Dual P-Channel Enhancement Mode MOSFET

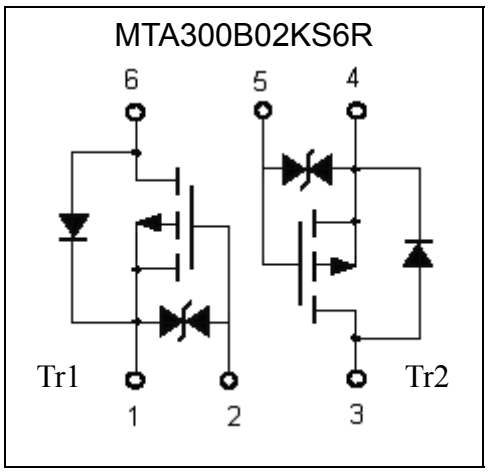
MTA300B02KS6R

BV_{DSS}		-20V
I_D @ V_{GS}=-4.5V, T_A=25°C		-1.15A
$R_{DSON(TYP)}$	V_{GS}=-4.5V, I_D=-650mA	158mΩ
	V_{GS}=-2.5V, I_D=-650mA	219mΩ
	V_{GS}=-1.8V, I_D=-650mA	342mΩ

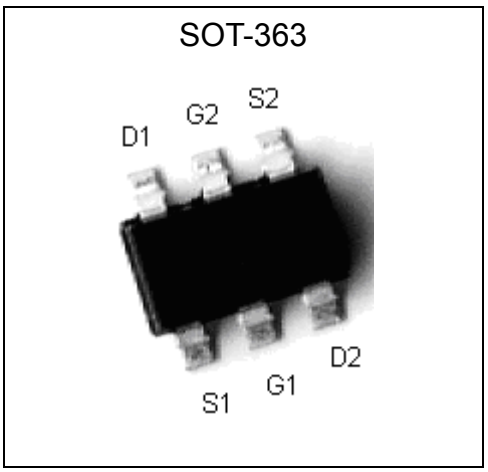
Features

- Low on-resistance
- ESD protected gate
- High speed switching
- Low-voltage drive
- Easily designed drive circuits
- Easy to use in parallel
- Pb-free lead plating and halogen-free package

Equivalent Circuit

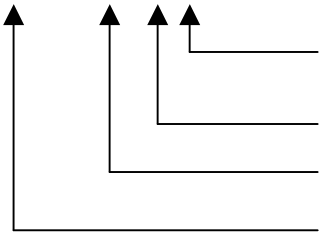


Outline



Ordering Information

Device	Package	Shipping
MTA300B02KS6R-0-T1-G	SOT-363 (Pb-free lead plating and halogen-free package)	3000 pcs / Tape & Reel



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

Packing spec, T1 : 3000 pcs / tape & reel, 7” reel

Product rank, zero for no rank products

Product name

The following characteristics apply to both Tr1 and Tr2

Absolute Maximum Ratings (Ta=25°C)

Parameter		Symbol	Limits	Unit
Drain-Source Voltage		V_{DSS}	-20	V
Gate-Source Voltage		V_{GSS}	±12	
Continuous Drain Current @V_{GS}=-4.5V (Note 1)	T_A=25°C	I_D	-1060	mA
	T_A=85°C		-765	
Continuous Drain Current @V_{GS}=-2.5V (Note 1)	T_A=25°C	I_D	-900	
	T_A=85°C		-645	
Continuous Drain Current @V_{GS}=-4.5V (Note 2)	T_A=25°C	I_D	-1150	
	T_A=85°C		-830	
Continuous Drain Current @V_{GS}=-2.5V (Note 2)	T_A=25°C	I_D	-970	
	T_A=85°C		-706	
Pulsed Drain Current, tp=300μs, duty ≤5%		I_{DP}	-4800	
Total Power Dissipation (Note 1)		P_D	300	mW
Total Power Dissipation (Note 2)			350	
Operating Junction and Storage Temperature Range		Tj ; Tstg	-55~+150	°C

Thermal Performance

Parameter	Symbol	Limit	Unit
Thermal Resistance, Junction-to-Ambient, Steady state (Note 1)	$R_{\theta JA}$	417	°C/W
Thermal Resistance, Junction-to-Ambient, Steady state (Note 2)		357	
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	120	

Note : 1. Surface mounted on FR-4 board of minimum copper pad, t≤5s.
2. Surface mounted on FR-4 board of 1 in² copper pad, 2 oz copper, t≤5s.

