Dual P-Channel Enhancement Mode MOSFET

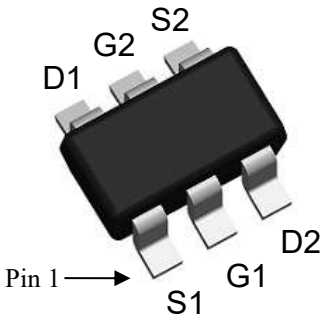
Features

- Low On Resistance
- Low Gate Charge
- Fast Switching Characteristic
- ESD protected gate, typical 4kV (HBM)

BV_{DSS}	-20V
I_D@V_{GS}=-4.5V, T_A=25°C	-0.51A
$R_{DS(ON)}$ typ.@V_{GS}=-4.5V, I_D=-0.2A	0.75Ω
$R_{DS(ON)}$ typ.@V_{GS}=-2.5V, I_D=-0.2A	0.9Ω
$R_{DS(ON)}$ typ.@V_{GS}=-1.8V, I_D=-10mA	1.1Ω

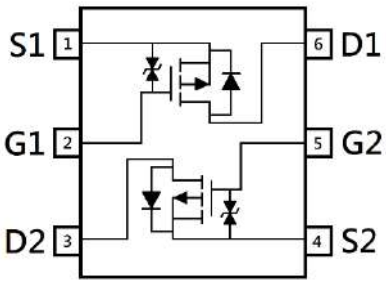
Outline

SOT-363



Equivalent Circuit

KWA600B02K



G : Gate S : Source D : Drain

Ordering Information

Device	Package	Shipping
KWA600B02K	SOT-363 (Pb-free lead plating and halogen-free package)	3000 pcs / Tape & Reel

Absolute Maximum Ratings (T_A=25°C)

Parameter		Symbol	Limits	Unit
Drain-Source Voltage		V_{DS}	-20	V
Gate-Source Voltage		V_{GS}	±8	
Continuous Drain Current @ V_{GS}=-4.5V, T_A=25°C		I_D	-0.51	A
Continuous Drain Current @ V_{GS}=-4.5V, T_A=70°C			-0.4	
Pulsed Drain Current	*a	I_{DM}	-2	
Continuous Body Diode Forward Current @ T_A=25°C		I_S	-0.4	
Pulsed Body Diode Forward Current @ T_A=25°C		I_{SM}	-1.6	
ESD susceptibility	*b	V_{ESD}	4000	V
Total Power Dissipation	T_A=25°C	P_D	0.48	W
	T_A=70°C		0.31	
Operating Junction and Storage Temperature Range		T_J, T_{stg}	-55~+150	°C

Thermal Data

Parameter	Symbol	Steady State	Unit
Thermal Resistance, Junction-to-ambient	$R_{\theta JA}$	260	°C/W

Note:

*a. Repetitive rating, 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.

*b. Human body model, 1.5kΩ in series with 100pF.

Electrical Characteristics (T_A=25°C, unless otherwise specified)

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Static					
BV_{DSS}	-20	-	-	V	V_{GS}=0V, I_D=-250μA
$V_{GS(th)}$	-0.4	-	-1.2		V_{DS}=V_{GS}, I_D=-250μA
G_{FS}	-	1	-	S	V_{DS}=-5V, I_D=-0.4A
I_{GSS}	-	-	±10	μA	V_{GS}=±8V, V_{DS}=0V
I_{DSS}	-	-	-1		V_{DS}=-16V, V_{GS}=0V
$R_{DS(ON)}$	-	0.75	1.1	Ω	V_{GS}=-4.5V, I_D=-0.2A
	-	0.9	1.5		V_{GS}=-2.5V, I_D=-0.2A
	-	1.1	2.5		V_{GS}=-1.8V, I_D=-10mA
Dynamic					
Ciss	-	45	-	pF	V_{DS}=-10V, V_{GS}=0V, f=1MHz
Coss	-	15	-		
Crss	-	8	-		
Qg *1, 2	-	1	-	nC	V_{DS}=-20V, I_D=-0.4A, V_{GS}=-4.5V
Qgs *1, 2	-	0.2	-		
Qgd *1, 2	-	0.2	-		
$t_{d(ON)}$ *1, 2	-	11	-	ns	V_{DS}=-10V, I_D=-0.2A, V_{GS}=-4.5V, R_{GS}=10Ω
tr *1, 2	-	20	-		
$t_{d(OFF)}$ *1, 2	-	45	-		
t_f *1, 2	-	35	-		
Source-Drain Diode					
V_{SD} *1	-	-0.9	-1.2	V	I_S=-0.4A, V_{GS}=0V
trr	-	25	-	ns	I_F=-0.5A, dI_F/dt=100A/μs
Qrr	-	5	-	nC	

