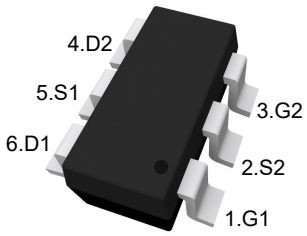
TN6847CSG

N and P-Channel Enhancement Mode Power MOSFET

Features

- **N-Channel**
  V_{DS}=30V,I_D=5.8A
  $R_{DS(on)}$<38mΩ@V_{GS}=10V
  $R_{DS(on)}$<58mΩ@V_{GS}=4.5V
- **P-Channel**
  V_{DS}=-30V,I_D=-4.5A
  $R_{DS(on)}$<68mΩ@V_{GS}=-10V
  $R_{DS(on)}$<96mΩ@V_{GS}=-4.5V
- High Power and Current handing capability

SOT-23-6

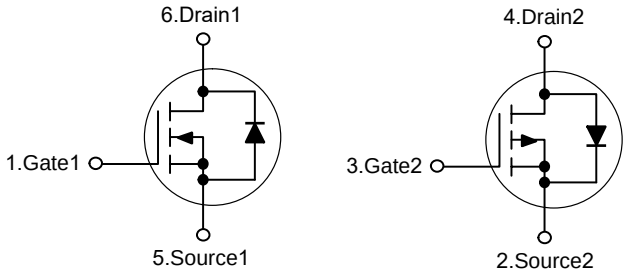


Marking Code:6847

Applications

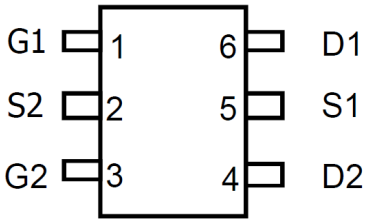
- Motor Drive Applications
- Networking
- Half/Full Bridge Topology

Schematic Diagram



N-Channel **P-Channel**

Pin Assignment



Top View

Absolute Maximum Ratings

Ratings at 25℃ ambient temperature unless otherwise specified.

Parameter	Symbol	N-Channel	P-Channel	Unit
Drain-Source Voltage	V_{DS}	30	-30	V
Gate-Source Voltage	V_{GS}	±12	±12	V
Continuous Drain Current (T_a =25℃)	I_D	5.8	-4.5	A
Continuous Drain Current (T_a =100℃)	I_D	3.6	-2.6	A
Pulsed Drain Current (1)	I_{DM}	23	-16.8	A
Power Dissipation	P_D	1.7	1.7	W
Thermal Resistance from Junction to Ambient	$R_{\theta JA}$	74	74	℃/W
Junction Temperature	T_J	150	150	℃
Storage Temperature	T_{STG}	-55~ +150	-55~ +150	℃

Thermal Characteristics

Thermal Resistance,Junction-to-Ambient Note2	$R_{\theta JA}$	69.4	℃/W

N-Channel

Electrical Characteristics

(T_a=25°C unless otherwise specified)

Parameter	Symbol	Test Condition	Min	Type	Max	Unit
Static Characteristics						
Drain-source breakdown voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D =250μA	30	-	-	V
Zero gate voltage drain current	I_{DSS}	V_{DS} =30V, V_{GS} = 0V	-	-	1	μA
Gate-body leakage current	I_{GSS}	V_{GS} =±12V,V_{DS} = 0V	-	-	±100	nA
Gate threshold voltage(3)	$V_{GS(th)}$	V_{DS} =V_{GS}, I_D =250μA	0.4	1.0	1.5	V
Drain-source on-resistance(3)	$R_{DS(on)}$	V_{GS} =4.5V, I_D =5A	-	24	38	mΩ
		V_{GS} =2.5V, I_D =1A	-	35	58	
Dynamic characteristics						
Input Capacitance	C_{iss}	V_{DS} =15V, V_{GS} =0V, f =1MHz	-	700	-	pF
Output Capacitance	C_{oss}		-	66	-	
Reverse Transfer Capacitance	C_{rss}		-	52	-	
Switching characteristics						
Turn-on delay time	$t_{d(on)}$	V_{DD}=15V, I_D=4.0A, V_{GS}=4.5V, R_G=10Ω	-	12	-	ns
Turn-on rise time	t_r		-	52	-	
Turn-off delay time	$t_{d(off)}$		-	17	-	
Turn-off fall time	t_f		-	10	-	
Total Gate Charge	Qg	VDS=15V, ID=4.0A, VGS=4.5V	-	4.8	-	nC
Gate-Source Charge	Qgs		-	1.2	-	
Gate-Drain Charge	Qgd		-	1.7	-	
Source-Drain Diode characteristics						
Diode Forward voltage(3)	V_{DS}	V_{GS} =0V, I_S=5.8A	-	-	1.2	V
Diode Forward current(4)	I_S		-	-	5.8	A

Notes:

1. Repetitive Rating: pulse width limited by maximum junction temperature
2. Pulse Test: pulse width≤300μs, duty cycle≤2%
3. Surface Mounted on FR4 Board,t≤10 sec

P-Channel

Electrical Characteristics

(T_a=25°C unless otherwise specified)

