P-Channel Enhancement Mode Power MOSFET

MTB450P10KL3

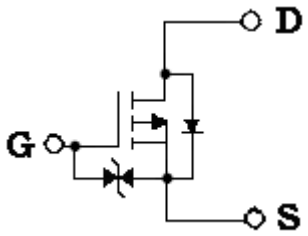
Features

- Simple drive requirement
- Small package outline
- ESD protected gate
- Pb-free lead plating package

BV_{DSS}	-100V
I_D @ T_A=25°C, V_{GS}=-10V	-1.3A
R_{DSON}@V_{GS}=-10V, I_D=-1A	440mΩ (typ)
R_{DSON}@V_{GS}=-4.5V, I_D=-1A	520mΩ (typ)

Equivalent Circuit

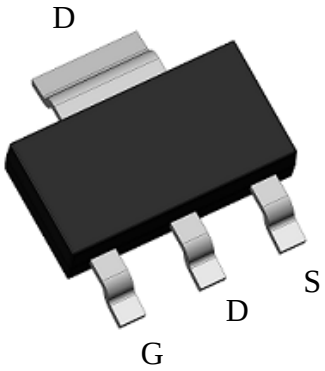
MTB450P10KL3



G：Gate D：Drain S：Source

Outline

SOT-223



Ordering Information

Device	Package	Shipping
MTB450P10KL3-0-T3-G	SOT-223 (Pb-free lead plating & 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 @ V_{GS}=-10V, T_C=25°C		I_D	-3.0	A
Continuous Drain Current @ V_{GS}=-10V, T_C=100°C			-1.9	
Continuous Drain Current @ V_{GS}=-10V, T_A=25°C			-1.3	
Continuous Drain Current @ V_{GS}=-10V, T_A=70°C			-1.0	
Pulsed Drain Current *1		I_{DM}	-12	
Avalanche Current @ L=0.1mH		I_{AS}	-7	
Avalanche Energy @ L=0.1mH, I_D=-7A		E_{AS}	2.4	mJ
Total Power Dissipation	@T_C=25℃	P_D	10	W
	@T_C=100℃		4	
	@T_A=25℃		1.8	
	@T_A=70℃		1.1	
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	RθJC	12.3	°C/W
Thermal Resistance, Junction-to-ambient, max	RθJA	67 (Note)	

Note : Surface mounted on a 1 in^2 pad of 2 oz. copper, t≤10s; 120°C/W when mounted on minimum copper pad.

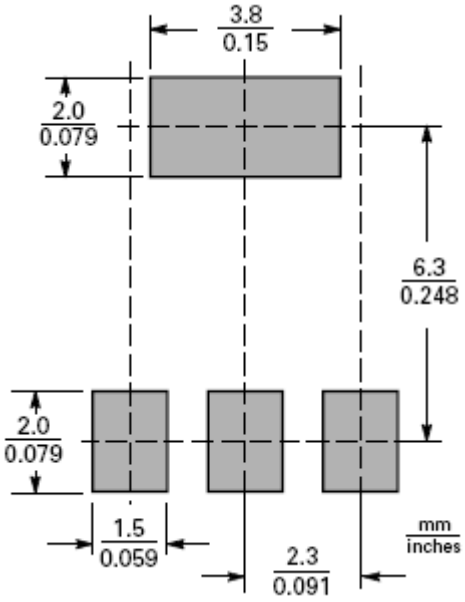
Characteristics (Tc=25°C, unless otherwise specified)

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Static					
BV_{DSS}	-100	-	-	V	V_{GS}=0V, I_D=-250μA
$V_{GS(th)}$	-1	-	-2.5		V_{DS}=V_{GS}, I_D=-250μA
I_{GSS}	-	-	±10	μA	V_{GS}=±16V, V_{DS}=0V
I_{DSS}	-	-	-1	μA	V_{DS}=-80V, V_{GS}=0V
	-	-	-10		V_{DS}=-80V, V_{GS}=0V, T_J=70°C
$R_{DS(ON)}$ *1	-	440	600	mΩ	V_{GS}=-10V, I_D=-1A
	-	520	725		V_{GS}=-4.5V, I_D=-1A
G_{FS} *1	-	2.7	-	S	V_{DS}=-5V, I_D=-1A
Dynamic					
Qg *1, 2	-	6	-	nC	V_{DS}=-50V, I_D=-1A, V_{GS}=-10V
Qgs *1, 2	-	1	-		
Qgd *1, 2	-	1.3	-		
$t_{d(ON)}$ *1, 2	-	5	-	ns	V_{DS}=-50V, I_D=-1A, V_{GS}=-10V, R_G=6Ω
tr *1, 2	-	16	-		
$t_{d(OFF)}$ *1, 2	-	18	-		
t_f *1, 2	-	16	-		