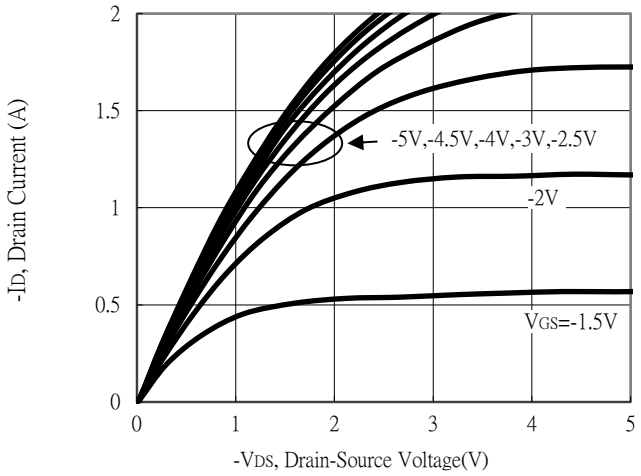
Note:

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

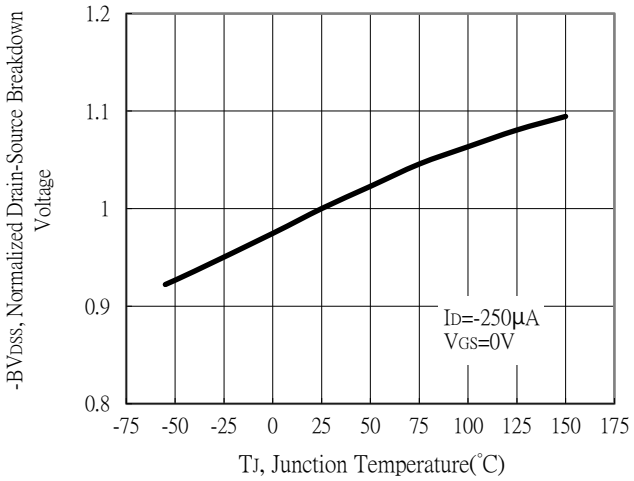
*2. Independent of operating temperature

Typical Characteristics

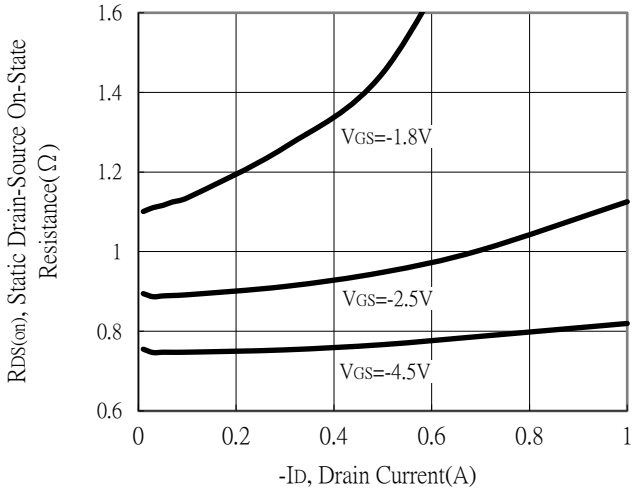
Typical Output Characteristics



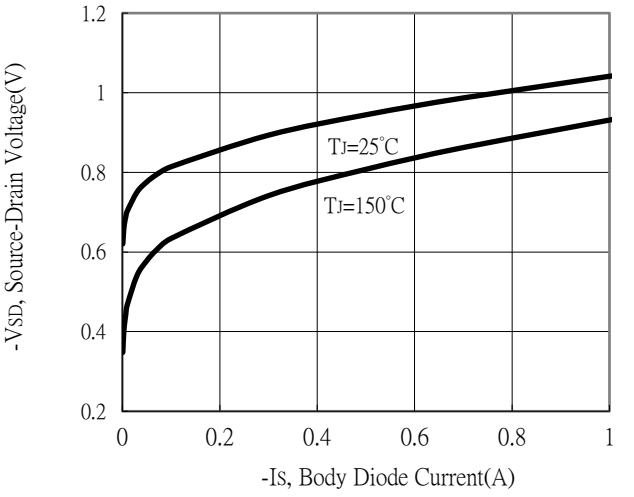
Breakdown Voltage vs Junction Temperature



