



New Product

Si4421DY  
Vishay Siliconix

P-Channel 20-V (D-S) MOSFET

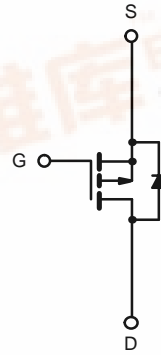
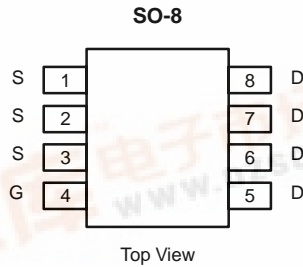
PRODUCT SUMMARY		
$V_{DS}$ (V)	$r_{DS(on)}$ ( $\Omega$ )	$I_D$ (A)
-20	0.00875 @ $V_{GS} = -4.5$ V	-14
	0.01075 @ $V_{GS} = -2.5$ V	-12
	0.0135 @ $V_{GS} = -1.8$ V	-11

FEATURES

- TrenchFET® Power MOSFET

APPLICATIONS

- Game Station  
- Load Switch



P-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS ( $T_A = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)					
Parameter	Symbol	10 secs	Steady State	Unit	
Drain-Source Voltage	$V_{DS}$	-20		V	
Gate-Source Voltage	$V_{GS}$	$\pm 8$			
Continuous Drain Current ( $T_J = 150^\circ\text{C}$ ) <sup>a</sup>	$T_A = 25^\circ\text{C}$	$I_D$	-14	-10	A
			$T_A = 70^\circ\text{C}$	-11.5	
Pulsed Drain Current		$I_{DM}$	-40		
continuous Source Current (Diode Conduction) <sup>a</sup>		$I_S$	-2.7	-1.36	
Maximum Power Dissipation <sup>a</sup>	$T_A = 25^\circ\text{C}$	$P_D$	3.0	1.5	W
			$T_A = 70^\circ\text{C}$	1.9	
Operating Junction and Storage Temperature Range		$T_J, T_{stg}$	-55 to 150		$^\circ\text{C}$

THERMAL RESISTANCE RATINGS					
Parameter		Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient <sup>a</sup>	$t \leq 10$ sec	$R_{thJA}$	33	42	$^\circ\text{C/W}$
	Steady State		70	85	
Maximum Junction-to-Foot (Drain)	Steady State	$R_{thJF}$	16	21	

Notes:  
a. Surface Mounted on 1" x 1" FR4 Board.



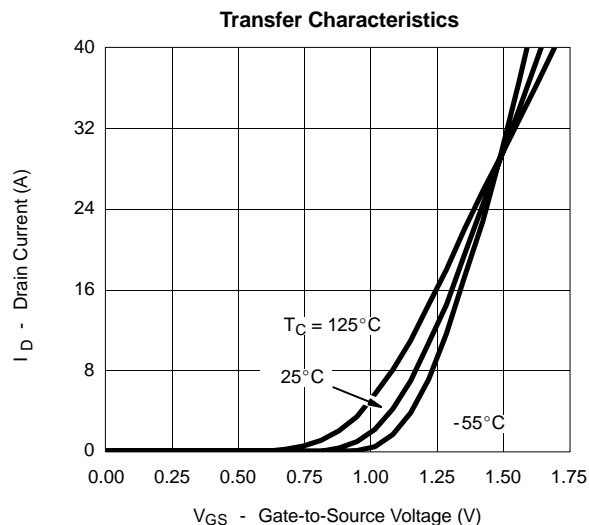
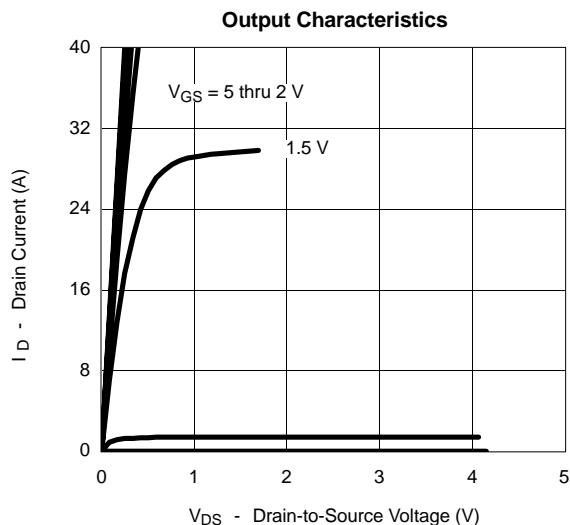
**SPECIFICATIONS (T<sub>J</sub> = 25 °C UNLESS OTHERWISE NOTED)**