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Ciss	-	263	-	pF	V_{DS}=-50V, V_{GS}=0V, f=1MHz
Coss	-	21	-		
Crss	-	16	-		
Rg	-	5.7	-	Ω	f=1MHz
Source-Drain Diode					
I_S *1	-	-	-1.3	A	
I_{SM} *3	-	-	-5.2		
V_{SD} *1	-	-0.83	-1.2	V	I_S=-1A, V_{GS}=0V
trr	-	16.2	-	ns	I_F=-1A, dI_F/dt=100A/μs
Qrr	-	11.1	-	nC	

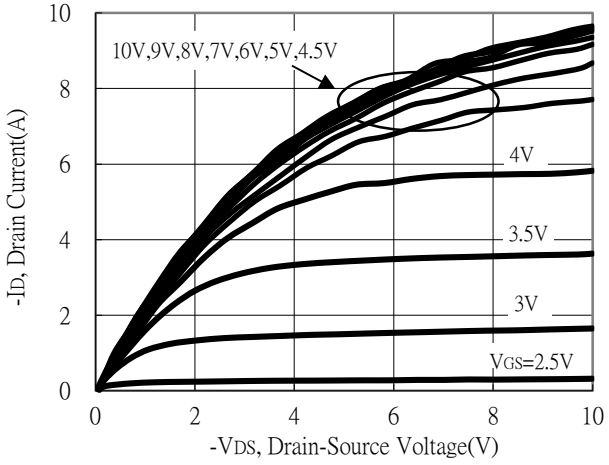
Note : *1.Pulse Test : Pulse Width ≤300μs, Duty Cycle≤2%
*2.Independent of operating temperature
*3.Pulse width limited by maximum junction temperature.

Recommended soldering footprint

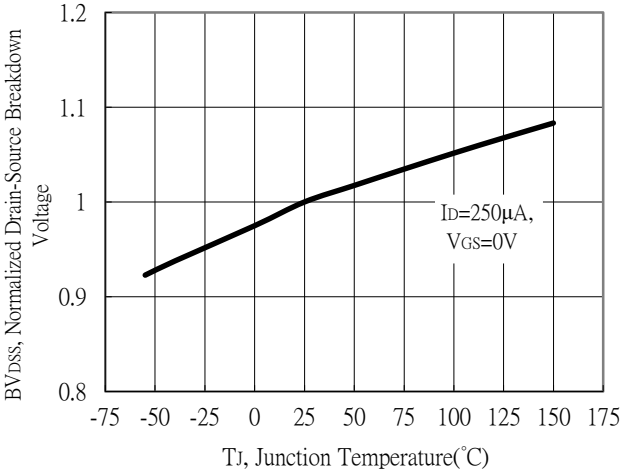


Typical Characteristics

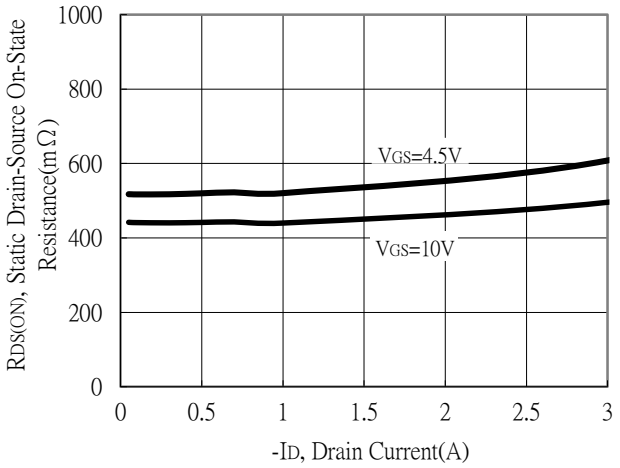
Typical Output Characteristics



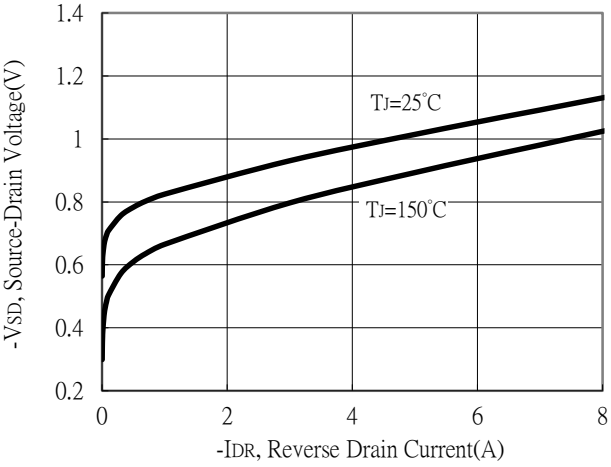
Brekdown Voltage vs Ambient Temperature



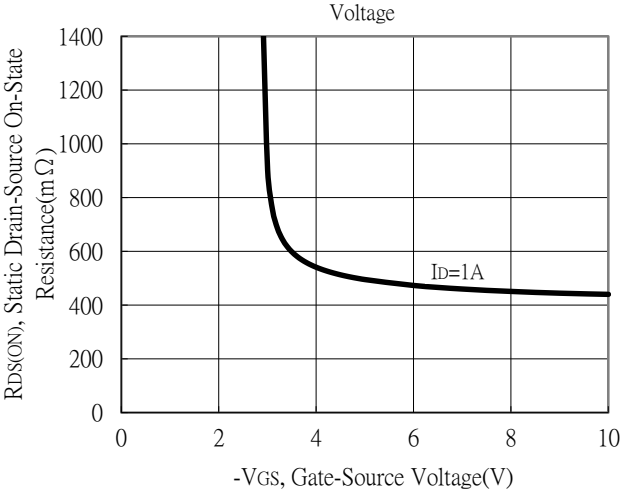
Static Drain-Source On-State resistance vs Drain Current



