

Si3861DV

Integrated Load Switch

General Description

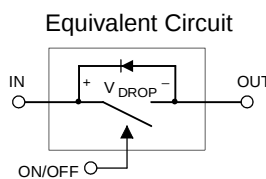
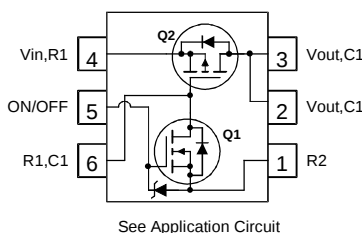
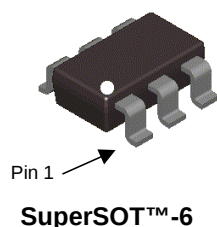
This device is particularly suited for compact power management in portable electronic equipment where 2.5V to 8V input and 2.8A output current capability are needed. This load switch integrates a small N-Channel power MOSFET (Q1) that drives a large P-Channel power MOSFET (Q2) in one tiny SuperSOT™-6 package.

Applications

- Load switch
- Power management

Features

- -2.8 A, -8 V. $R_{DS(ON)} = 55\text{ m}\Omega$ @ $V_{GS} = -4.5\text{ V}$
 $R_{DS(ON)} = 70\text{ m}\Omega$ @ $V_{GS} = -2.5\text{ V}$
 $R_{DS(ON)} = 100\text{ m}\Omega$ @ $V_{GS} = -1.8\text{ V}$
- Control MOSFET (Q1) includes Zener protection for ESD ruggedness (>6KV Human body model)
- High performance trench technology for extremely low $R_{DS(ON)}$



Absolute Maximum Ratings T_A=25°C unless otherwise noted

Symbol	Parameter	Ratings	Units
V_{IN}	Maximum Input Voltage	± 8	V
$V_{ON/OFF}$	High level ON/OFF voltage range	-0.5 to 8	V
I_{Load}	Load Current – Continuous (Note 1)	-2.8	A
	– Pulsed	-9	
P_D	Maximum Power Dissipation (Note 1)	0.7	W
T_J, T_{STG}	Operating and Storage Junction Temperature Range	-55 to +150	°C

Thermal Characteristics

$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient (Note 1)	180	°C/W
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case (Note 1)	60	°C/W

Package Marking and Ordering Information

Device Marking	Device	Reel Size	Tape width	Quantity
.861	Si3861DV	7"	8mm	3000 units

Electrical Characteristics $T_A = 25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
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Off Characteristics

BV_{IN}	Vin Breakdown Voltage	$V_{ON/OFF} = 0\text{ V}, I_D = -250\text{ }\mu\text{A}$	8			V
I_{Load}	Zero Gate Voltage Drain Current	$V_{IN} = 6.4\text{ V}, V_{ON/OFF} = 0\text{ V}$			-1	μA
I_{FL}	Leakage Current, Forward	$V_{ON/OFF} = 0\text{ V}, V_{IN} = 8\text{ V}$			-100	nA
I_{RL}	Leakage Current, Reverse	$V_{ON/OFF} = 0\text{ V}, V_{IN} = -8\text{ V}$			100	nA

On Characteristics (Note 2)

$V_{ON/OFF(th)}$	Gate Threshold Voltage	$V_{IN} = V_{ON/OFF}, I_D = -250\text{ }\mu\text{A}$	0.4	0.9	1.5	V
$R_{DS(on)}$	Static Drain-Source On-Resistance (Q2)	$V_{IN} = 4.5\text{ V}, I_D = -2.8\text{ A}$ $V_{IN} = 2.5\text{ V}, I_D = -2.5\text{ A}$ $V_{IN} = 1.8\text{ V}, I_D = -2.0\text{ A}$		34 45 64	55 70 100	$\text{m}\Omega$
$R_{DS(on)}$	Static Drain-Source On-Resistance (Q1)	$V_{IN} = 4.5\text{ V}, I_D = 0.4\text{ A}$ $V_{IN} = 2.7\text{ V}, I_D = 0.2\text{ A}$		3.1 3.8	4 5	Ω

