Electrical Characteristics

$T_A = 25°C$ unless otherwise noted

| Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
Off Characteristics						
BV_{DSS}	Drain–Source Breakdown Voltage	$V_{GS} = 0$ V, $I_D = -250$ µA	−20			V
$\frac{\Delta BV_{DSS}}{\Delta T_J}$	Breakdown Voltage Temperature Coefficient	$I_D = -250$ µA, Referenced to 25°C		−16		mV/°C
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = -16$ V, $V_{GS} = 0$ V			−1	µA
I_{GSSF}	Gate–Body Leakage, Forward	$V_{GS} = -12$ V, $V_{DS} = 0$ V			−100	nA
I_{GSSR}	Gate–Body Leakage, Reverse	$V_{GS} = 12$ V, $V_{DS} = 0$ V			100	nA
On Characteristics (Note 2)						
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}$, $I_D = -250$ µA	−0.6	−1.0	−1.5	V
$\frac{\Delta V_{GS(th)}}{\Delta T_J}$	Gate Threshold Voltage Temperature Coefficient	$I_D = -250$ µA, Referenced to 25°C		3		mV/°C
$R_{DS(on)}$	Static Drain–Source On–Resistance	$V_{GS} = -4.5$ V, $I_D = -6.2$ A $V_{GS} = -2.5$ V, $I_D = -5$ A $V_{GS} = -4.5$ V, $I_D = -6.2$A, $T_J = 125°C$		23 34 45	33 50 56	mΩ
$I_{D(on)}$	On–State Drain Current	$V_{GS} = -4.5$ V, $V_{DS} = -5$ V	−15			A
g_{FS}	Forward Transconductance	$V_{DS} = -5$ V, $I_D = -6.2$ A		19		S
Dynamic Characteristics						
C_{iss}	Input Capacitance	$V_{DS} = -10$ V, $V_{GS} = 0$ V, f = 1.0 MHz		1456		pF
C_{oss}	Output Capacitance			300		pF
C_{rss}	Reverse Transfer Capacitance			150		pF
Switching Characteristics (Note 2)						
$t_{d(on)}$	Turn–On Delay Time	$V_{DD} = -10$ V, $I_D = -1$ A, $V_{GS} = -4.5$ V, $R_{GEN} = 6$ Ω		15	27	ns
t_r	Turn–On Rise Time			11	20	ns
$t_{d(off)}$	Turn–Off Delay Time			57	91	ns
t_f	Turn–Off Fall Time			37	59	ns
Q_g	Total Gate Charge	$V_{DS} = -10$ V, $I_D = -6.2$ A, $V_{GS} = -4.5$ V		14	20	nC
Q_{gs}	Gate–Source Charge			3		nC
Q_{gd}	Gate–Drain Charge			5		nC
Drain–Source Diode Characteristics and Maximum Ratings						
I_S	Maximum Continuous Drain–Source Diode Forward Current				−1.3	A
V_{SD}	Drain–Source Diode Forward Voltage	$V_{GS} = 0$ V, $I_S = -1.3$ A (Note 2)		−0.7	-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.
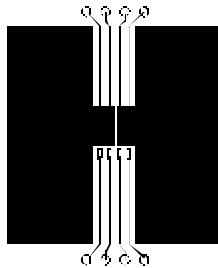
a)   78°C/W when mounted on a 0.5in² pad of 2 oz copper
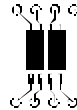
b)   125°C/W when mounted on a 0.02 in² pad of 2 oz copper
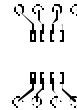
c)   135°C/W when mounted on a minimum pad.

Scale 1 : 1 on letter size paper

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

Si4963DY Rev A(W)

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Rev. G