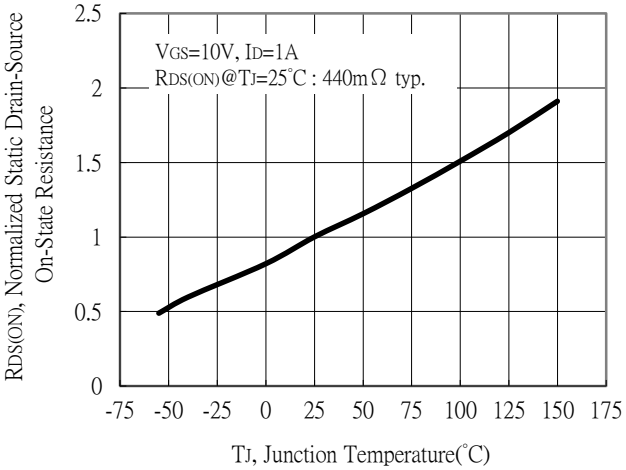
Reverse Drain Current vs Source-Drain Voltage



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

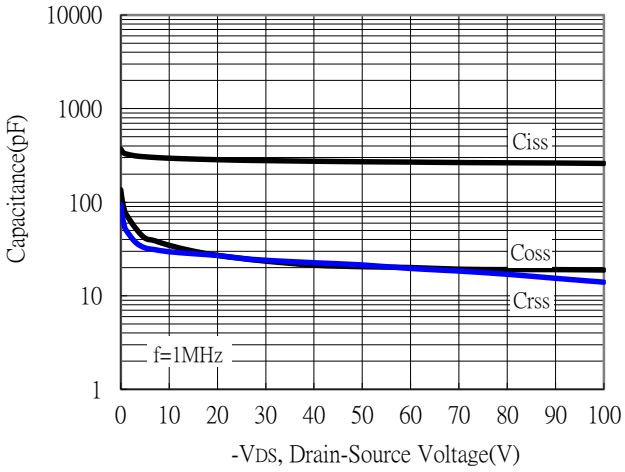


Drain-Source On-State Resistance vs Junction Tempearture

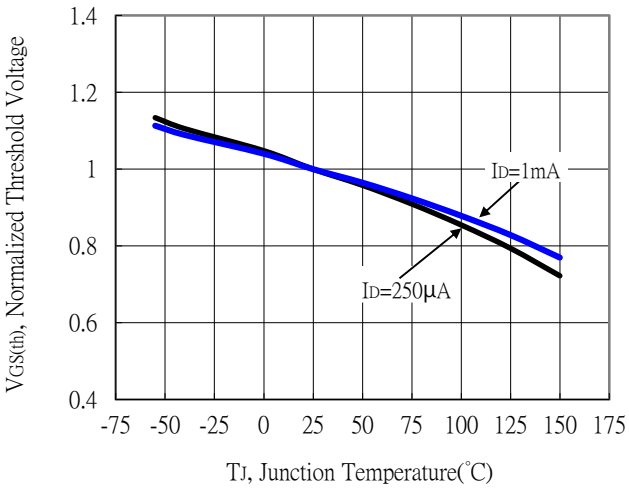


Typical Characteristics(Cont.)