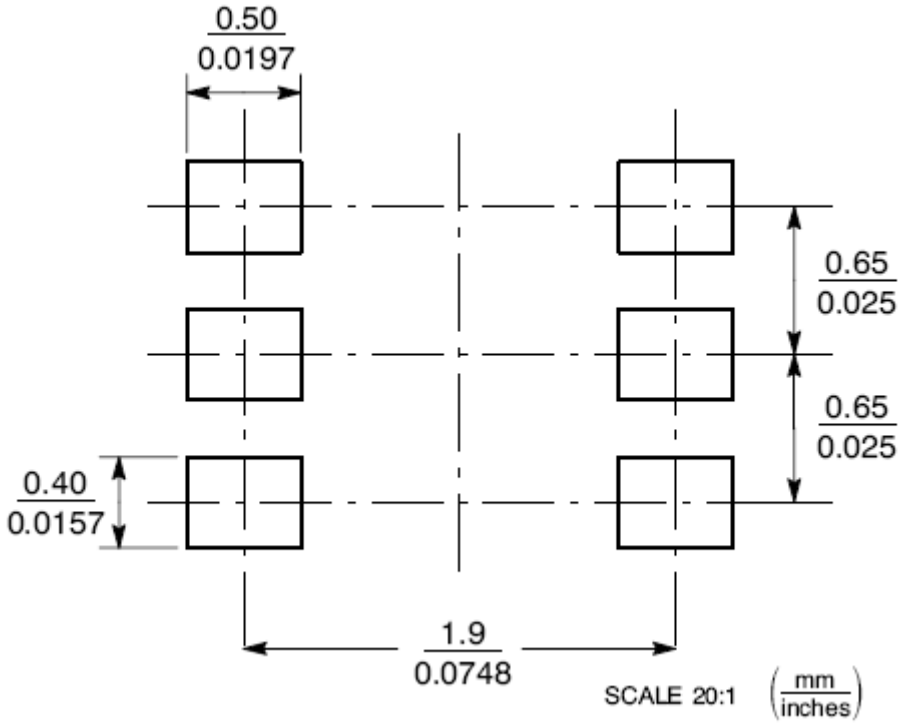
Electrical Characteristics (Ta=25°C)

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Static					
BV_{DSS}*	-20	-	-	V	V_{GS}=0V, I_D=-250μA (Note 1)
$V_{GS(th)}$	-0.5	-	-1.2		V_{DS}=V_{GS}, I_D=-250μA
I_{GSS}	-	-	±10	μA	V_{GS}=±10V, V_{DS}=0V
I_{DSS}	-	-	1		V_{DS}=-16V, V_{GS}=0V
	-	-	5		V_{DS}=-16V, V_{GS}=0V, Tj=85°C (Note 2)
$R_{DS(ON)}$*	-	158	260	mΩ	V_{GS}=-4.5V, I_D=-650mA (Note 1)
	-	219	350		V_{GS}=-2.5V, I_D=-650mA (Note 1)
	-	342	800		V_{GS}=-1.8V, I_D=-650mA (Note 1)
G_{FS}	-	1.7	-	S	V_{DS}=-10V, I_D=-500mA

Dynamic					
C_{iss}	-	181	-	pF	V_{DS}=-10V, V_{GS}=0V, f=1MHz
C_{oss}	-	38	-		
C_{rss}	-	28	-		
Qg	-	2.6	-	nC	V_{DS}=-10V, V_{GS}=-4.5V, I_D=-1A
Qgs	-	0.6	-		
Qgd	-	0.7	-		
$td_{(ON)}$	-	6.4	-	ns	V_{DD}=-10V, I_D=-500mA, V_{GS}=-4.5V, R_G=20Ω
tr	-	18.8	-		
$td_{(OFF)}$	-	17	-		
tf	-	15.8	-		
Source-Drain Diode					
V_{SD}	-	-0.91	-1.2	V	V_{GS}=0V, I_S=-1A (Note 1)
trr	-	4.6	-	ns	I_F=-0.5A, dI_F/dt=100A/μs
Qrr	-	1.0	-	nC	

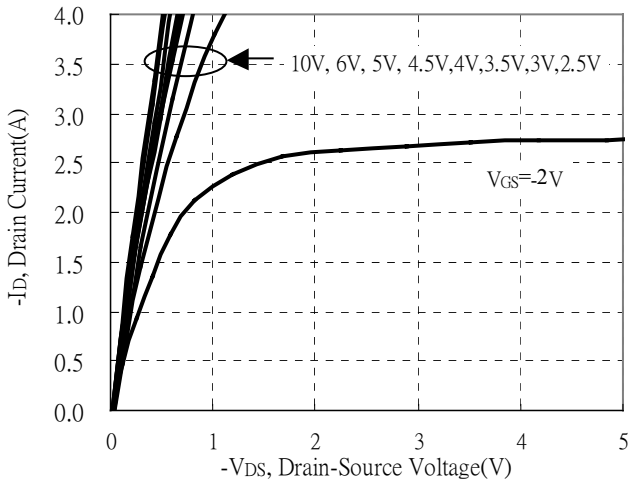
Note :1. Pulse Test : Pulse Width ≤300μs, Duty Cycle≤2%.
2. Guaranteed by design, not subject to production testing.

