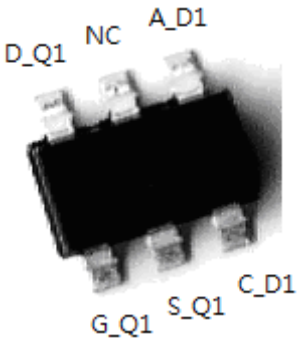
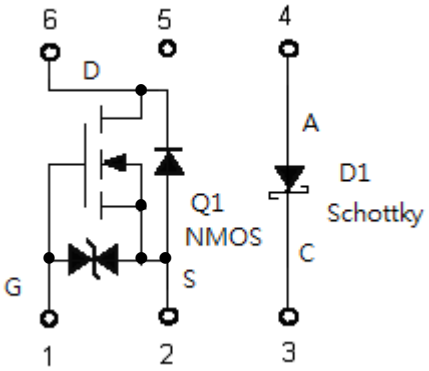
200mA Sychronous Rectifier featuring N-MOSFET and Schottky Diode

Features:

- N-MOS with ESD Gate Protection
- N-MOS with Low On-Resistance
- Low V_F Schottky Diode
- Low Static, Switching and Conduction Losses
- Pb-free lead plating and halogen-free package

SOT-363





Ordering Information

Device	Package	Shipping
KWB1K6N06K	SOT-363 (Pb-free lead plating and halogen-free package)	3000 pcs / Tape & Reel

Absolute Maximum Ratings, Total Device (Ta=25°C, unless otherwise specified)

Characteristic	Symbol	Value	Unit
Power Dissipation (Note)	P_D	200	mW
Power Derating Factor above 25°C	P_{der}	1.6	mW/°C
Output Current	I_{OUT}	200	mA

Thermal Characteristics

Characteristic	Symbol	Value	Unit
Junction Operation and Storage Temperature Range	Tj ; Tstg	-55 ~ +150	°C
Thermal Resistance, Junction to Ambient to Air (Note)	$R_{\Theta JA}$	625	°C/W

Note : Surface mounted on a FR-4 board with area of 1 in × 0.85 in × 0.062 in copper pad.

Sub-Component Device : ESD Protected N-Channel MOSFET (Q1)

(Ta=25°C, unless otherwise specified)

Characteristic	Symbol	Value	Unit
Drain Source Voltage	V_{DSS}	60	V
Drain Gate Voltage (R_{GS}<1MΩ)	V_{DGR}	60	V
Gate Source Voltage	V_{GSS}	±20	V
Drain Current Continuous(V_{GS}=10V)	I_D	200	mA
Pulsed (tp≤10μs, Duty Cycle≤1%)	I_{DM}	800	
Continuous Source Current	I_S	200	mA

Sub-Component Device : Schottky Diode (D1)

Characteristic	Symbol	Value	Unit
Peak Repetitive Reverse Voltage Working Peak Reverse Voltage DC Blocking Voltage	V_{RRM} V_{RWM} V_R	40	V
RMS Reverse Voltage	$V_{R(RMS)}$	28	V
Forward Continuous Current	I_{FM}	350	mA
Non-Repetitive Peak Forward Surge Current @ t<1.0s	I_{FSM}	1.5	A

Electrical Characteristics (Tj=25°C, unless otherwise noted)

ESD protected N-Channel MOSFET (Q1) @ T_A=25°C, unless otherwise specified

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Static					
BV_{DSS}	60	-	-	V	V_{GS}=0V, I_D=250μA
$\Delta BV_{DSS}/\Delta Tj$	-	0.07	-	V/°C	Reference to 25°C, I_D=250μA
$V_{GS(th)}$	0.8	1.5	2.3	V	V_{DS}=V_{GS}, I_D=250μA
	0.9	1.7	2.5		V_{DS}=V_{GS}, I_D=1mA
I_{GSS}	-	-	±10	μA	V_{GS}=±20V, V_{DS}=0V
I_{DSS}	-	-	1		V_{DS}=60V, V_{GS}=0V
	-	-	10		V_{DS}=48V, V_{GS}=0V (Tj=70°C)
*$R_{DS(ON)}$	-	1.8	2.5	Ω	V_{GS}=5V, I_D=50mA
	-	1.5	2		V_{GS}=10V, I_D=500mA
*G_{FS}	-	300	-	mS	V_{DS}=10V, I_D=200mA
Dynamic					
Ciss	-	29	50	pF	V_{DS}=25V, V_{GS}=0, f=1MHz
Coss	-	4.3	25		
Crss	-	2.9	5		
$t_{d(ON)}$	-	2.8	-	ns	V_{DS}=25V, I_D=500mA, V_{GS}=10V R_G=6Ω
t_r	-	16	-		
$t_{d(OFF)}$	-	7.6	-		
t_f	-	14.4	-		
Qg	-	2.0	-	nC	V_{DS}=30V, I_D=500mA, V_{GS}=10V
Qgs	-	0.9	-		
Qgd	-	0.7	-		
Source-Drain Diode					
*I_S	-	-	200	mA	
*I_{SM}	-	-	800		
*V_{SD}	-	0.87	1.2	V	V_{GS}=0V, I_S=300mA
*trr	-	12.3	-	ns	I_F=500mA, dI_F/dt=100A/μs
*Qrr	-	5.6	-	nC	