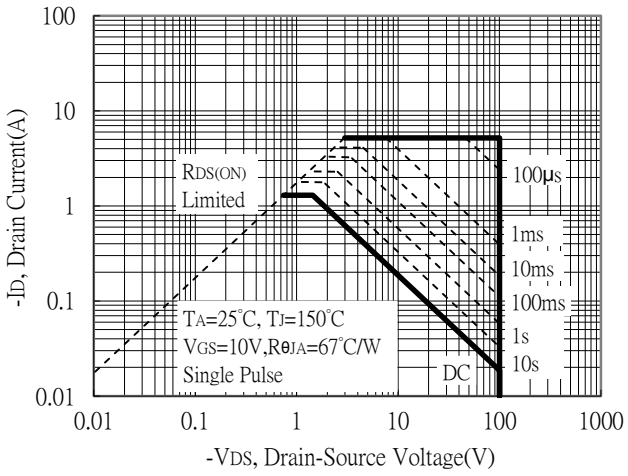
Capacitance vs Drain-to-Source Voltage



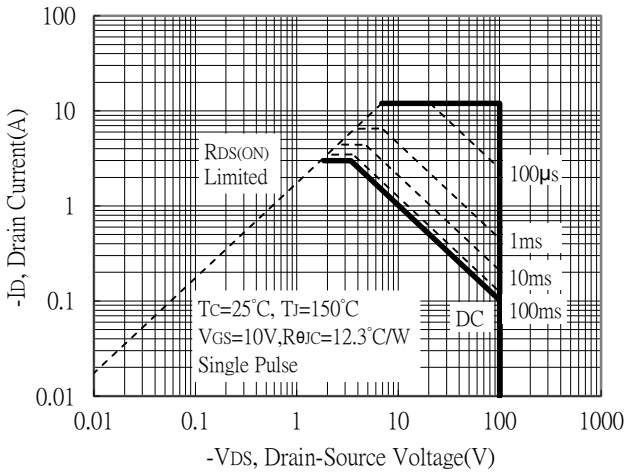
Threshold Voltage vs Junction Tempearture



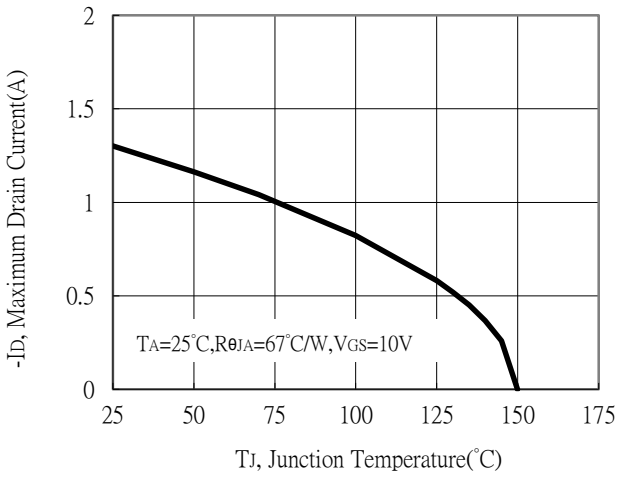
Maximum Safe Operating Area



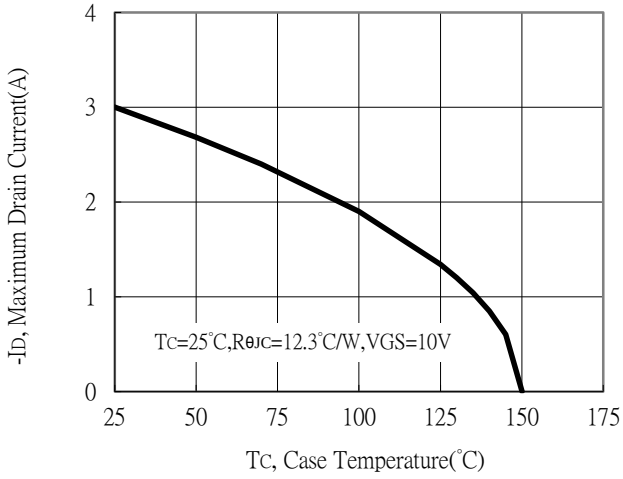
Maximum Safe Operating Area



Maximum Drain Current vs Junction Temperature

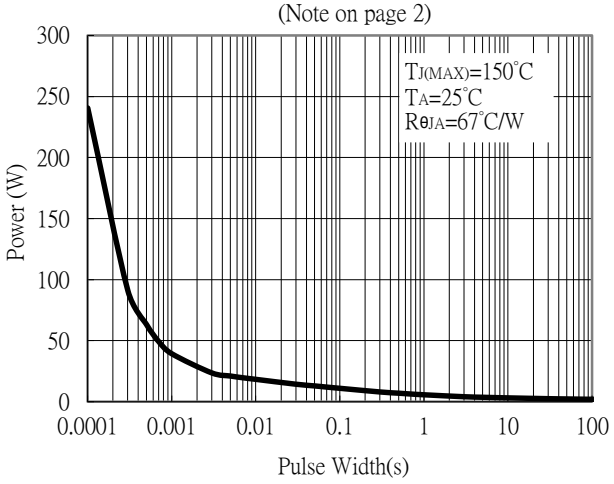


Maximum Drain Current vs Case Temperature

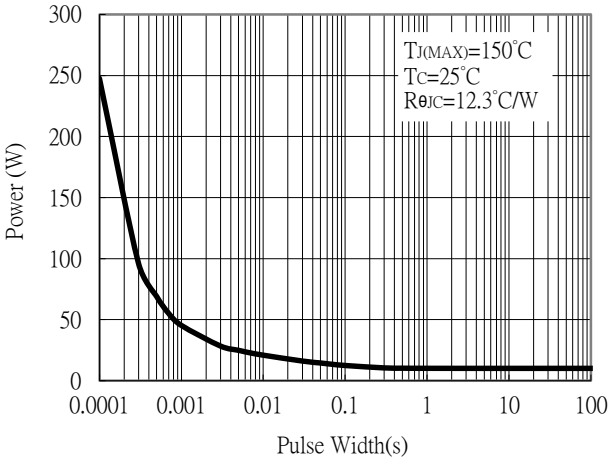


Typical Characteristics(Cont.)

