

FDR8521L

P-Channel MOSFET With Gate Driver For Load Switch Application

General Description

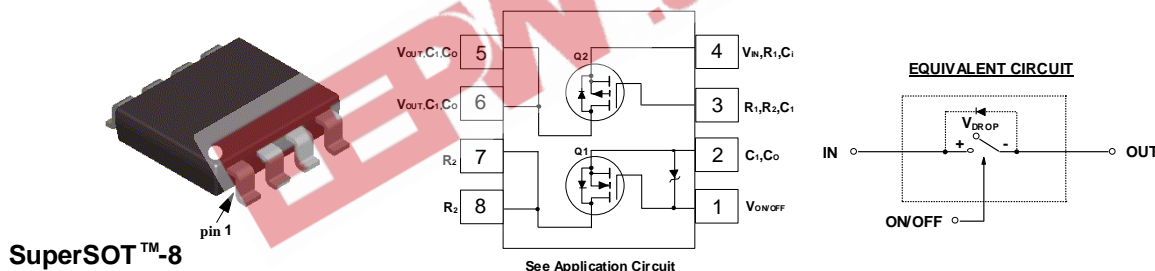
This device is designed for configuration as a load switch and is particularly suited for power management in portable battery powered electronic equipment. Designed to operate from 3V to 20V input and supply up to 2.9A, the device features a small N-Channel MOSFET (Q1) together with a large P-Channel Power MOSFET (Q2) in a single SO-8 package.

Applications

- Power management
- Load switch

Features

- $V_{\text{DROP}} = 0.07 \text{ V} @ V_{\text{IN}} = 12 \text{ V}, I_{\text{L}} = 1 \text{ A}, R_{\text{(ON)}} = 0.07 \Omega$
 $V_{\text{DROP}} = 0.115 \text{ V} @ V_{\text{IN}}^{\text{IN}} = 5 \text{ V}, I_{\text{L}}^{\text{L}} = 1 \text{ A}, R_{\text{(ON)}} = 0.115 \Omega.$
- $V_{\text{DROP}} = 0.2 \text{ V} @ V_{\text{IN}} = 12 \text{ V}, I_{\text{L}} = 2.9 \text{ A}, R_{\text{(ON)}} = 0.07 \Omega$
 $V_{\text{DROP}} = 0.2 \text{ V} @ V_{\text{IN}}^{\text{IN}} = 5 \text{ V}, I_{\text{L}}^{\text{L}} = 1.8 \text{ A}, R_{\text{(ON)}} = 0.115 \Omega.$
- Control MOSFET (Q1) includes Zener protection for ESD ruggedness (>6kV Human Body Model).
- High density cell design for extremely low on-resistance.



Absolute Maximum Ratings

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

Symbol	Parameter	Ratings	Units
V_{IN}	Input Voltage Range (Note 1)	3 - 20	V
$V_{\text{ON/OFF}}$	On/Off Voltage Range	2.5 - 8	V
I_{D}	Load Current - Continuous (Note 2)	2.9	A
	- Pulsed	8	
P_{D}	Maximum Power Dissipation (Note 2)	0.8	W
$T_{\text{J}}, T_{\text{stg}}$	Operating and Storage Temperature Range	-55 to +150	$^\circ\text{C}$
ESD	Electrostatic Discharge Rating MIL-STD-883D Human-Body-Model (100pf/1500 Ohm)	6	kV

Thermal Characteristics

$R_{\theta\text{JA}}$	Thermal Resistance, Junction-to-Ambient (Note 2)	156	$^\circ\text{C/W}$
$R_{\theta\text{JC}}$	Thermal Resistance, Junction-to-Case (Note 2)	40	$^\circ\text{C/W}$

