P-Channel Enhancement Mode Power MOSFET

MTE5D0P06F3

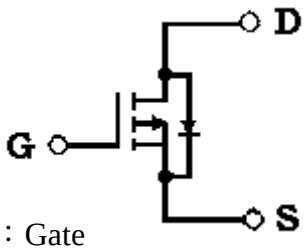
BV_{DSS}	-60V
I_D @ V_{GS}=-10V, T_C=25°C	-92A
I_D @ V_{GS}=-10V, T_A=25°C	-11.7A
$R_{DSON(TYP)}$ @ V_{GS}=-10V, I_D=-20A	6.7mΩ

Features

- Low Gate Charge
- Simple Drive Requirement
- Repetitive Avalanche Rated
- Fast Switching Characteristic
- RoHS compliant package

Symbol

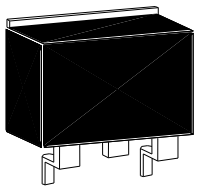
MTE5D0P06F3



G：Gate
D：Drain
S：Source

Outline

TO-263



G D S

Ordering Information

Device	Package	Shipping
MTE5D0P06F3-0-T7-X	TO-263 (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, V_{GS}=-10V		(Note 5)	I_D	-92	A
Continuous Drain Current @ T_C=100°C, V_{GS}=-10V		(Note 5)		-58.2	
Pulsed Drain Current		(Note 3)	I_{DM}	-312	
Continuous Drain Current @ T_A=25°C , V_{GS}=-10V		(Note 2)	I_{DSM}	-11.7	
Continuous Drain Current @ T_A=70°C , V_{GS}=-10V		(Note 2)		-9.4	
Avalanche Current @ L=0.1mH		(Note 3)	I_{AS}	-100	
Avalanche Energy @ L=1mH, I_D=-40A, V_{DD}=-25V		(Note 4)	E_{AS}	800	mJ
Repetitive Avalanche Energy			E_{AR}	12	
Power Dissipation	T_C=25°C	(Note 1)	P_D	125	W
	T_C=100°C	(Note 1)		50	
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~+150	°C

Thermal Data

Parameter		Symbol	Value	Unit
Thermal Resistance, Junction-to-case, max		$R_{\theta JC}$	1	°C/W
Thermal Resistance, Junction-to-ambient, max , t≤10s	(Note 2)	$R_{\theta JA}$	15	
Thermal Resistance, Junction-to-ambient, max	(Note 2)		62	

Note : 1.The power dissipation P_D is based on $T_{J(MAX)}$=150°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.

3. Pulse width limited by junction temperature $T_{J(MAX)}$=150°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=0.1mH, I_{AS}=-50A, V_{GS}=-10V, V_{DD}=-25V.

5. Calculated continuous drain current based on maximum allowable junction temperature.

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

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

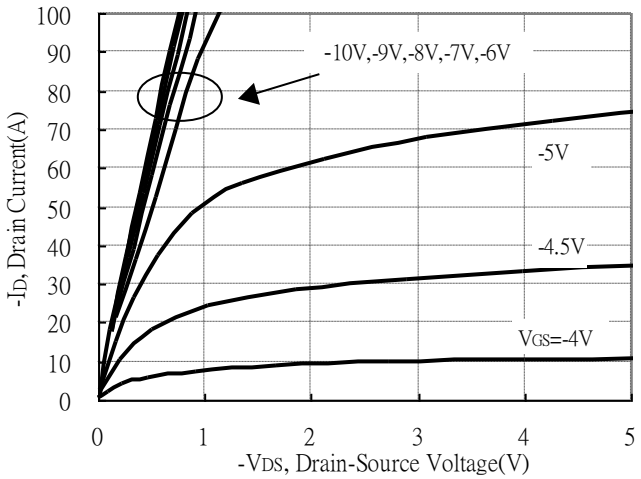
Characteristics (T_C=25°C, unless otherwise specified)