Recommended Soldering Footprint

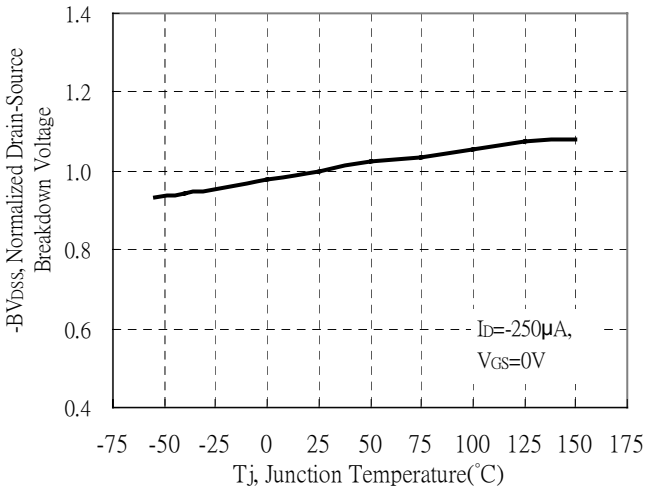


Typical Characteristics

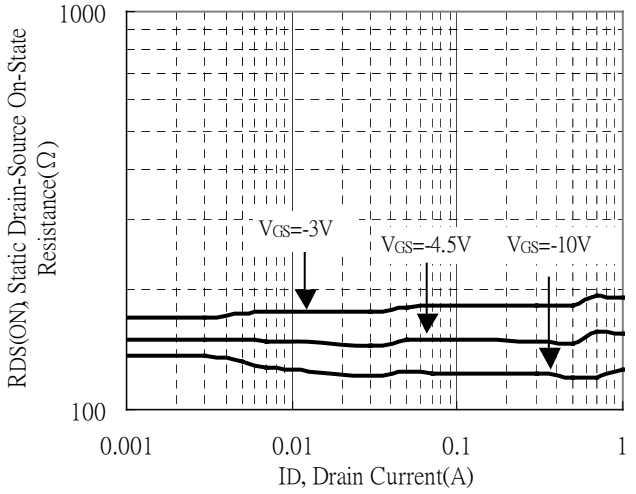
Typical Output Characteristics



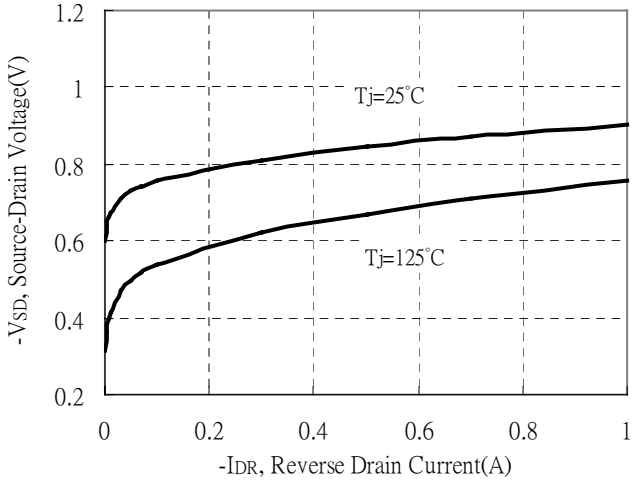
Brekdown Voltage vs Ambient Temperature



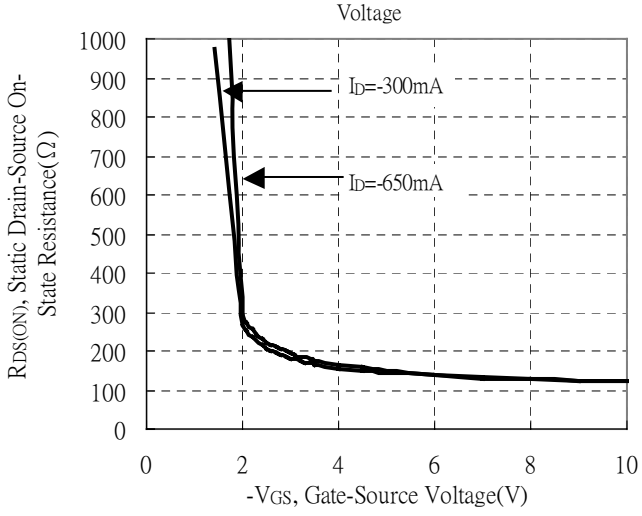
Static Drain-Source On-State resistance vs Drain Current



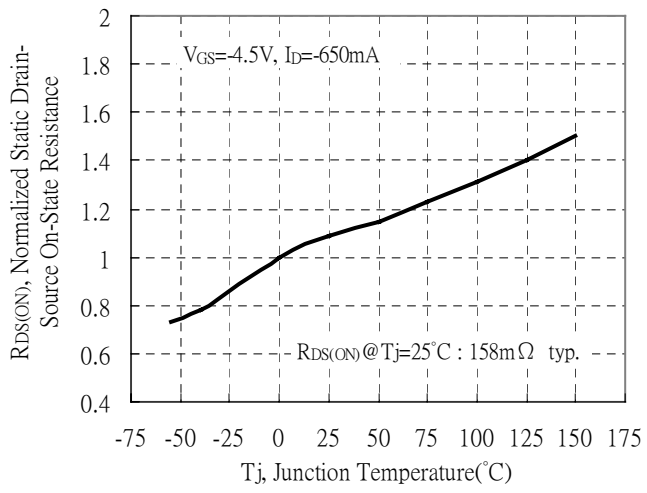
Reverse Drain Current vs Source-Drain Voltage