Package Marking and Ordering Information

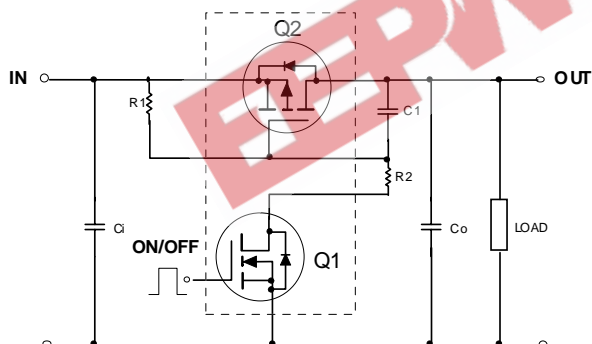
Device Marking	Device	Reel Size	Tape width	Quantity
8521L	FDR8521L	13"	12mm	3000 units

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

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
OFF Characteristics						
I_{FL}	Forward Leakage Current	$V_{IN} = 20\text{ V}$, $V_{ON/OFF} = 250\ \mu\text{A}$			1	μA
ON Characteristics (Note 3)						
V_{DROP}	Conduction Voltage	$V_{IN} = 12\text{ V}$, $V_{ON/OFF} = 3.3\text{ V}$, $I_L = 1\text{ A}$ $V_{IN} = 5\text{ V}$, $V_{ON/OFF} = 3.3\text{ V}$, $I_L = 1\text{ A}$ $V_{IN} = 12\text{ V}$, $V_{ON/OFF} = 3.3\text{ V}$, $I_L = 2.9\text{ A}$ $V_{IN} = 5\text{ V}$, $V_{ON/OFF} = 3.3\text{ V}$, $I_L = 1.8\text{ A}$		0.053 0.085	0.070 0.115 0.200 0.200	V
$R_{(ON)}$	Q_2 - Static On-Resistance	$V_{GS} = -12\text{ V}$, $I_D = 2.9\text{ A}$ $V_{GS} = -5\text{ V}$, $I_D = 1.8\text{ A}$		0.054 0.090	0.070 0.115	Ω
I_L	Load Current	$V_{DROP} = 0.2\text{ V}$, $V_{IN} = 12\text{ V}$, $V_{ON/OFF} = 3.3\text{ V}$ $V_{DROP} = 0.2\text{ V}$, $V_{IN} = 5\text{ V}$, $V_{ON/OFF} = 3.3\text{ V}$	2.9 1.8			A

Notes:

- Range of V_{IN} can be up to 25V, but R_1 and R_2 must be scaled such that V_{GS} of Q_2 does not exceed -20V.
- $R_{\theta JA}$ 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.
- Pulse Test: Pulse Width < 300 μs , Duty Cycle < 2.0%.

FDR8521L Load Switch Application**APPLICATION CIRCUIT****External Component Recommendation:**

For applications where $C_o \leq 1\ \mu\text{F}$.

For slew rate control, select R_2 in the range of 470 - 10k Ω .

For additional in-rush current control, $C_1 \leq 1000\text{pF}$ can be added.

Select R_1 so that the R_1/R_2 ratio ranges from 10 - 100. R_1 is required to turn Q_2 off.

Typical Characteristics (continued)

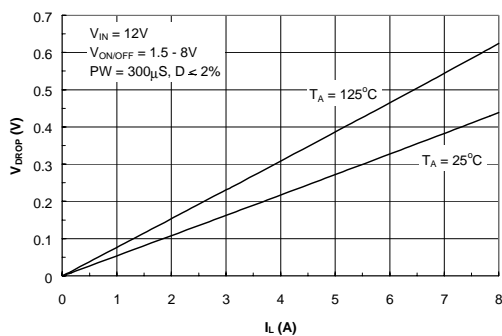


Figure 1. Conduction Voltage Drop Variation with Load Current.

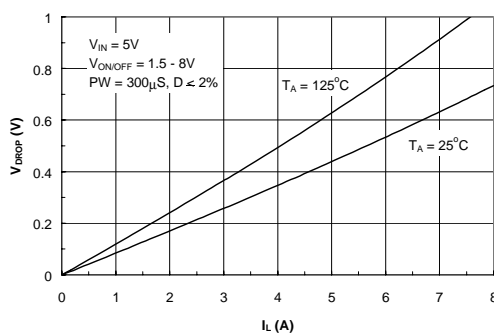


Figure 2. Conduction Voltage Drop Variation with Load Current.