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
<b>Static</b>						
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = -850 μA	-0.4		-0.8	V
Gate-Body Leakage	I <sub>GSS</sub>	V <sub>DS</sub> = 0 V, V <sub>GS</sub> = ±8 V			±100	nA
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> = -16 V, V <sub>GS</sub> = 0 V			-1	μA
		V <sub>DS</sub> = -16 V, V <sub>GS</sub> = 0 V, T <sub>J</sub> = 70 °C			-10	
On-State Drain Current <sup>a</sup>	I <sub>D(on)</sub>	V <sub>DS</sub> = -5 V, V <sub>GS</sub> = -4.5 V	-30			A
Drain-Source On-State Resistance <sup>a</sup>	r <sub>DS(on)</sub>	V <sub>GS</sub> = -4.5 V, I <sub>D</sub> = -14 A		0.007	0.00875	Ω
		V <sub>GS</sub> = -2.5 V, I <sub>D</sub> = -12 A		0.0085	0.01075	
		V <sub>GS</sub> = -1.8 V, I <sub>D</sub> = -11 A		0.011	0.0135	
Forward Transconductance <sup>a</sup>	g <sub>fs</sub>	V <sub>DS</sub> = -10 V, I <sub>D</sub> = -14 A		55		S
Diode Forward Voltage <sup>a</sup>	V <sub>SD</sub>	I <sub>S</sub> = -2.7 A, V <sub>GS</sub> = 0 V		-0.6	-1.1	V
<b>Dynamic<sup>b</sup></b>						
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> = -10 V, V <sub>GS</sub> = -4.5 V, I <sub>D</sub> = -14 A		82	125	nC
Gate-Source Charge	Q <sub>gs</sub>			10		
Gate-Drain Charge	Q <sub>gd</sub>			27		
Gate Resistance	R <sub>g</sub>			3		Ω
Turn-On Delay Time	t <sub>d(on)</sub>	V <sub>DD</sub> = -10 V, R <sub>L</sub> = 10 Ω I <sub>D</sub> ≅ -1 A, V <sub>GEN</sub> = -4.5 V, R <sub>G</sub> = 6 Ω		45	70	ns
Rise Time	t <sub>r</sub>			90	140	
Turn-Off Delay Time	t <sub>d(off)</sub>			350	550	
Fall Time	t <sub>f</sub>			170	260	
Source-Drain Reverse Recovery Time	t <sub>rr</sub>	I <sub>F</sub> = -2.1 A, di/dt = 100 A/μs		135	210	

**Notes**

- a. Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2%.
- b. Guaranteed by design, not subject to production testing.

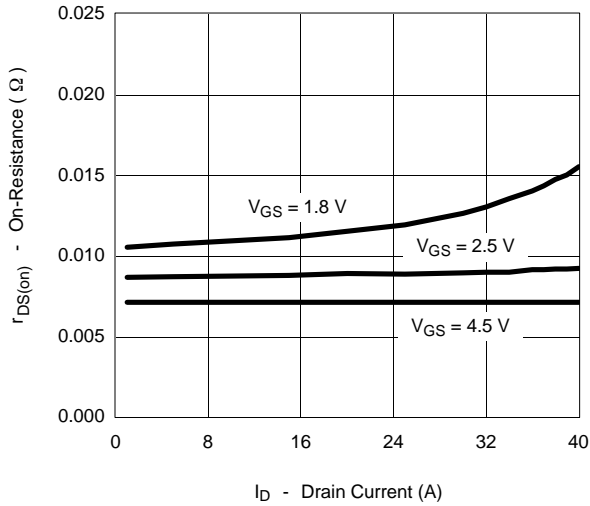
**TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)**