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Static					
BV_{DSS}	-60	-	-	V	V_{GS}=0V, I_D=-250μA
$V_{GS(th)}$	-2	-	-4		V_{DS} = V_{GS}, I_D=-250μA
G_{FS}	-	40.3	-	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
	-	-	-10		V_{DS} =-48V, V_{GS} =0V, Tj=125°C
*$R_{DS(ON)}$	-	6.7	9	mΩ	V_{GS} =-10V, I_D=-20A
Dynamic					
*Qg	-	129	-	nC	V_{DS}=-30V, I_D=-20A, V_{GS}=-10V
*Qgs	-	20.5	-		
*Qgd	-	42.9	-		
*$t_{d(ON)}$	-	39.6	-	ns	V_{DS}=-30V, I_D=-20A, V_{GS}=-10V, R_G=1Ω
*tr	-	30.6	-		
*$t_{d(OFF)}$	-	91.8	-		
*t_f	-	22.2	-		
Ciss	-	6717	-	pF	V_{GS}=0V, V_{DS}=-30V, f=1MHz
Coss	-	756	-		
Crss	-	347	-		
Rg	-	0.9	-	Ω	f=1MHz
Source-Drain Diode					
*I_S	-	-	-92	A	
*I_{SM}	-	-	-312		
*V_{SD}	-	-0.81	-1.2	V	I_S=-20A, V_{GS}=0V
*trr	-	32.1	-	ns	I_F=-20A, V_{GS}=0V, dI_F/dt=100A/μs
*Qrr	-	33.2	-	nC	

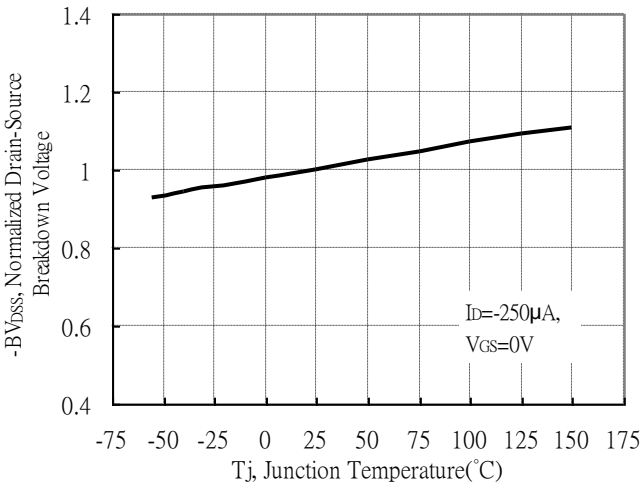
*Pulse Test : Pulse Width ≤300μs, Duty Cycle≤2%

Typical Characteristics

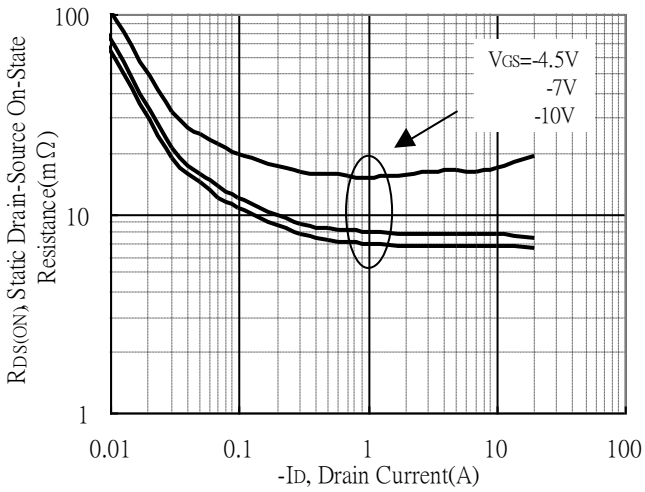
Typical Output Characteristics



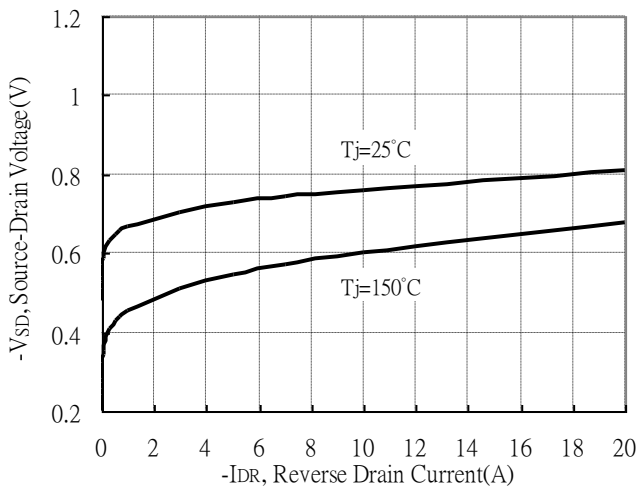
Brekdown Voltage vs Junction Temperature