Parameter	Symbol	Test Condition	Min	Type	Max	Unit
Static Characteristics						
Drain-source breakdown voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D =-250μA	-30			V
Zero gate voltage drain current	I_{DSS}	V_{DS} =-30V, V_{GS} = 0V			-1	μA
Gate-body leakage current	I_{GSS}	V_{GS} =±12V, V_{DS} = 0V			±100	nA
Gate threshold voltage(2)	$V_{GS(th)}$	V_{DS} =V_{GS}, I_D =-250μA	-0.5	-0.9	-1.3	V
Drain-source on-resistance(2)	$R_{DS(on)}$	V_{GS} =-4.5V, I_D =-4A		53	68	mΩ
		V_{GS} =-2.5V, I_D =-1A		75	96	
Dynamic characteristics						
Input Capacitance	C_{iss}	V_{DS} =-15V, V_{GS} =0V, f =1MHz		882		pF
Output Capacitance	C_{oss}			104		
Reverse Transfer Capacitance	C_{rss}			65		
Switching characteristics						
Turn-on delay time	$t_{d(on)}$	V_{DD}=-15V, I_D=-1.0A, V_{GS}=-10V, R_G=2.5Ω		7		ns
Turn-on rise time	t_r			3		
Turn-off delay time	$t_{d(off)}$			20		
Turn-off fall time	t_f			12		
Total Gate Charge	Qg	VDS=-15V, ID=-4.2A, VGS=-10V		8.5		nC
Gate-Source Charge	Qgs			1.8		
Gate-Drain Charge	Qgd			2.7		
Source-Drain Diode characteristics						
Diode Forward voltage(2)	V_{DS}	V_{GS} =0V, I_S=-4.2A			1.2	V
Diode Forward current(3)	I_S		-	-	-4.2	A

Notes:

1. Repetitive Rating: pulse width limited by maximum junction temperature
2. Pulse Test: pulse width≤300μs, duty cycle≤2%
3. Surface Mounted on FR4 Board,t≤10 sec