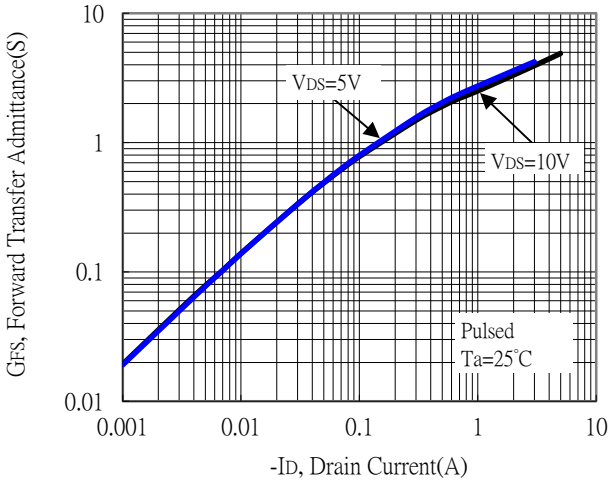
Single Pulse Power Rating, Junction to Ambient
(Note on page 2)



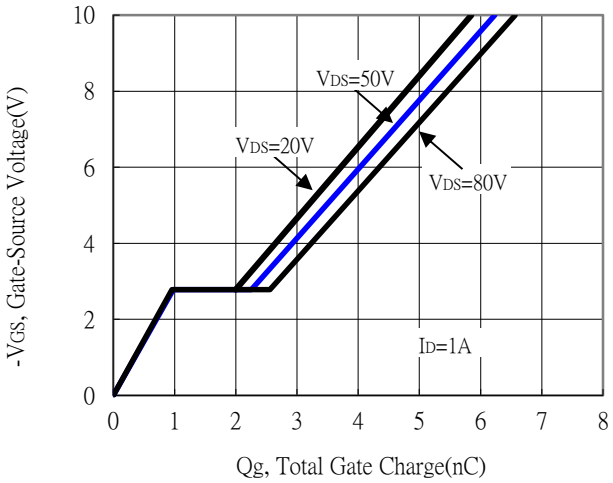
Single Pulse Power Rating, Junction to Case



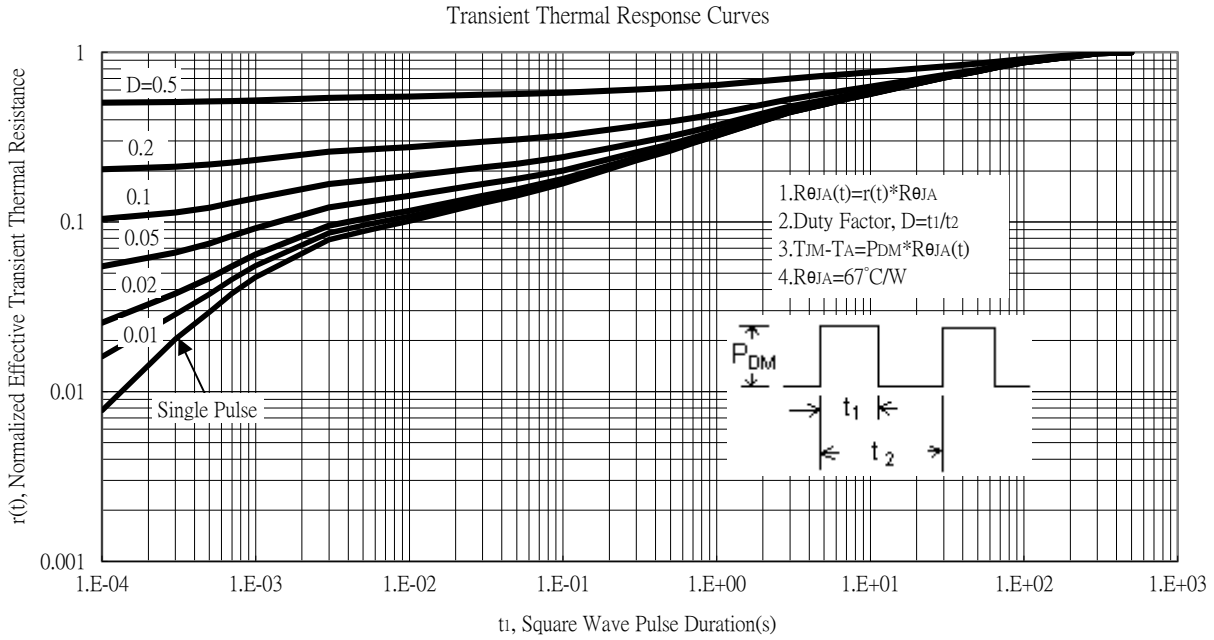
Forward Transfer Admittance vs Drain Current

