

N-Channel 30-V (D-S) MOSFET

PRODUCT SUMMARY				
V _{DS} (V)	$R_{DS(on)}\left(\Omega\right)$	I _D (A)		
30	0.011 at V _{GS} = 10 V	12		
	0.0145 at V _{GS} = 4.5 V	9.8		

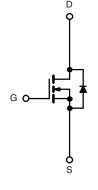
FEATURES

- Halogen-free According to IEC 61249-2-21 Available
- TrenchFET[®] Power MOSFET
- 100 % R_g Tested
- 100 % UIS Tested



APPLICATIONS

- Notebook PC
 - Core
 - System Power



N-Channel MOSFET

_	SO-8	_
S 1		8 D
S 2		7 D
S 3		6 D
G 4		5 D
L	Top Viow	_

Ordering Information: Si4688DY-T1-E3 (Lead (Pb)-free)

Si4688DY-T1-GE3 (Lead (Pb)-free and Halogen-free)

ABSOLUTE MAXIMUM RATINGS	T _A = 25 °C, unle	ss otherwise r	noted		
Parameter		Symbol	10 s	Steady State	Unit
Drain-Source Voltage		V _{DS}	30		V
Gate-Source Voltage		V _{GS}	± 20		
Ocations of David Ocasa (T. 450.00)3	T _A = 25 °C	I _D	12	8.9	
Continuous Drain Current (T _J = 150 °C) ^a	T _A = 70 °C		9.5	7.1	
Pulsed Drain Current		I _{DM}	40		Α
Continuous Source Current (Diode Conduction) ^a		I _S	2.3	1.3	
Single Pulse Avalanche Current	L = 0.1 mH	I _{AS}	20		
Avalanche Energy	L = 0.1 mH	E _{AS} 20		mJ	
M	T _A = 25 °C	В	2.5	1.4	W
Maximum Power Dissipation ^a	T _A = 70 °C	P_{D}	1.6	0.9	
Operating Junction and Storage Temperature Range		T _J , T _{stg}	- 55 to 150		°C

THERMAL RESISTANCE RATINGS						
Parameter		Symbol	Typical	Maximum	Unit	
Manipular lungtion to Aughient	t ≤ 10 s	R _{thJA}	43	50	°C/W	
Maximum Junction-to-Ambient ^a	Steady State	' ¹thJA	73	90		
Maximum Junction-to-Foot (Drain)	Steady State	R_{thJF}	19	25		

Notes:

a. Surface Mounted on 1" x 1" FR4 board.

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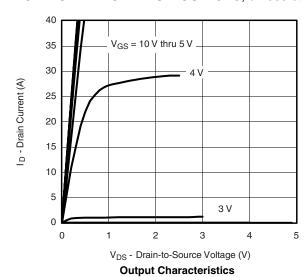
SPECIFICATIONS T _J = 25 °C, unless otherwise noted								
Parameter	Symbol	Test Conditions	Conditions Min.		Max.	Unit		
Static								
Gate Threshold Voltage V _{GS(th)}		$V_{DS} = V_{GS}$, $I_D = 250 \mu A$	1.0		3.0	٧		
Gate-Body Leakage	I _{GSS}	$V_{DS} = 0 V, V_{GS} = \pm 20 V$			± 100	nA		
Zava Cata Valta va Dvain Coverant	I _{DSS}	V _{DS} = 30 V, V _{GS} = 0 V			1			
Zero Gate Voltage Drain Current		$V_{DS} = 30 \text{ V}, V_{GS} = 0 \text{ V}, T_{J} = 55 ^{\circ}\text{C}$			5	μΑ		
On-State Drain Current ^a	I _{D(on)}	$V_{DS} \ge 5 \text{ V}, V_{GS} = 10 \text{ V}$	30			Α		
	В	V _{GS} = 10 V, I _D = 12 A		0.009	0.011	0		
Drain-Source On-State Resistance ^a	R _{DS(on)}	V _{GS} = 4.5 V, I _D = 9.8 A		0.012	0.0145	Ω		
Forward Transconductance ^a	9 _{fs}	V _{DS} = 15 V, I _D = 12 A		32		S		
Diode Forward Voltage ^a	V_{SD}	$I_S = 2.3 \text{ A}, V_{GS} = 0 \text{ V}$		0.76	1.1	٧		
Dynamic ^b								
Input Capacitance	C _{iss}			1580				
Output Capacitance	C _{oss}	$V_{DS} = 15 \text{ V}, V_{GS} = 0 \text{ V}, f = 1 \text{ MHz}$		295		pF		
Reverse Transfer Capacitance	C _{rss}			140				
Total Gate Charge	Q _g Q _{gs}	$V_{DS} = 15 \text{ V}, V_{GS} = 5 \text{ V}, I_{D} = 12 \text{ A}$		13.2	20	nC		
Total Gate Charge				25.4	38			
Gate-Source Charge		$V_{DS} = 15 \text{ V}, V_{GS} = 10 \text{ V}, I_{D} = 12 \text{ A}$		5.3				
Gate-Drain Charge	Q_{gd}			4.3				
Gate Resistance	R_{g}		0.9	1.8	2.7	Ω		
Turn-On Delay Time	t _{d(on)}			13	20			
Rise Time	t_r $V_{DD} = 15 \text{ V}, R_L = 15 \Omega$			10	15			
Turn-Off Delay Time	t _{d(off)}	$\text{I}_\text{D}\cong\text{1 A, V}_\text{GEN}=\text{10 V, R}_\text{g}=\text{6}~\Omega$		33	50	ns		
Fall Time	t _f			10	15			
Source-Drain Reverse Recovery Time	t _{rr}	$I_F = 2.3 \text{ A}, \text{ dI/dt} = 100 \text{ A/}\mu\text{s}$		25	40			

