last digit of Christinr year. For example, 2014→4, 2015→, 2016→6, …, etc.
Second Code : Month code, Jan→A, Feb→B, Mar→C, Apr→D, May→E, Jun→F, Jul→G, Aug→H, Sep→J, Oct→K, Nov→L, Dec→M
Third and fourth codes : production serial number, 01~99

*:Typical

DIM	Inches		Millimeters		DIM	Inches		Millimeters	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.1673	0.1791	4.25	4.55	E	0.3858	0.4016	9.80	10.20
A1	0.0472	0.0551	1.20	1.40	e	0.0500 BSC		1.27 BSC	
A2	0.0886	0.1004	2.25	2.55	E5	0.2854	-	7.25	-
A3	0.0004	0.0098	0.01	0.25	H	0.5768	0.6043	14.65	15.35
b	0.0197	0.0276	0.50	0.70	H2	0.0315	0.0472	0.80	1.20
b1	0.0228	0.0331	0.58	0.84	L	0.0945	0.1181	2.40	3.00
c	0.0157	0.0236	0.40	0.60	L1	0.0335	0.0453	0.85	1.15
D	0.3563	0.3720	9.05	9.45	L4	0.0098 BSC		0.25 BSC	
D4	0.2717	-	6.90	-	θ	2°	8°	2°	8°

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.