

# Si4463DY

## P-Channel 2.5V Specified PowerTrench® MOSFET

### General Description

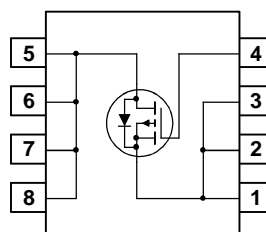
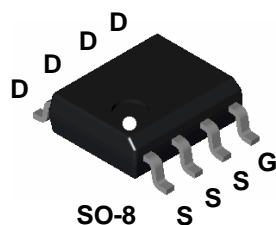
This P-Channel 2.5V specified MOSFET uses a rugged gate PowerTrench process. It has been optimized for power management applications with a wide range of gate drive voltage (2.5V – 12V).

### Applications

- Power management
- Load switch
- Battery protection

### Features

- -11.5 A, -20 V.  $R_{DS(ON)} = 12\text{ m}\Omega @ V_{GS} = -4.5\text{ V}$   
 $R_{DS(ON)} = 17.5\text{ m}\Omega @ V_{GS} = -2.5\text{ V}$
- Fast switching speed.
- High performance trench technology for extremely low  $R_{DS(ON)}$
- High power and current handling capability



### Absolute Maximum Ratings T<sub>A</sub>=25°C unless otherwise noted

Symbol	Parameter	Ratings	Units
V <sub>DSS</sub>	Drain-Source Voltage	-20	V
V <sub>GSS</sub>	Gate-Source Voltage	± 12	V
I <sub>D</sub>	Drain Current – Continuous (Note 1a)	-11.5	A
	– Pulsed	-50	
P <sub>D</sub>	Power Dissipation for Single Operation (Note 1a)	2.5	W
	(Note 1b)	1.2	
	(Note 1c)	1.0	
T <sub>J</sub> , T <sub>STG</sub>	Operating and Storage Junction Temperature Range	-55 to +150	°C

### Thermal Characteristics

R <sub>θJA</sub>	Thermal Resistance, Junction-to-Ambient (Note 1a)	50	°C/W
R <sub>θJC</sub>	Thermal Resistance, Junction-to-Case (Note 1)	25	°C/W

### Package Marking and Ordering Information

Device Marking	Device	Reel Size	Tape width	Quantity
4463	Si4463DY	13"	12mm	2500 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**

$BV_{DSS}$	Drain–Source Breakdown Voltage	$V_{GS} = 0\text{ V}, I_D = -250\ \mu\text{A}$	-20			V
$\frac{\Delta BV_{DSS}}{\Delta T_J}$	Breakdown Voltage Temperature Coefficient	$I_D = -250\ \mu\text{A}$ , Referenced to $25^\circ\text{C}$		-12		mV/°C
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS} = -16\text{ V}, V_{GS} = 0\text{ V}$			-1	$\mu\text{A}$
$I_{GSSF}$	Gate–Body Leakage, Forward	$V_{GS} = 12\text{ V}, V_{DS} = 0\text{ V}$			100	nA
$I_{GSSR}$	Gate–Body Leakage, Reverse	$V_{GS} = -12\text{ V}, V_{DS} = 0\text{ V}$			-100	nA

**On Characteristics (Note 2)**

$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = -250\ \mu\text{A}$	-0.6	-0.8	-1.5	V
$\frac{\Delta V_{GS(th)}}{\Delta T_J}$	Gate Threshold Voltage Temperature Coefficient	$I_D = -250\ \mu\text{A}$ , Referenced to $25^\circ\text{C}$		3		mV/°C
$R_{DS(on)}$	Static Drain–Source On–Resistance	$V_{GS} = -4.5\text{ V}, I_D = -11.5\text{ A}$ $V_{GS} = -2.5\text{ V}, I_D = -9.5\text{ A}$ $V_{GS} = -4.5\text{ V}, I_D = -11.5\text{ A}, T_J = 125^\circ\text{C}$		10 14 13	12 17.5 18	m $\Omega$
$I_{D(on)}$	On–State Drain Current	$V_{GS} = -4.5\text{ V}, V_{DS} = -5\text{ V}$	-50			A
$g_{FS}$	Forward Transconductance	$V_{DS} = -10\text{ V}, I_D = -10\text{ A}$		49		S

**Dynamic Characteristics**

$C_{iss}$	Input Capacitance	$V_{DS} = -10\text{ V}, V_{GS} = 0\text{ V},$ $f = 1.0\text{ MHz}$		4481		pF
$C_{oss}$	Output Capacitance			1532		pF
$C_{rss}$	Reverse Transfer Capacitance			540		pF

**Switching Characteristics (Note 2)**

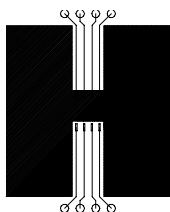
$t_{d(on)}$	Turn–On Delay Time	$V_{DD} = -5\text{ V}, I_D = -1\text{ A},$ $V_{GS} = -4.5\text{ V}, R_{GEN} = 6\ \Omega$		15	30	ns
$t_r$	Turn–On Rise Time			15	30	ns
$t_{d(off)}$	Turn–Off Delay Time			120	240	ns
$t_f$	Turn–Off Fall Time			60	120	ns
$Q_g$	Total Gate Charge	$V_{DS} = -10\text{ V}, I_D = -11.5\text{ A},$ $V_{GS} = -4.5\text{ V}$		41	60	nC
$Q_{gs}$	Gate–Source Charge			6.4		nC
$Q_{gd}$	Gate–Drain Charge			11.8		nC

**Drain–Source Diode Characteristics and Maximum Ratings**

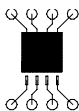
$I_S$	Maximum Continuous Drain–Source Diode Forward Current			-2.1		A
$V_{SD}$	Drain–Source Diode Forward Voltage	$V_{GS} = 0\text{ V}, I_S = -1.5\text{ A}$ (Note 2)		-0.65	-1.2	V

**Notes:**

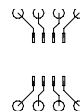
1.  $R_{\theta JA}$  is the sum of the junction-to-case and case-to-ambient thermal resistance where the case thermal reference is defined as the solder mounting surface of the drain pins.  $R_{\theta JC}$  is guaranteed by design while  $R_{\theta CA}$  is determined by the user's board design.



a)  $50^\circ\text{W}$  when mounted on a  $1\text{ in}^2$  pad of 2 oz copper



b)  $105^\circ\text{W}$  when mounted on a  $.04\text{ in}^2$  pad of 2 oz copper



c)  $125^\circ\text{W}$  when mounted on a minimum pad.

Scale 1 : 1 on letter size paper

2. Pulse Test: Pulse Width < 300 $\mu\text{s}$ , Duty Cycle < 2.0%

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