

## N-Channel 60-V (D-S) MOSFET

### PRODUCT SUMMARY

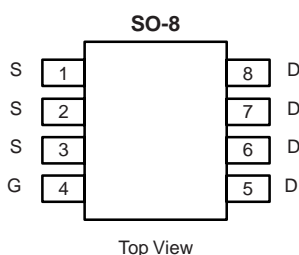
$V_{DS}$ (V)	$R_{DS(on)}$ ( $\Omega$ )	$I_D$ (A)
60	0.024 at $V_{GS} = 10$ V	7.5
	0.03 at $V_{GS} = 6.0$ V	6.5

### FEATURES

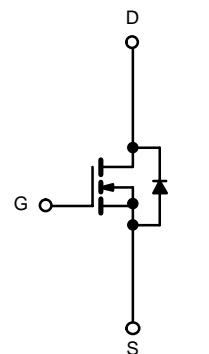
- Halogen-free According to IEC 61249-2-21 Available
- TrenchFET® Power MOSFET



**RoHS**  
COMPLIANT  
**HALOGEN**  
**FREE**  
Available



**Ordering Information:** Si4450DY-T1-E3 (Lead (Pb)-free)  
Si4450DY-T1-GE3 (Lead (Pb)-free and Halogen-free)



### ABSOLUTE MAXIMUM RATINGS $T_A = 25$ °C, unless otherwise noted

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	$V_{DS}$	60	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	
Continuous Drain Current ( $T_J = 150$ °C) <sup>a</sup>	$I_D$	$T_A = 25$ °C	A
		$T_A = 70$ °C	
Pulsed Drain Current	$I_{DM}$	50	
Continuous Source Current (Diode Conduction) <sup>a</sup>	$I_S$	2.1	
Maximum Power Dissipation <sup>a</sup>	$P_D$	$T_A = 25$ °C	W
		$T_A = 70$ °C	
Operating Junction and Storage Temperature Range	$T_J, T_{stg}$	- 55 to 150	°C

### THERMAL RESISTANCE RATINGS

Parameter	Symbol	Limit	Unit
Maximum Junction-to-Ambient <sup>a</sup>	$R_{thJA}$	50	°C/W

Notes:

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

For SPICE model information via the Worldwide Web: <http://www.vishay.com/www/product/spice.htm>

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

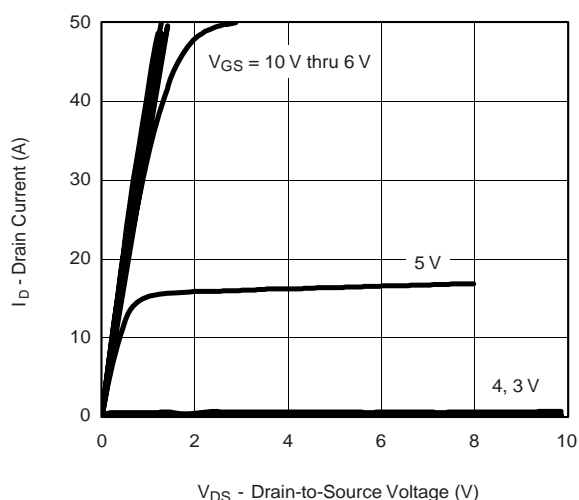
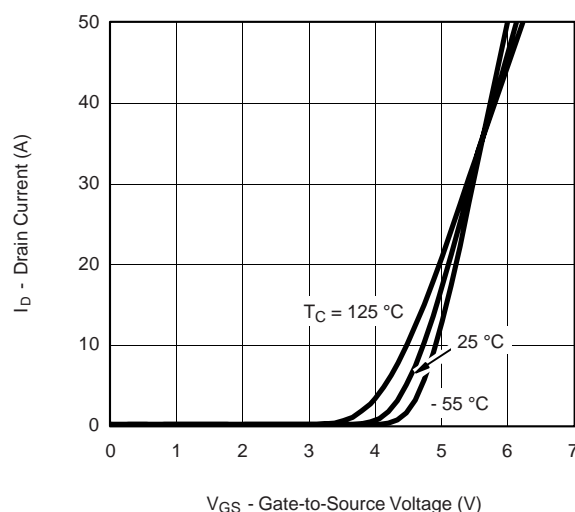
Parameter	Symbol	Test Conditions	Min.	Typ. <sup>a</sup>	Max.	Unit
<b>Static</b>						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$ , $I_D = 250\ \mu\text{A}$	2			V
Gate-Body Leakage	$I_{GSS}$	$V_{DS} = 0\ \text{V}$ , $V_{GS} = \pm 20\ \text{V}$			$\pm 100$	nA
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = 60\ \text{V}$ , $V_{GS} = 0\ \text{V}$			1	$\mu\text{A}$
		$V_{DS} = 60\ \text{V}$ , $V_{GS} = 0\ \text{V}$ , $T_J = 55^\circ\text{C}$			20	
On-State Drain Current <sup>b</sup>	$I_{D(on)}$	$V_{DS} = 5\ \text{V}$ , $V_{GS} = 10\ \text{V}$	20			A
Drain-Source On-State Resistance <sup>b</sup>	$R_{DS(on)}$	$V_{GS} = 10\ \text{V}$ , $I_D = 7.5\ \text{A}$		0.020	0.024	$\Omega$
		$V_{GS} = 6.0\ \text{V}$ , $I_D = 6.5\ \text{A}$		0.025	0.03	
Forward Transconductance <sup>b</sup>	$g_{fs}$	$V_{DS} = 15\ \text{V}$ , $I_D = 7.5\ \text{A}$		18.5		S
Diode Forward Voltage <sup>b</sup>	$V_{SD}$	$I_S = 2.1\ \text{A}$ , $V_{GS} = 0\ \text{V}$		0.75	1.2	V
<b>Dynamic</b>						
Total Gate Charge	$Q_g$	$V_{DS} = 30\ \text{V}$ , $V_{GS} = 10\ \text{V}$ , $I_D = 7.5\ \text{A}$		31	50	nC
Gate-Source Charge	$Q_{gs}$			7.7		
Gate-Drain Charge	$Q_{gd}$			8.3		
Gate Resistance	$R_g$		1		5.8	$\Omega$
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = 30\ \text{V}$ , $R_L = 30\ \Omega$ $I_D \cong 1\ \text{A}$ , $V_{GEN} = 10\ \text{V}$ , $R_g = 6\ \Omega$		16	30	ns
Rise Time	$t_r$			11	20	
Turn-Off Delay Time	$t_{d(off)}$			41	80	
Fall Time	$t_f$			21	40	
Source-Drain Reverse Recovery Time	$t_{rr}$	$I_F = 2.1\ \text{A}$ , $di/dt = 100\ \text{A}/\mu\text{s}$		46	80	