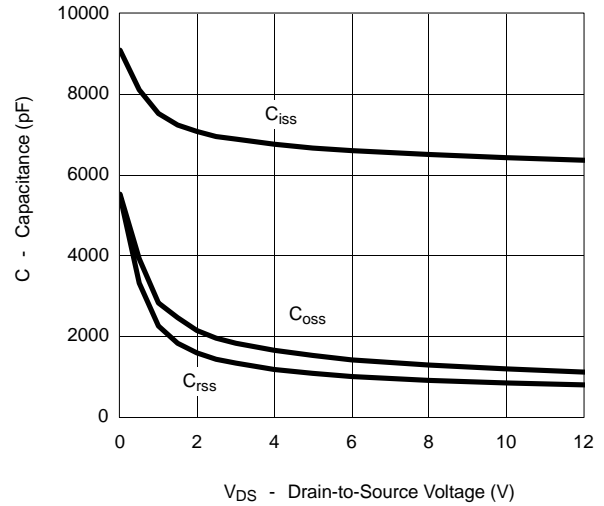


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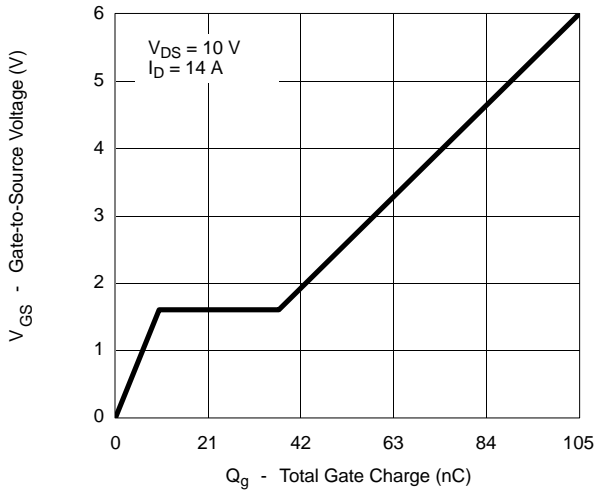
On-Resistance vs. Drain Current