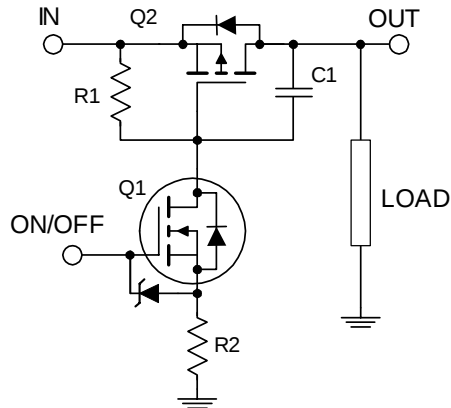
Drain-Source Diode Characteristics and Maximum Ratings

I_S	Maximum Continuous Drain-Source Diode Forward Current				-0.6	A
V_{SD}	Drain-Source Diode Forward Voltage	$V_{ON/OFF} = 0\text{ V}, I_S = -0.6\text{ A}$ (Note 2)			-1.2	V

Notes:

1. $R_{\theta JA}$ is the sum of the junction-to-case and case-to-ambient thermal resistance where the case thermal reference is defined as the solder mounting surface of the drain pins. $R_{\theta JC}$ is guaranteed by design while $R_{\theta JA}$ is determined by the user's board design.

2. Pulse Test: Pulse Width < 300 μs , Duty Cycle < 2.0%.

Si3861DV Load Switch Application Circuit**External Component Recommendation:**

For additional in-rush current control, R2 and C1 can be added. For more information, see application note AN1030.

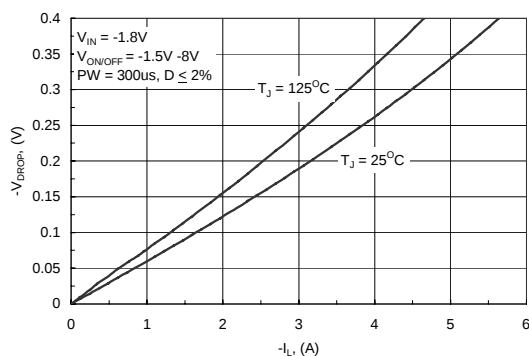


Figure 1. Conduction Voltage Drop Variation with Load Current.

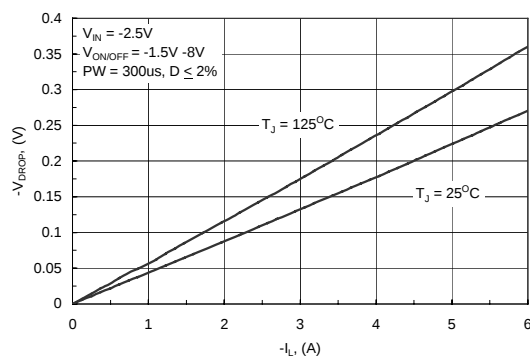


Figure 2. Conduction Voltage Drop Variation with Load Current.

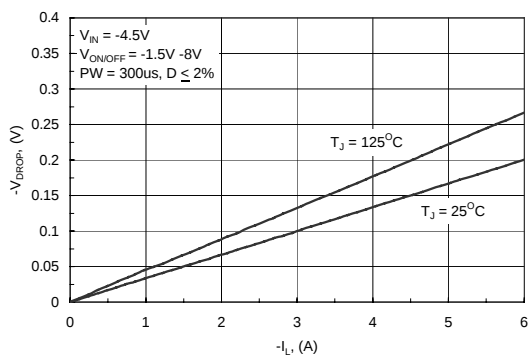


Figure 3. Conduction Voltage Drop Variation with Load Current.