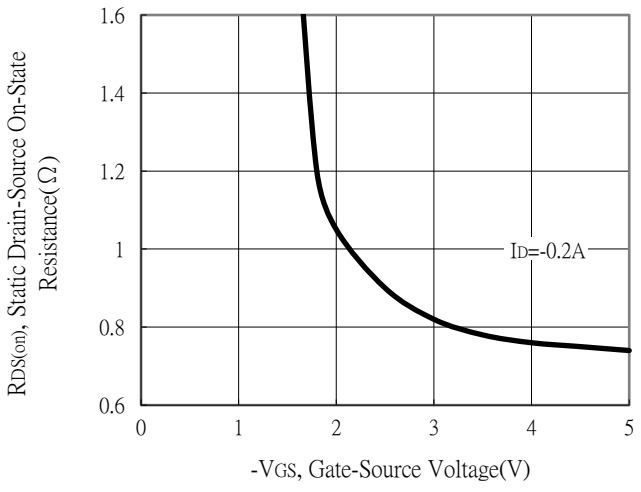
Static Drain-Source On-State resistance vs Drain Current



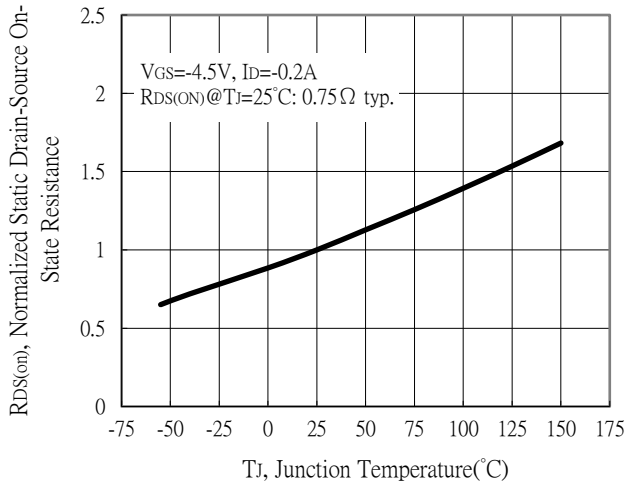
Body Diode Current vs Source-Drain Voltage



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

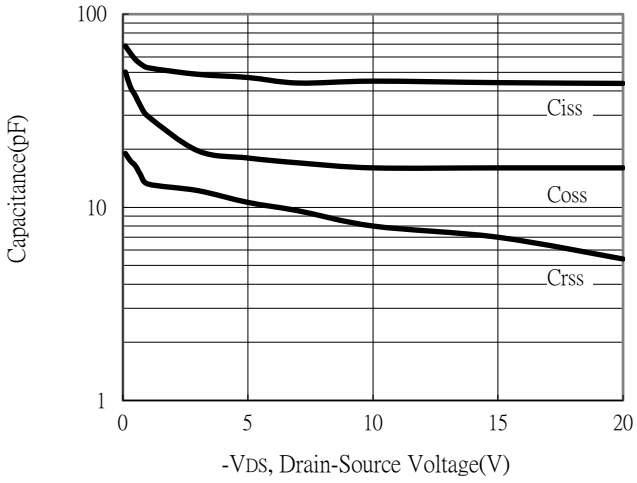


Drain-Source On-State Resistance vs Junction Temperature

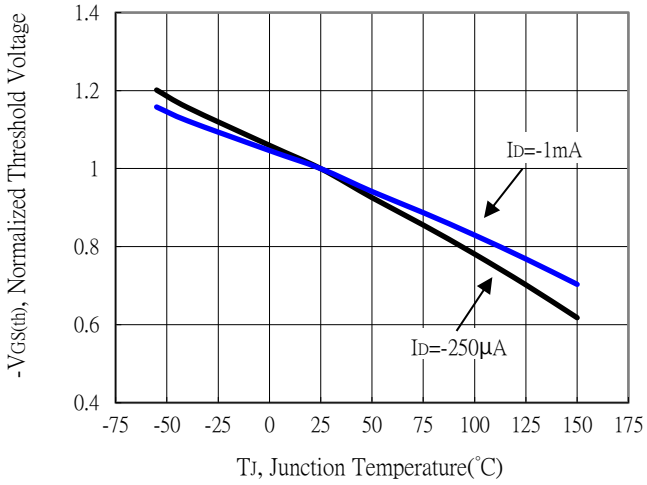


Typical Characteristics (Cont.)

