



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

PRODUCT SUMMARY			
	V <sub>DS</sub> (V)	R <sub>DS(on)</sub> (Ω)	I <sub>D</sub> (A)
Channel-1	30	0.019 at V <sub>GS</sub> = 10 V	8.0
		0.026 at V <sub>GS</sub> = 4.5 V	6.9
Channel-2	30	0.035 at V <sub>GS</sub> = 10 V	6.0
		0.048 at V <sub>GS</sub> = 4.5 V	5.0

### FEATURES

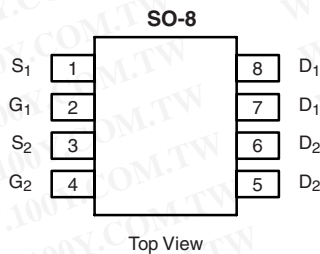
- Halogen-free According to IEC 61249-2-21 Available
- TrenchFET<sup>®</sup> Power MOSFETs
- 100 % R<sub>g</sub> Tested



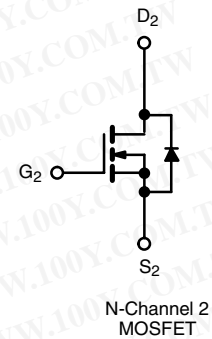
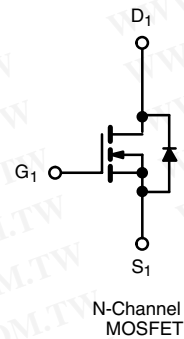
RoHS  
 COMPLIANT  
 HALOGEN  
**FREE**  
 Available

### APPLICATIONS

- Logic DC/DC
- Notebook PC



Ordering Information: Si4974DY-T1-E3 (Lead (Pb)-free)  
 Si4974DY-T1-GE3 (Lead (Pb)-free and Halogen-free)



ABSOLUTE MAXIMUM RATINGS T <sub>A</sub> = 25 °C, unless otherwise noted							
Parameter	Symbol	Channel-1		Channel-2		Unit	
		10 s	Steady State	10 s	Steady State		
Drain-Source Voltage	V <sub>DS</sub>	30				V	
Gate-Source Voltage	V <sub>GS</sub>	± 20					
Continuous Drain Current (T <sub>J</sub> = 150 °C) <sup>a</sup>	I <sub>D</sub>	T <sub>A</sub> = 25 °C	8.0	6.0	6.0	4.4	A
		T <sub>A</sub> = 70 °C	6.5	4.7	4.8	3.5	
Pulsed Drain Current	I <sub>DM</sub>	40		30		A	
Continuous Source Current (Diode Conduction) <sup>a</sup>	I <sub>S</sub>	1.8	1.0	1.8	1.0	A	
Single Pulse Avalanche Current	L = 0.1 mH I <sub>AS</sub> E <sub>AS</sub>	15		7		mJ	
Avalanche Energy		11		2.45			
Maximum Power Dissipation <sup>a</sup>	P <sub>D</sub>	T <sub>A</sub> = 25 °C	2	1.1	2	1.1	W
		T <sub>A</sub> = 70 °C	1.3	0.7	1.3	0.7	
Operating Junction and Storage Temperature Range	T <sub>J</sub> , T <sub>stg</sub>	- 55 to 150				°C	

THERMAL RESISTANCE RATINGS							
Parameter	Symbol	Channel-1		Channel-2		Unit	
		Typ.	Max.	Typ.	Max.		
Maximum Junction-to-Ambient <sup>a</sup>	R <sub>thJA</sub>	t ≤ 10 s	50	62.5	52	62.5	°C/W
		Steady State	90	110	91	110	
Maximum Junction-to-Foot (Drain)	R <sub>thJF</sub>	30	40	32	40		

Notes:

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

MOSFET SPECIFICATIONS $T_J = 25\text{ }^\circ\text{C}$ , unless otherwise noted						
Parameter	Symbol	Test Conditions	Min.	Typ. <sup>a</sup>	Max.	Unit
<b>Static</b>						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$ , $I_D = 250\text{ }\mu\text{A}$	Ch-1	1.0	3.0	V
			Ch-2	1.0	3.0	
Gate-Body Leakage	$I_{GSS}$	$V_{DS} = 0\text{ V}$ , $V_{GS} = \pm 20\text{ V}$	Ch-1		$\pm 100$	nA
			Ch-2		$\pm 100$	
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = 30\text{ V}$ , $V_{GS} = 0\text{ V}$	Ch-1		1	$\mu\text{A}$
			Ch-2		1	
		$V_{DS} = 30\text{ V}$ , $V_{GS} = 0\text{ V}$ , $T_J = 85\text{ }^\circ\text{C}$	Ch-1		15	
			Ch-2		15	
On-State Drain Current <sup>b</sup>	$I_{D(on)}$	$V_{DS} = 5\text{ V}$ , $V_{GS} = 10\text{ V}$	Ch-1	20		A
			Ch-2	20		
Drain-Source On-State Resistance <sup>b</sup>	$R_{DS(on)}$	$V_{GS} = 10\text{ V}$ , $I_D = 8.0\text{ A}$	Ch-1		0.016	$\Omega$
			Ch-2		0.029	
		$V_{GS} = 4.5\text{ V}$ , $I_D = 6.0\text{ A}$	Ch-1		0.0215	
			Ch-2		0.040	
Forward Transconductance <sup>b</sup>	$g_{fs}$	$V_{DS} = 15\text{ V}$ , $I_D = 8.0\text{ A}$	Ch-1		19	S
			Ch-2		13	
Diode Forward Voltage <sup>b</sup>	$V_{SD}$	$I_S = 1.8\text{ A}$ , $V_{GS} = 0\text{ V}$	Ch-1		0.8	V
			Ch-2		0.8	
<b>Dynamic<sup>a</sup></b>						
Total Gate Charge	$Q_g$	Channel-1 $V_{DS} = 15\text{ V}$ , $V_{GS} = 4.5\text{ V}$ , $I_D = 8.0\text{ A}$	Ch-1		7.0	nC
			Ch-2		3.3	
Gate-Source Charge	$Q_{gs}$	Channel-2 $V_{DS} = 15\text{ V}$ , $V_{GS} = 4.5\text{ V}$ , $I_D = 6.0\text{ A}$	Ch-1		2.6	nC
			Ch-2		1.2	
Gate-Drain Charge	$Q_{gd}$	Channel-2 $V_{DS} = 15\text{ V}$ , $V_{GS} = 4.5\text{ V}$ , $I_D = 6.0\text{ A}$	Ch-1		3.0	nC
			Ch-2		1.5	
Gate Resistance	$R_g$		Ch-1	0.8	1.5	$\Omega$
			Ch-2	0.9	1.95	
Turn-On Delay Time	$t_{d(on)}$	Channel-1 $V_{DD} = 15\text{ V}$ , $R_L = 15\text{ }\Omega$	Ch-1		8	ns
Rise Time	$t_r$	$I_D \equiv 1\text{ A}$ , $V_{GEN} = 10\text{ V}$ , $R_G = 6\text{ }\Omega$	Ch-2		6	
			Ch-1		12	
Turn-Off Delay Time	$t_{d(off)}$	Channel-2 $V_{DD} = 15\text{ V}$ , $R_L = 15\text{ }\Omega$	Ch-1		22	
			Ch-2		15	
Fall Time	$t_f$	$I_D \equiv 1\text{ A}$ , $V_{GEN} = 10\text{ V}$ , $R_G = 6\text{ }\Omega$	Ch-1		6	
			Ch-2		6	
Source-Drain Reverse Recovery Time	$t_{rr}$	$I_F = 1.8\text{ A}$ , $dI/dt = 100\text{ A}/\mu\text{s}$	Ch-1		20	
			Ch-2		15	

## Notes:

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

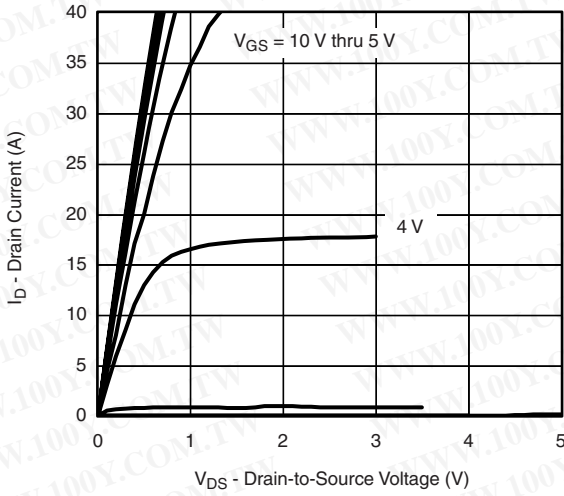
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure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