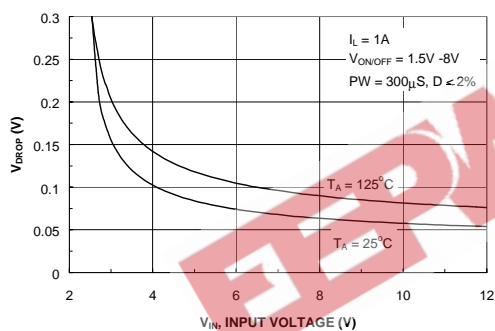


Figure 3. On-Resistance Variation with Input Voltage.

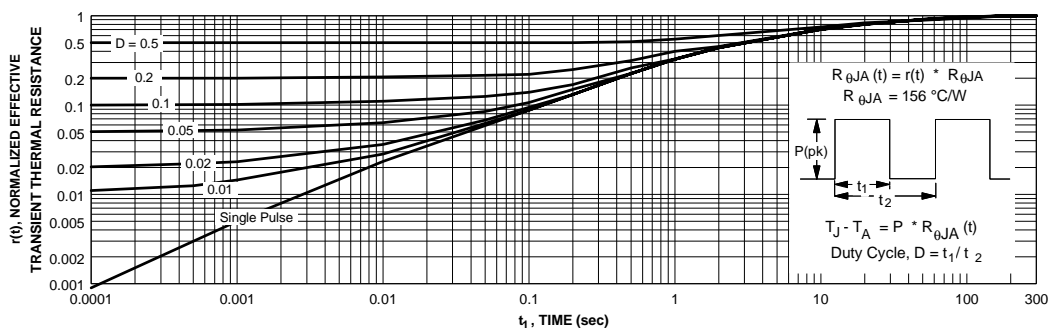


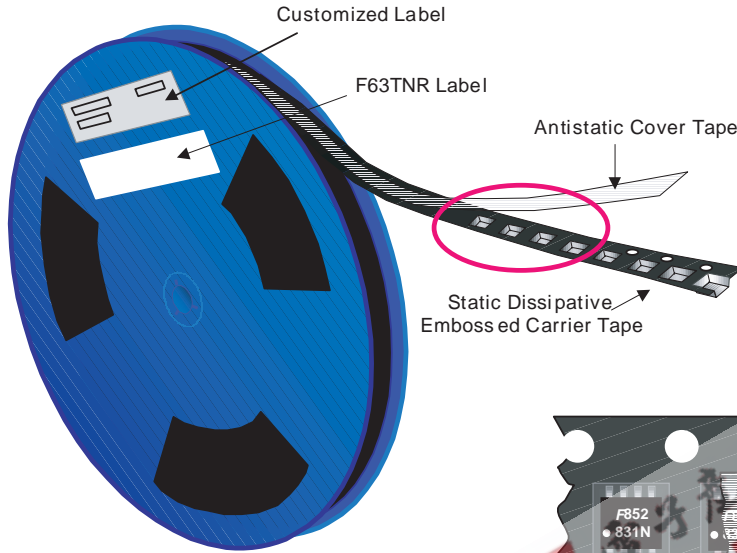
Figure 4. Transient Thermal Response Curve.

Thermal characterization performed using the conditions described in Note 2. Transient thermal response will change depending on the circuit board design.