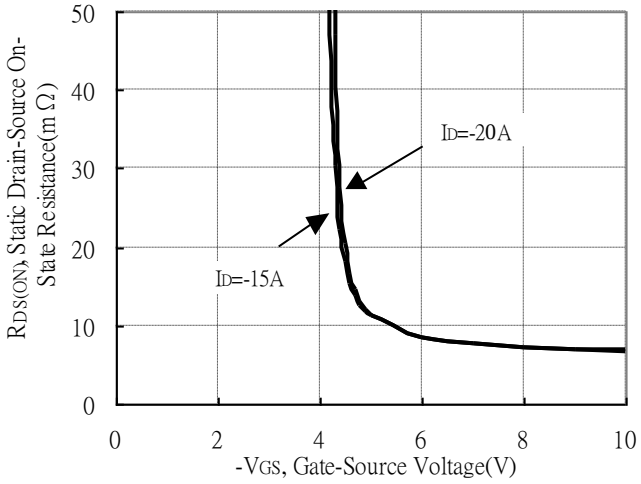
Static Drain-Source On-State resistance vs Drain Current



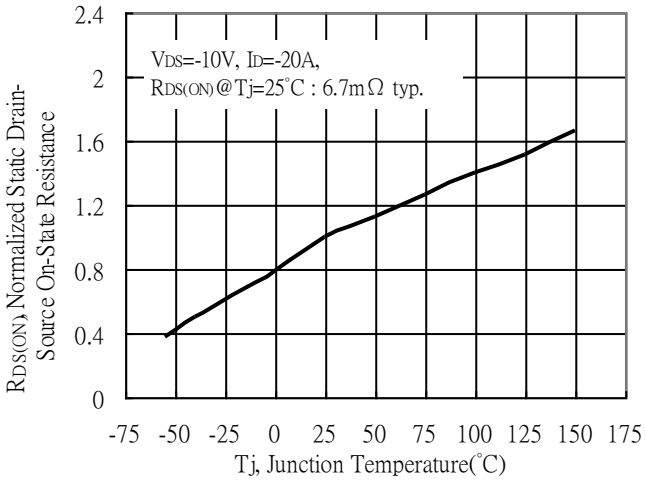
Reverse Drain Current vs Source-Drain Voltage



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

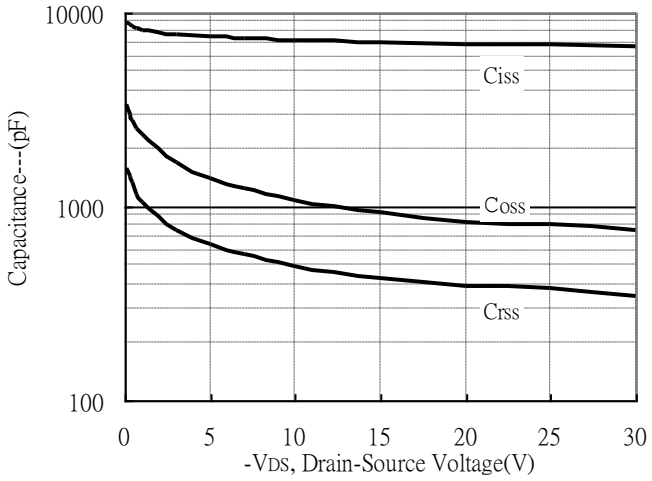


Drain-Source On-State Resistance vs Junction Tempearture

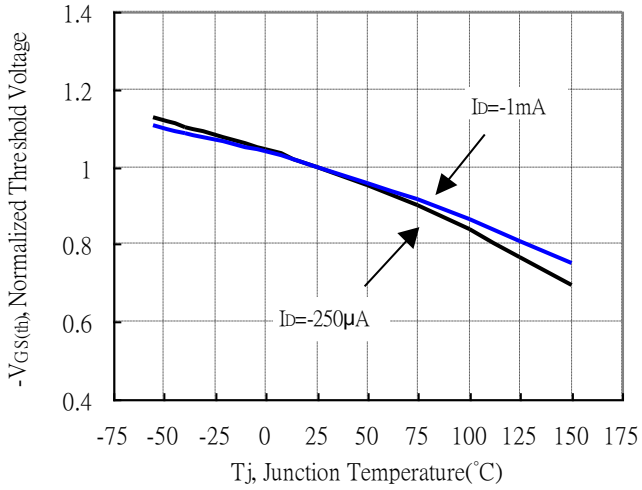


Typical Characteristics(Cont.)