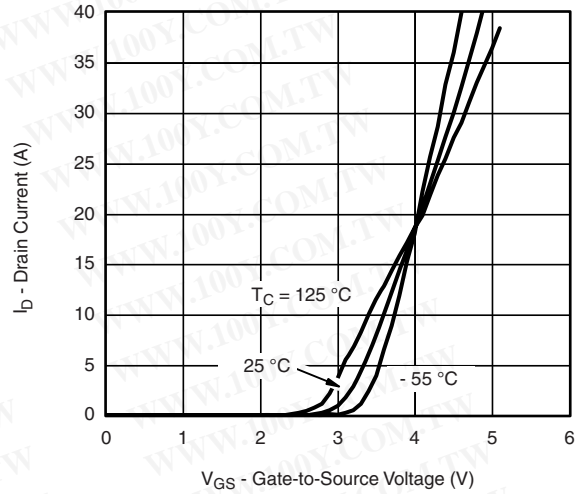
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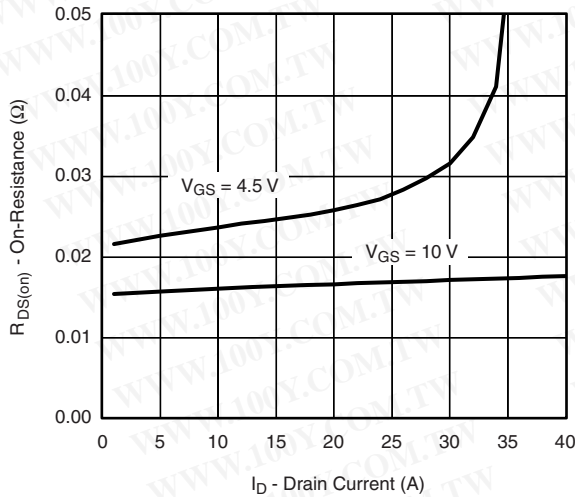
**CHANNEL-1 TYPICAL CHARACTERISTICS** 25 °C, unless otherwise noted



