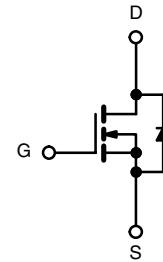
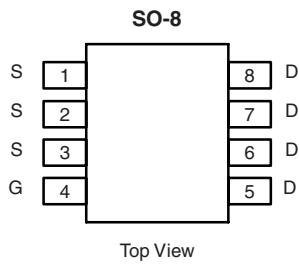


## N-Channel Reduced $Q_g$ , Fast Switching MOSFET

PRODUCT SUMMARY		
$V_{DS}$ (V)	$R_{DS(on)}$ ( $\Omega$ )	$I_D$ (A)
30	0.012 at $V_{GS} = 10$ V	$\pm 11$
	0.020 at $V_{GS} = 4.5$ V	$\pm 9$

### FEATURES

- Halogen-free According to IEC 61249-2-21 Definition
- TrenchFET® Power MOSFETs
- High-Efficiency PWM Optimized
- Compliant to RoHS Directive 2002/95/EC



**Ordering Information:** Si4890DY-T1-E3 (Lead (Pb)-free)  
Si4890DY-T1-GE3 (Lead (Pb)-free and Halogen-free)

N-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS $T_A = 25$ °C, unless otherwise noted				
Parameter	Symbol	Limit	Unit	
Drain-Source Voltage	$V_{DS}$	30		V
Gate-Source Voltage	$V_{GS}$	$\pm 25$		
Continuous Drain Current ( $T_J = 150$ °C) <sup>a, b</sup>	$I_D$	$\pm 11$		A
$T_A = 70$ °C		$\pm 9$		
Pulsed Drain Current (10 $\mu$ s Pulse Width)	$I_{DM}$	$\pm 50$		
Continuous Source Current (Diode Conduction) <sup>a, b</sup>	$I_S$	2.3		
Maximum Power Dissipation <sup>a, b</sup>	$P_D$	2.5		W
$T_A = 70$ °C		1.6		
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 (MOSFET) <sup>a</sup>	$t \leq 10$ s	$R_{thJA}$	50	°C/W
	Steady State		70	

Notes:

a. Surface Mounted on FR4 board.  
b.  $t \leq 10$  s.