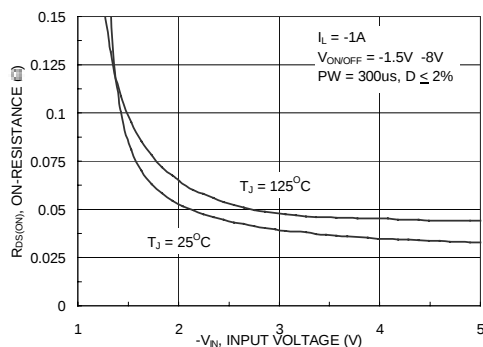
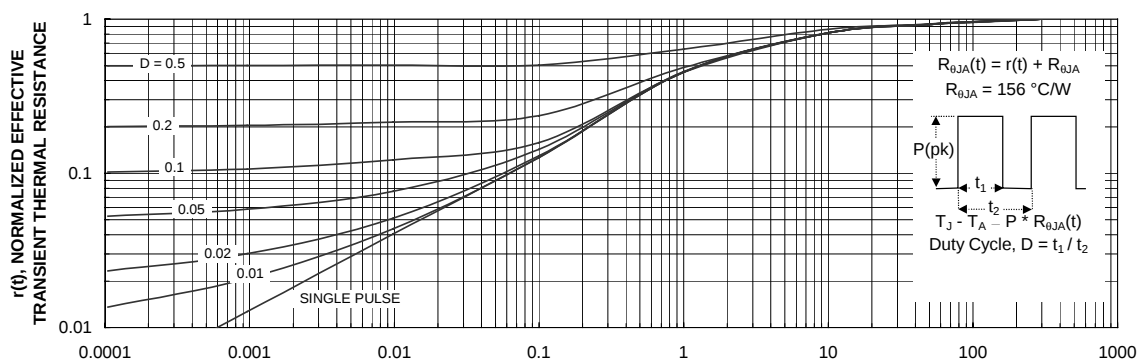


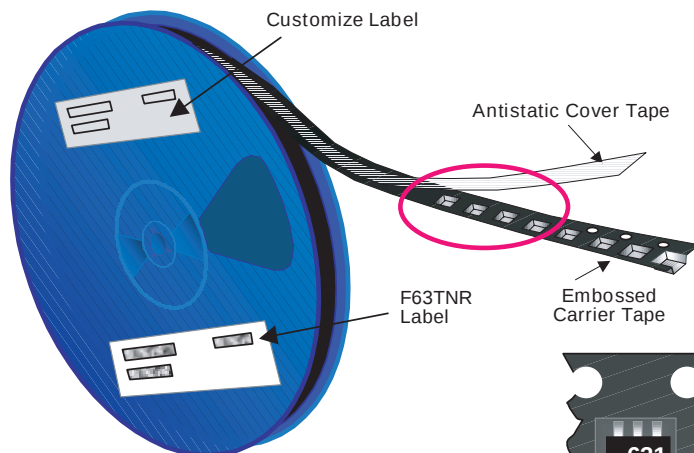
Figure 4. On-Resistance Variation With Input Voltage



SuperSOT™-6 Tape and Reel Data



SSOT-6 Packaging Configuration: Figure 1.0

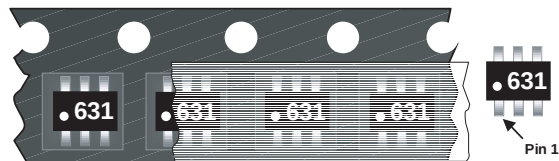


Packaging Description:

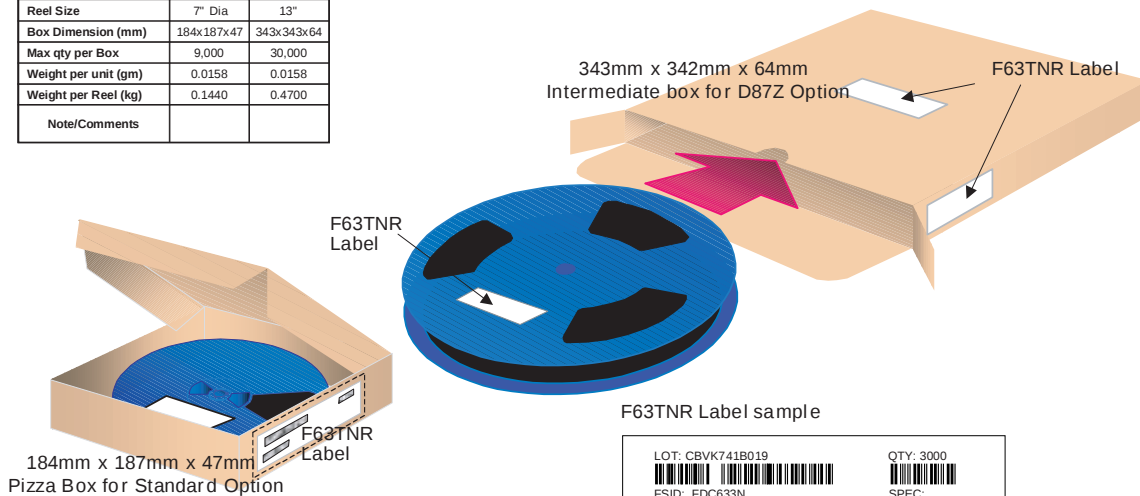
SSOT-6 parts are shipped in tape. The carrier tape is made from a dissipative (carbon filled) polycarbonate resin. The cover tape is a multilayer film (Heat Activated Adhesive in nature) primarily composed of polyester film, adhesive layer, sealant, and anti-static sprayed agent. These reeled parts in standard option are shipped with 3,000 units per 7" or 177cm diameter reel. The reels are dark blue in color and is made of polystyrene plastic (anti-static coated). Other option comes in 10,000 units per 13" or 330cm diameter reel. This and some other options are described in the Packaging Information table.

These full reels are individually barcode labeled and placed inside a pizza box (illustrated in figure 1.0) made of recyclable corrugated brown paper with a Fairchild logo printing. One pizza box contains three reels maximum. And these pizza boxes are placed inside a barcode labeled shipping box which comes in different sizes depending on the number of parts shipped.

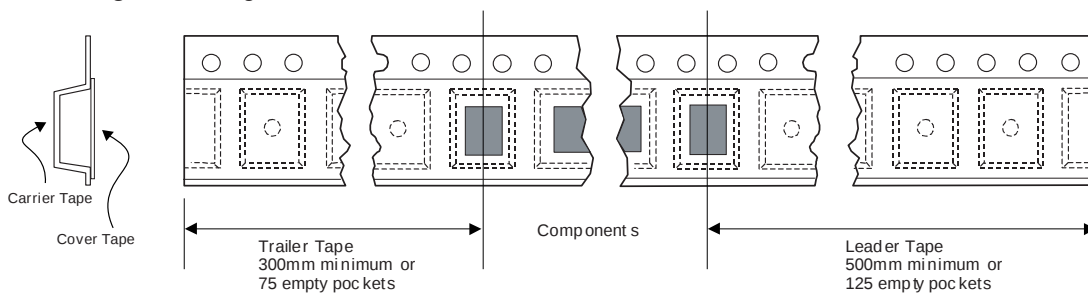
SSOT-6 Packaging Information		
Packaging Option	Standard (no flow code)	D87Z
Packaging type	TNR	TNR
Qty per Reel/Tube/Bag	3,000	10,000
Reel Size	7" Dia	13"
Box Dimension (mm)	184x187x47	343x343x64
Max qty per Box	9,000	30,000
Weight per unit (gm)	0.0158	0.0158
Weight per Reel (kg)	0.1440	0.4700
Note/Comments		



SSOT-6 Unit Orientation



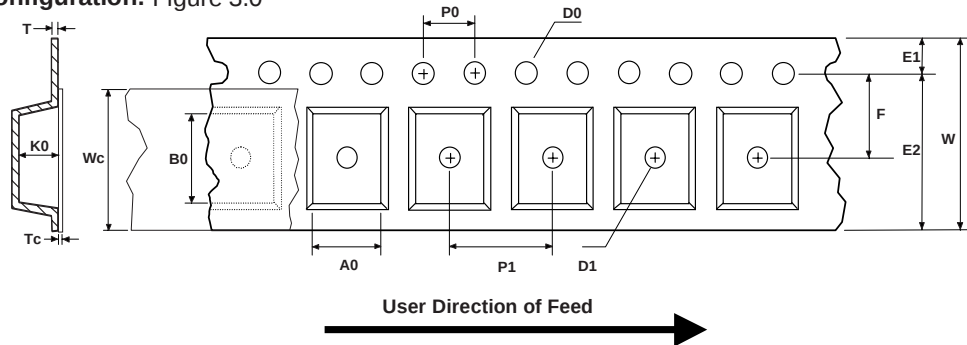
SSOT-6 Tape Leader and Trailer Configuration: Figure 2.0