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

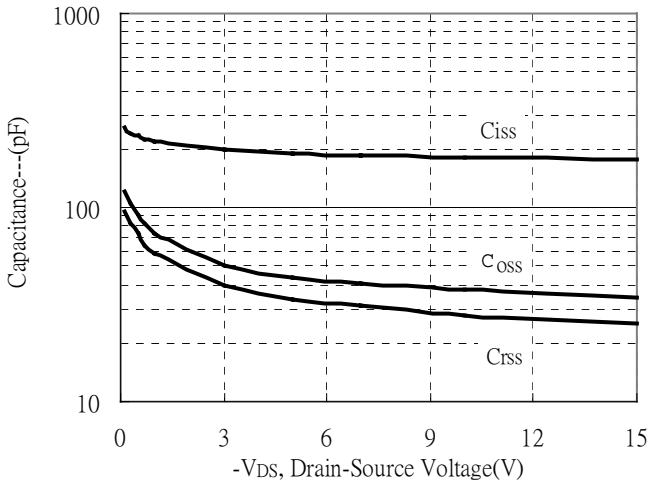


Drain-Source On-State Resistance vs Junction Tempearture

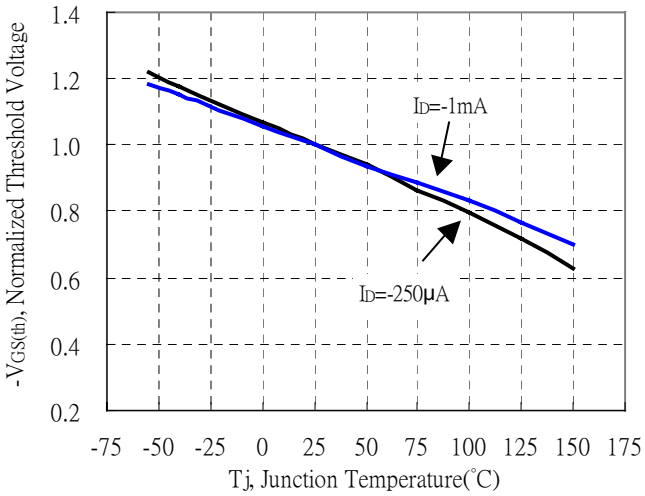


Typical Characteristics (Cont.)

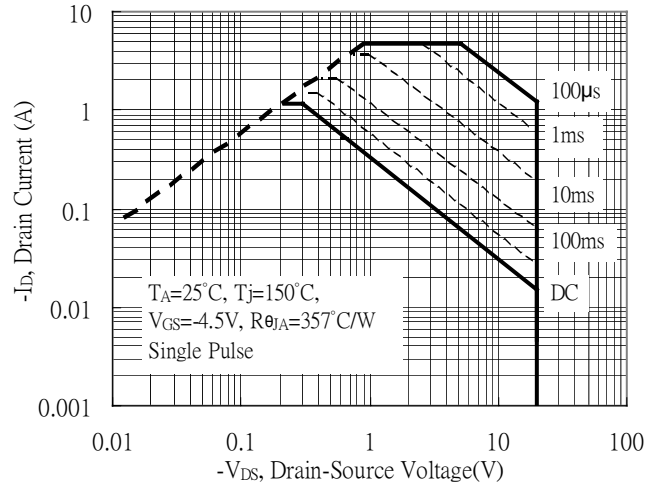
Capacitance vs Drain-to-Source Voltage



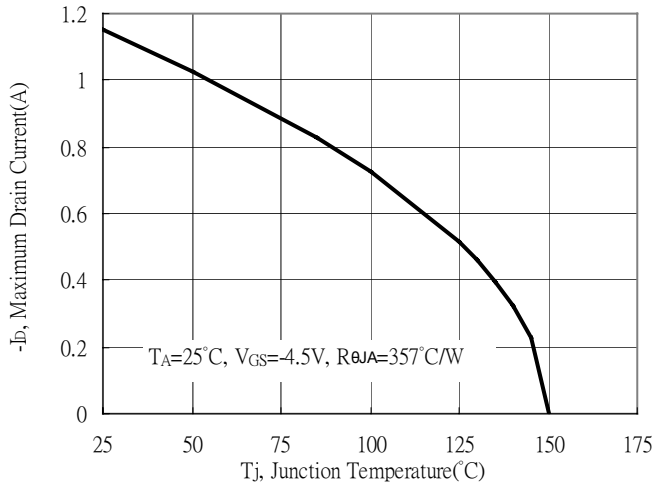
Threshold Voltage vs Junction Tempearture