SuperSOT™-8 Tape and Reel Data and Package Dimensions



SSOT-8 Packaging Configuration: Figure 1.0



Packaging Description:

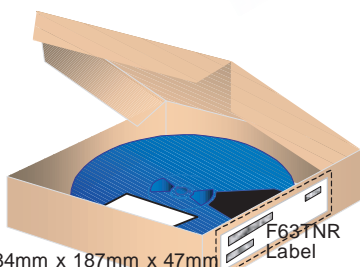
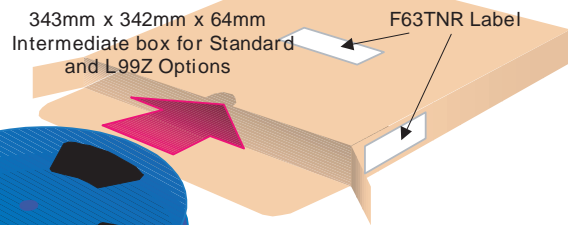
SSOT-8 parts are shipped in tape. The carrier tape is made from a dissipative (carbon filled) polycarbonate resin. The cover tape is a multilayer film (Heat Activated Adhesive in nature) primarily composed of polyester film, adhesive layer, sealant, and anti-static sprayed agent. These reeled parts in standard option are shipped with 3,000 units per 13" or 330cm diameter reel. The reels are dark blue in color and is made of polystyrene plastic (anti-static coated). Other option comes in 500 units per 7" or 177cm diameter reel. This and some other options are further described in the Packaging Information table.

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



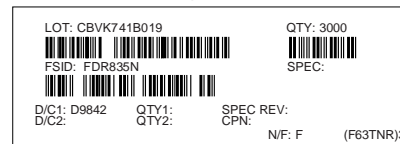
SSOT-8 Unit Orientation

SSOT-8 Packaging Information		
Packaging Option	Standard (no flow code)	D84Z
Packaging type	TNR	TNR
Qty per Reel/Tube/Bag	3,000	500
Reel Size	13" Dia	7" Dia
Box Dimension (mm)	343x64x343	184x187x47
Max qty per Box	6,000	1,000
Weight per unit (gm)	0.0416	0.0416
Weight per Reel (kg)	0.5615	0.0980
Note/Comments		