N-Channel

Electrical Characteristics Curves

Figure1: Output Characteristics

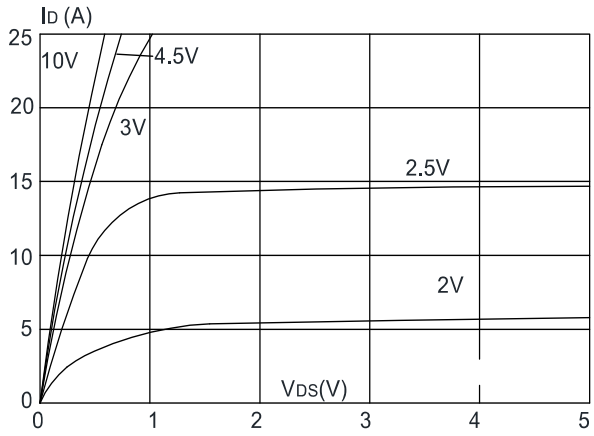


Figure 2: Typical Transfer Characteristics

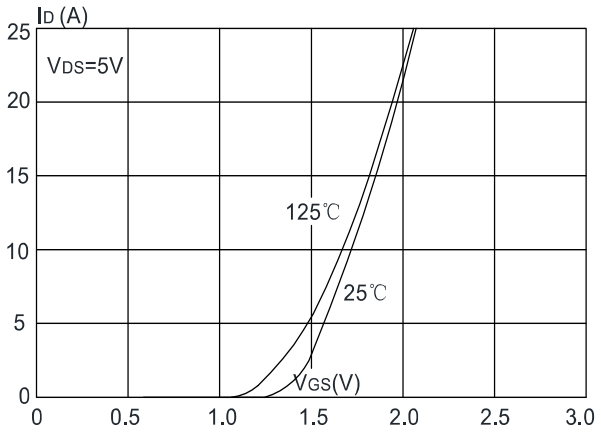


Figure 3: On-resistance vs. Drain Current

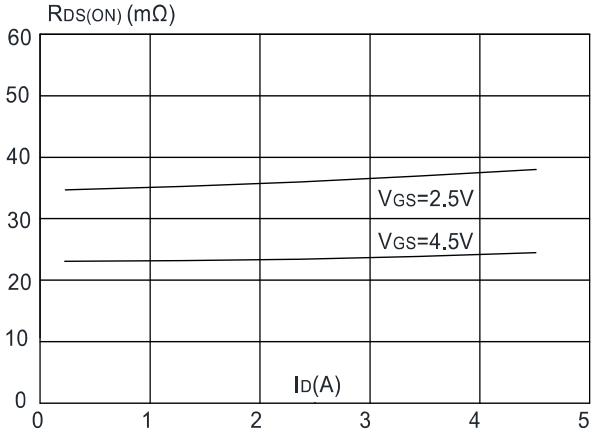


Figure 4: Body Diode Characteristics

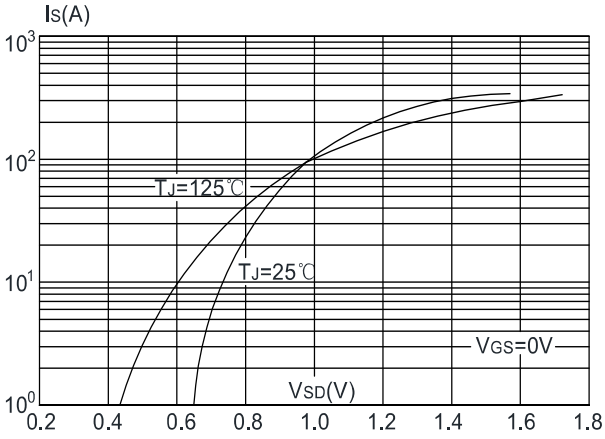


Figure 5: Gate Charge Characteristics

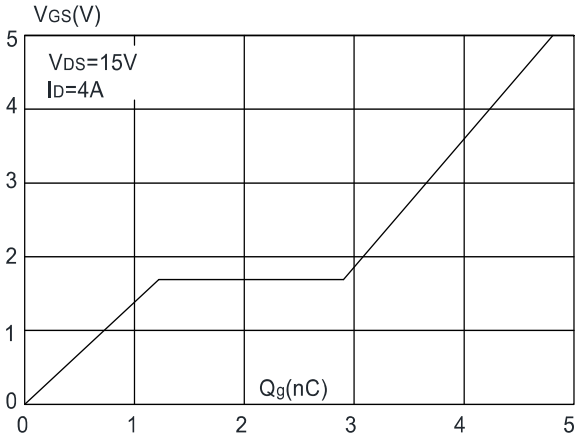


Figure 6: Capacitance Characteristics

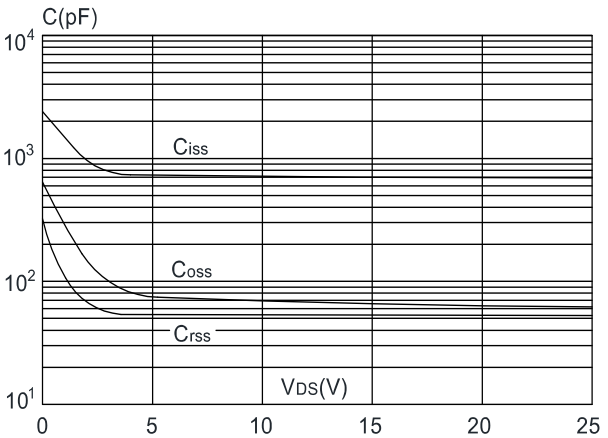


Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

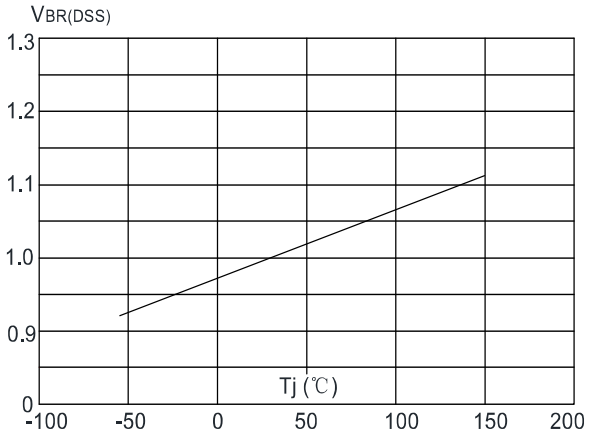


Figure 8: Normalized on Resistance vs. Junction Temperature

