

200V N-Channel MOSFET

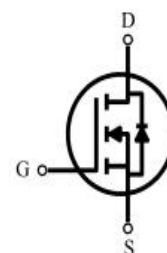
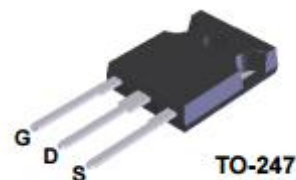
Features

- $V_{DS}=200V$ $I_D=50A$
- $R_{DS(ON)}=30m\Omega(Typ.)@V_{GS}=10V$
- Low On-Resistance
- Improved dv/dt capability
- Super Low Gate Charge
- 100% EAS Guaranteed
- Fast switching speed

Applications

- High frequency switching mode power supply(SMPS)
- Uninterruptible Power Supply (UPS)
- Power Factor Correction (PFC)

PIN DESCRIPTION



Part Number	Package	Marking	ROHS Status	Packing
SI200N05H	TO-247	SI200N05H	Pd-Free	Box(Tube)

Absolute Maximum Ratings ($T_c=25^\circ C$ unless otherwise noted)

Symbol	Parameter	Value	Unit
V_{DS}	Drain-Source Voltage	200	V
V_{GS}	Gate-Source Voltage	± 20	V
I_D	Continuous Drain Current	$T_c=25^\circ C$ 50	A
I_{DM}	Pulsed Drain Current	200	A
E_{AS}	Single Pulse Avalanche Energy	784	mJ
I_{AS}	Avalanche Current	39.5	A
E_{AR}	Repetitive Avalanche Energy	470	W
T_J, T_{stg}	Operating Junction and Storage Temperature Range	-55 to 150	$^\circ C$
P_D	Total Power Dissipation	$T_c=25^\circ C$ 34	W/ $^\circ C$

THERMAL RESISTANCE RATINGS

Symbol	Paramete	Typical	Max	Unit
$R_{\theta JA}$	Maximum Junction-to-Ambient	-	45	$^\circ C/W$
$R_{\theta JC}$	Maximum Junction-to-Case	-	0.5	

Electrical Characteristics (T_C=25°C unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	TYP.	Max.	Unit
Static Characteristics						
V _{(BRV)DSS}	Drain-source breakdown voltage	V _{GS} =0V, I _D = 250uA	200	-	-	V
V _{GS(th)}	Gate threshold voltage	V _{DS} =V _{GS} , I _D =250uA	2	-	4	V
I _{DSS}	Drain-Source Leakage Current	V _{DS} =200V, V _{GS} =0V	-	-	1	uA
I _{GSS}	Gate-source leakage current	V _{DS} =0V, V _{GS} =±20V	-	-	±100	nA
R _{DS(on)}	Drain-source on-state resistance	V _{GS} =10V, I _D =25A	-	30	-	mΩ
Dynamic Characteristic						
Q _g	Total Gate Charge	V _{GS} =10V, V _{DD} =160V I _D =50A	-	244	-	nC
Q _{gs}	Gate-Source Charge		-	16	-	nC
Q _{gd}	Gate-Drain Charge		-	144	-	nC
T _{d(on)}	Turn-on delay time	I _D =50A, V _{DD} =100V, R _G =25Ω, V _{GS} =10V	-	53	-	nS
T _r	Rise time		-	65	-	nS
T _{d(off)}	Turn-off delay time		-	689	-	nS
T _f	Fall time		-	230	-	nS
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =25V f=1.0MHz	-	3538	-	pF
C _{oss}	Output Capacitance		-	655	-	pF
C _{rss}	Reverse Transfer Capacitance		-	280	-	pF
Source-Drain Diode						
V _{SD}	Diode Forward Voltage	V _{GS} =0V, I _S =25A	-	-	1.5	V
I _{SM}	Maximum Pulsed Drain to Source Diode Forward Current		-	-	200	A
I _S	Maximum Continuous Drain to Source Diode Forward Current		-	-	50	A
T _{rr}	Reverse Recovery Time	V _{GS} =0V, I _F =10A, diF/dt=100A/μs	-	205	-	ns
Q _{rr}	Reverse Recovery Charge		-	2.04	-	uC