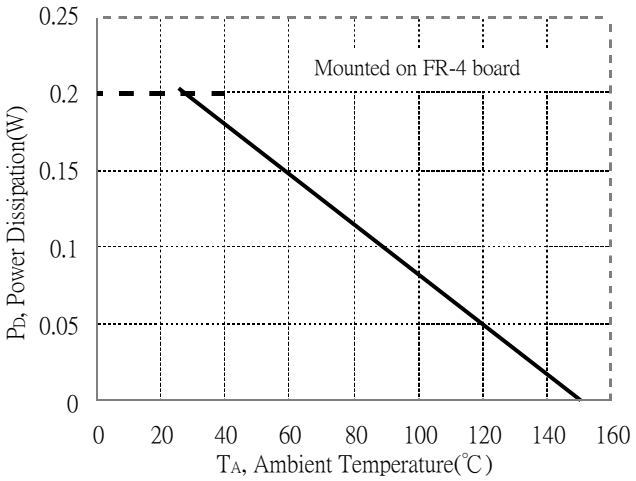
*Pulse Test : Pulse Width ≤300μs, Duty Cycle≤2%

Schottky Barrier Diode (D1) @ T_A=25°C, unless otherwise specified

Characteristic	Symbol	Min	Typ	Max	Unit	Test Conditions
Reverse Breakdown Voltage	$V_{(BR)R}$	40	-	-	V	I_R=10μA
Forward Voltage Drop	V_{FM}	-	-	0.37	V	I_F=20mA
		-	-	0.6		I_F=200mA
Peak Reverse Current	I_{RM}	-	-	5	μA	V_R=30V
Total Capacitance	C_T	-	41	-	pF	V_R=0V, f=1MHz

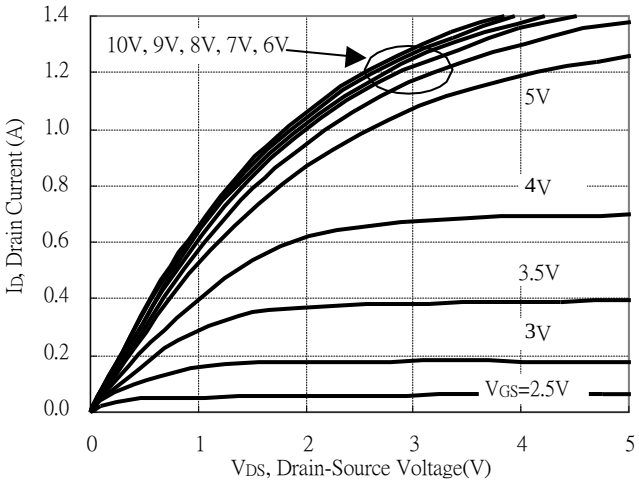
Typical Characteristics, total device

Power Derating Curve

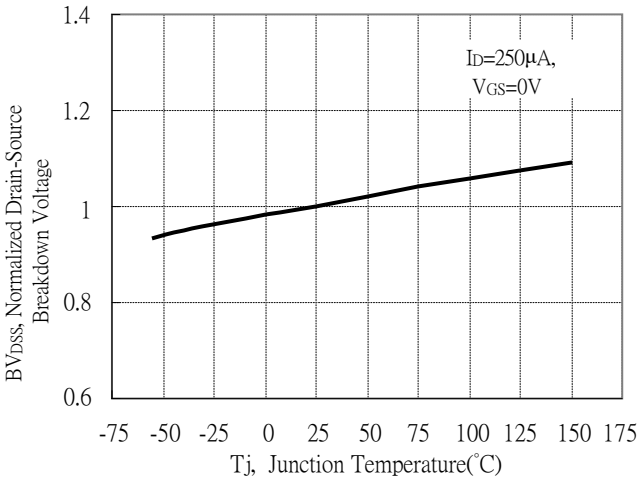


Typical Characteristics, NMOS (Q1)