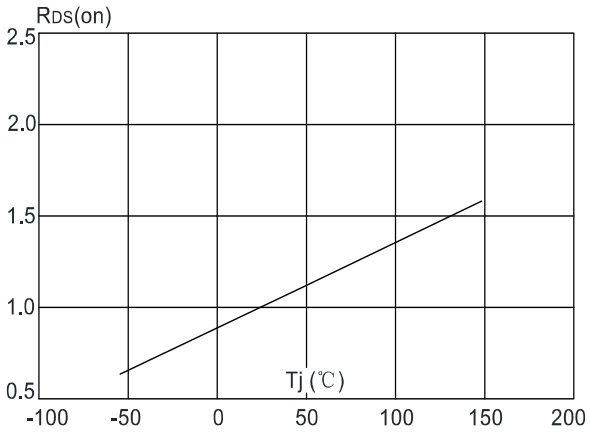


Figure 9: Maximum Safe Operating Area

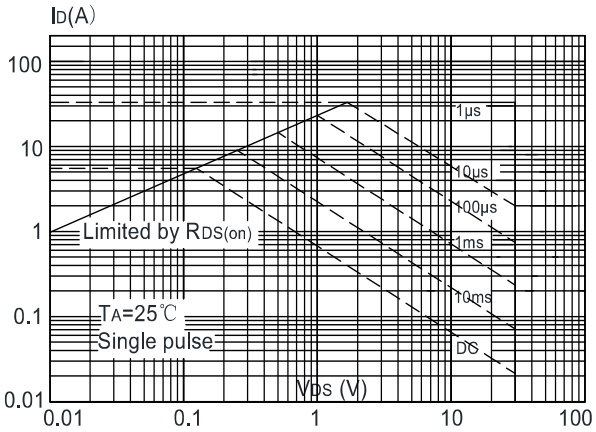


Figure 10: Maximum Continuous Drain Current vs. Ambient Temperature

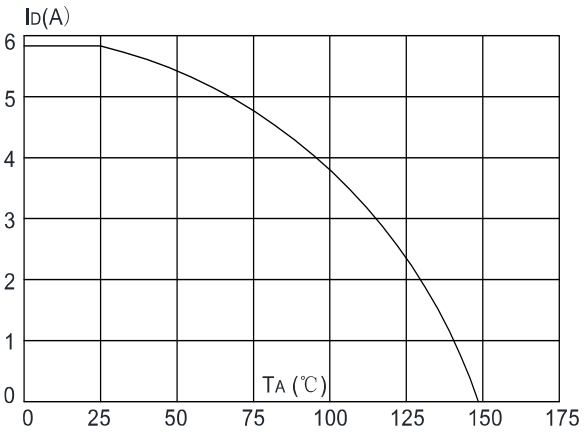
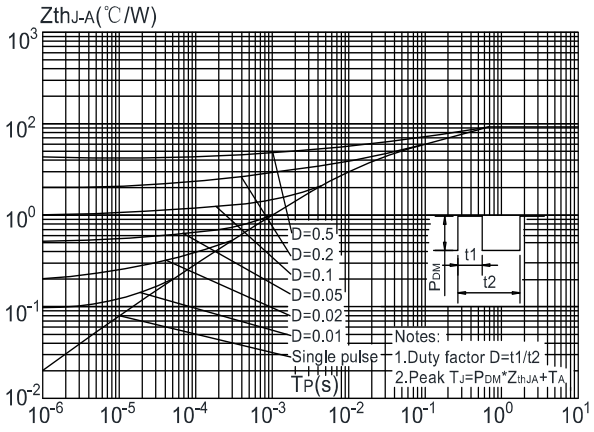


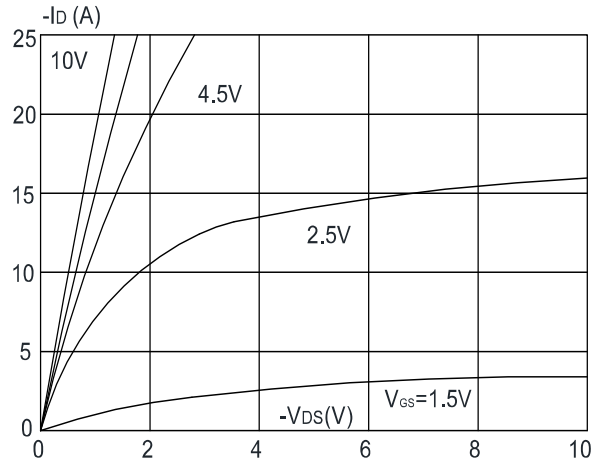
Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Ambient



P-Channel

Electrical Characteristics Curves

Figure1: Output Characteristics



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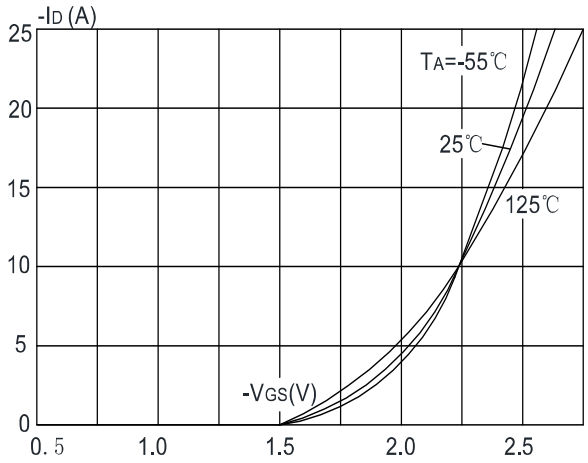

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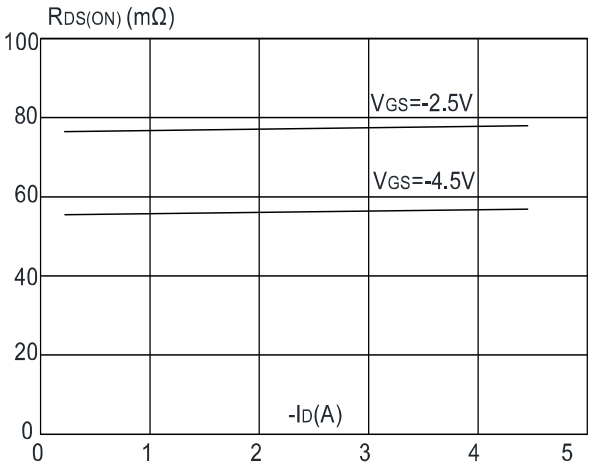
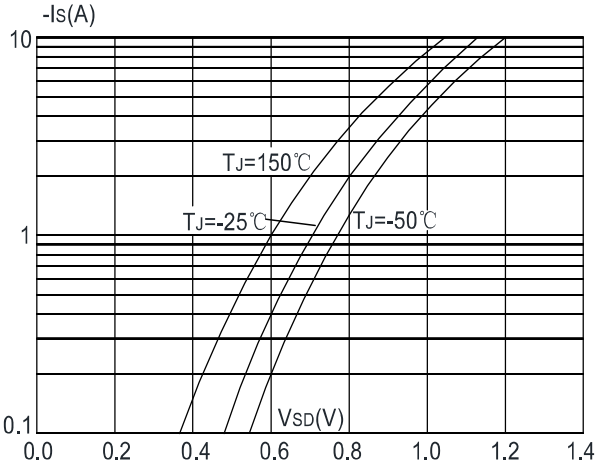