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Pulse Test: Pulse width ≤ 300μs, Duty Cycle ≤ 2% .
3. L=1mH, V_{DD}=30V, R_G=25 Ω, Starting T_J = 25 °C

Typical Characteristics ($T_J = 25^\circ\text{C}$, unless otherwise noted)

Figure 1. Output Characteristics ($T_J = 25^\circ\text{C}$)

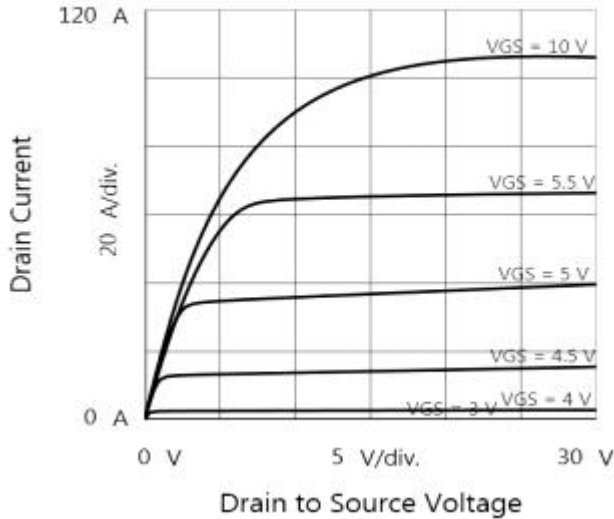


Figure 2. Transfer Characteristics