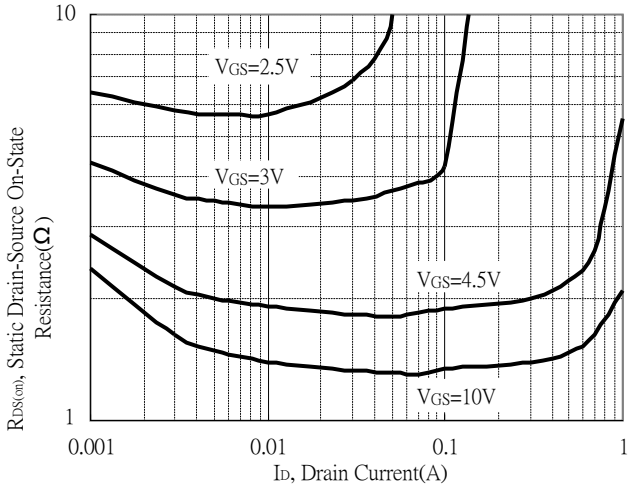
Typical Output Characteristics



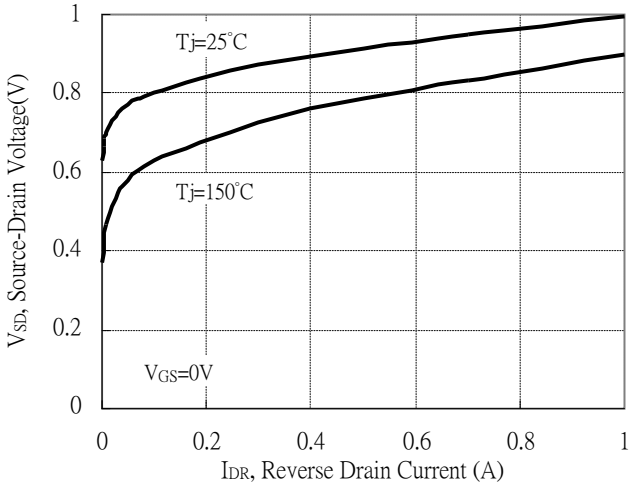
Brekdown Voltage vs Ambient Temperature



Static Drain-Source On-State resistance vs Drain Current

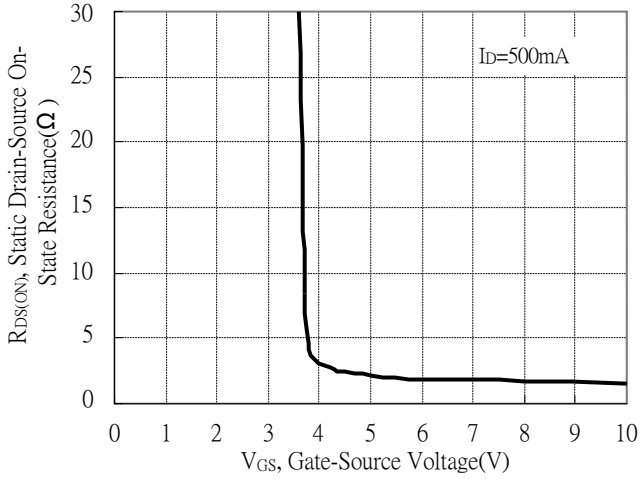


Reverse Drain Current vs Source-Drain Voltage

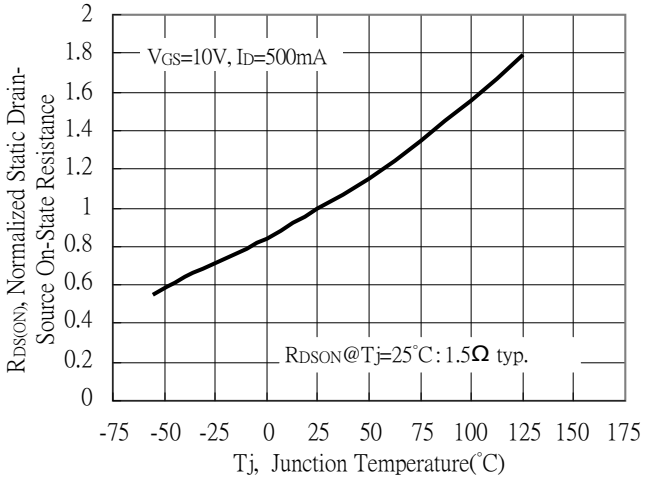


Typical Characteristics(Cont.), NMOS (Q1)