Figure 4: Body Diode Characteristics



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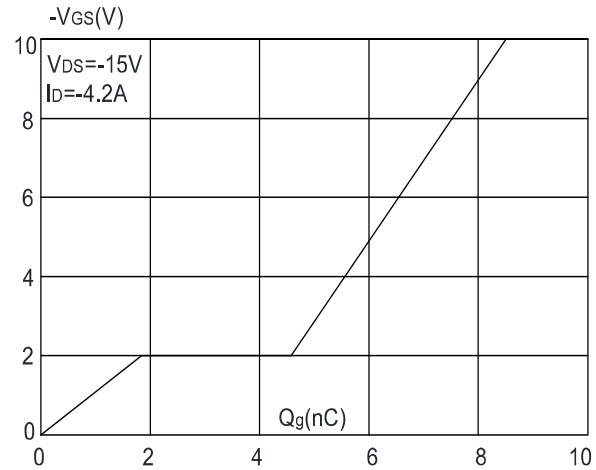

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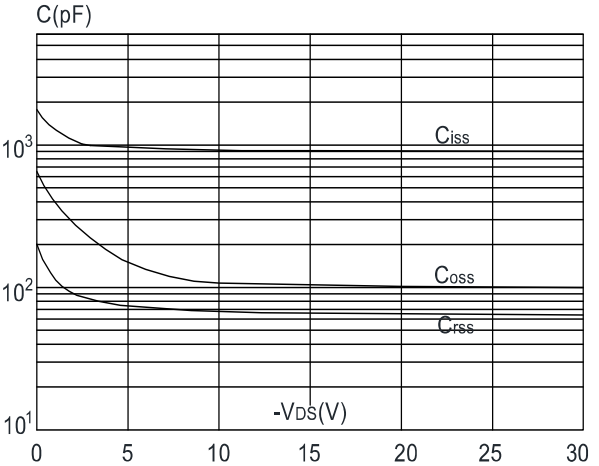

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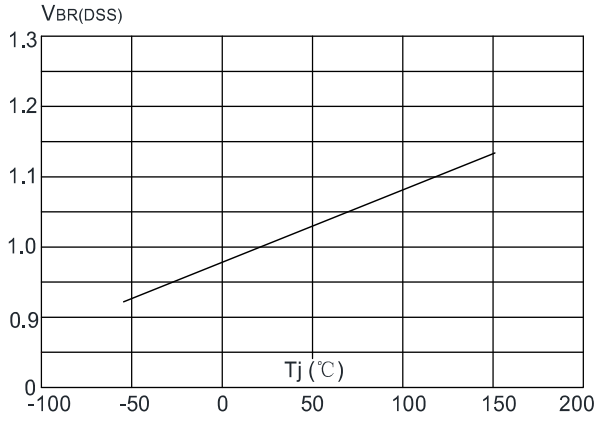

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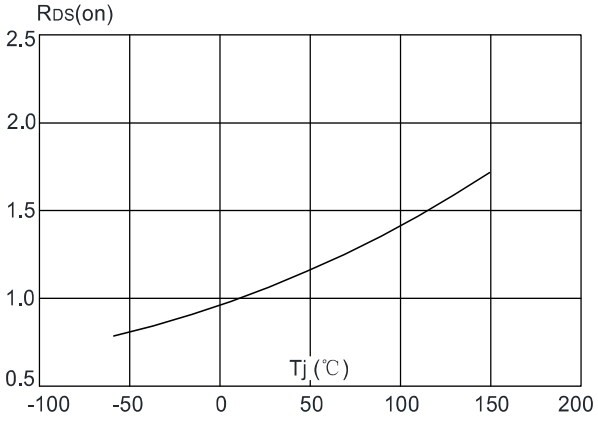
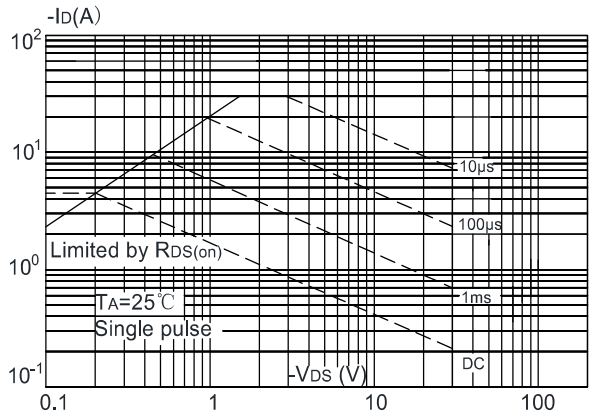