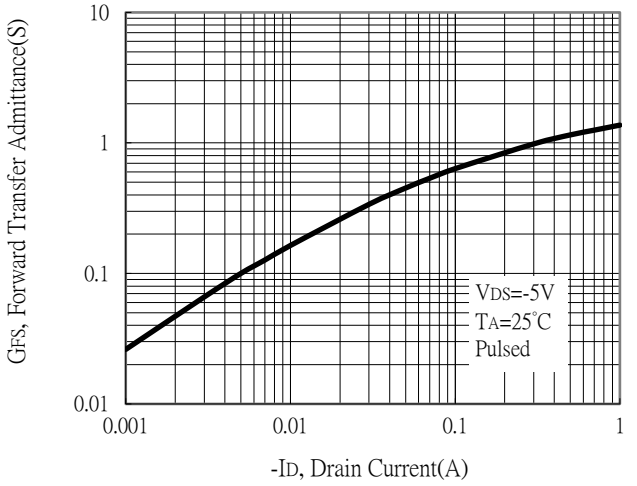
Capacitance vs Drain-to-Source Voltage



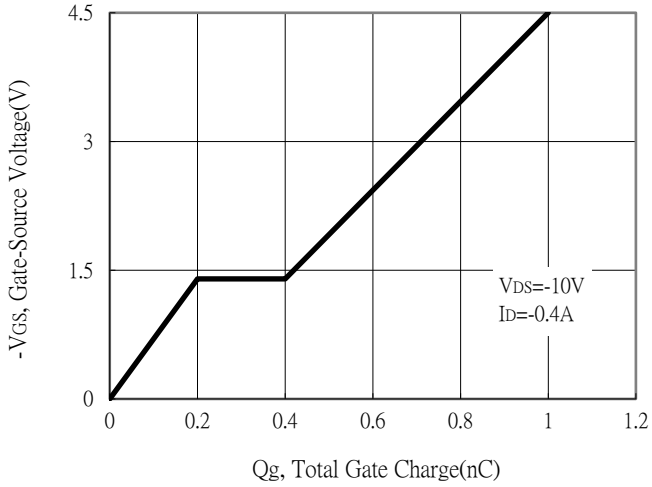
Threshold Voltage vs Junction Temperature



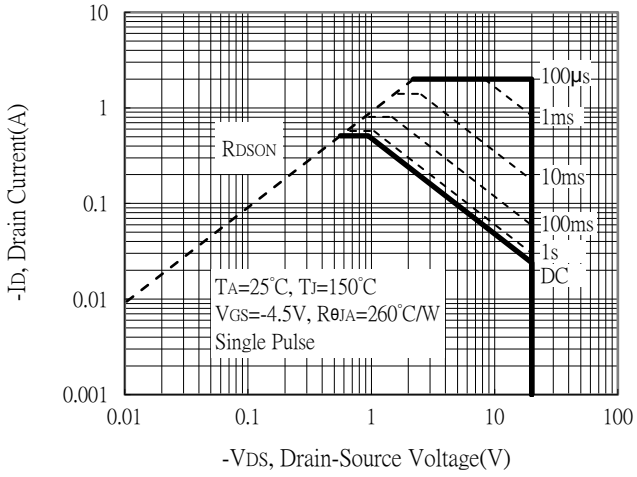
Forward Transfer Admittance vs Drain Current