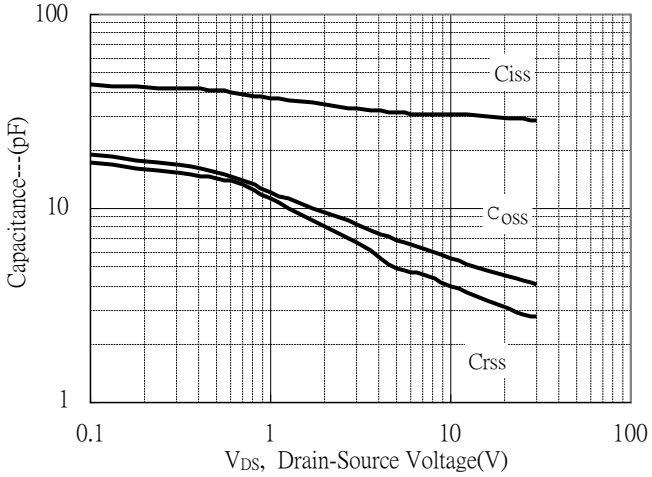
Static Drain-Source On-State Resistance vs Gate-Source Voltage



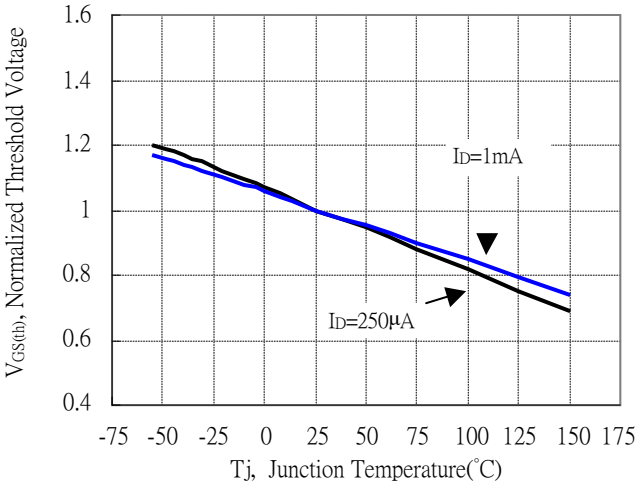
Drain-Source On-State Resistance vs Junction Tempearture



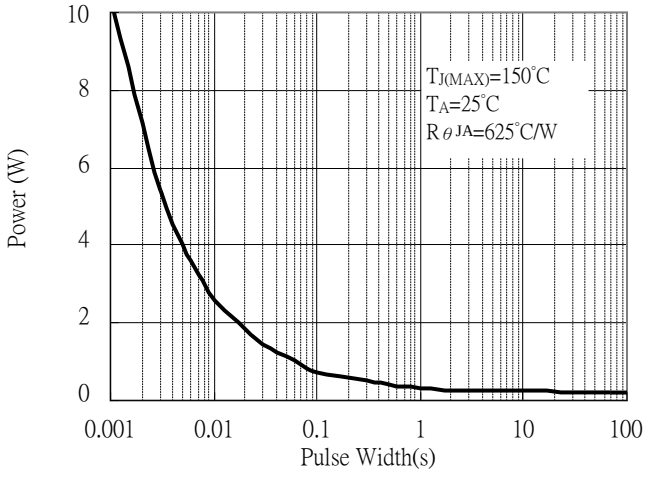
Capacitance vs Drain-to-Source Voltage



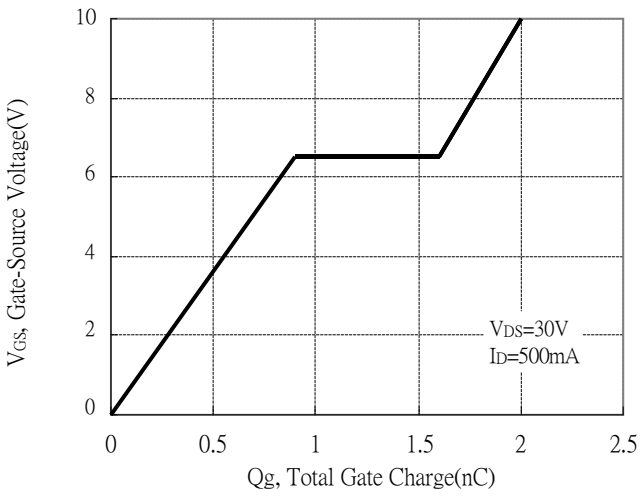
Threshold Voltage vs Junction Tempearture