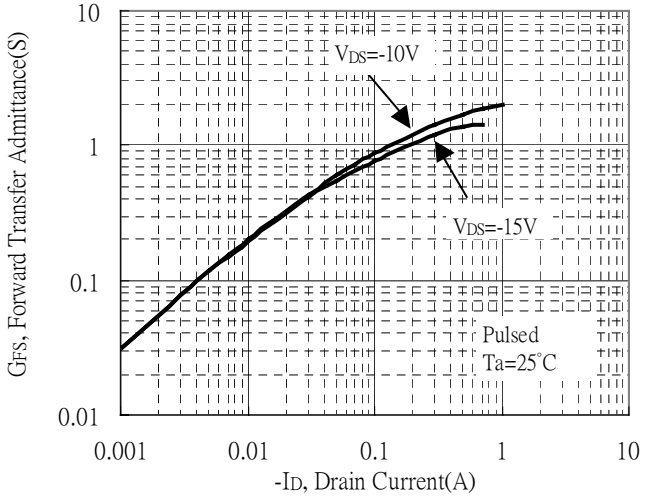
Maximum Safe Operating Area



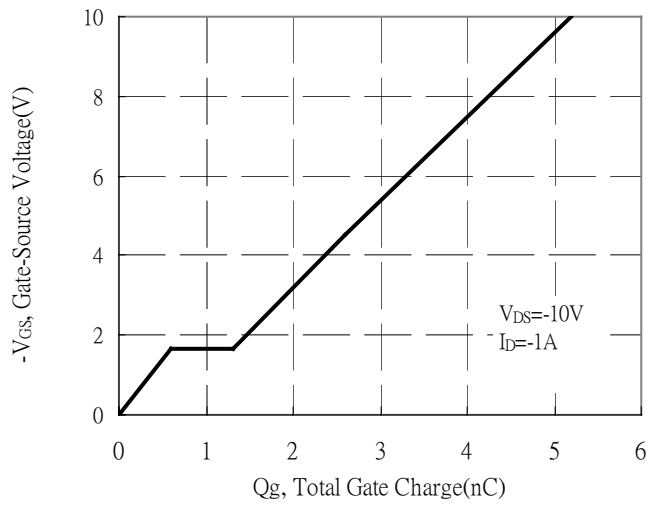
Maximum Drain Current vs JunctionTemperature



Forward Transfer Admittance vs Drain Current

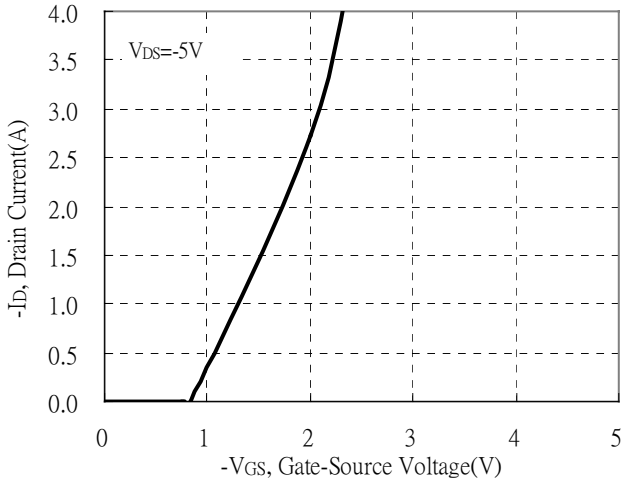


Gate Charge Characteristics

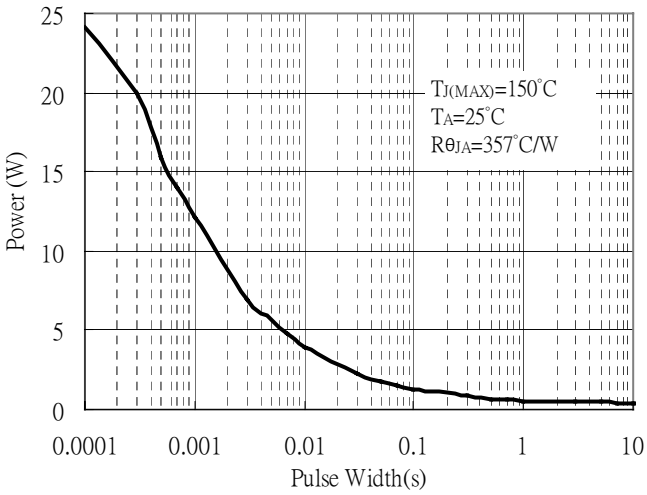


Typical Characteristics (Cont.)