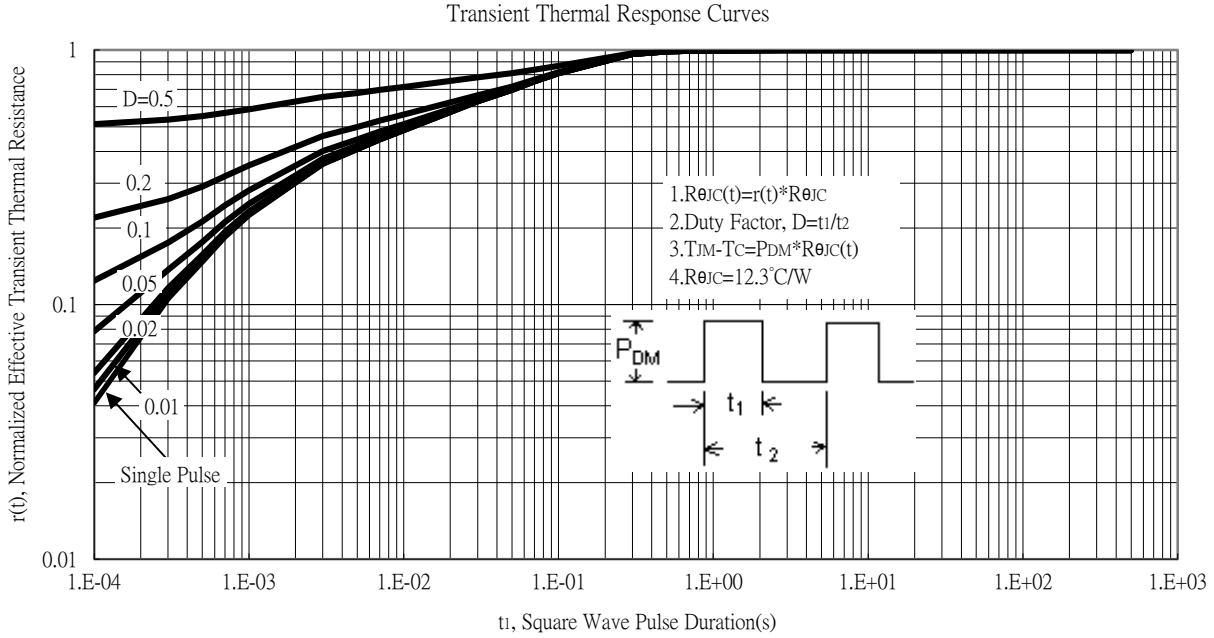


Gate Charge Characteristics

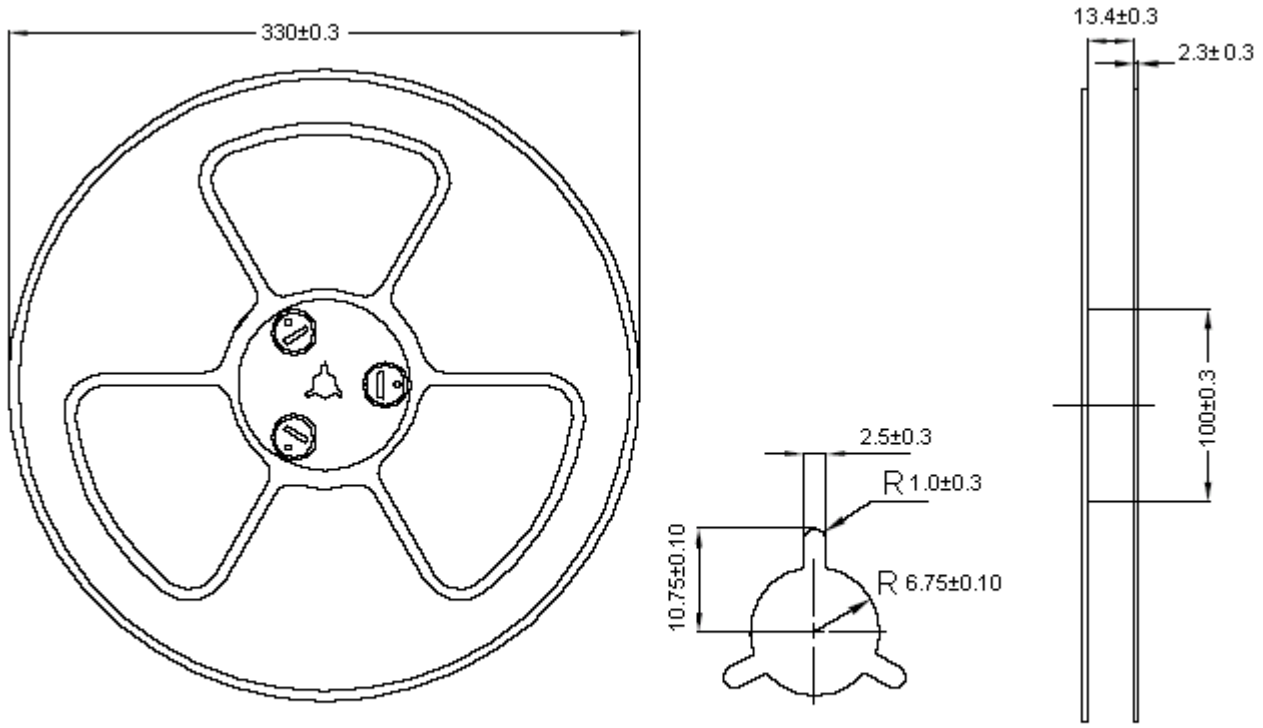


Typical Characteristics(Cont.)