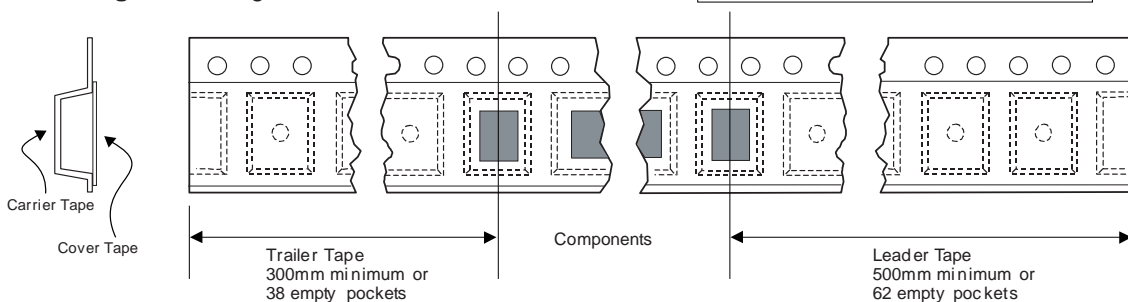


184mm x 187mm x 47mm
Pizza Box for D84Z Option

F63TNR Label sample

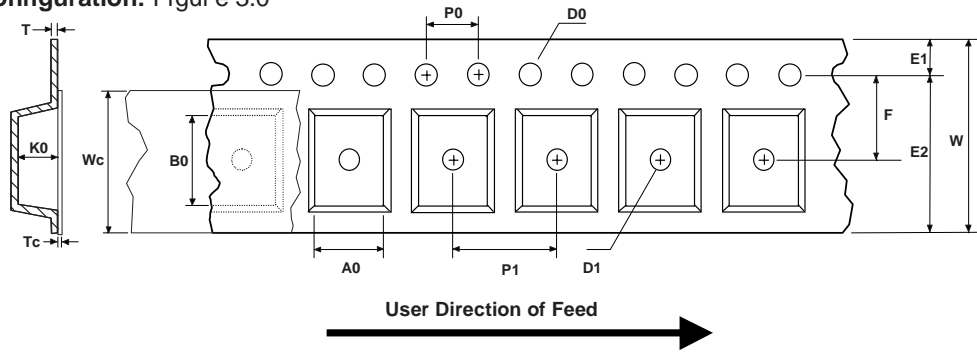


SSOT-8 Tape Leader and Trailer Configuration: Figure 2.0



SuperSOT™-8 Tape and Reel Data and Package Dimensions, continued

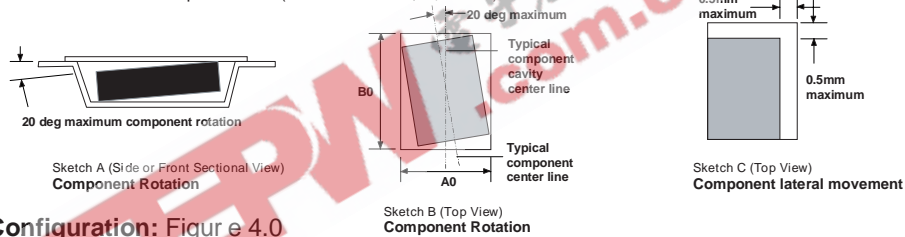
SSOT-8 Embossed Carrier Tape Configuration: Figure 3.0



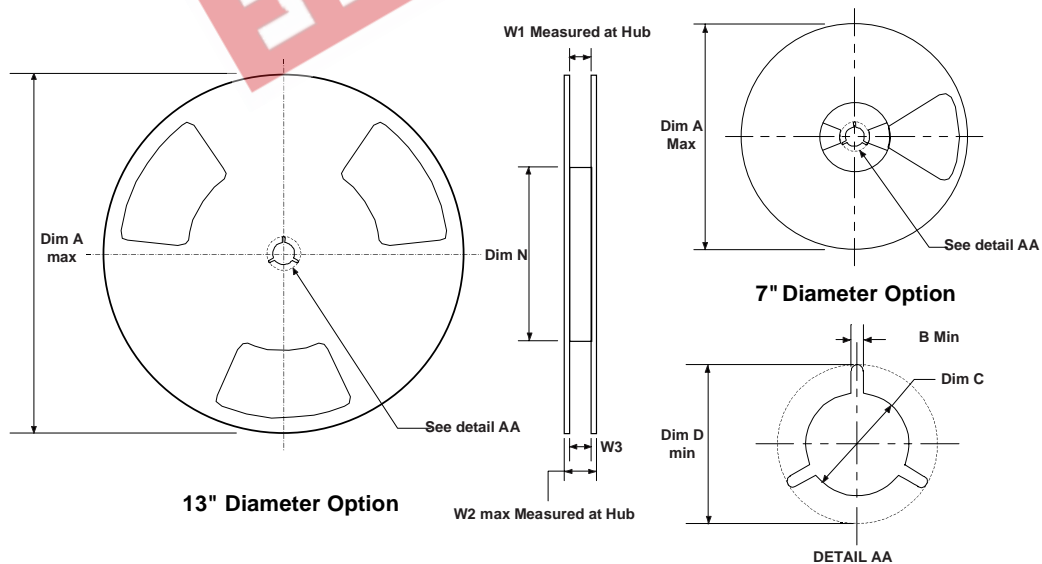
Dimensions are in millimeter

Pkg type	A0	B0	W	D0	D1	E1	E2	F	P1	P0	K0	T	Wc	Tc
SSOT-8 (12mm)	4.47 +/-0.10	5.00 +/-0.10	12.0 +/-0.3	1.55 +/-0.05	1.50 +/-0.10	1.75 +/-0.10	10.25 min	5.50 +/-0.05	8.0 +/-0.1	4.0 +/-0.1	1.37 +/-0.10	0.280 +/-0.150	9.5 +/-0.025	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-8 Reel Configuration: Figure 4.0