Figure 9: Maximum Safe Operating Area



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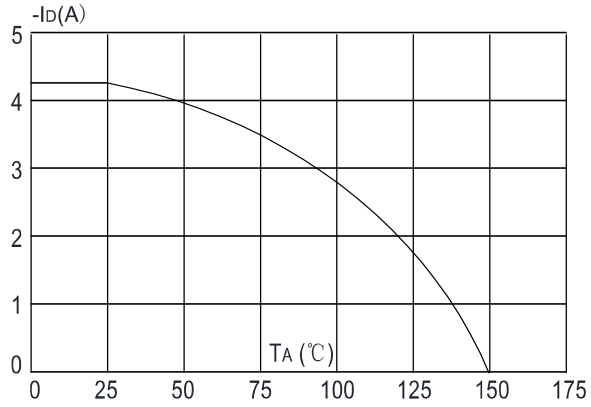
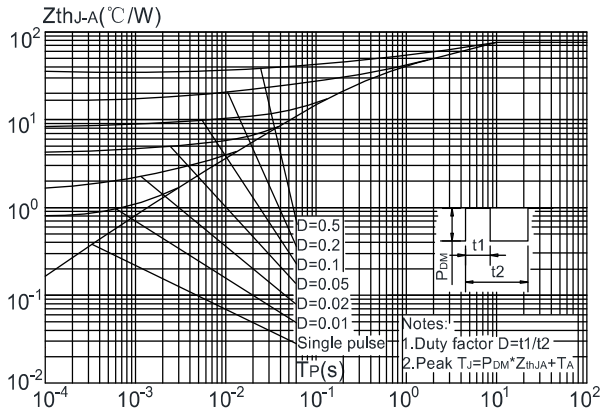


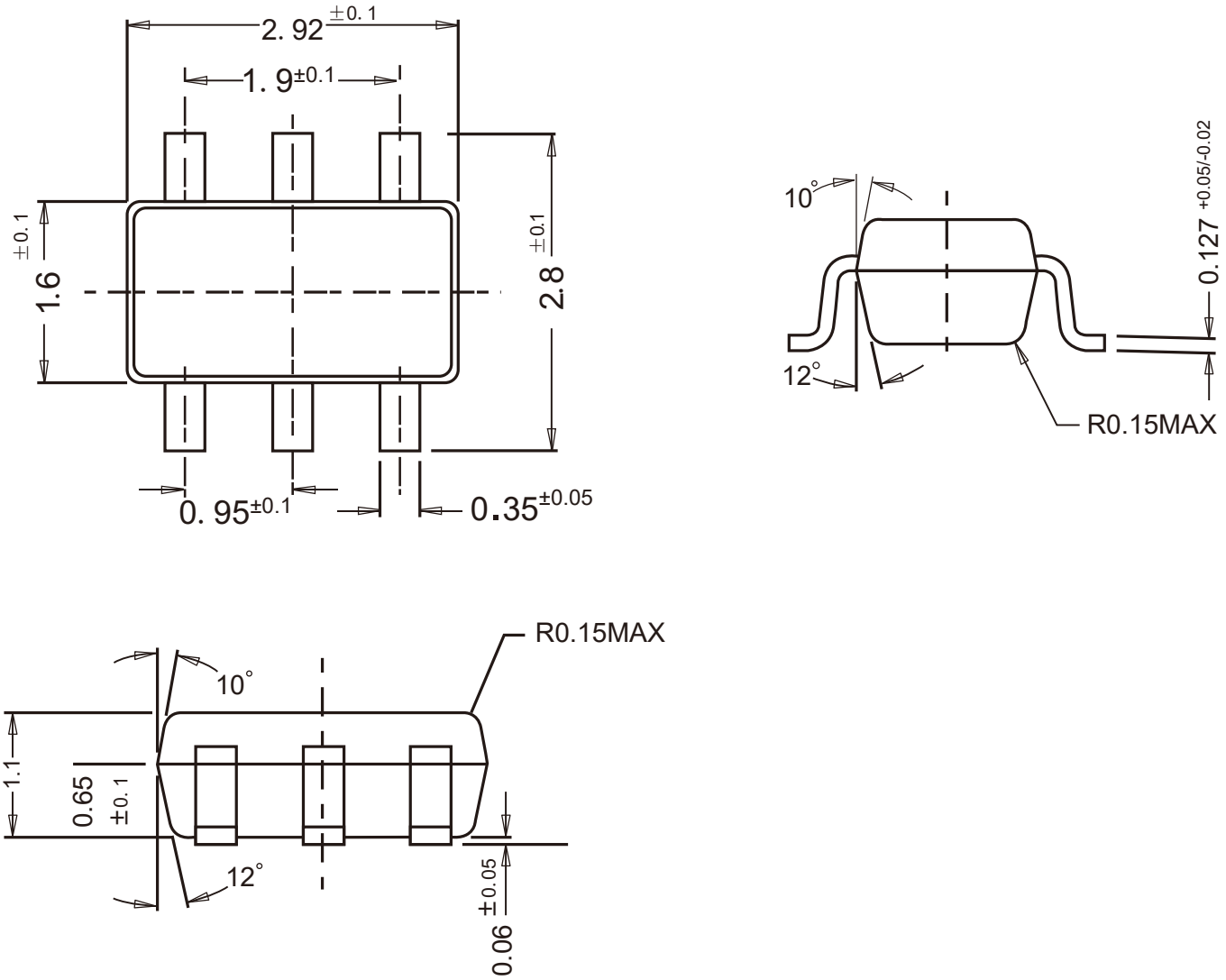
Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Ambient