**MOSFET SPECIFICATIONS**  $T_J = 25^\circ\text{C}$ , unless otherwise noted

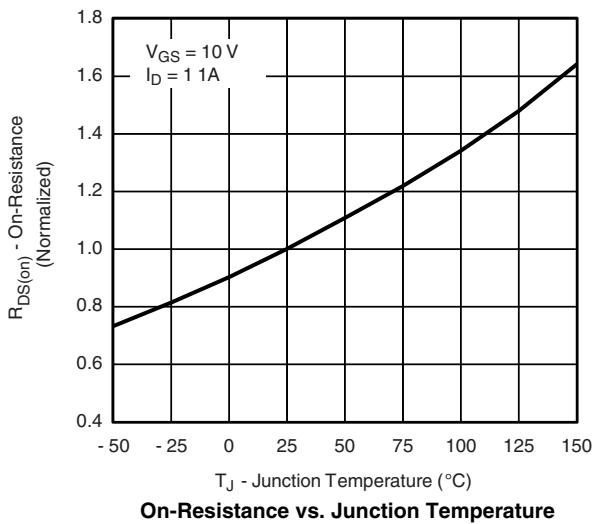
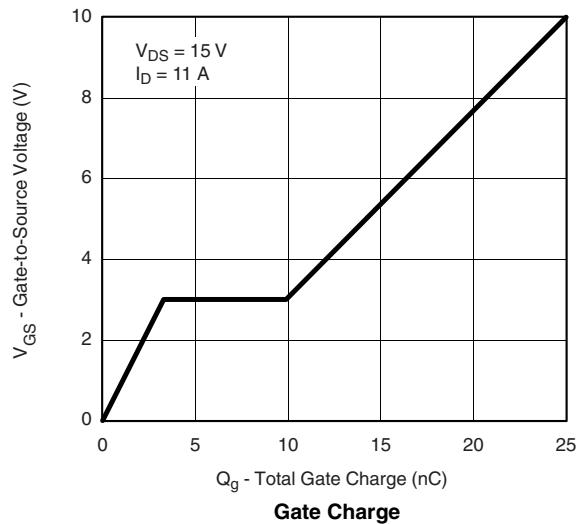
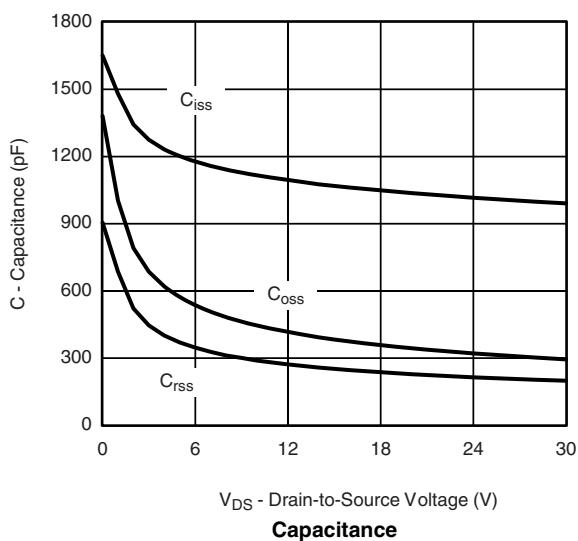
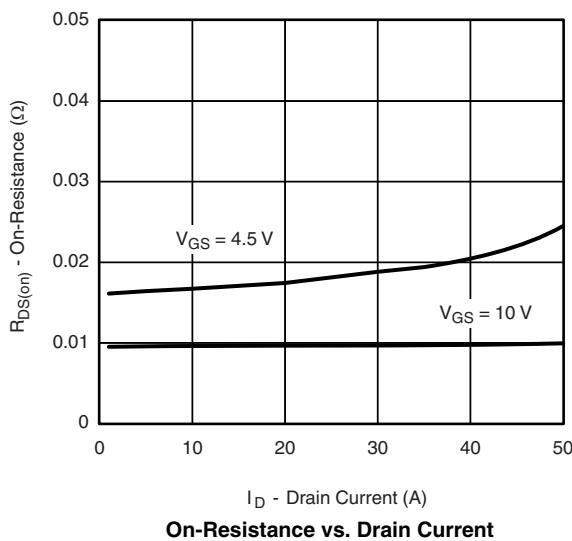
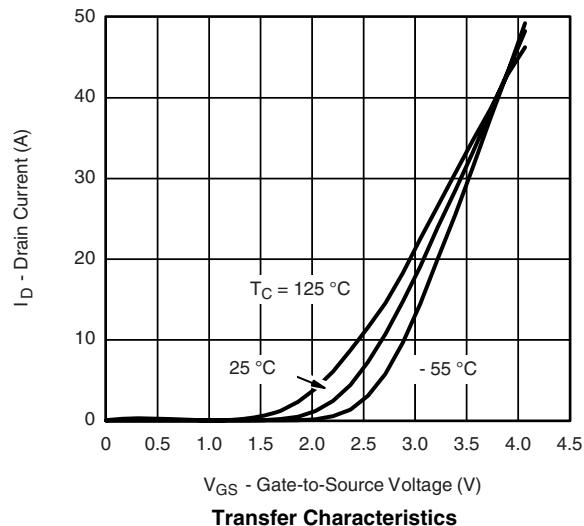
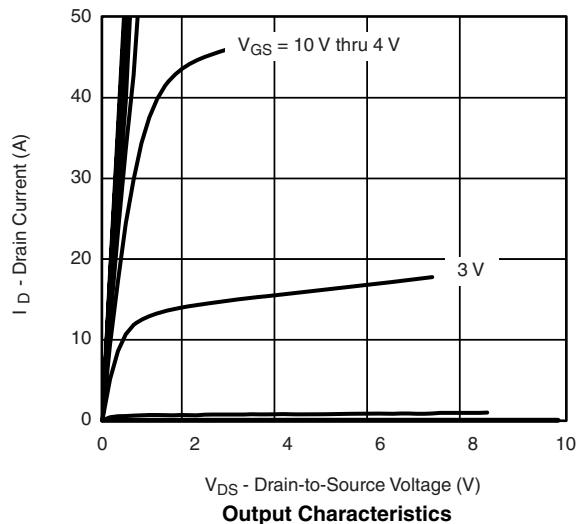
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
<b>Static</b>						
Gate Threshold Voltage	$V_{GS(\text{th})}$	$V_{DS} = V_{GS}, I_D = 250 \mu\text{A}$	0.8			V
Gate-Body Leakage	$I_{GSS}$	$V_{DS} = 0 \text{ V}, V_{GS} = \pm 20 \text{ V}$			$\pm 100$	nA
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = 24 \text{ V}, V_{GS} = 0 \text{ V}$		1		$\mu\text{A}$
		$V_{DS} = 24 \text{ V}, V_{GS} = 0 \text{ V}, T_J = 55^\circ\text{C}$		5		
On-State Drain Current <sup>a</sup>	$I_{D(\text{on})}$	$V_{DS} \geq 5 \text{ V}, V_{GS} = 10 \text{ V}$	40			A
Drain-Source On-State Resistance <sup>a</sup>	$R_{DS(\text{on})}$	$V_{GS} = 10 \text{ V}, I_D = 11 \text{ A}$		0.0098	0.012	$\Omega$
		$V_{GS} = 4.5 \text{ V}, I_D = 9 \text{ A}$		0.0164	0.020	
Forward Transconductance <sup>a</sup>	$g_{fs}$	$V_{DS} = 15 \text{ V}, I_D = 11 \text{ A}$		21		S
Diode Forward Voltage <sup>a</sup>	$V_{SD}$	$I_S = 2.3 \text{ A}, V_{GS} = 0 \text{ V}$		0.71	1.1	V
<b>Dynamic<sup>b</sup></b>						
Total Gate Charge	$Q_g$	$V_{DS} = 15 \text{ V}, V_{GS} = 5.0 \text{ V}, I_D = 11 \text{ A}$		14.2	20	nC
Gate-Source Charge	$Q_{gs}$			3.3		
Gate-Drain Charge	$Q_{gd}$			6.6		
Turn-On Delay Time	$t_{d(\text{on})}$	$V_{DD} = 15 \text{ V}, R_L = 15 \Omega$ $I_D \geq 1 \text{ A}, V_{GEN} = 10 \text{ V}, R_g = 6 \Omega$		13	20	ns
Rise Time	$t_r$			8.5	15	
Turn-Off Delay Time	$t_{d(\text{off})}$			35	53	
Fall Time	$t_f$			17	26	
Source-Drain Reverse Recovery Time	$t_{rr}$	$I_F = 2.3 \text{ A}, dI/dt = 100 \text{ A}/\mu\text{s}$		35	70	