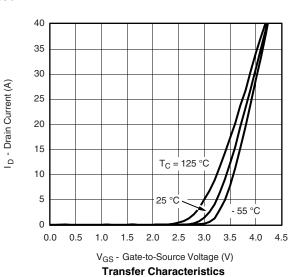
Notes:

- a. Pulse test; pulse width $\leq 300~\mu s,$ duty cycle $\leq 2~\%.$
- b. Guaranteed by design, not subject to production testing.

Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



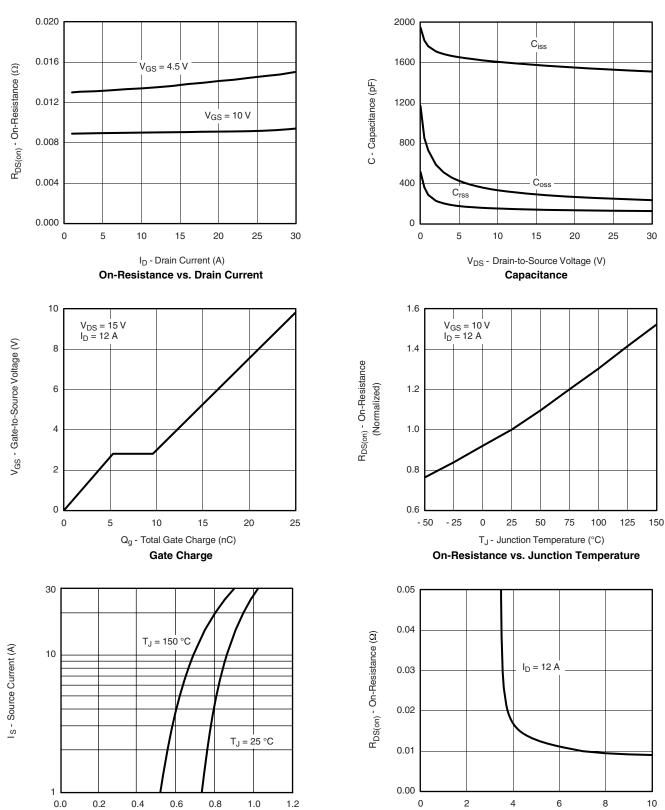








TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



 V_{SD} - Source-to-Drain Voltage (V)

Source-Drain Diode Forward Voltage

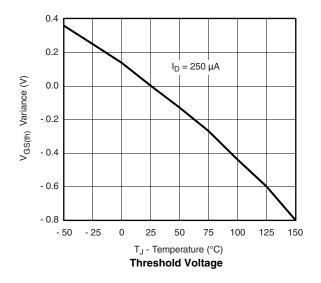
V_{GS} - Gate-to-Source Voltage (V)

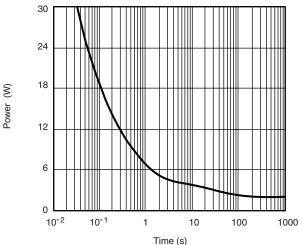
On-Resistance vs. Gate-to-Source Voltage

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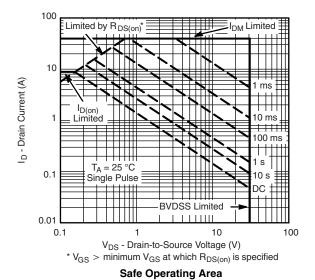
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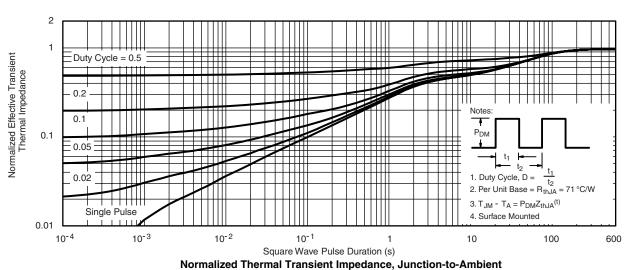
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted





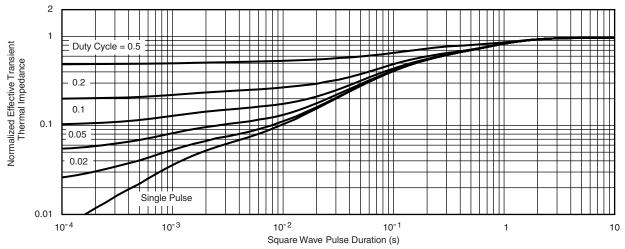
Single Pulse Power, Junction-to-Ambient







TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



Normalized Thermal Transient Impedance, Junction-to-Foot

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