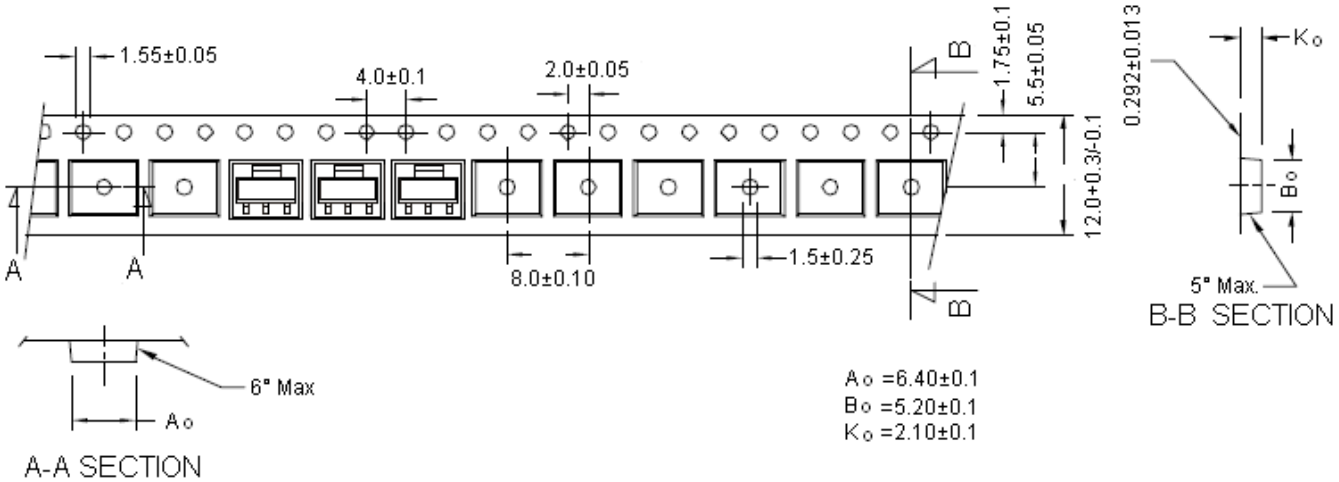
Reel Dimension



UNIT : mm

NOTE : 1. Material : Anti-static polystyrene
2. Surface resistivity 10^9 Ω/sq

Carrier Tape Dimension



Ao =6.40±0.1
Bo =5.20±0.1
Ko =2.10±0.1

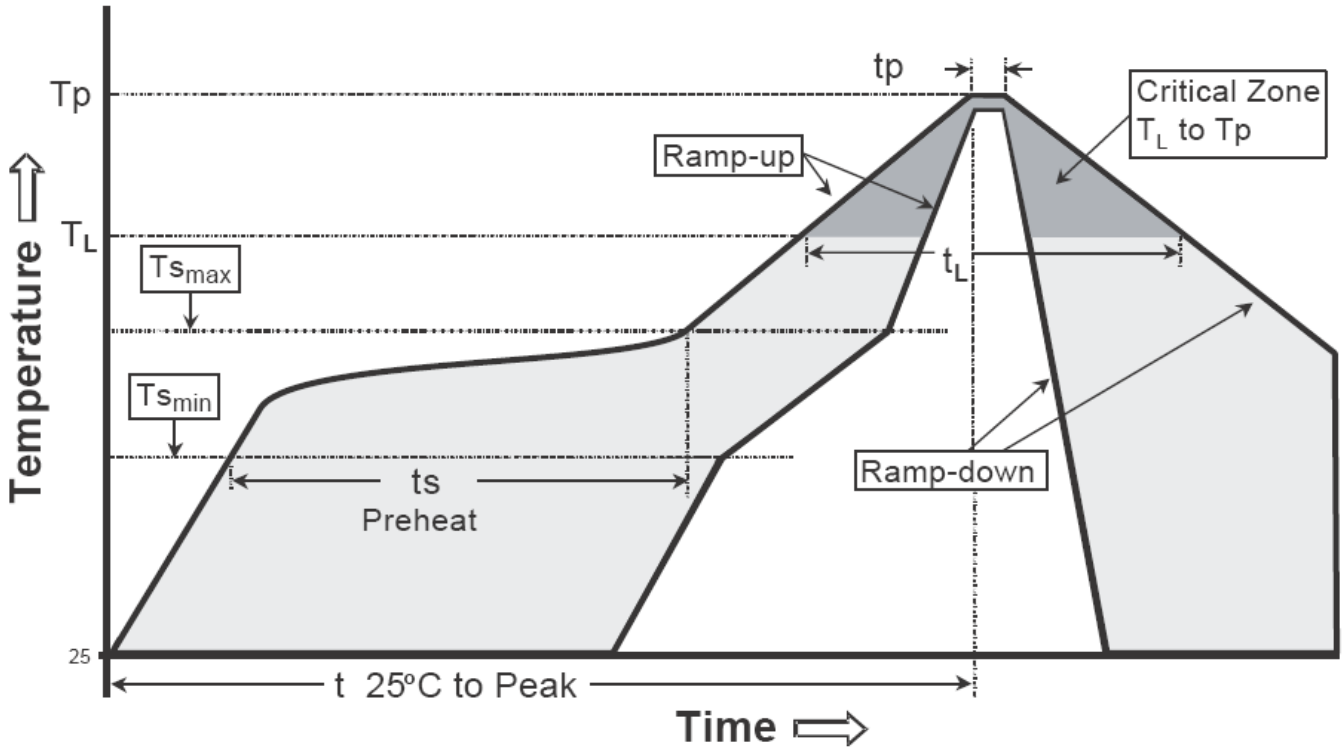
Notes:
1. 10 sprocket hole pitch cumulative tolerance ±0.2.
2. Camber not to exceed 1mm in 100mm.
3. Material: conductive black polystyrene
4. Ao & Bo measured on a plane 0.3mm above the bottom of the pocket.
5. Ko measured from a plane on the inside bottom of the pocket to the top surface of the carrier.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