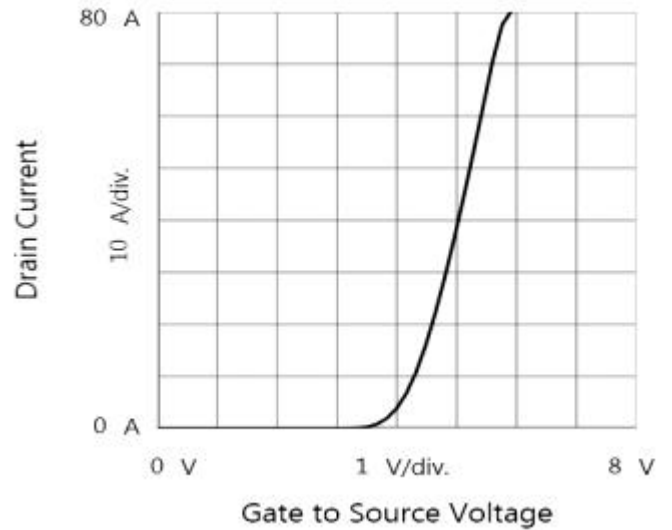


Figure 3. Maximum Continuous Drain Current vs Case Temperature

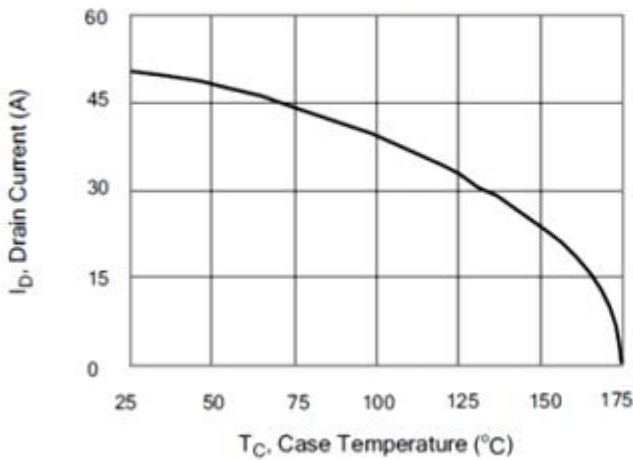


Figure 4. Drain to Source Voltage vs. Gate to Source Voltage

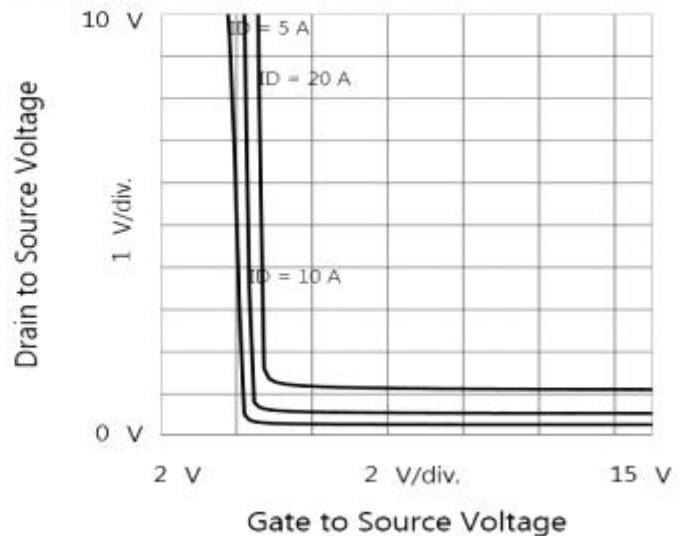


Figure 5 . Typical Breakdown Voltage vs Junction Temperature

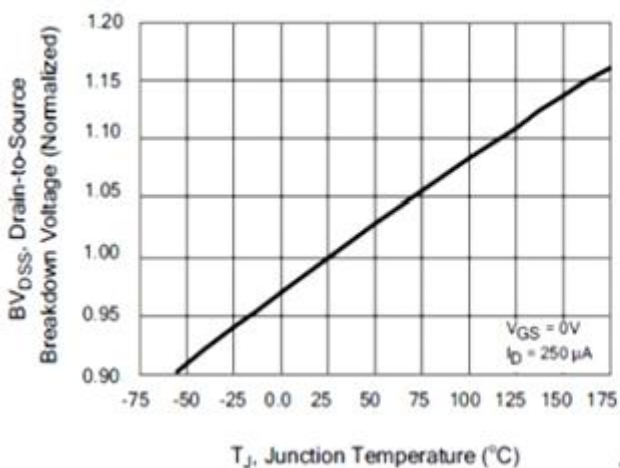
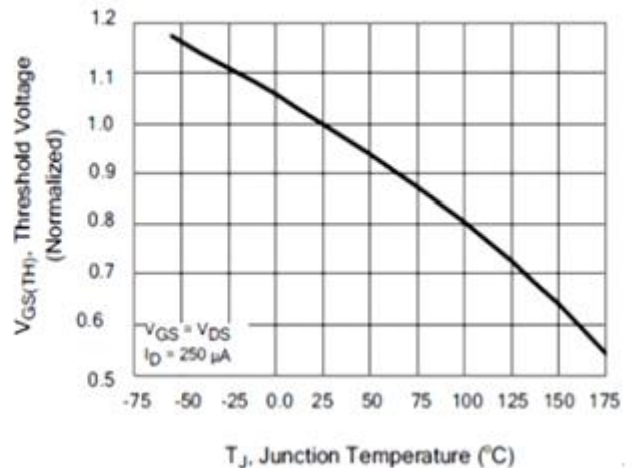