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

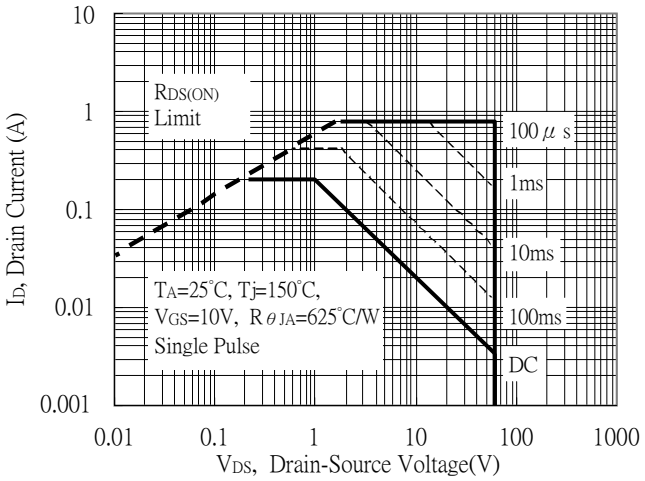


Gate Charge Characteristics

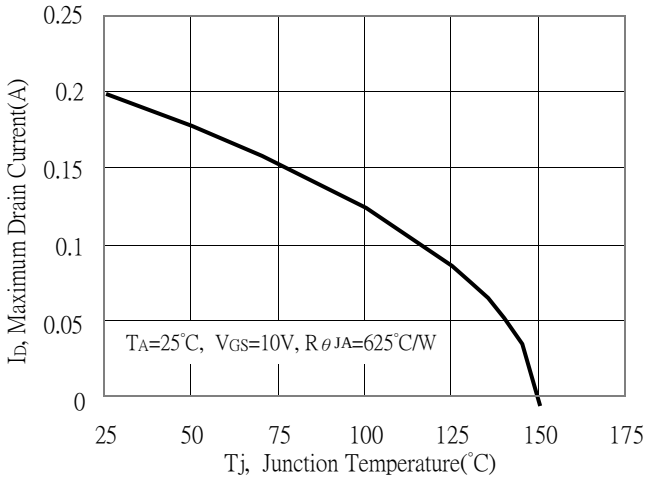


Typical Characteristics(Cont.), NMOS (Q1)

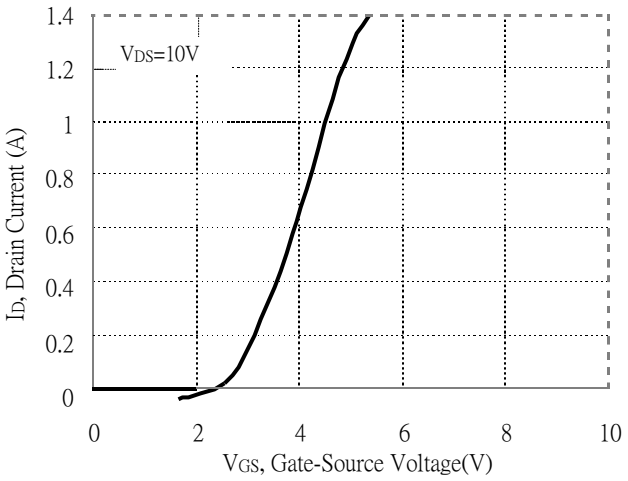
Maximum Safe Operating Area



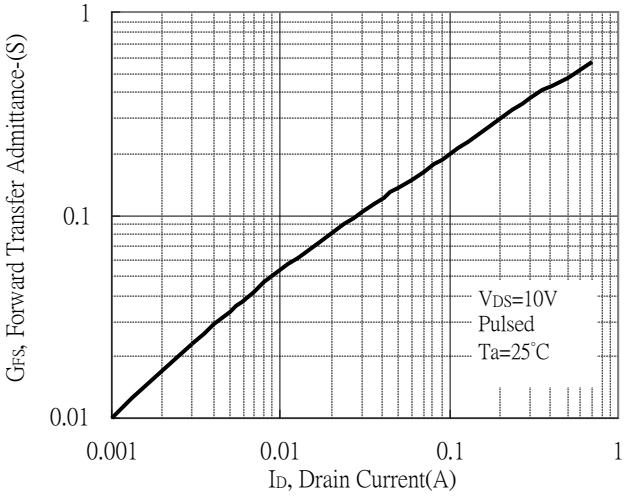
Maximum Drain Current vs JunctionTemperature



