

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

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

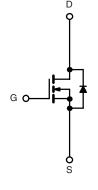
FEATURES

- 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 View	

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

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

ABSOLUTE MAXIMUM RATINGS T _A = 25 °C, unless otherwise noted						
Parameter		Symbol	10 s	Steady State	Unit	
Drain-Source Voltage		V_{DS}	30		V	
Gate-Source Voltage		V _{GS}	± 20			
Opation of Duple Office 4 150 00/8	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 = U. I IIII	E _{AS}	2	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	VV	
Operating Junction and Storage Temperature Range		T _J , T _{stg}	- 55 to 150		°C	

THERMAL RESISTANCE RATINGS						
Parameter		Symbol	Typical	Maximum	Unit	
Maximum Junction-to-Ambient ^a	t ≤ 10 s	R _{thJA}	43	50	°C/W	
Maximum Junction-to-Ambient [∞]	Steady State		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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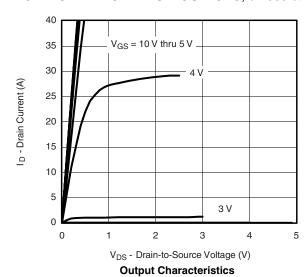
SPECIFICATIONS T _J = 25 °C, unless otherwise noted							
Parameter	Symbol	Test Conditions	Min.	Тур.	Max.	Unit	
Static							
Gate Threshold Voltage	V _{GS(th)}	$V_{DS} = V_{GS}, I_D = 250 \mu A$			3.0	٧	
Gate-Body Leakage	I _{GSS}	$V_{DS} = 0 V, V_{GS} = \pm 20 V$			± 100	nA	
Zava Cata Valta va Dvain Commant	1	$V_{DS} = 30 \text{ V}, V_{GS} = 0 \text{ V}$			1		
Zero Gate Voltage Drain Current	I _{DSS}	$V_{DS} = 30 \text{ V}, V_{GS} = 0 \text{ V}, T_{J} = 55 ^{\circ}\text{C}$			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	Ω	
Drain-Source On-State Resistance ^a	R _{DS(on)}	$V_{GS} = 4.5 \text{ V}, I_D = 9.8 \text{ A}$		0.012	0.0145		
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		1	
Total Gate Charge	Q _g .	$V_{DS} = 15 \text{ V}, V_{GS} = 5 \text{ V}, I_{D} = 12 \text{ A}$		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	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		

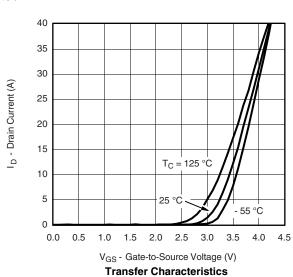
Notes:

- 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



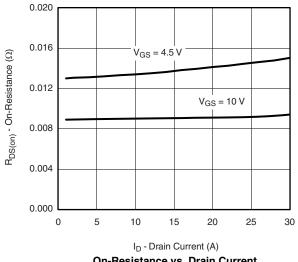




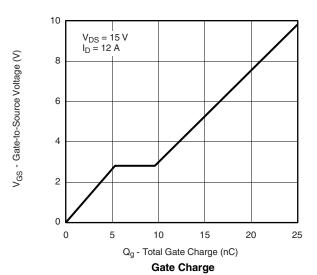


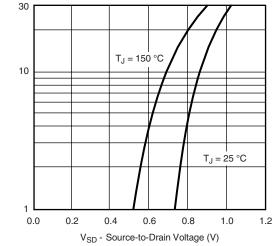


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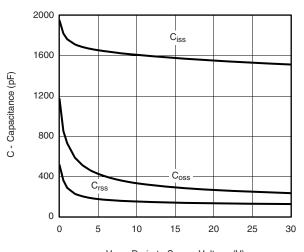


On-Resistance vs. Drain Current

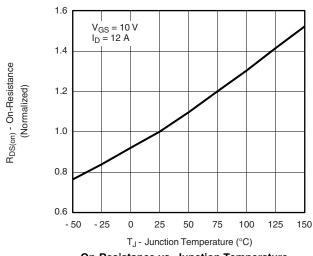




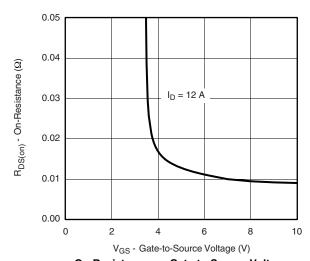
Source-Drain Diode Forward Voltage



V_{DS} - Drain-to-Source Voltage (V) Capacitance



On-Resistance vs. Junction Temperature



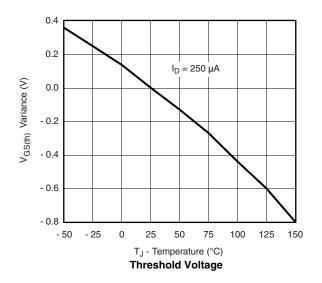
On-Resistance vs. Gate-to-Source Voltage

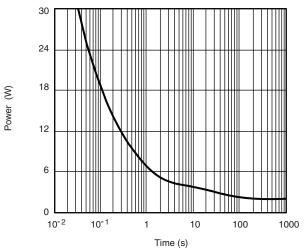
Is - Source Current (A)

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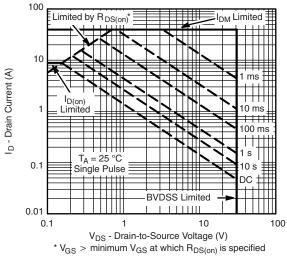
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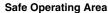
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted

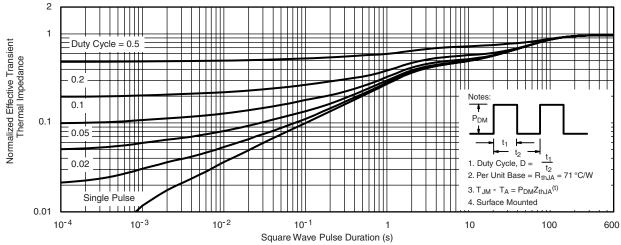




Single Pulse Power, Junction-to-Ambient



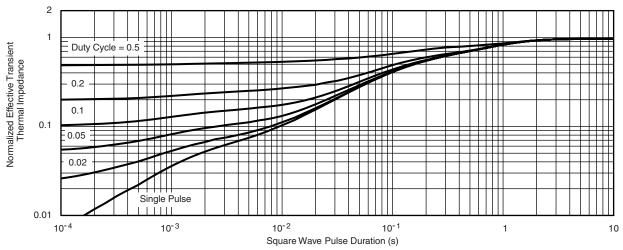




Normalized Thermal Transient Impedance, Junction-to-Ambient



TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



Normalized Thermal Transient Impedance, Junction-to-Foot

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