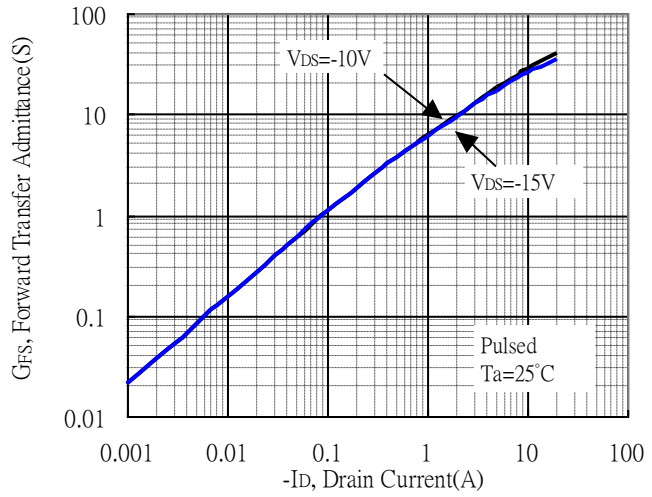
Capacitance vs Drain-to-Source Voltage



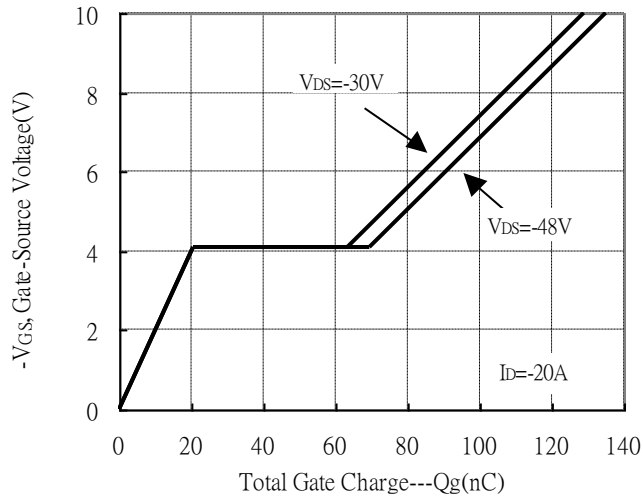
Threshold Voltage vs Junction Tempearture



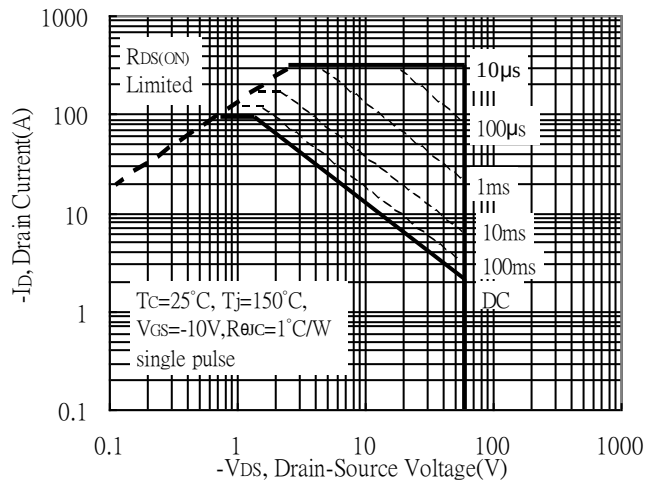
Forward Transfer Admittance vs Drain Current