Uni : millimeter

Recommended wave soldering condition

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

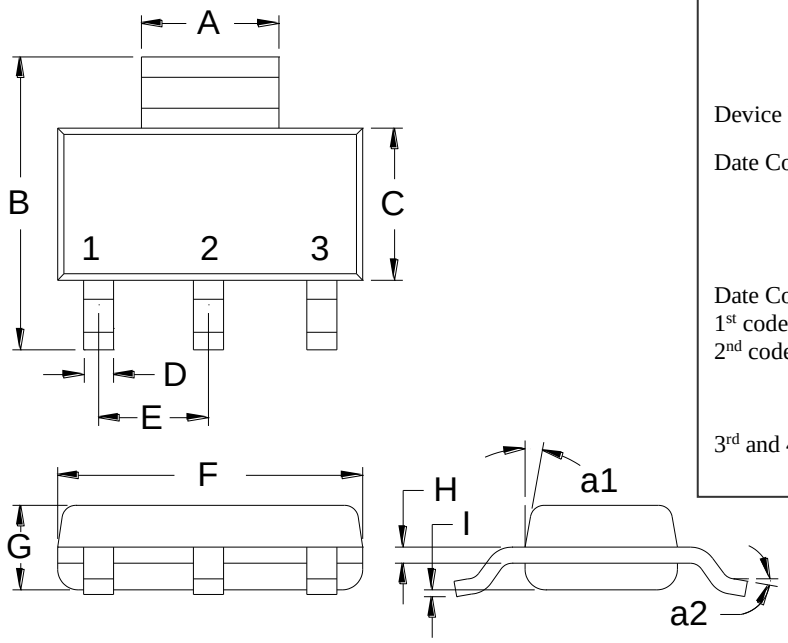
Recommended temperature profile for IR reflow



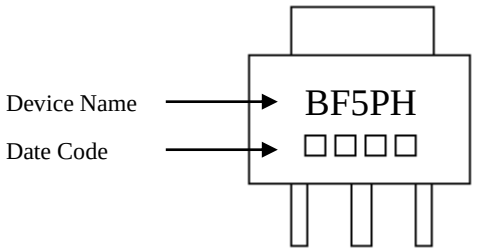
Profile feature	Sn-Pb eutectic Assembly	Pb-free Assembly
Average ramp-up rate (Tsmax to Tp)	3°C/second max.	3°C/second max.
Preheat −Temperature Min(Ts min) −Temperature Max(Ts max) −Time(ts min to ts max)	 100°C 150°C 60-120 seconds	 150°C 200°C 60-180 seconds
Time maintained above: −Temperature (TL)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

SOT-223 Dimension



Marking:



Date Code(counting from left to right) :
1st code: year code, the last digit of Christian year
2nd 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
3rd and 4th codes : prodcution serial number, 01~99

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

3-Lead SOT-223 Plastic
Surface Mounted Package
CYStek Package Code: L3

*: Typical

DIM	Inches		Millimeters		DIM	Inches		Millimeters	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.1142	0.1220	2.90	3.10	G	0.0551	0.0709	1.40	1.80
B	0.2638	0.2874	6.70	7.30	H	0.0098	0.0138	0.23	0.35
C	0.1299	0.1457	3.30	3.70	I	0.0008	0.0039	0.02	0.10
D	0.0236	0.0315	0.60	0.80	a1	*13°	-	*13°	-
E	*0.0906	-	*2.30	-	a2	0°	10°	0°	10°
F	0.2480	0.2638	6.30	6.70					

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.