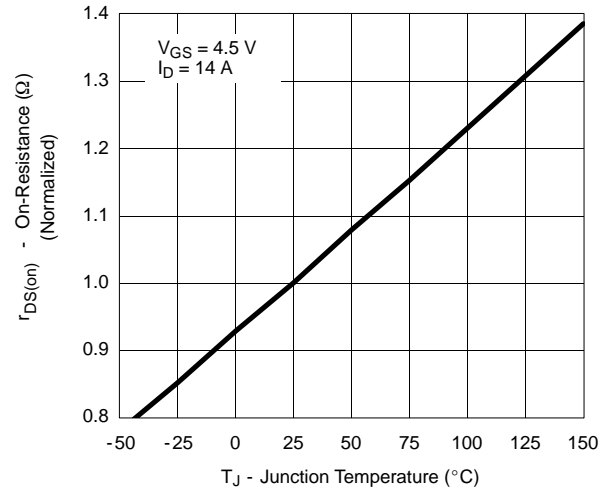
Capacitance



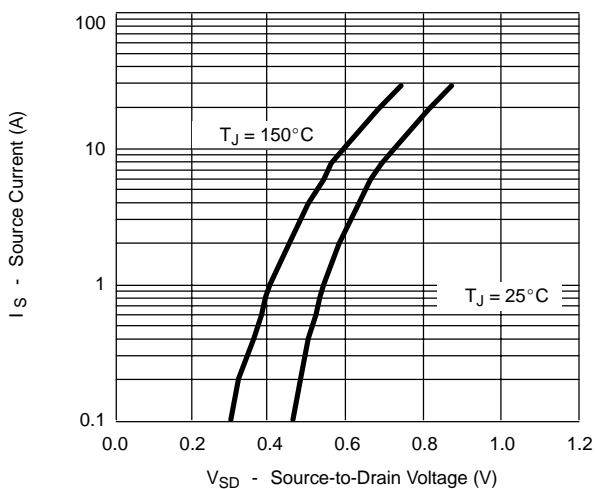
Gate Charge



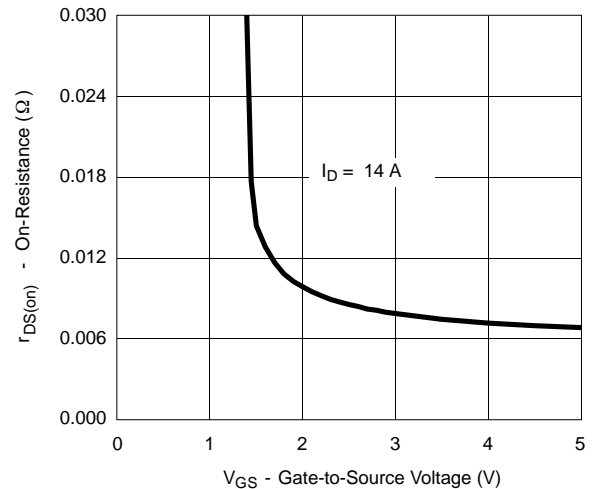
On-Resistance vs. Junction Temperature



Source-Drain Diode Forward Voltage

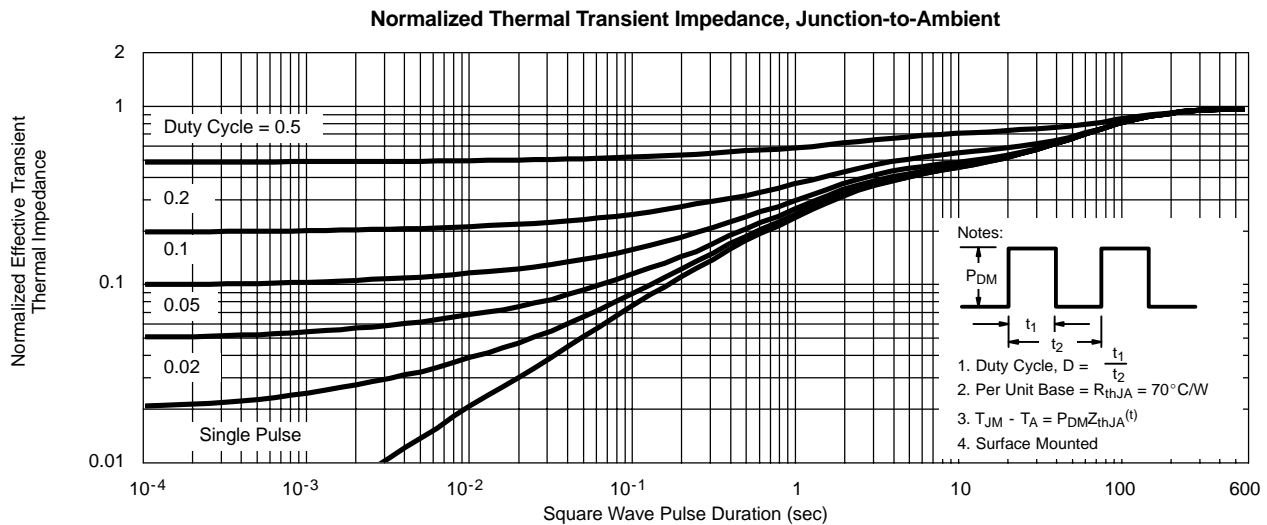
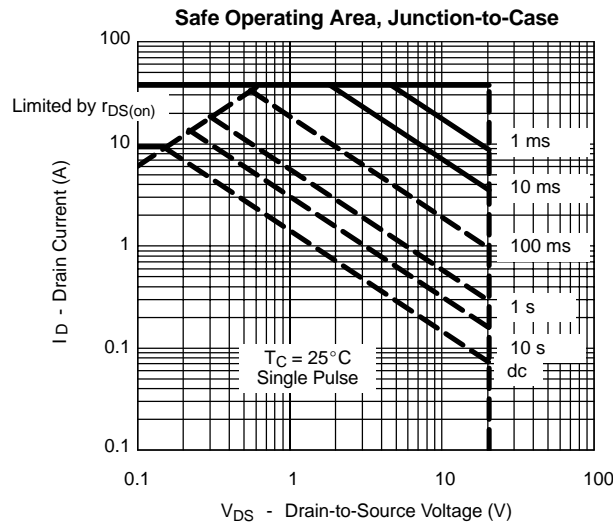
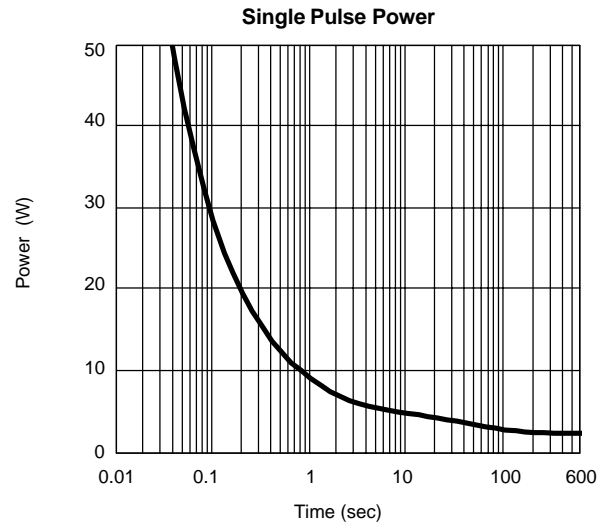
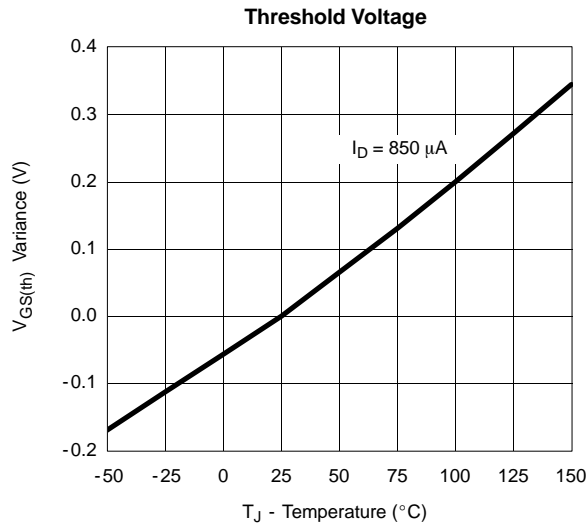


On-Resistance vs. Gate-to-Source Voltage





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