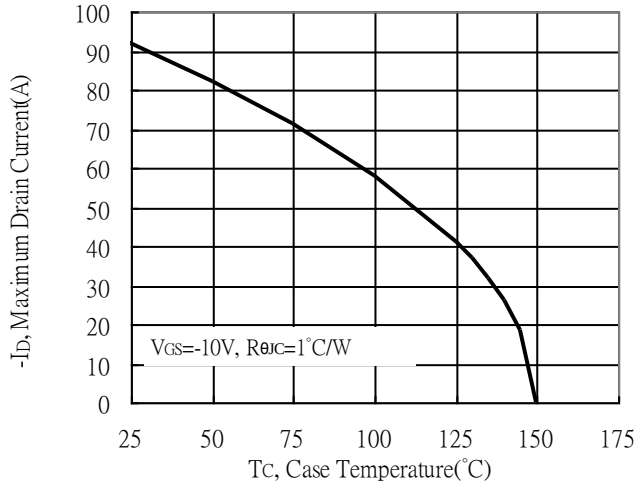
Gate Charge Characteristics



Maximum Safe Operating Area

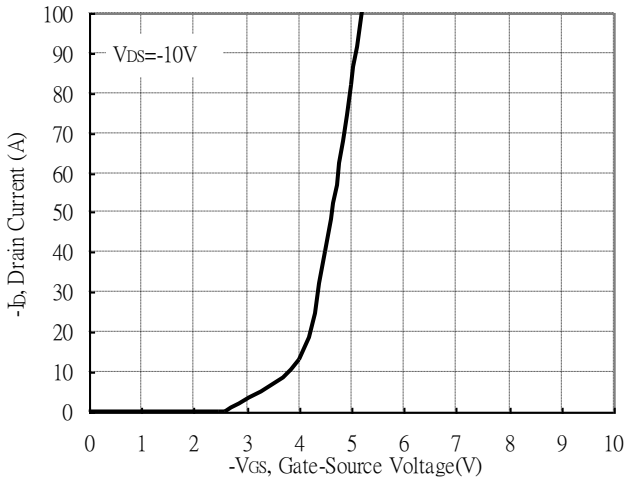


Maximum Drain Current vs Case Temperature

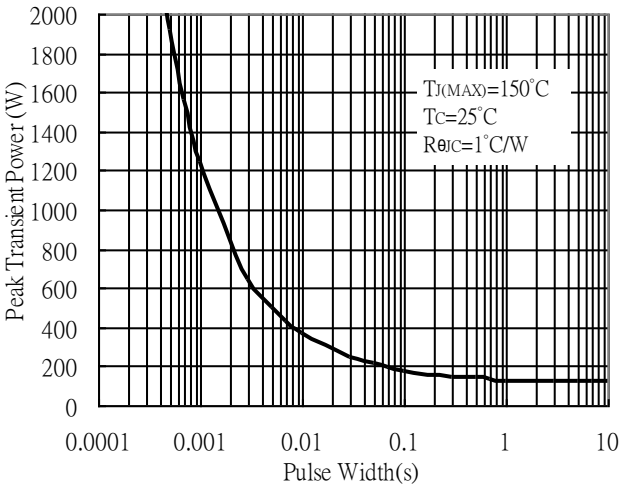


Typical Characteristics(Cont.)