Package Outline

SOT-23-6

Dimensions in mm

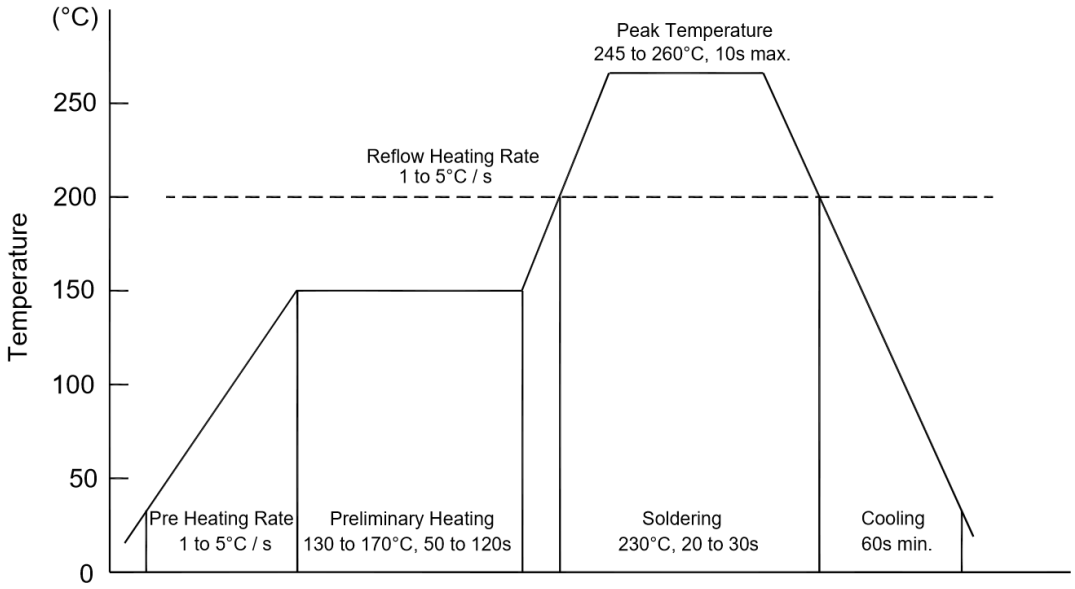


Ordering Information

Device	Package	Shipping
TN6847CSG	SOT-23-6	3,000PCS/Reel&7inches

Conditions of Soldering and Storage

◆ Recommended condition of reflow soldering



Recommended peak temperature is over 245 ^{O}C. If peak temperature is below 245 ^{O}C, you may adjust the following parameters:

- Time length of peak temperature (longer)
- Time length of soldering (longer)
- Thickness of solder paste (thicker)

◆ Conditions of hand soldering

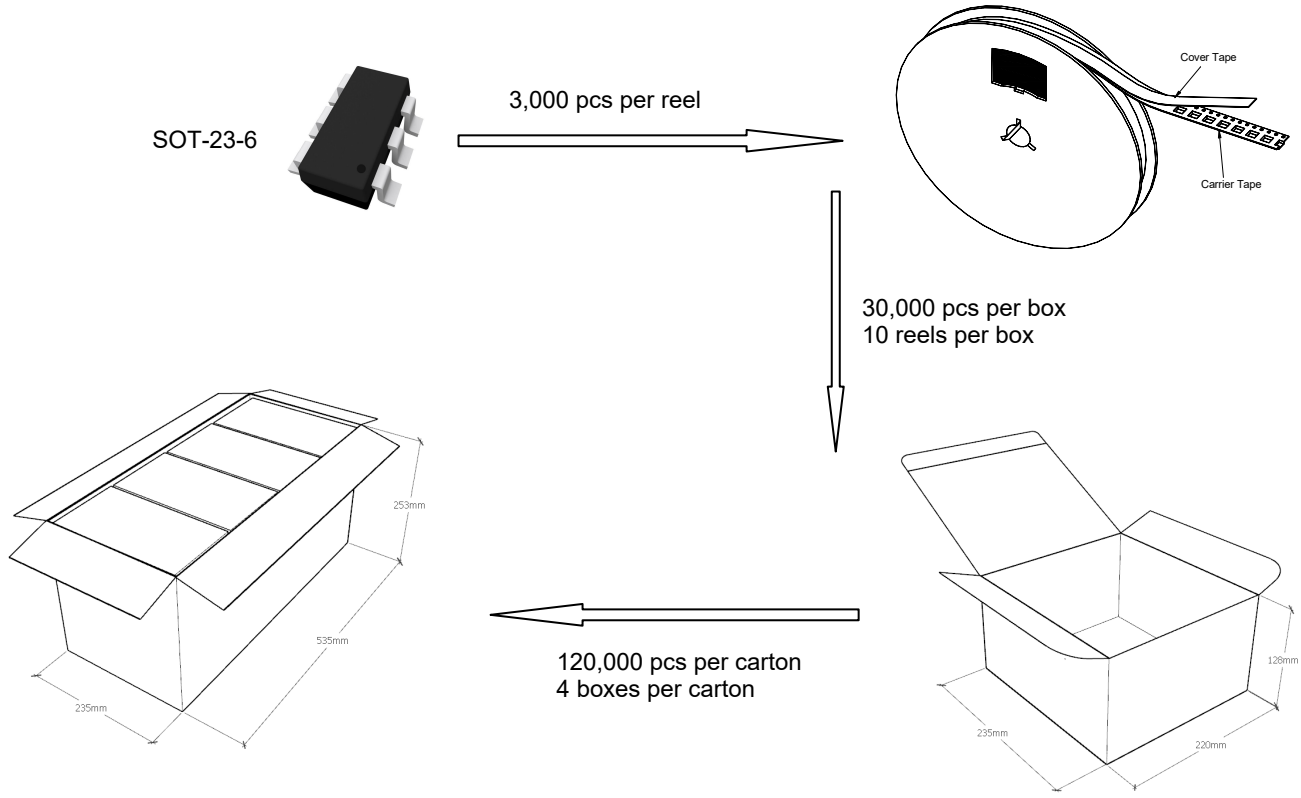
- Temperature: 370 ^{O}C
- Time: 3s max.
- Times: one time