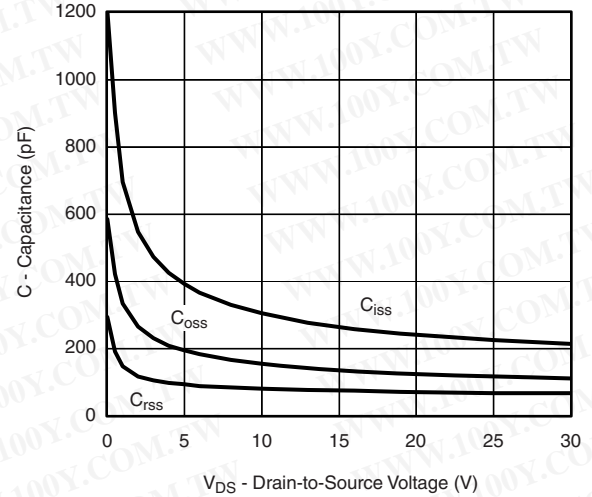
**Output Characteristics**



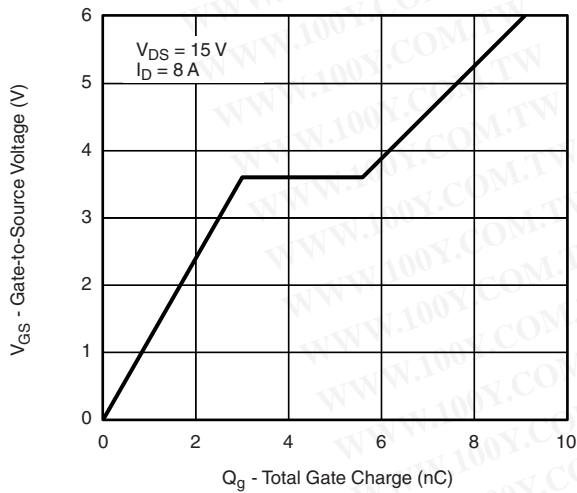
**Transfer Characteristics**



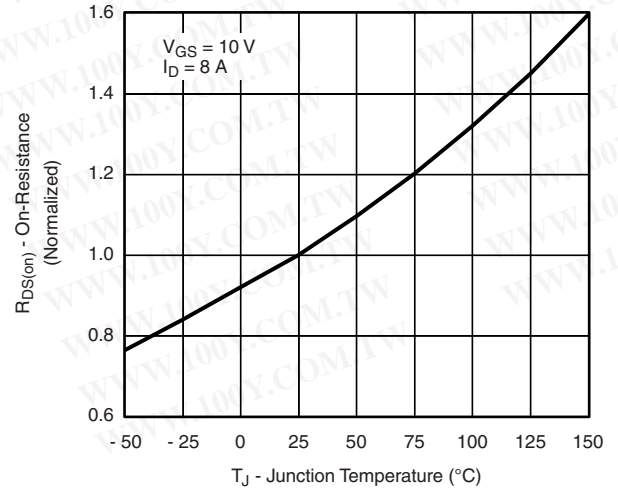
**On-Resistance vs. Drain Current**



**Capacitance**



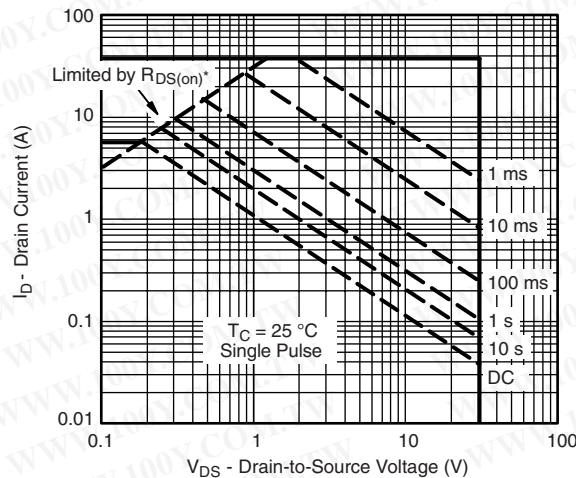
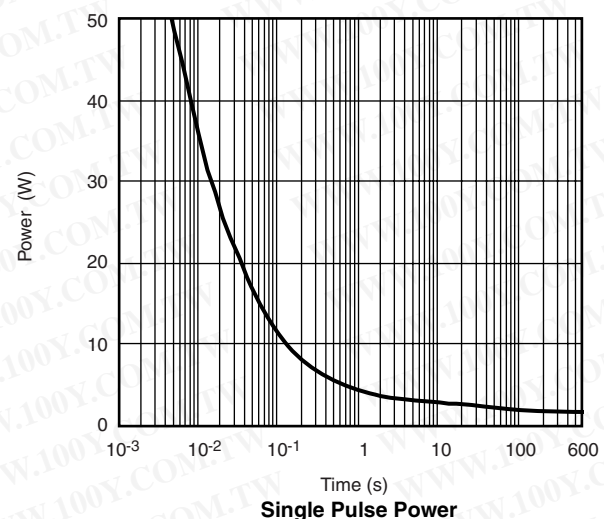
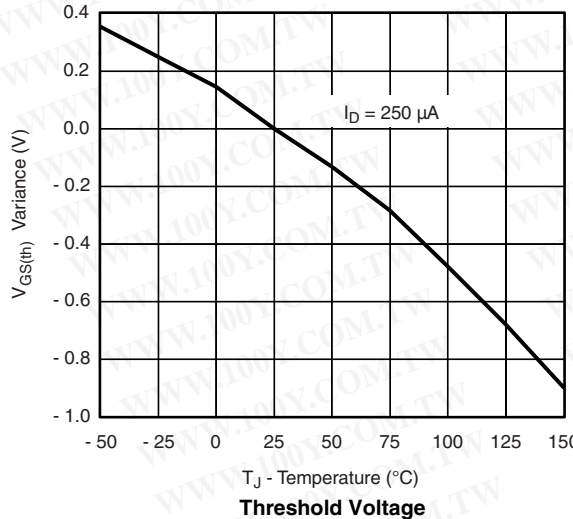
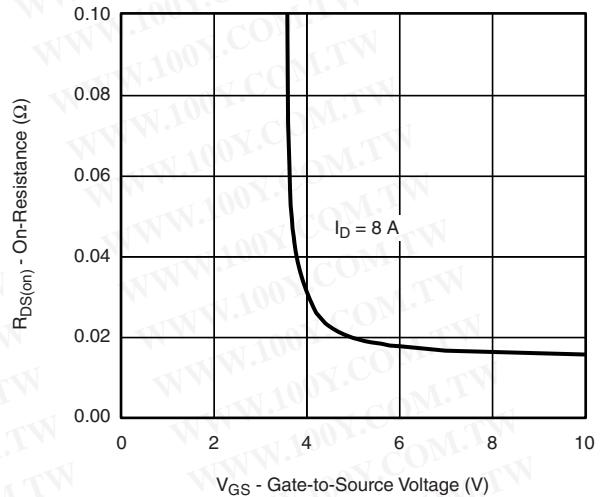
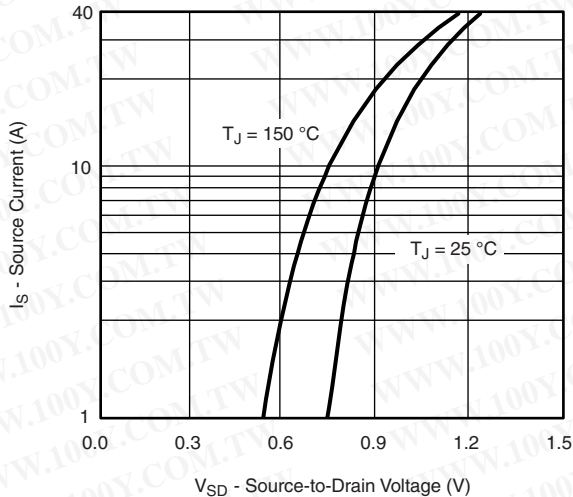
**Gate Charge**