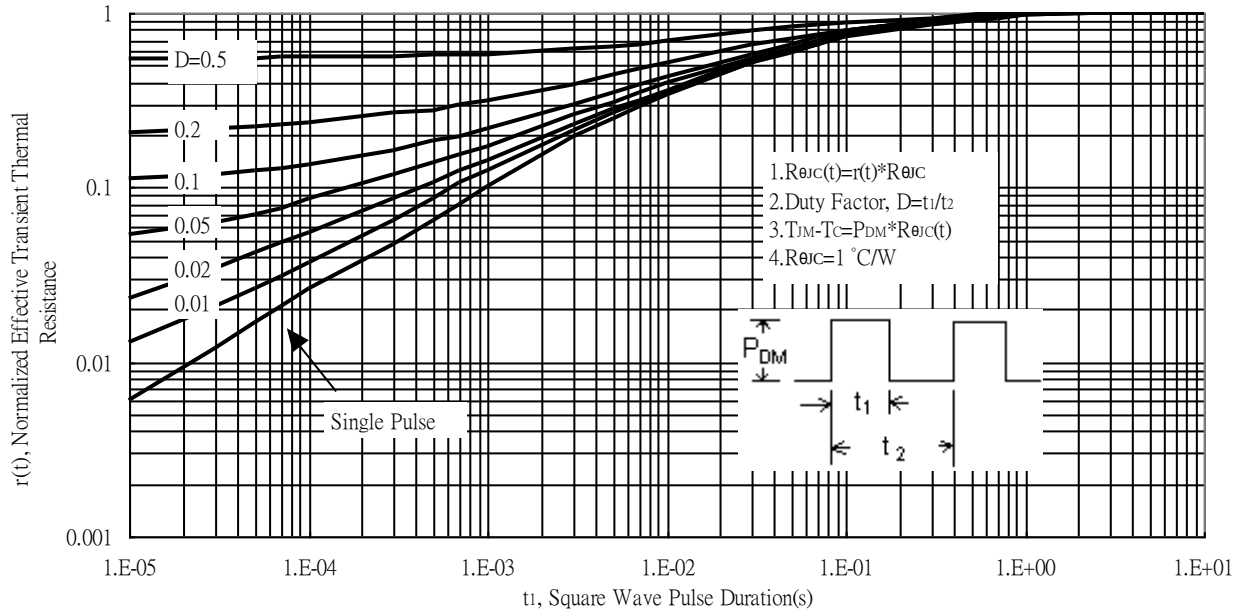
Typical Transfer Characteristics



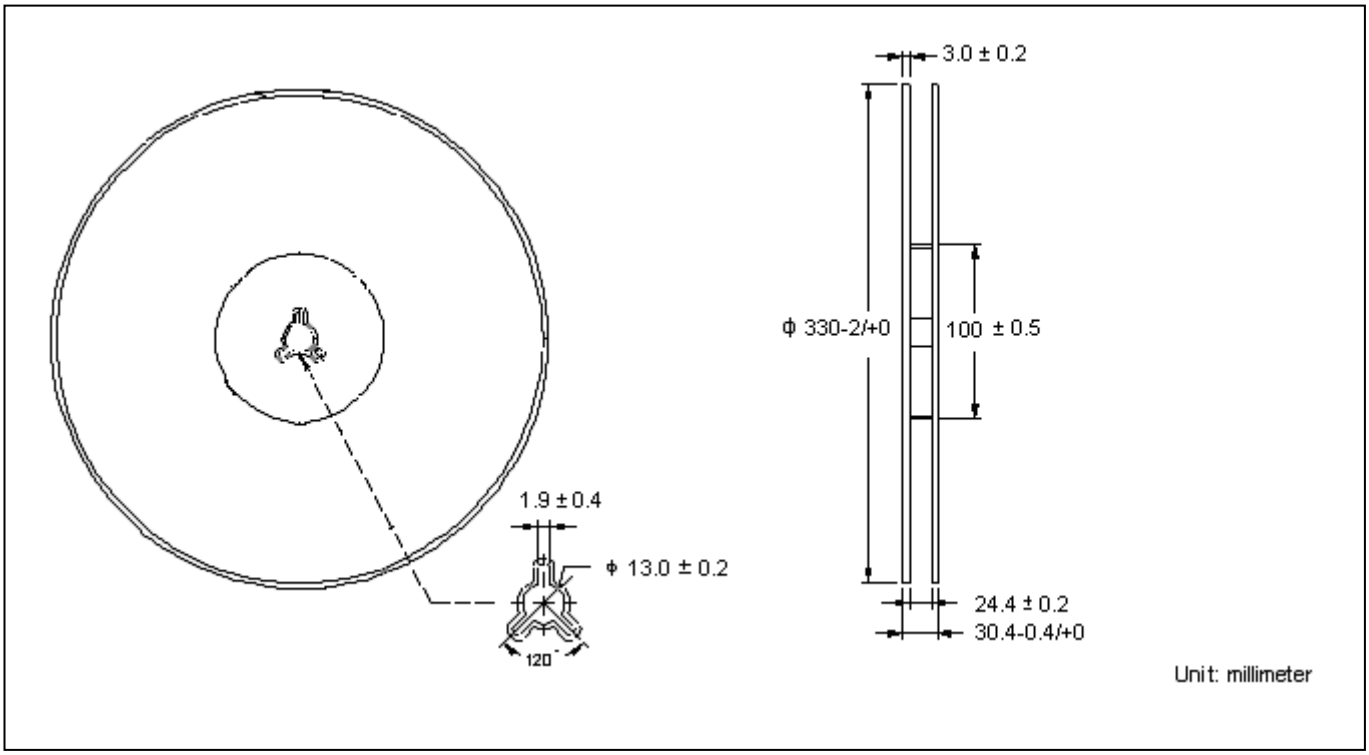
Single Pulse Maximum Power Dissipation



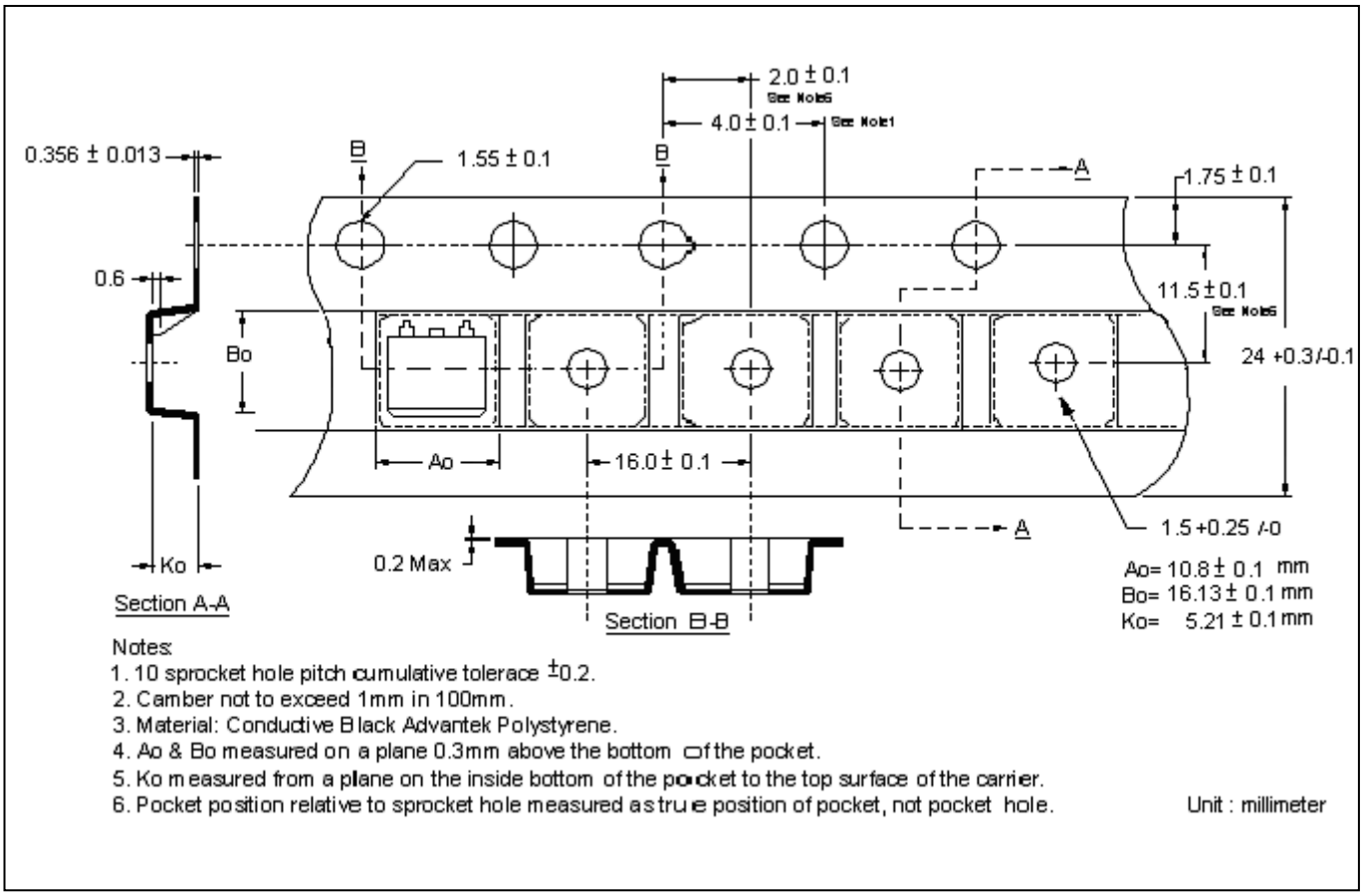
Transient Thermal Response Curves



Reel Dimension



Carrier Tape Dimension



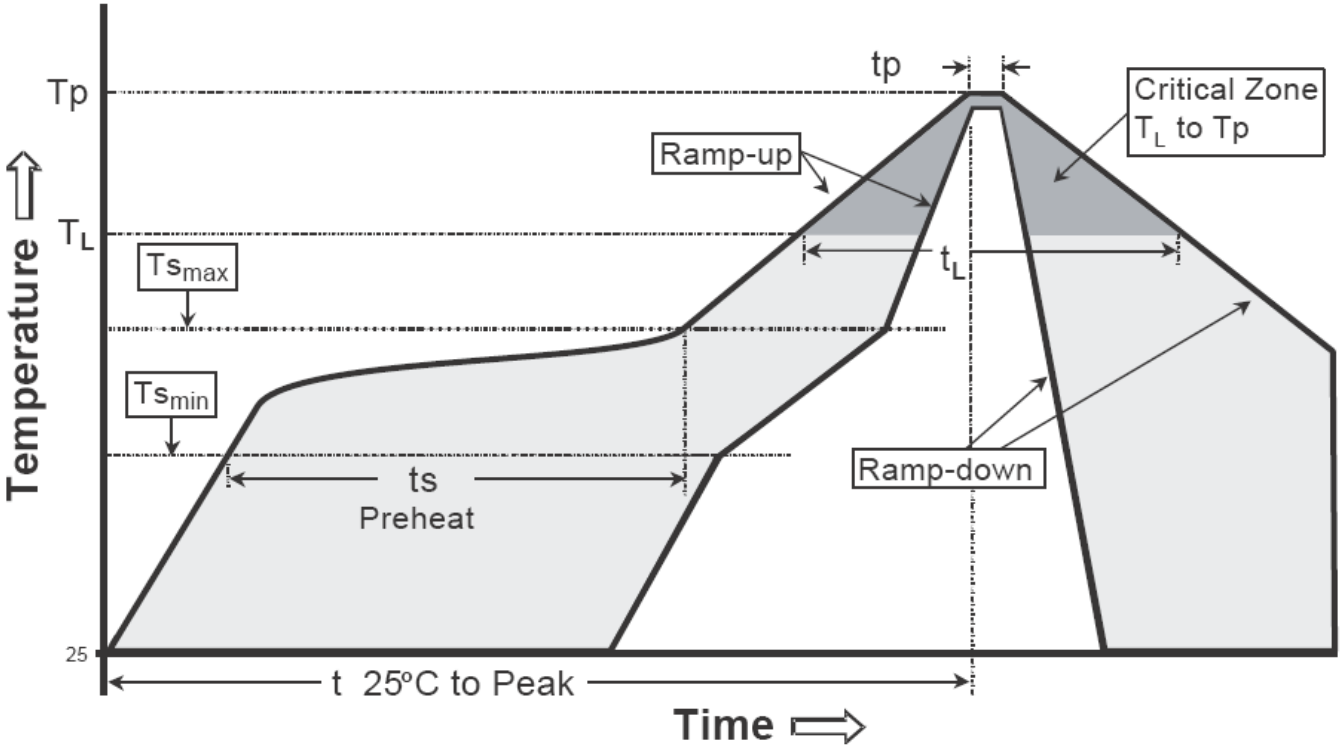
Notes:
1. 10 sprocket hole pitch cumulative tolerace ±0.2.
2. Camber not to exceed 1mm in 100mm.
3. Material: Conductive Black Advantek Polystyrene.
4. Ao & Bo measured on a plane 0.3mm above the bottom of the pocket.
5. Ko measured from a plane on the inside bottom of the pocket to the top surface of the carrier.
6. Pocket position relative to sprocket hole measured as true position of pocket, not pocket hole.