SuperSOT™-6 Tape and Reel Data, continued

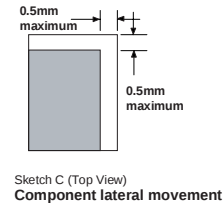
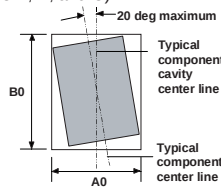
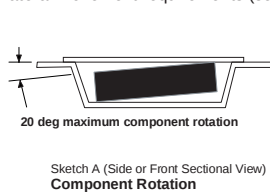
SSOT-6 Embossed Carrier Tape

Configuration: Figure 3.0

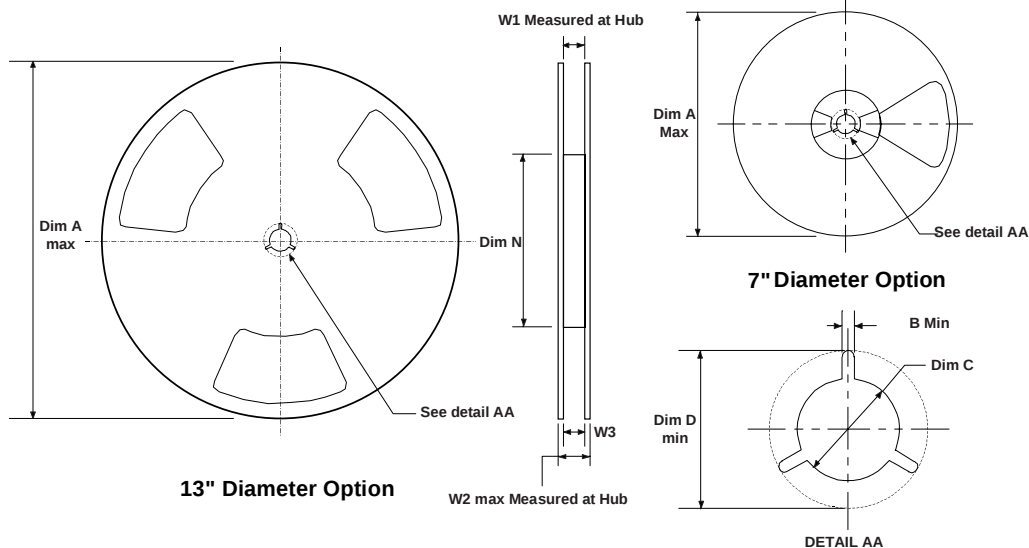


Dimensions are in millimeter														
Pkg type	A0	B0	W	D0	D1	E1	E2	F	P1	P0	K0	T	Wc	Tc
SSOT-6 (8mm)	3.23 +/-0.10	3.18 +/-0.10	8.0 +/-0.3	1.55 +/-0.05	1.125 +/-0.125	1.75 +/-0.10	6.25 min	3.50 +/-0.05	4.0 +/-0.1	4.0 +/-0.1	1.37 +/-0.10	0.255 +/-0.150	5.2 +/-0.3	0.06 +/-0.02

Notes: A0, B0, and K0 dimensions are determined with respect to the EIA/Jedec RS-481 rotational and lateral movement requirements (see sketches A, B, and C).