◆ Storage conditions

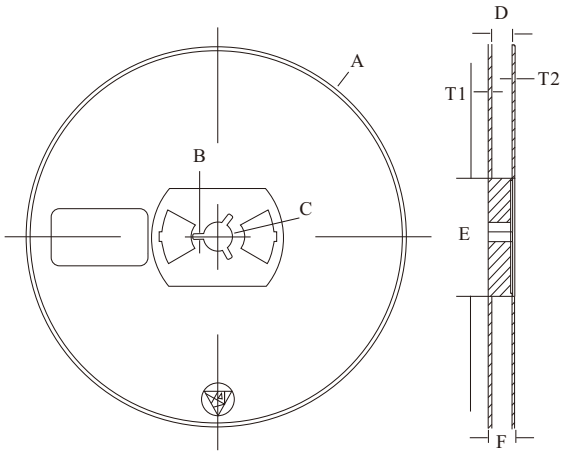
- **Temperature**
  5 to 40 ^{O}C
- **Humidity**
  30 to 80% RH
- **Recommended period**
  One year after manufacturing

Package Specifications

- The method of packaging

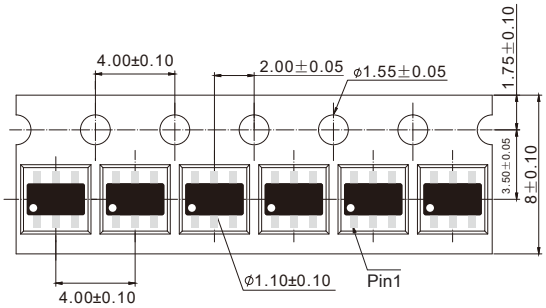


◆ Embossed tape and reel data



Symbol	Value (unit: mm)
A	Ø 177.8±1
B	2.7±0.2
C	Ø 13.5±0.2
E	Ø 54.5±0.2
F	12.3±0.3
D	9.6+2/-0.3
T1	1.0±0.2
T2	1.2±0.2

Reel (7")



Tape (8mm)

Contact Information

TANI website: **http://www.tanisemi.com** Email:tani@tanisemi.com

For additional information, please contact your local Sales Representative.

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Product Specification Statement

The product specification aims to provide users with a reference regarding various product parameters, performance, and usage. It presents certain aspects of the product's performance in graphical form and is intended solely for users to select product and make product comparisons, enabling users to better understand and evaluate the characteristics and advantages of the product. It does not constitute any commitment, warranty, or guarantee.

The product parameters described in the product specification are numerical values, characteristics, and functions obtained through actual testing or theoretical calculations of the product in an independent or ideal state. Due to the complexity of product applications and variations in test conditions and equipment, there may be slight fluctuations in parameter test values. TANI shall not guarantee that the actual performance of the product when installed in the customer's system or equipment will be entirely consistent with the product specification, especially concerning dynamic parameters. It is recommended that users consult with professionals for product selection and system design. Users should also thoroughly validate and assess whether the actual parameters and performance when installed in their respective systems or equipment meet their requirements or expectations. Additionally, users should exercise caution in verifying product compatibility issues, and TANI assumes no responsibility for the application of the product. TANI strives to provide accurate and up -to- date information to the best of our ability. However, due to technical, human, or other reasons, TANI cannot guarantee that the information provided in the product specification is entirely accurate and error-free. TANI shall not be held responsible for any losses or damages resulting from the use or reliance on any information in these product specifications.

TANI reserves the right to revise or update the product specification and the products at any time without prior notice, and the user's continued use of the product specification is considered an acceptance of these revisions and updates. Prior to purchasing and using the product, users should verify the above information with TANI to ensure that the prod uct specification is the most current, effective, and complete. If users are particularly concerned about product parameters, please consult TANI in detail or request relevant product test reports. Any data not explicitly mentioned in the product specification shall be subject to separate agreement.

Users are advised to pay attention to the parameter limit values specified in the product specification and maintain a certain margin in design or application to ensure that the product does not exceed the parameter limit values defined in the product specification. This precaution should be taken to avoid exceeding one or more of the limit values, which may result in permanent irreversible damage to the product, ultimately affecting the quality and reliability of the system or equipment.

The design of the product is intended to meet civilian needs and is not guaranteed for use in harsh environments or precision equipment. It is not recommended for use in systems or equipment such as medical devices, aircraft, nuclear power, and similar systems, where failures in these systems or equipment could reasonably be expected to result in personal injury. TANI shall assume no responsibility for any consequences resulting from such usage.

Users should also comply with relevant laws, regulations, policies, and standards when using the product specification. Users are responsible for the risks and liabilities arising from the use of the product specification and must ensure that it is not used for illegal purposes. Additionally, users should respect the intellectual property rights related to the product specification and refrain from infringing upon any third- party legal rights. TANI shall assume no responsibility for any disputes or controv ersies arising from the above-mentioned issues in any form.