Figure 6 . Typical Threshold Voltage vs Junction Temperature



Switching Time Test Circuit and Wave forms

Figure A: Gate Charge Test Circuit and Waveform

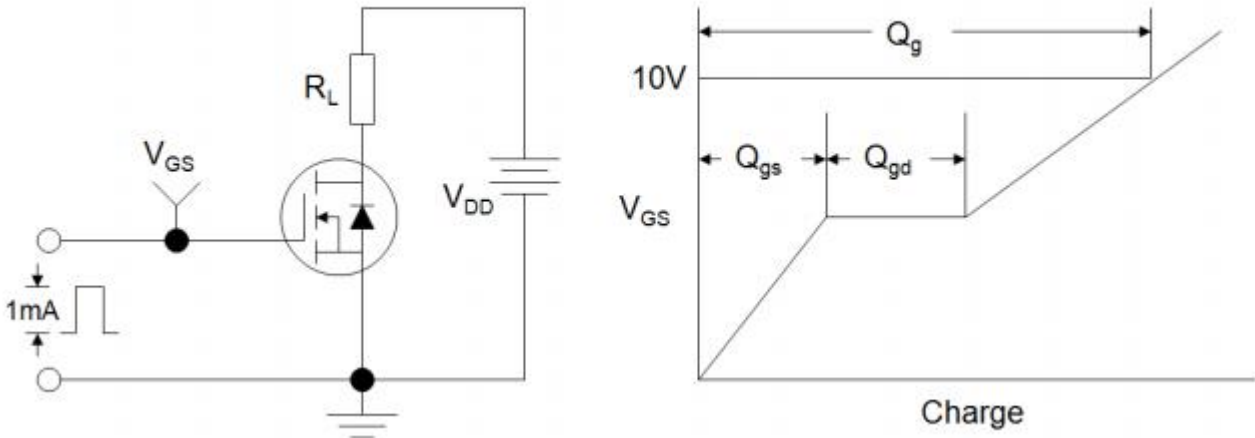