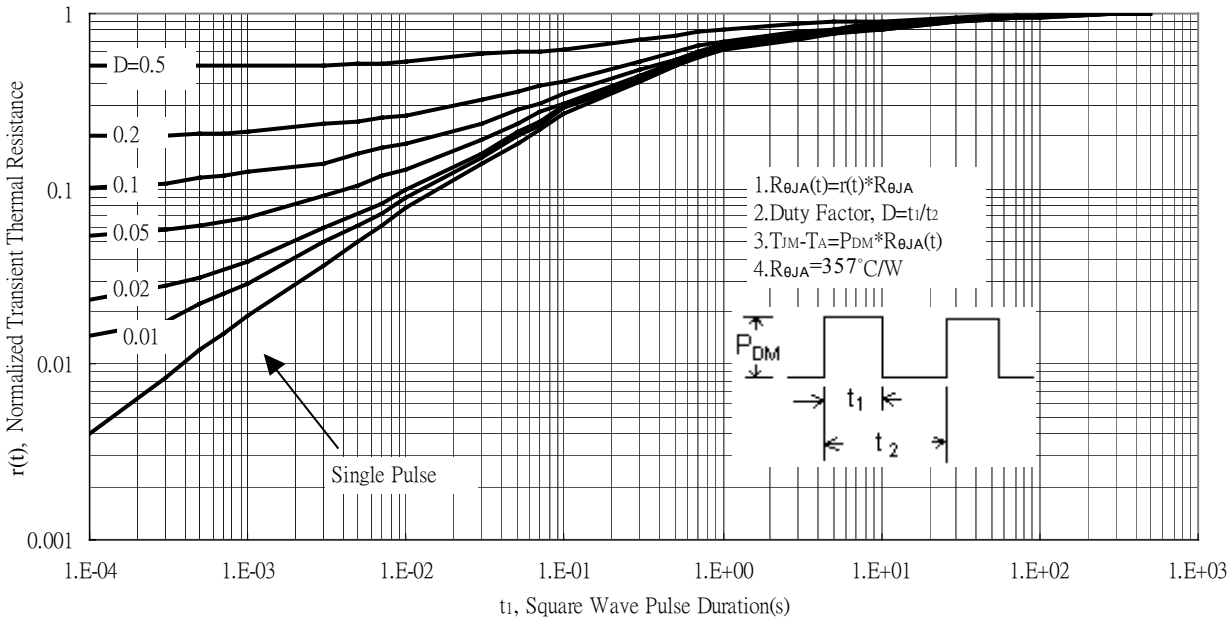
Typical Transfer Characteristics



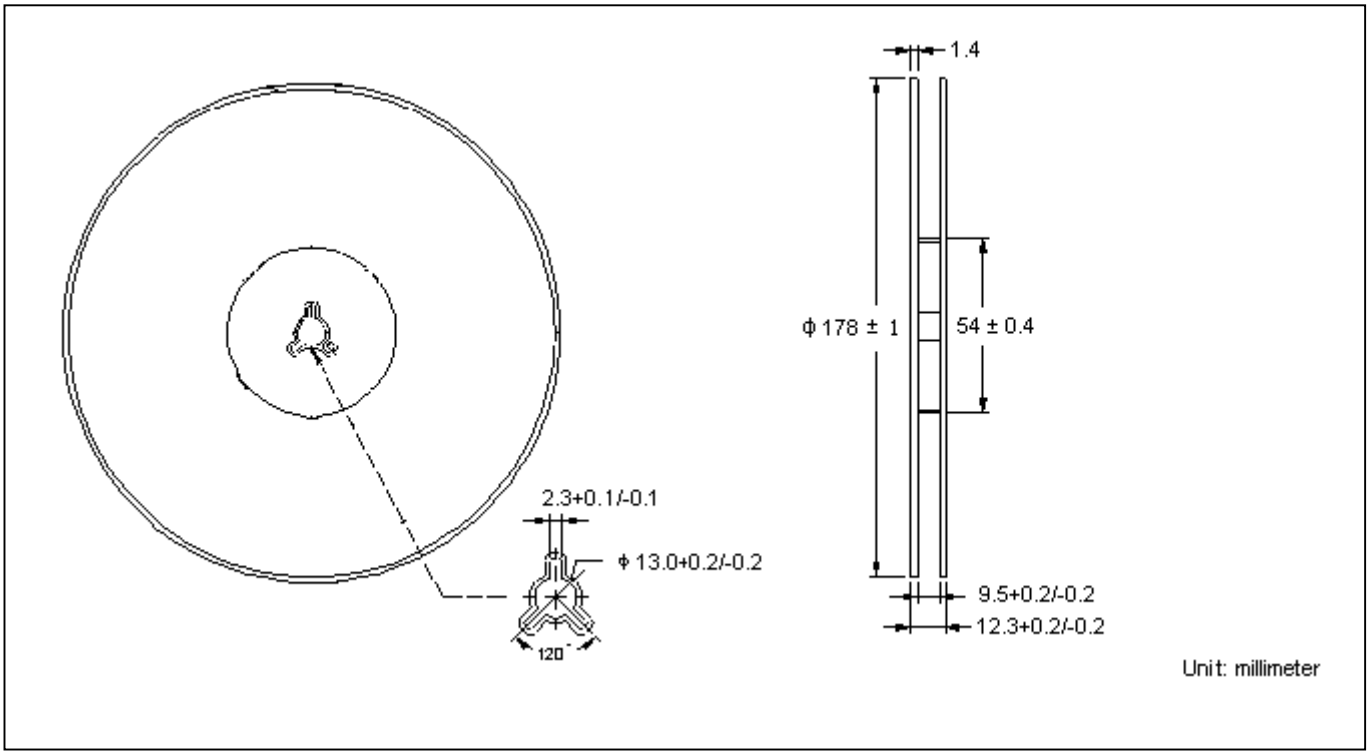
Single Pulse Power Rating, Junction to Case Ambient