**On-Resistance vs. Junction Temperature**



**CHANNEL-1 TYPICAL CHARACTERISTICS** 25 °C, unless otherwise noted



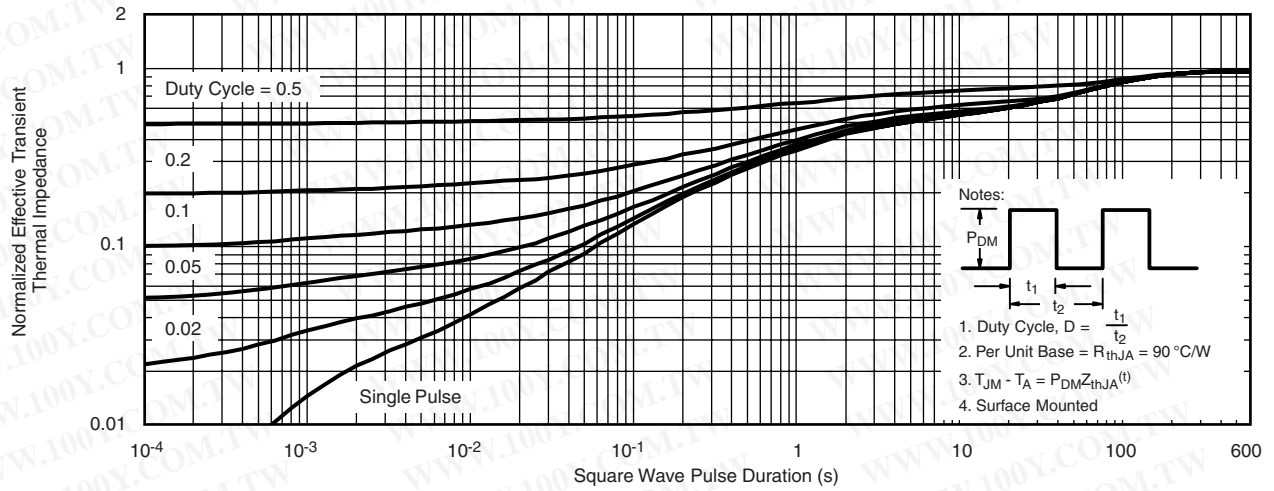
\*  $V_{GS} >$  minimum  $V_{GS}$  at which  $R_{DS(on)}$  is specified