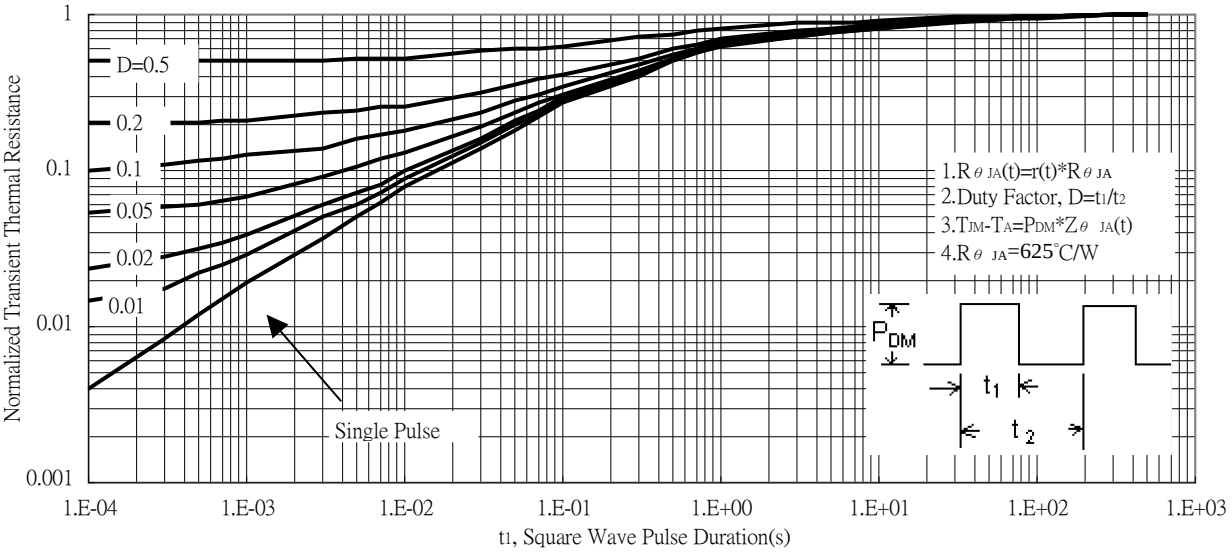
Typical Transfer Characteristics



Forward Transfer Admittance vs Drain Current

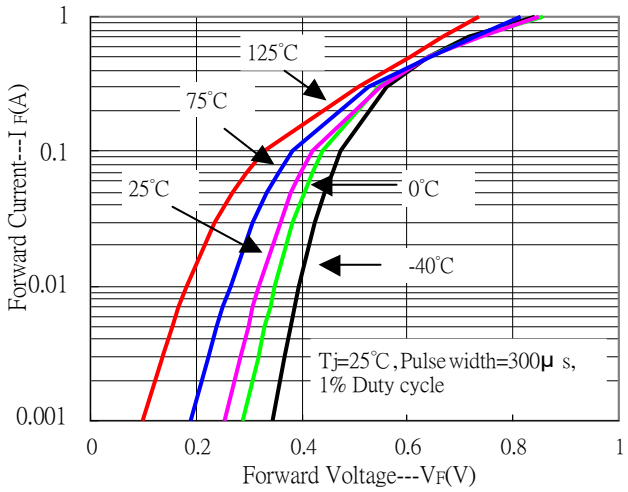


Transient Thermal Response Curves

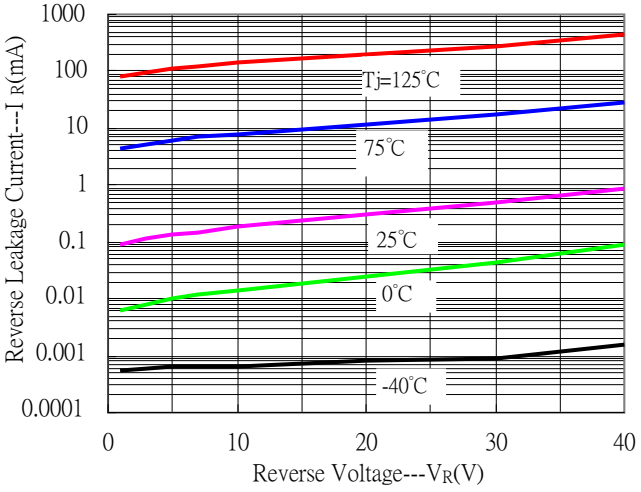


Typical Characteristics, Schottky Barrier Diode (D1)