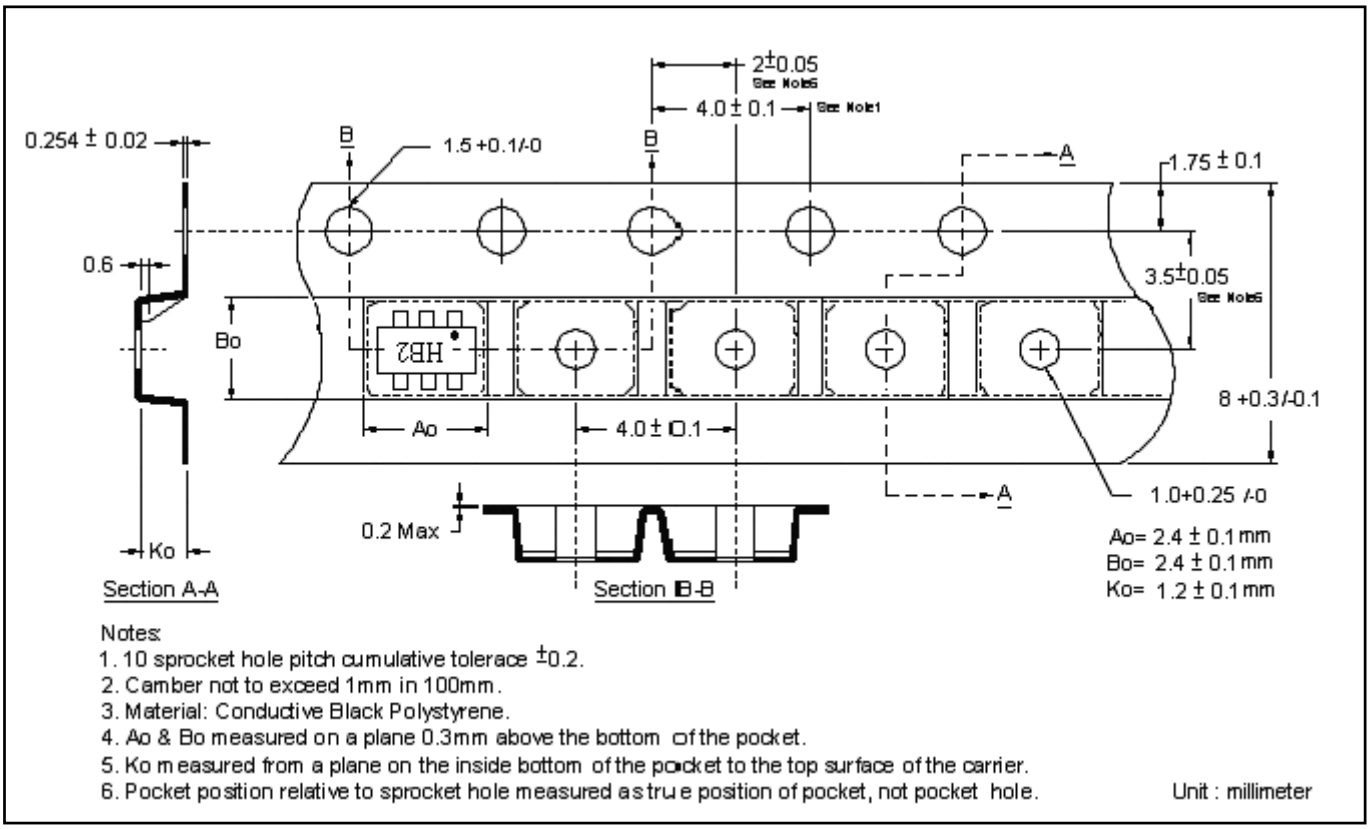
Transient Thermal Response Curves



Reel Dimension



Carrier Tape Dimension



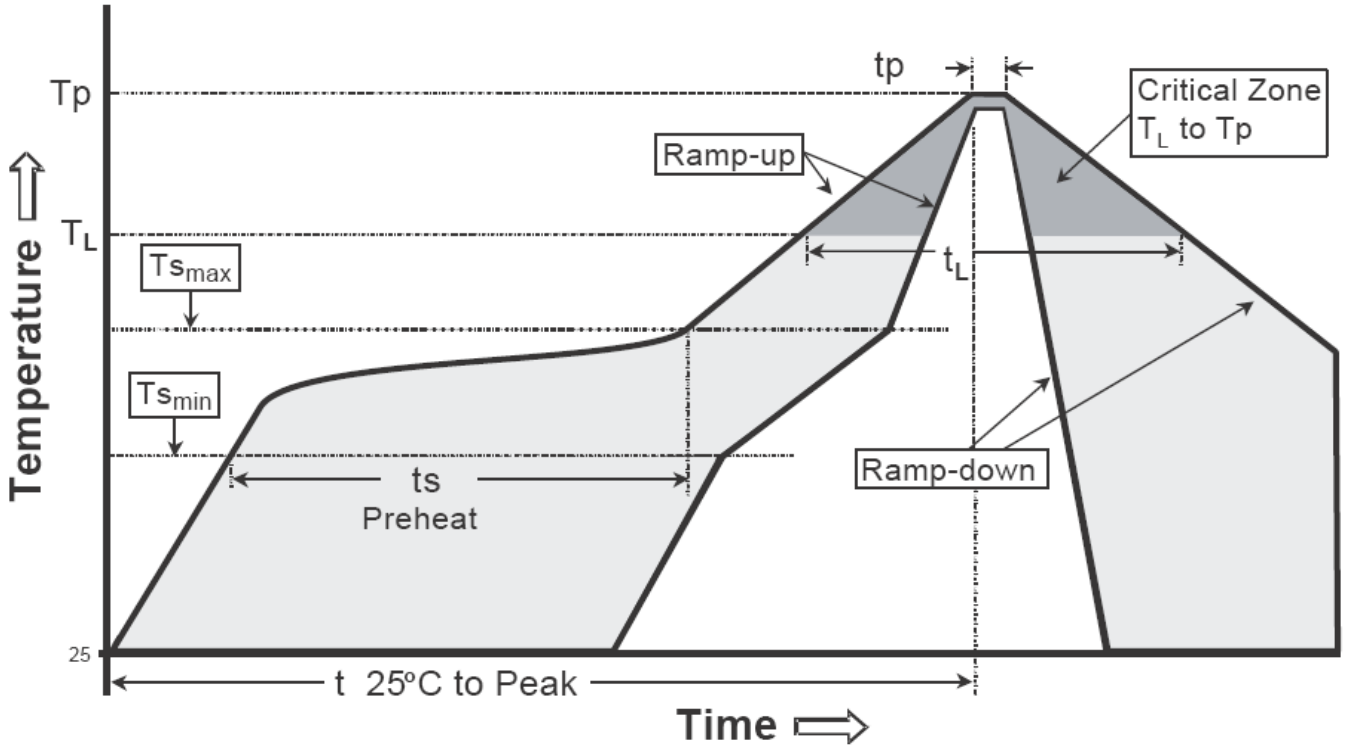
Notes:
1. 10 sprocket hole pitch cumulative tolerace ±0.2.
2. Camber not to exceed 1mm in 100mm.
3. Material: Conductive Black Polystyrene.
4. Ao & Bo measured on a plane 0.3mm above the bottom of the pocket.
5. Ko measured from a plane on the inside bottom of the pocket to the top surface of the carrier.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