SSOT-6 Reel Configuration: Figure 4.0

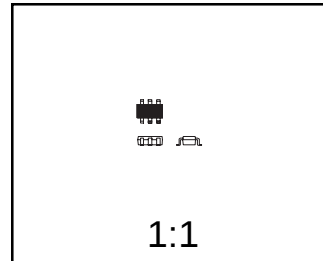
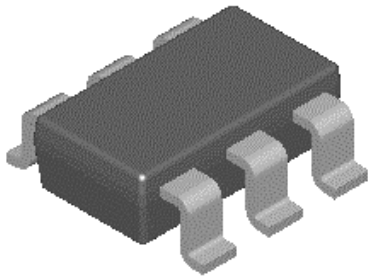


Dimensions are in inches and millimeters									
Tape Size	Reel Option	Dim A	Dim B	Dim C	Dim D	Dim N	Dim W1	Dim W2	Dim W3 (LSL-USL)
8mm	7" Dia	7.00 177.8	0.059 1.5	512 +0.020/-0.008 13 +0.5/-0.2	0.795 20.2	2.165 55	0.331 +0.059/-0.000 8.4 +1.5/0	0.567 14.4	0.311 - 0.429 7.9 - 10.9
8mm	13" Dia	13.00 330	0.059 1.5	512 +0.020/-0.008 13 +0.5/-0.2	0.795 20.2	4.00 100	0.331 +0.059/-0.000 8.4 +1.5/0	0.567 14.4	0.311 - 0.429 7.9 - 10.9

SuperSOT™-6 Package Dimensions



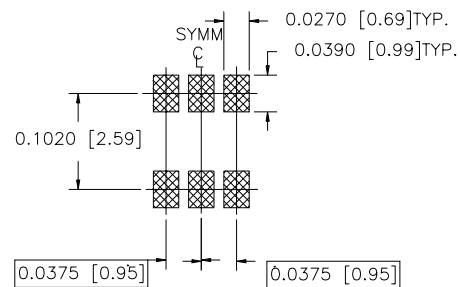
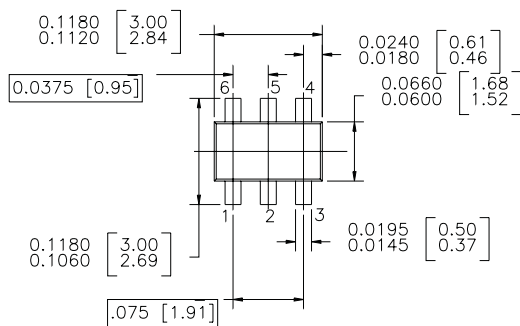
SuperSOT™-6 (FS PKG Code 31, 33)



Scale 1:1 on letter size paper

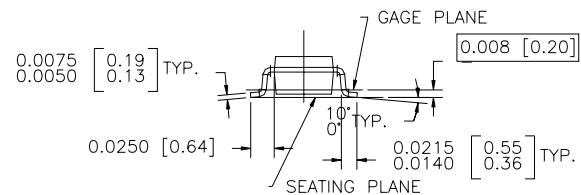
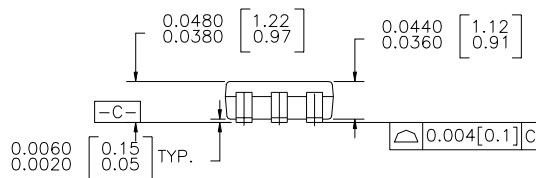
Dimensions shown below are in:
inches [millimeters]

Part Weight per unit (gram): 0.0158



LAND PATTERN RECOMMENDATION

CONTROLLING DIMENSION IS INCH
VALUES IN [] ARE MILLIMETERS



SUPER SOT 6 LEADS

NOTES : UNLESS OTHERWISE SPECIFIED

1.0 STANDARD LEAD FINISH : 150 MICROINCHES 93.81 MICROMETERS)
MINIMUM TIN / LEAD (SOLDER) ON COPPER.

2.0 NO JEDEC REGISTRATION AS OF JULY 1996

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CROSSVOLT TM	GTO TM	QFET TM	SyncFET TM
DenseTrench TM	HiSeC TM	QS TM	TinyLogic TM
DOME TM	ISOPLANAR TM	QT Optoelectronics TM	UHC TM
EcoSPARK TM	LittleFET TM	Quiet Series TM	UltraFET [®]
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EnSigna TM	MICROWIRE TM	SMART START TM	
FACT TM	OPTOLOGIC TM	Star* Power TM	
FACT Quiet Series TM	OPTOPLANAR TM	Stealth TM	

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