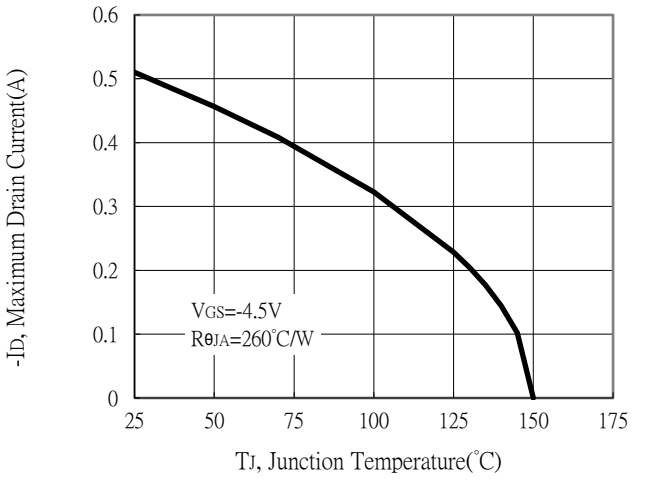
Gate Charge Characteristics



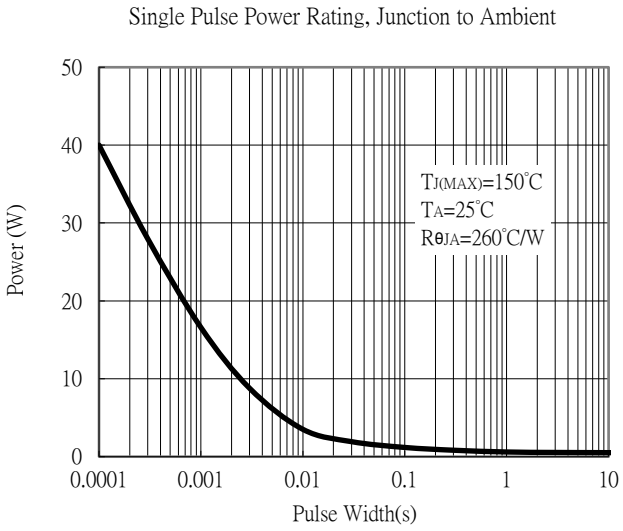
Maximum Safe Operating Area

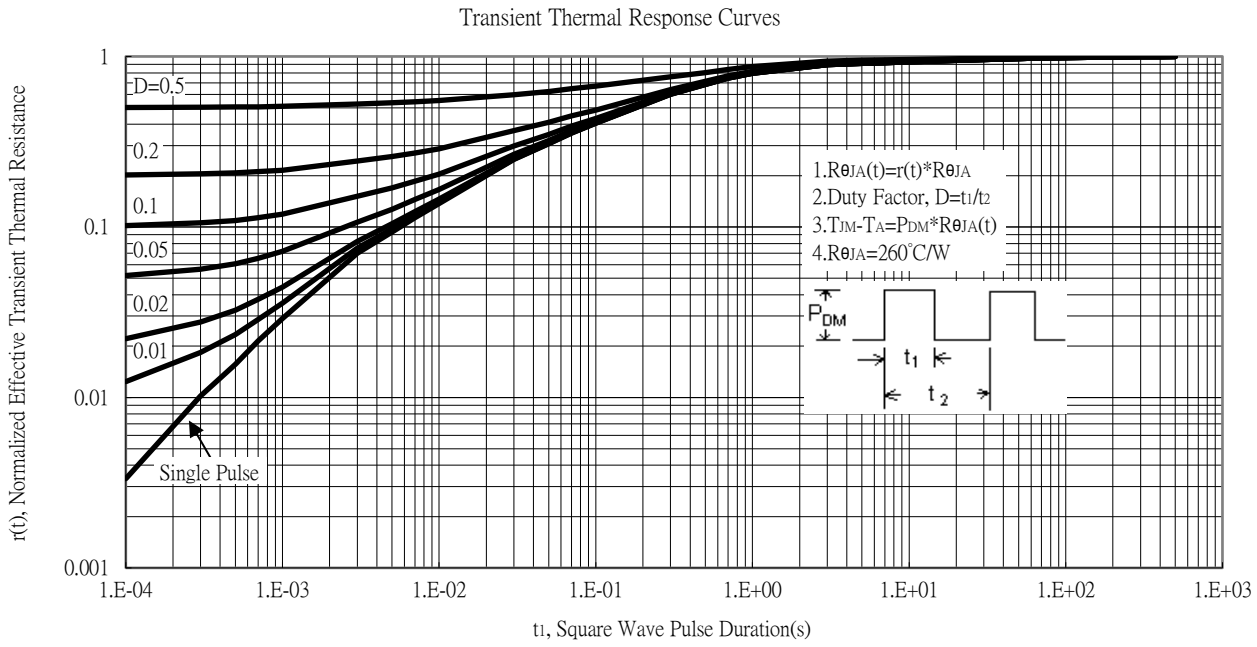


Maximum Drain Current vs Junction Temperature

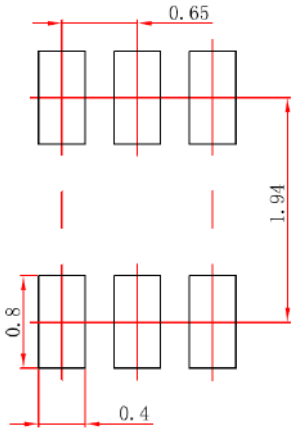


Typical Characteristics (Cont.)