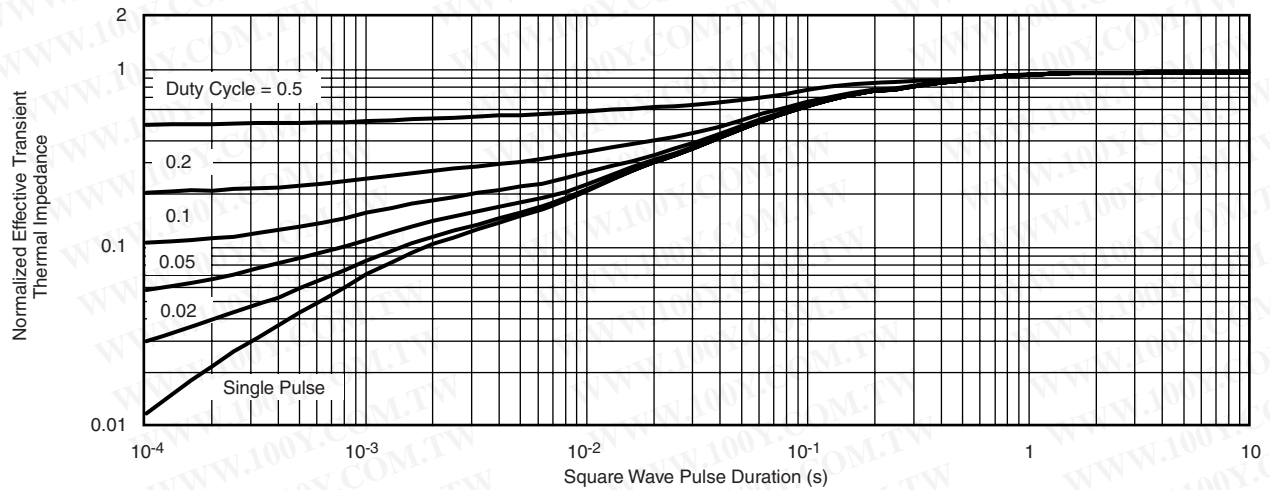
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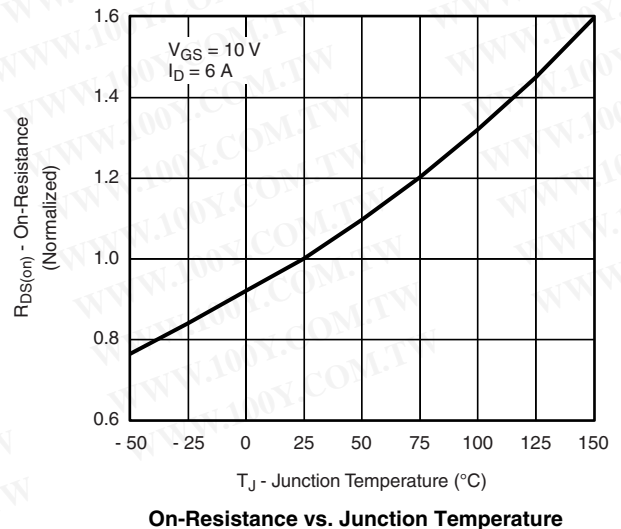
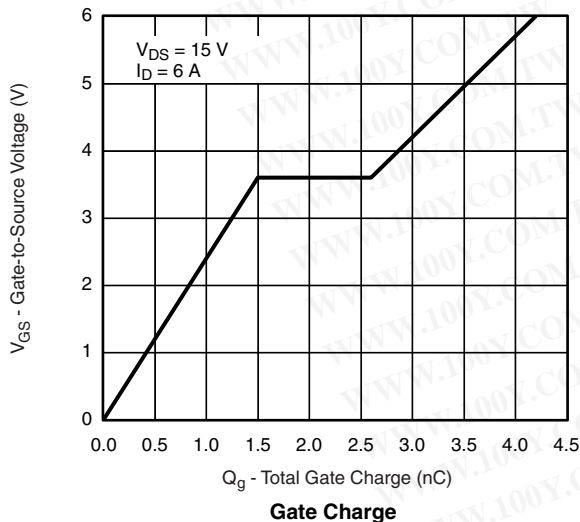
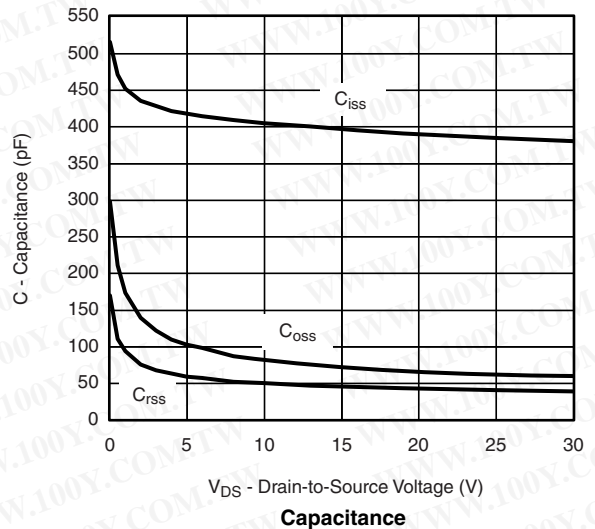
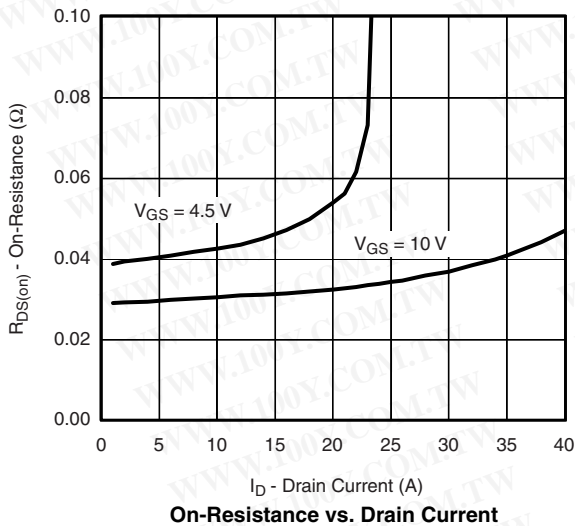
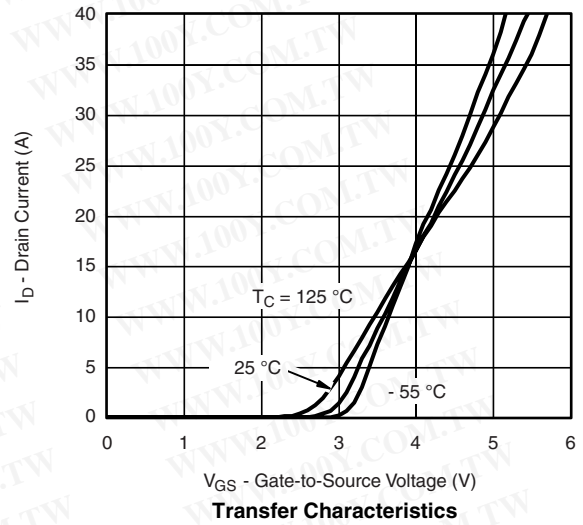
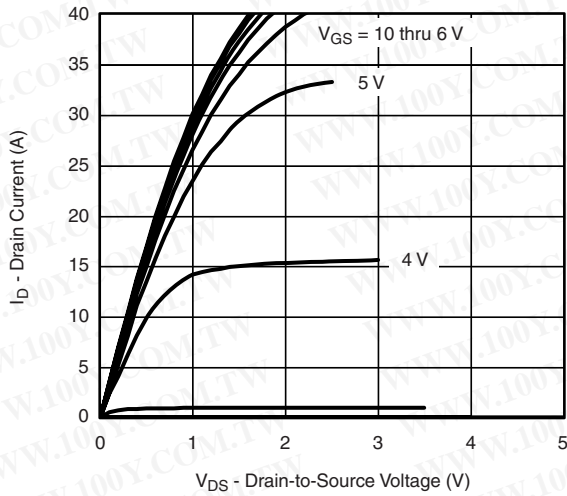
**Normalized Thermal Transient Impedance, Junction-to-Ambient**