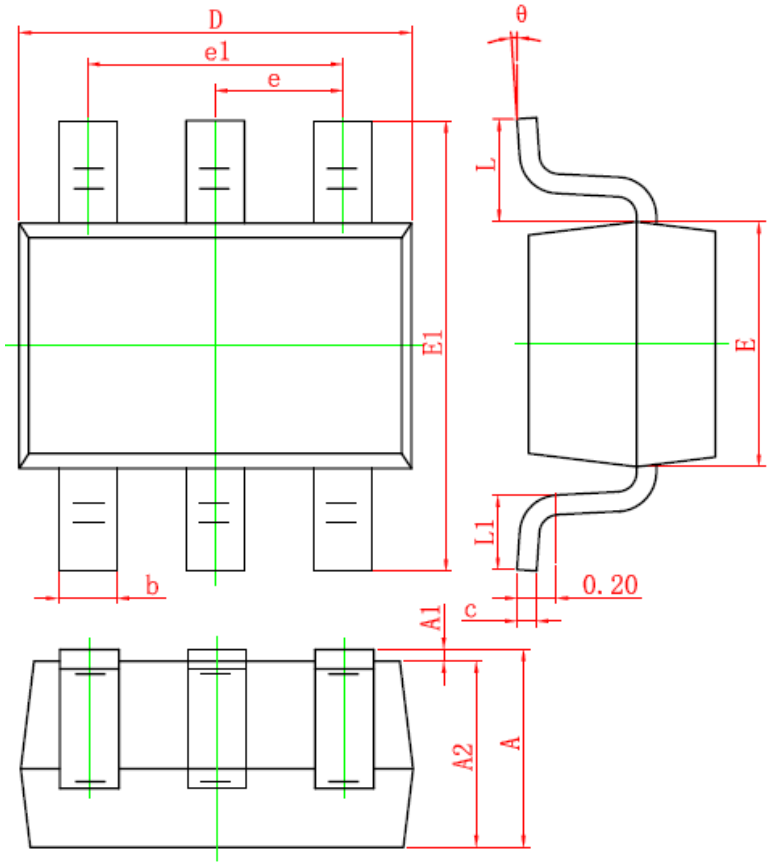
Recommended temperature profile for IR reflow



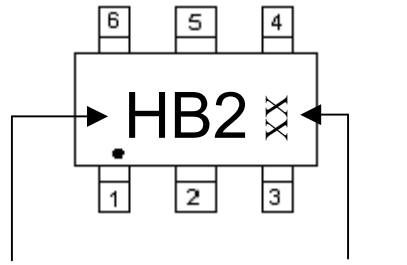
Profile feature	Sn-Pb eutectic Assembly	Pb-free Assembly
Average ramp-up rate (Tsmax to Tp)	3°C/second max.	3°C/second max.
Preheat −Temperature Min(T_S min) −Temperature Max(T_S max) −Time($t_{s\ min}$ to $t_{s\ max}$)	 100°C 150°C 60-120 seconds	 150°C 200°C 60-180 seconds
Time maintained above: −Temperature (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 :1. All temperatures refer to topside of the package, measured on the package body surface.
2.For devices mounted on FR-4 PCB of 1.6mm or equivalent grade PCB. If other grade PCB is used, care should be taken to match the coefficients of thermal expansion between components and PCB. If they are not matched well, the solder joints may crack or the bodies of the parts may crack or shatter as the assembly cools.

SOT-363 Dimension



Marking:



6-Lead SOT-363R Plastic
Surface Mounted Package
CYStek Package Code: S6R

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.
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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