Notes:

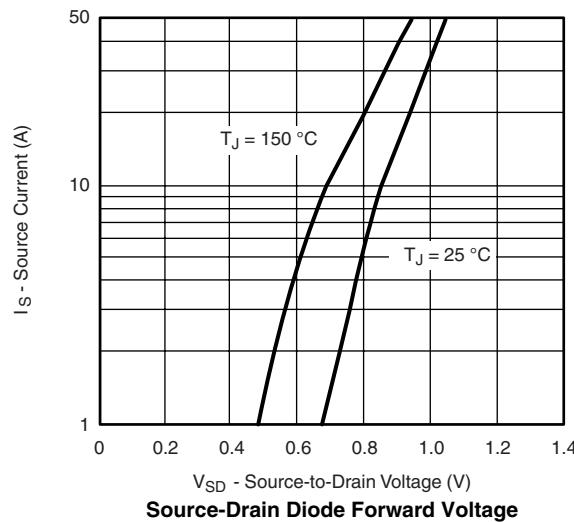
a. Pulse test; pulse width  $\leq 300 \mu\text{s}$ , duty cycle  $\leq 2 \%$ .

b. Guaranteed by design, not subject to production testing.

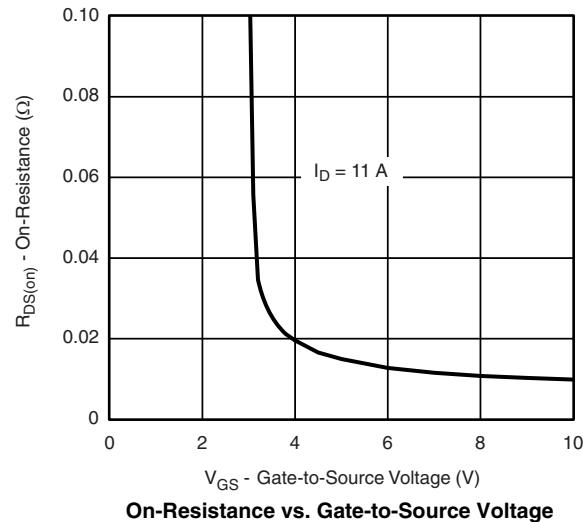
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure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