Figure B: Resistive Switching Test Circuit and Waveform

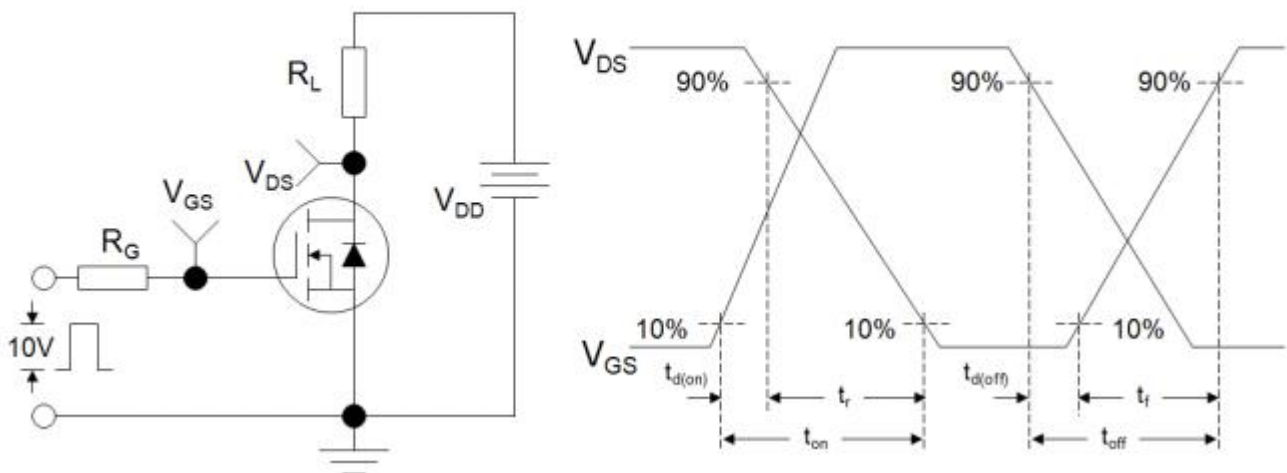
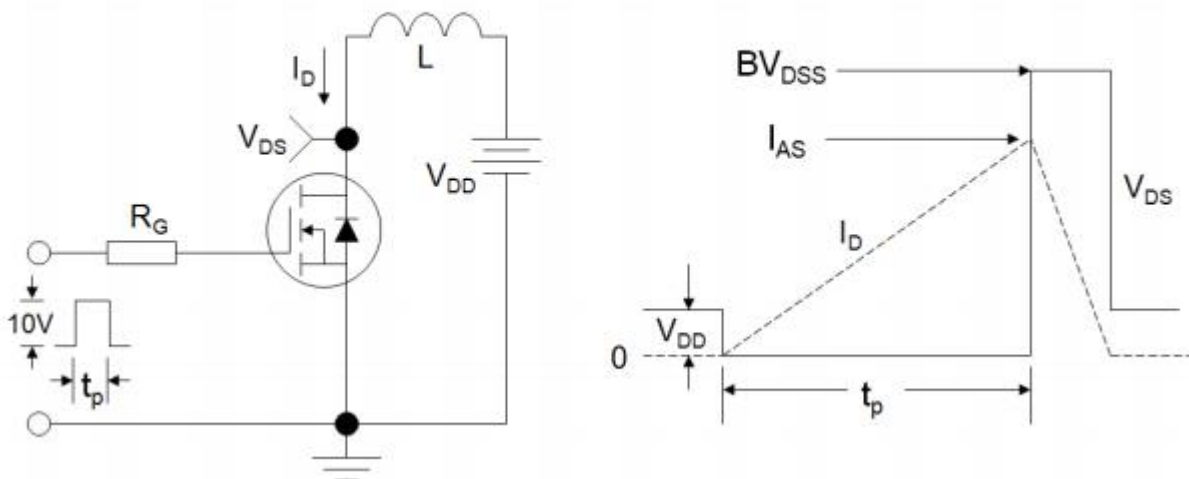
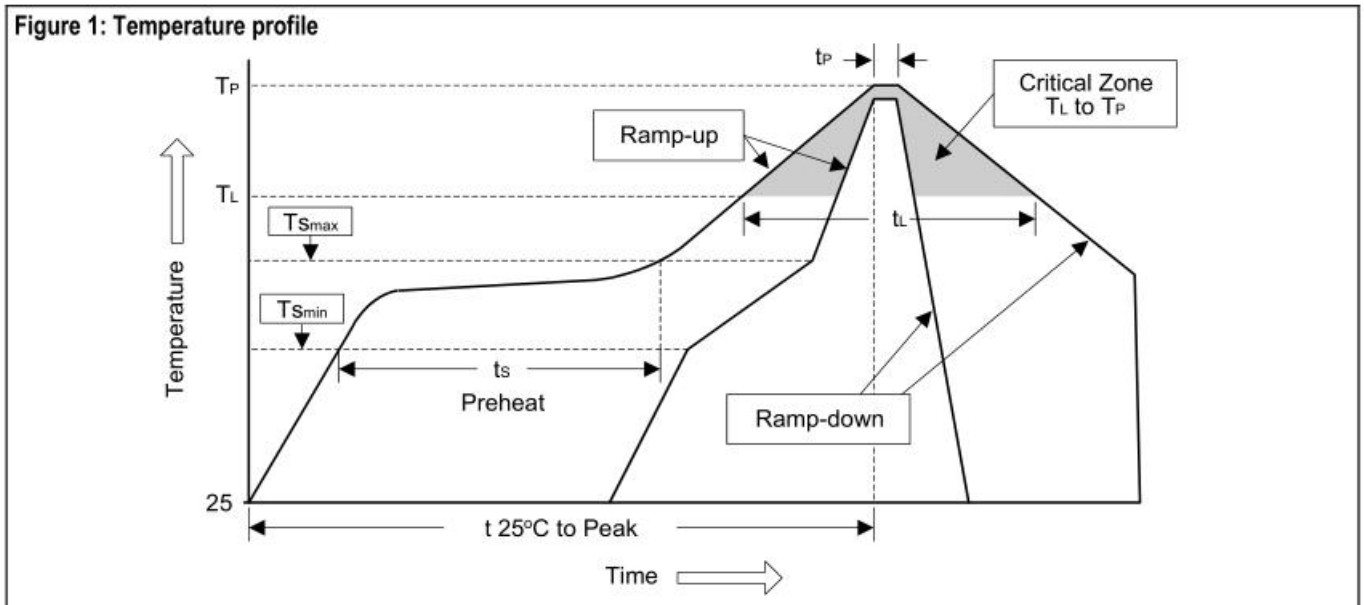