Unit : millimeter

Recommended wave soldering condition

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

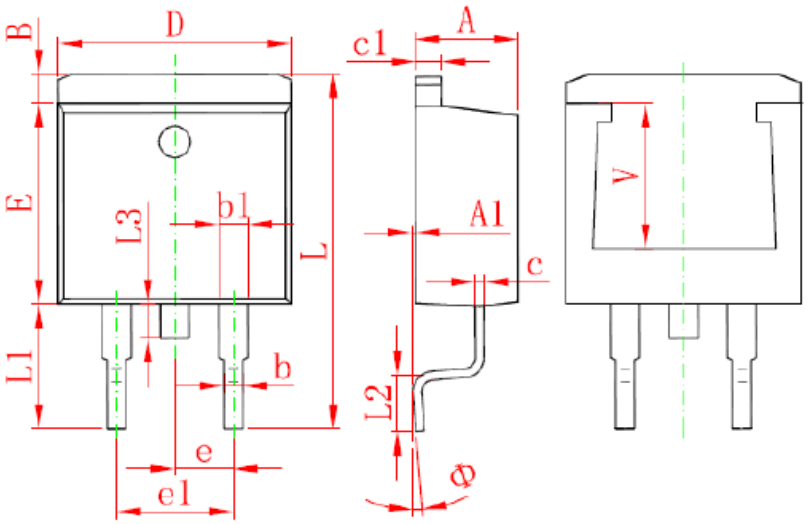
Recommended temperature profile for IR reflow



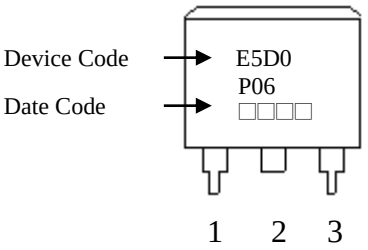
Profile feature	Sn-Pb eutectic Assembly	Pb-free Assembly
Average ramp-up rate (Tsmax to Tp)	3°C/second max.	3°C/second max.
Preheat −Temperature Min(Ts min) −Temperature Max(Ts max) −Time(ts min to ts max)	 100°C 150°C 60-120 seconds	 150°C 200°C 60-180 seconds
Time maintained above: −Temperature (TL) − Time (tL)	 183°C 60-150 seconds	 217°C 60-150 seconds
Peak Temperature(TP)	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 Dimension



Marking :



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

3-Lead Plastic Surface Mounted Package
CYStek Package Code : F3

Date Code : (From left to right)
First Code : Year code, the last digit of Christian 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

DIM	Millimeters		Inches		DIM	Millimeters		Inches	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	4.470	4.670	0.176	0.184	e	2.540 TYP		0.100 TYP	
A1	0.000	0.150	0.000	0.006	e1	4.980	5.180	0.196	0.204
B	1.120	1.420	0.044	0.056	L	14.940	15.500	0.588	0.610
b	0.710	0.910	0.028	0.036	L1	4.950	5.450	0.195	0.215
b1	1.170	1.370	0.046	0.054	L2	2.340	2.740	0.092	0.108
c	0.310	0.530	0.012	0.021	L3	1.300	1.700	0.051	0.067
c1	1.170	1.370	0.046	0.054	Φ	0°	8°	0°	8°
D	10.010	10.310	0.394	0.406	V	6.400 REF		0.253 REF	
E	8.500	8.900	0.335	0.350					

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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