**TYPICAL CHARACTERISTICS** 25 °C, unless otherwise noted


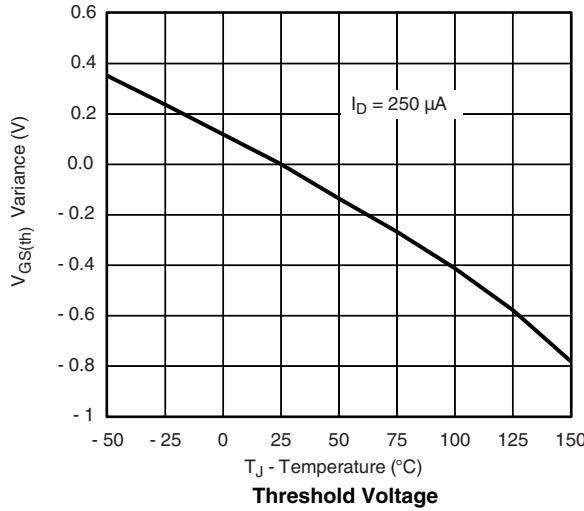
## TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



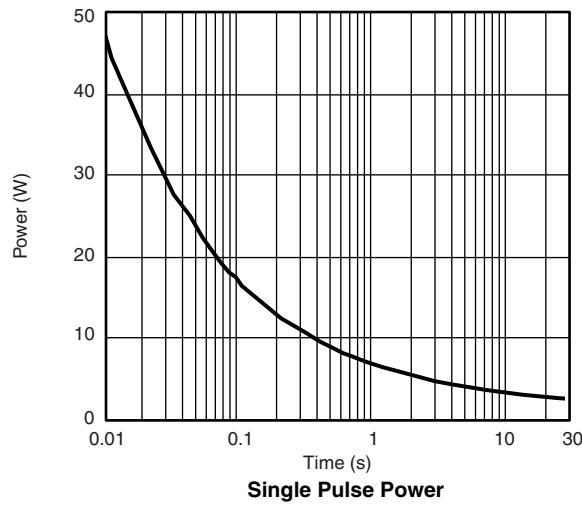
Source-Drain Diode Forward Voltage



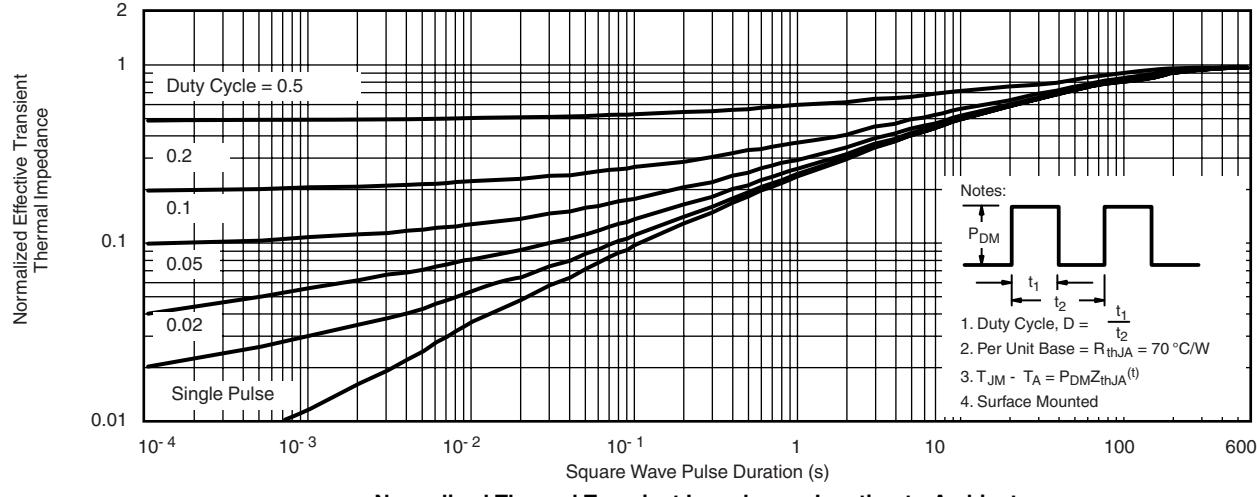
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage



Single Pulse Power



Normalized Thermal Transient Impedance, Junction-to-Ambient

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