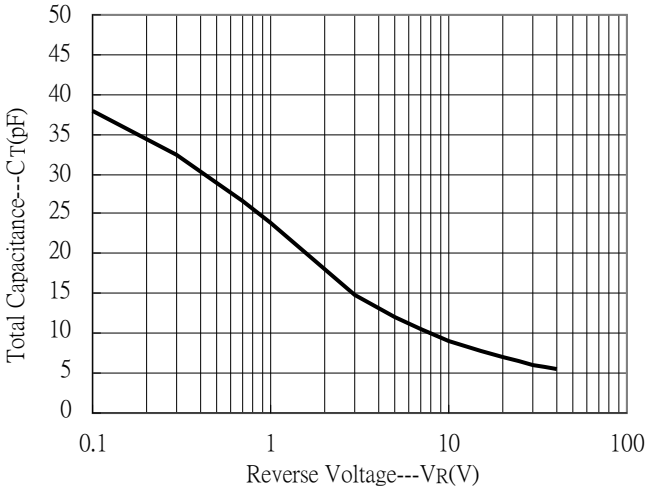
Forward Current vs Forward Voltage



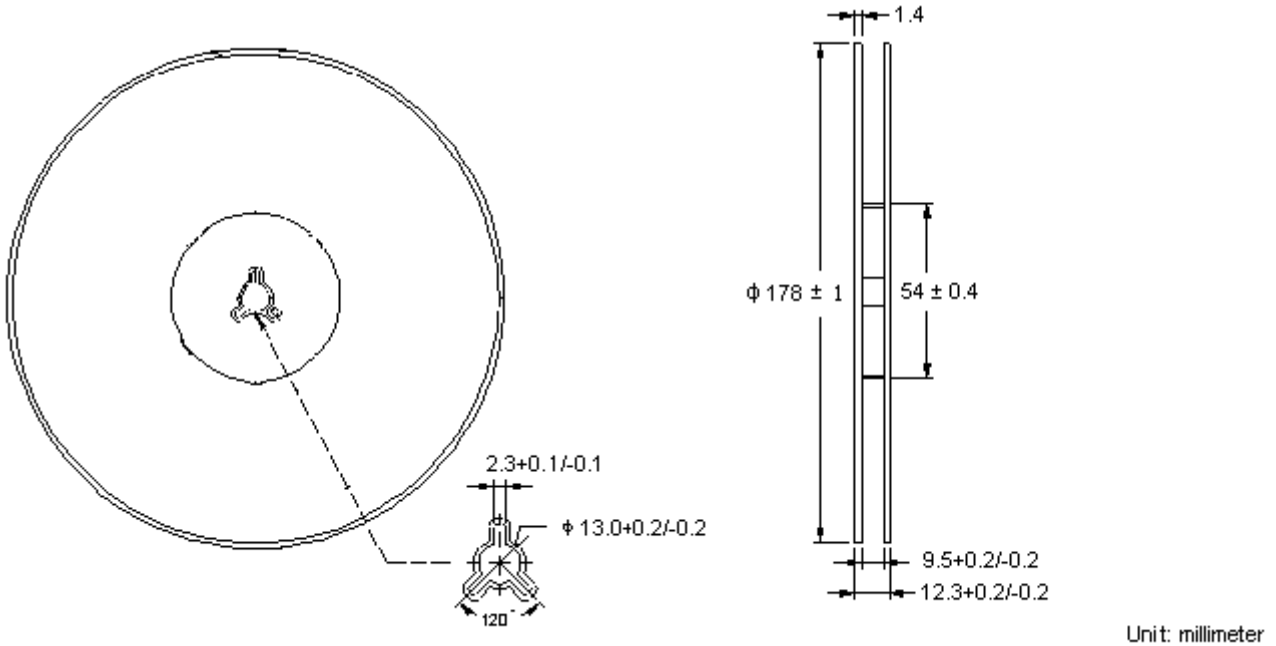
Reverse Leakage Current vs Reverse Voltage