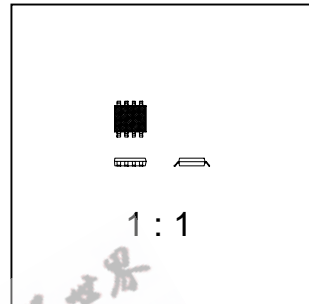
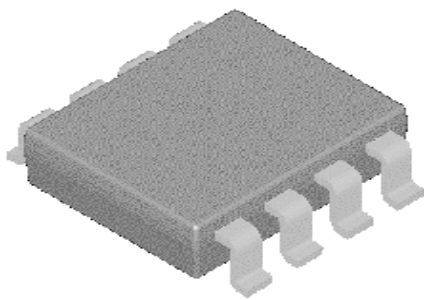


Dimensions are in inches and millimeters

Tape Size	Reel Option	Dim A	Dim B	Dim C	Dim D	Dim N	Dim W1	Dim W2	Dim W3 (LSL-USL)
12mm	7" Dia	7.00 177.8	0.059 1.5	512 +0.020/-0.008 13 +0.5/-0.2	0.795 20.2	5.906 150	0.488 +0.078/-0.000 12.4 +2/0	0.724 18.4	0.469 - 0.606 11.9 - 15.4
12mm	13" Dia	13.00 330	0.059 1.5	512 +0.020/-0.008 13 +0.5/-0.2	0.795 20.2	7.00 178	0.488 +0.078/-0.000 12.4 +2/0	0.724 18.4	0.469 - 0.606 11.9 - 15.4

SuperSOT™-8 Tape and Reel Data and Package Dimensions, continued

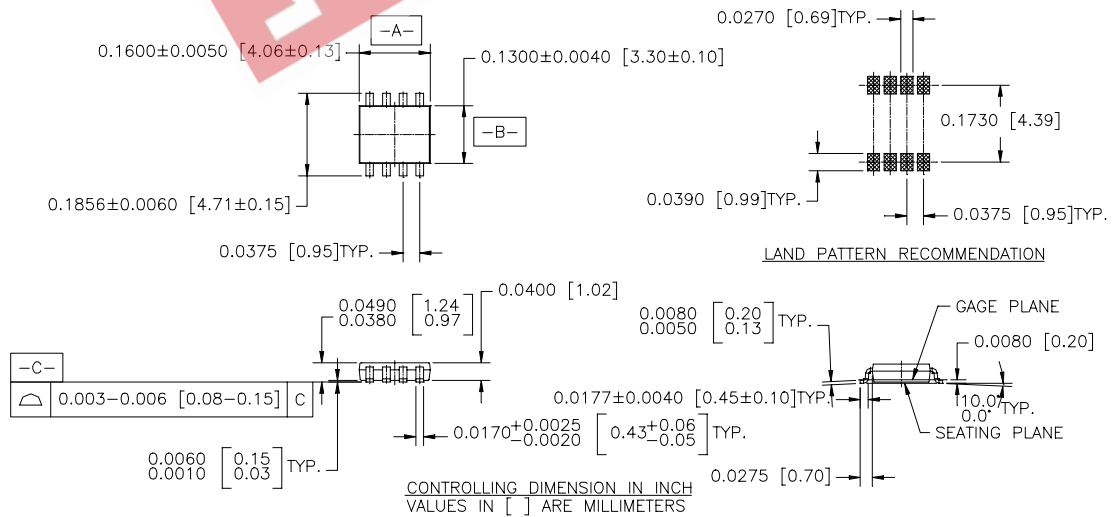
SuperSOT™-8 (FS PKG Code 34, 35)



Scale 1:1 on letter size paper

Dimensions shown below are in:
inches [millimeters]

Part Weight per unit (gram): 0.0416



NOTES : UNLESS OTHERWISE SPECIFIED

- STANDARD LEAD FINISH TO BE 200 MICROINCHES / 5.08 MICROMETERS MINIMUM TIN/LEAD (SOLDER) ON COPPER.
- NO JEDEC REGISTRATION AS JAN. 1996

SUPER SOT, 8 LEADS

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