**Normalized Thermal Transient Impedance, Junction-to-Foot**

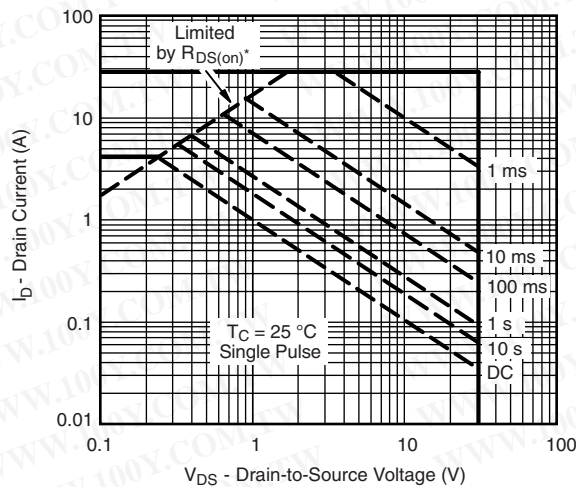
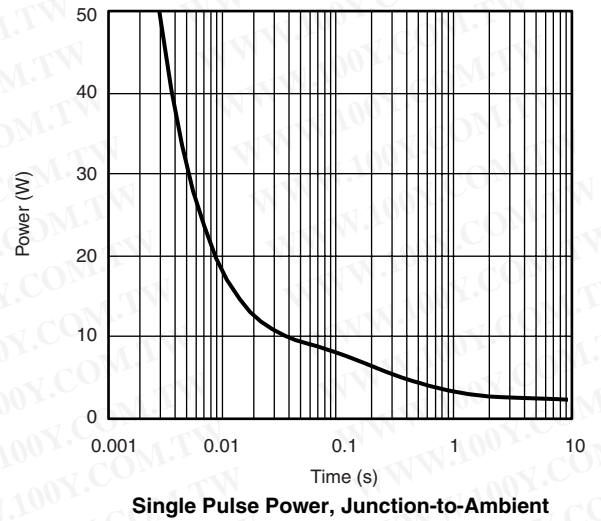
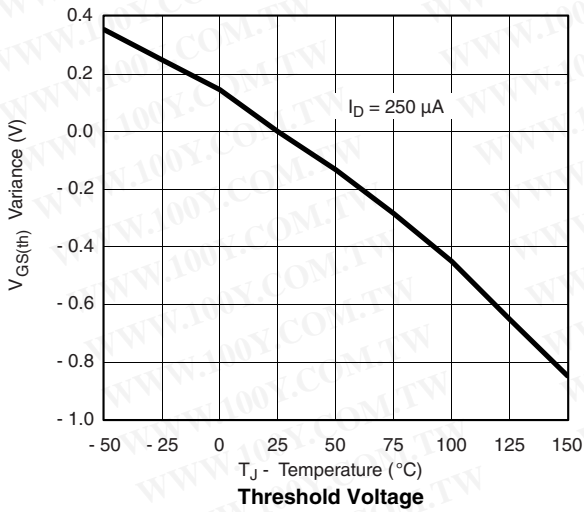
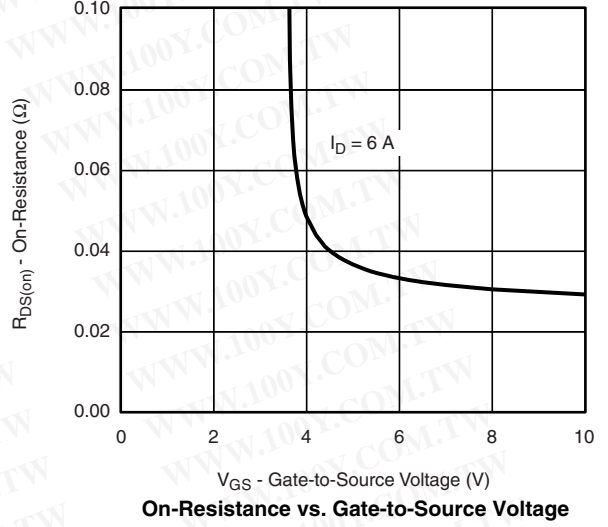
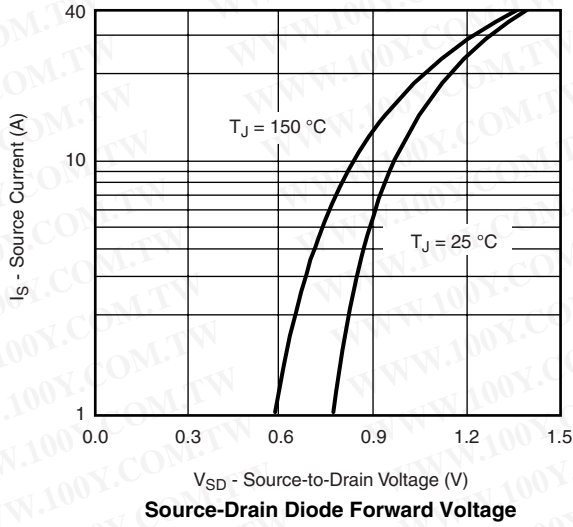