Figure C: Unclamped Inductive Switching Test Circuit and Waveform



Soldering Methods for Products

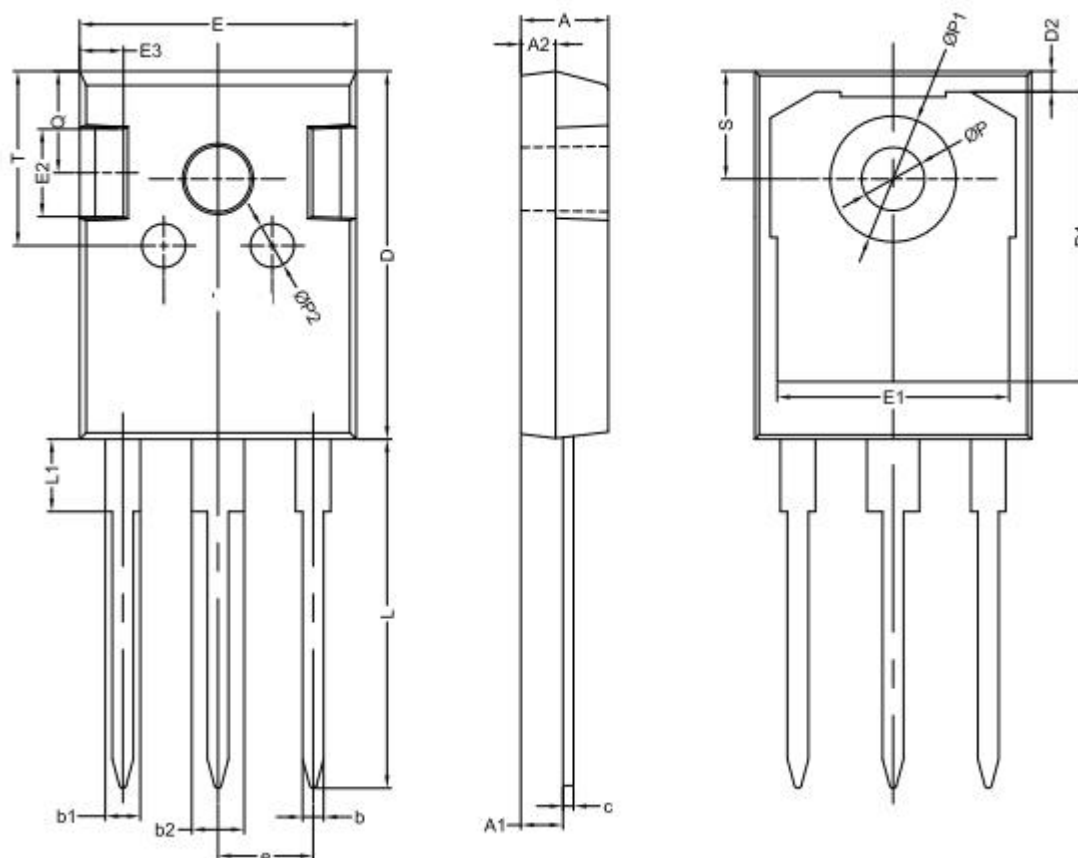
Profile Feature	Sn-Pb Eutectic Assembly	Pb-Free Assembly
Average ramp-up rate(TL to TP)	<3°C/sec	<3°C/sec
Preheat -Temperature Min(Ts min) -Temperature Max(Ts max) -Time(min to max)(ts)	- 100°C 150°C 60 to 120 sec	- 150°C 200°C 60 to 180 sec
Ts max to TL - ramp-up rate	<3°C/sec	<3°C/sec
Time maintained above: -Temperature(TL) -Time(TL)	183°C 60 to 150 sec	217°C 60 to 150 sec
Peak Temperature(TP)	240°C+0/-5°C	250°C+0/-5°C
Time within 5°C of actual Peak Temperature	10 to 30 sec	20 to 40 sec
Ramp-down Rate	<6°C/sec	<6°C/sec
Time 25 °C to Peak Temperature	<6 minutes	<8 minutes



- Note :**
- 1.Storage environment: Temperature=10°C to 35@Humidity=45%±15%
 - 2.Reflow soldering of surface-mount devices
 - 3.Flow(wave) soldering(solder dipping)

Products	Peak Temperature	Dipping Time
Pb devices	245°C±5°C	5sec±1sec
Pb-free devices	250°C+0/-5°C	5sec±1sec

Package Outline



unit: mm					
Symbol	Min	Max	Symbol	Min	Max
A	4.80	5.20	D2	1.20Typ.	
A1	2.21	2.61	E	15.60	16.0
A2	1.90	2.10	E1	13.30Typ.	
b	1.10	1.35	E2	5.00Typ.	
b1	2.00Typ.		e	5.44Typ.	
b2	3.00Typ.		L	19.42	20.42
C	0.55	0.75	L1	4.13Typ.	
D	20.80	21.20	P	3.50	3.70
D1	16.55Typ.		P1	-	7.40

■ Important Notice

Si-Trend reserves the right to change all product 、 product specifications and data without prior notice ; Our customer Please confirm to place an order confirmation before make the integrity of information complete and up-to-date ◦

Any semiconductor under specific conditions are possible to certain failure or malfunction rate ; Customers are responsible in the use of Si-Trend products to system design and manufacturing in compliance with safety standards and adopting safety measures , To avoid the potential risk of failure may cause the personal safety and property loss ◦

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■ Modify record

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20160215	A.0	original	7