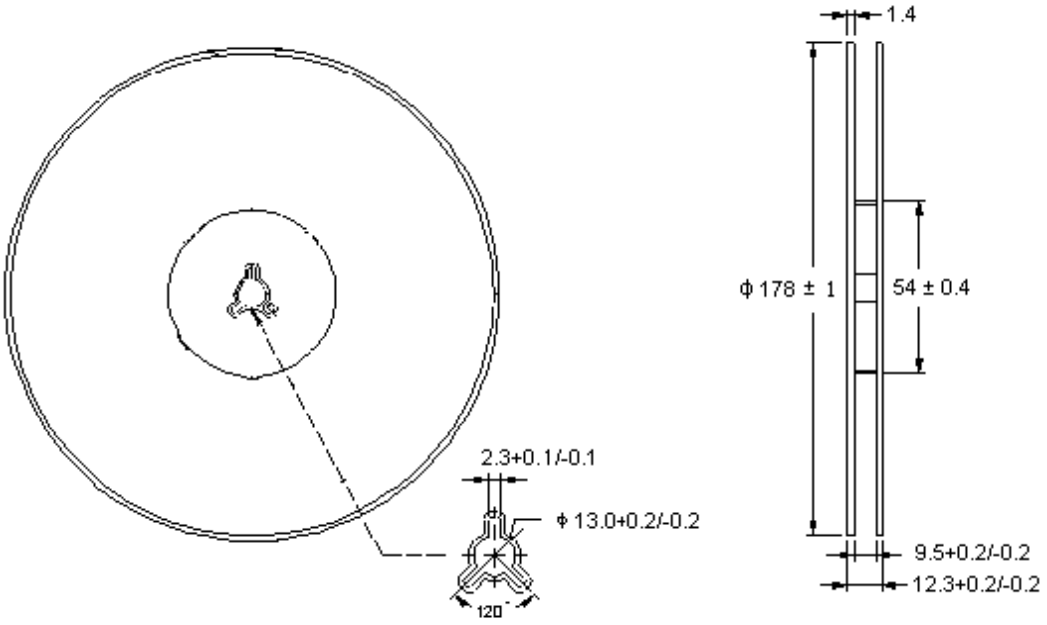


Recommended Soldering Footprint



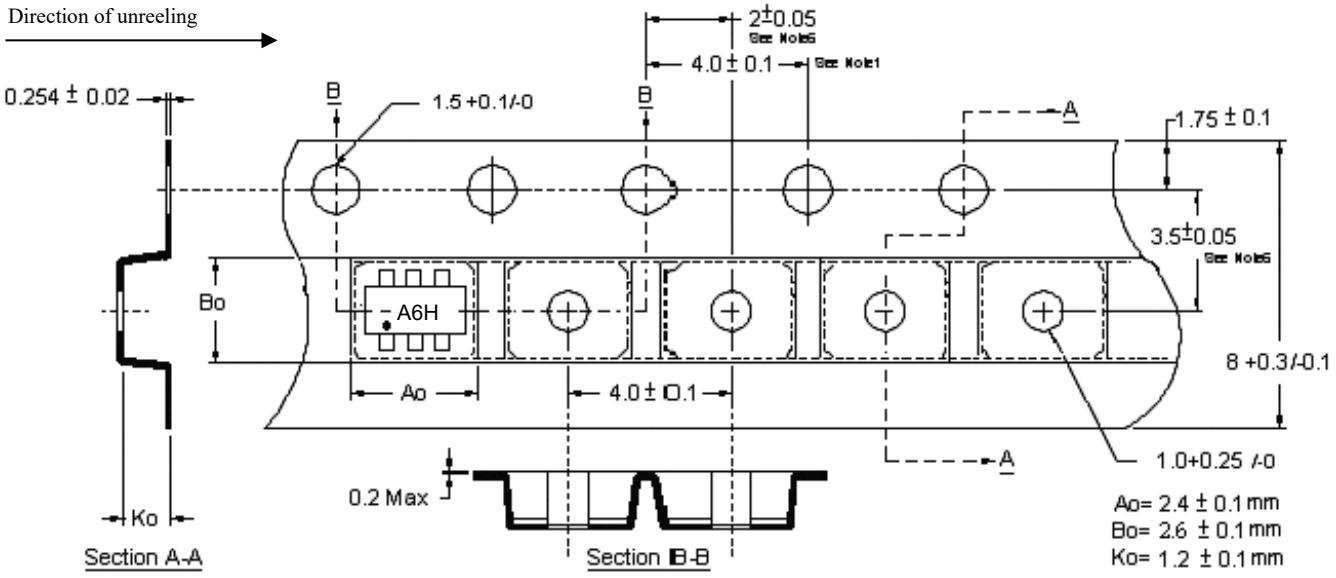
Unit:mm

Reel Dimension



Unit: millimeter

Carrier Tape Dimension



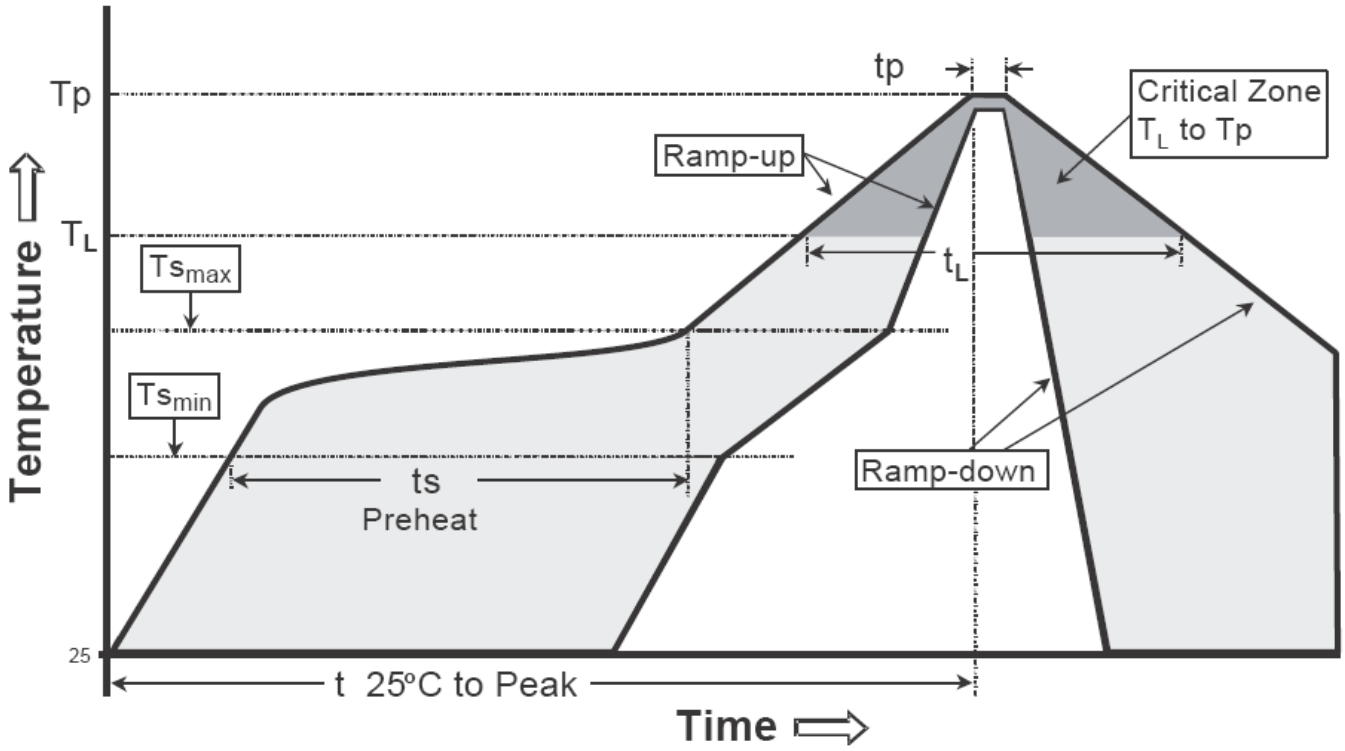
Notes:
1. 10 sprocket hole pitch cumulative tolerace ±0.2.
2. Camber not to exceed 1mm in 100mm.
3. Material: Conductive Black Polystyrene.
4. Ao & Bo measured on a plane 0.3mm above the bottom of the pocket.
5. Ko measured from a plane on the inside bottom of the pocket to the top surface of the carrier.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