### CHANNEL-2 TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



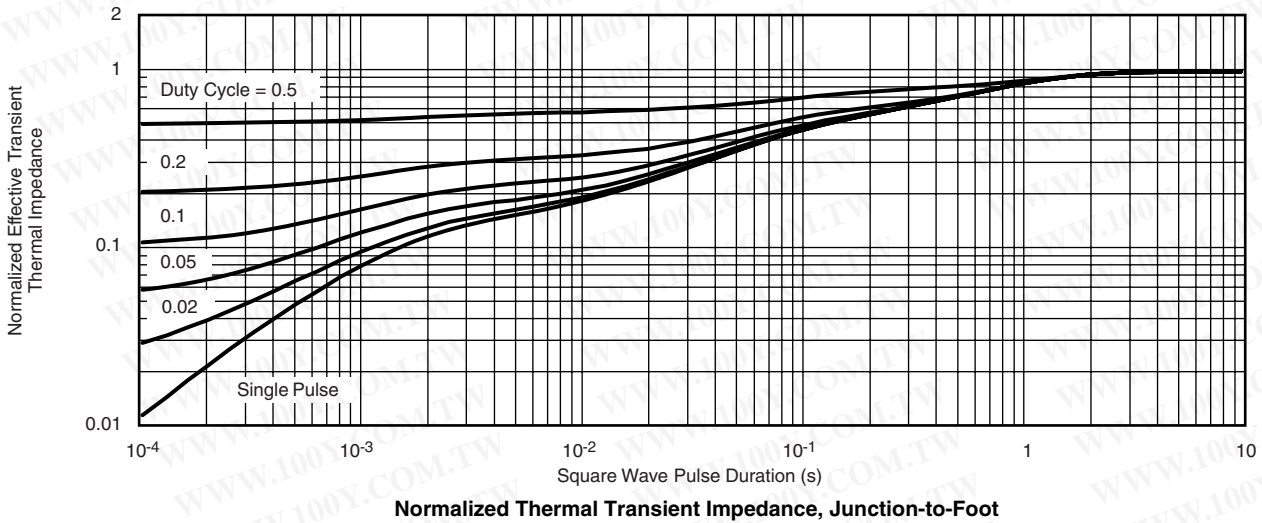
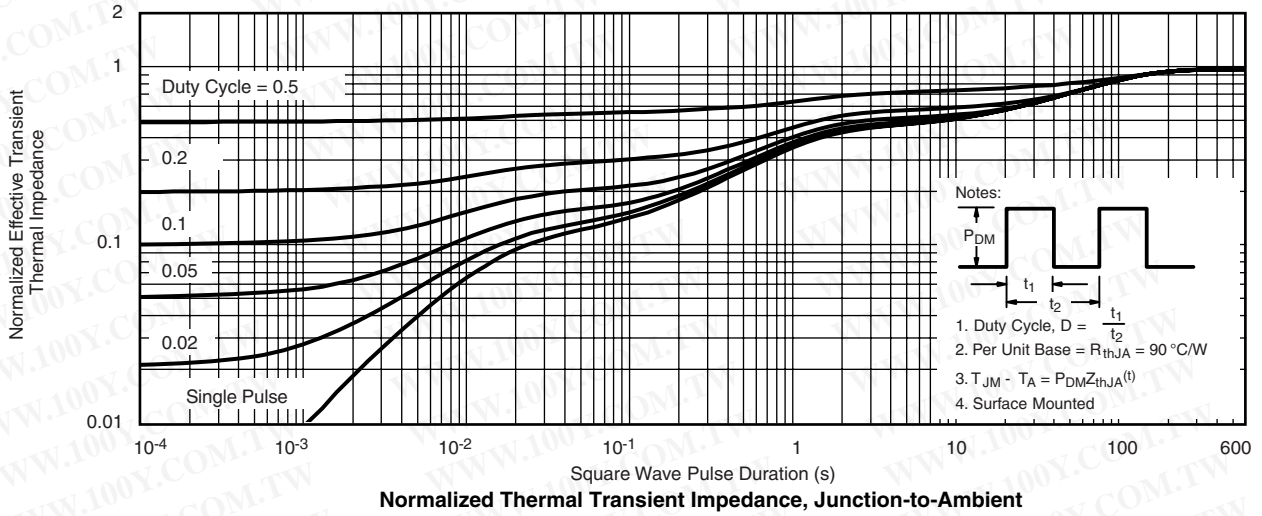


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