Total Capacitance vs Reverse Voltage

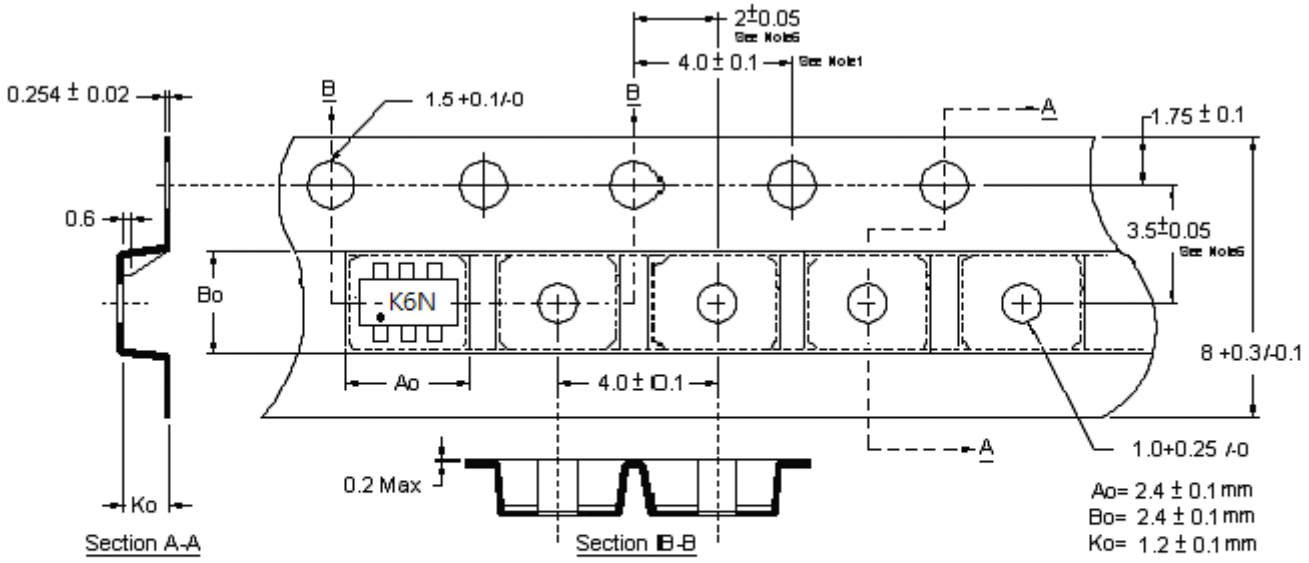


Reel Dimension



Unit: millimeter

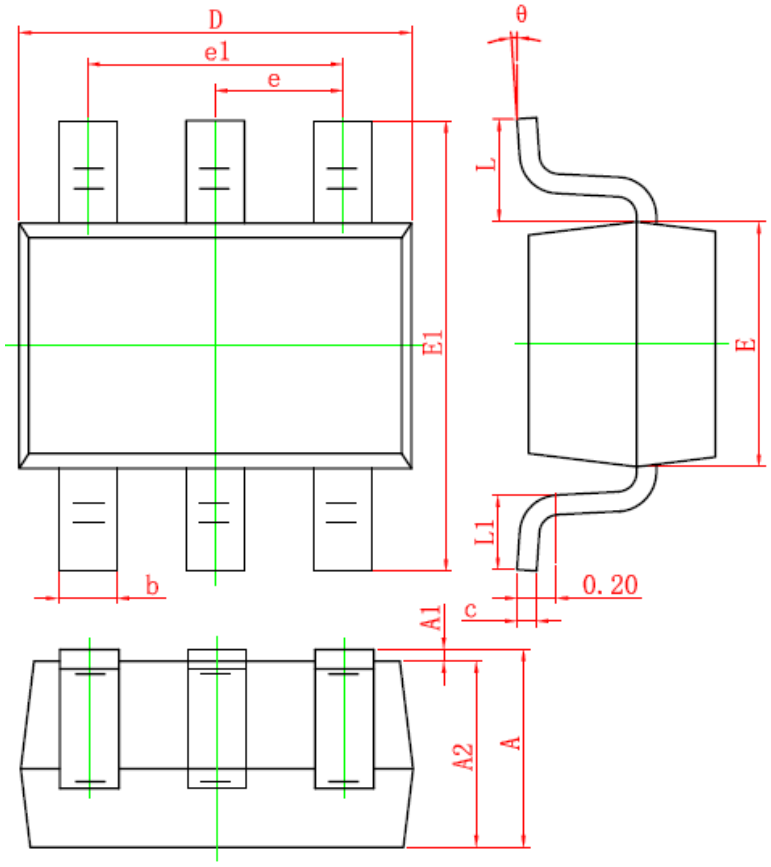
Carrier Tape Dimension



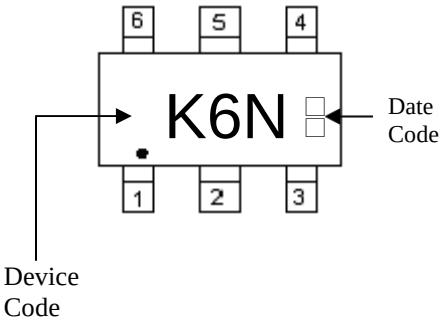
Notes:
1. 10 sprocket hole pitch cumulative tolerace ±0.2.
2. Camber not to exceed 1mm in 100mm.
3. Material: Conductive Black Polystyrene.
4. Ao & Bo measured on a plane 0.3mm above the bottom of the pocket.
5. Ko measured from a plane on the inside bottom of the pocket to the top surface of the carrier.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

Unit : millimeter

SOT-363 Dimension



Marking:



6-Lead SOT-363 Plastic
Surface Mounted Package

Style:
Pin 1. Gate (G_Q1)
Pin 2. Source (S_Q1)
Pin 3. Cathode (C_D1)
Pin 4. Anode (A_D1)
Pin 5. Not Connected (NC)
Pin 6. Drain (D_Q1)

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					