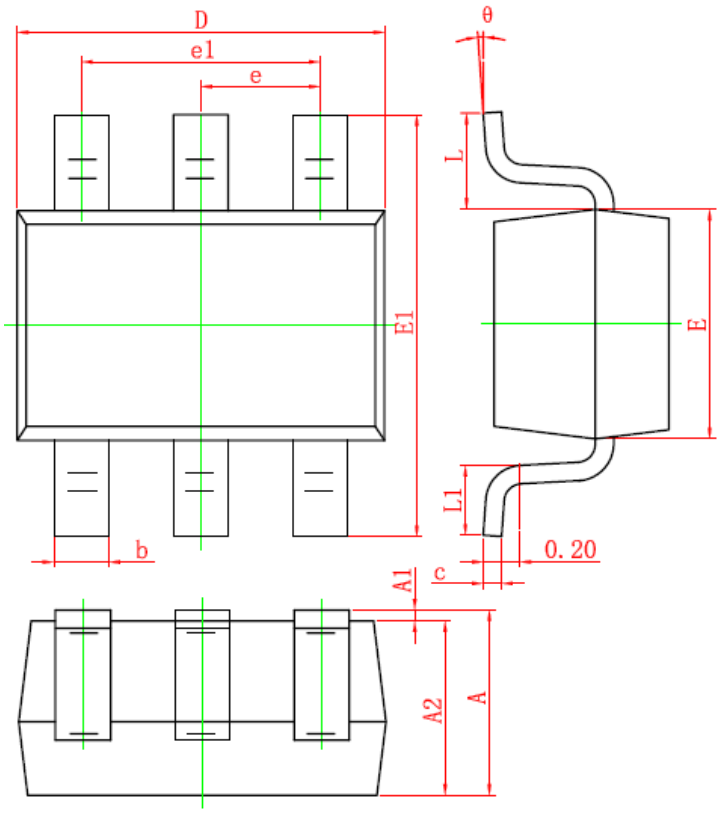
Recommended temperature profile for IR reflow

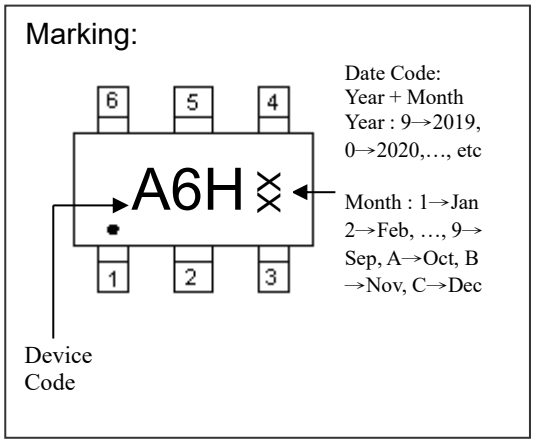


Profile feature	Sn-Pb eutectic Assembly	Pb-free Assembly
Average ramp-up rate (Tsmax to Tp)	3°C/second max.	3°C/second max.
Preheat −Temperature Min(Ts min) −Temperature Max(Ts max) −Time(ts min to ts max)	 100°C 150°C 60-120 seconds	 150°C 200°C 60-180 seconds
Time maintained above: −Temperature (TL)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

SOT-363 Dimension





6-Lead SOT-363 Plastic
Surface Mounted Package

Style:
Pin 1. Source1 (S1)
Pin 2. Gate1 (G1)
Pin 3. Drain2 (D2)
Pin 4. Source2 (S2)
Pin 5. Gate2 (G2)
Pin 6. Drain1 (D1)

DIM	Millimeters		Inches		DIM	Millimeters		Inches	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.900	1.100	0.035	0.043	E1	2.150	2.450	0.085	0.096
A1	0.000	0.100	0.000	0.004	e	0.650	TYP	0.026	TYP
A2	0.900	1.000	0.035	0.039	e1	1.200	1.400	0.047	0.055
b	0.150	0.350	0.006	0.014	L	0.525	REF	0.021	REF
c	0.080	0.150	0.003	0.006	L1	0.260	0.460	0.010	0.018
D	2.000	2.200	0.079	0.087	θ	0°	8°	0°	8°
E	1.150	1.350	0.045	0.053					

Notes : 1.Controlling dimension : millimeters.
2.Maximum lead thickness includes lead finish thickness, and minimum lead thickness is the minimum thickness of base material.

Material :

- Lead : Pure tin plated.
- Mold Compound : Epoxy resin family, flammability solid burning class:UL94V-0.