Notes:

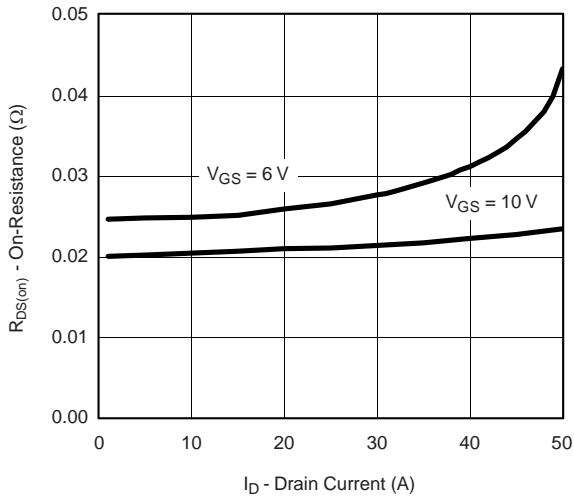
a. For design aid only; not subject to production testing.

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

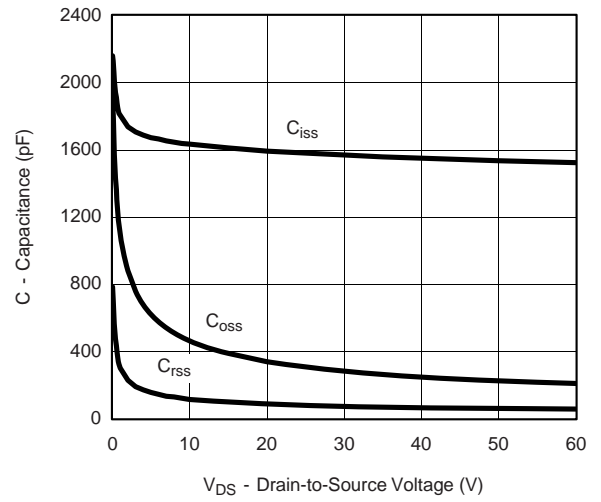
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure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

**TYPICAL CHARACTERISTICS**  $25^\circ\text{C}$ , unless otherwise noted**Output Characteristics****Transfer Characteristics**

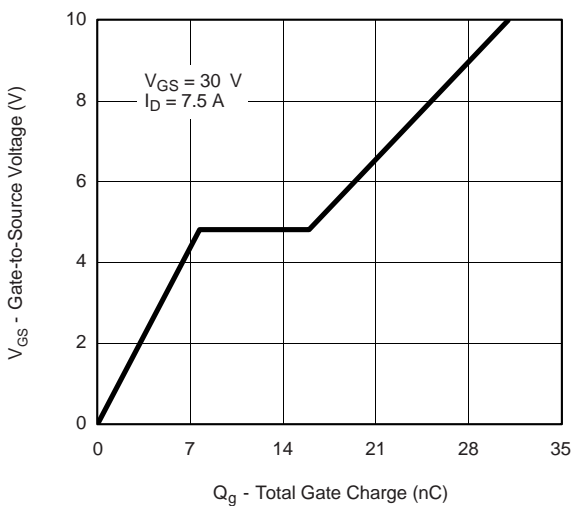
## TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



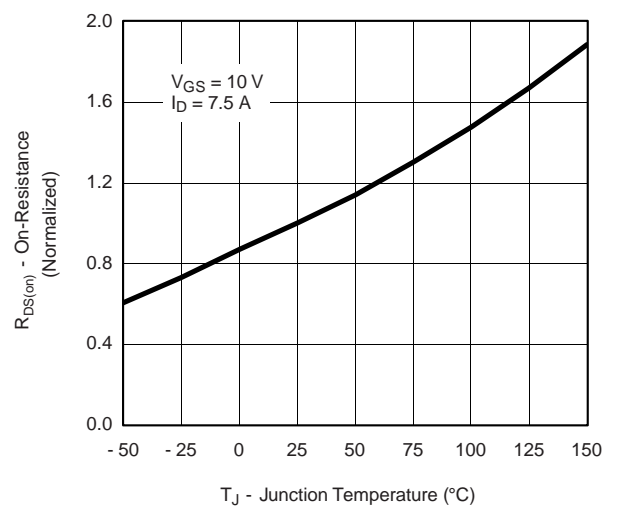
On-Resistance vs. Drain Current



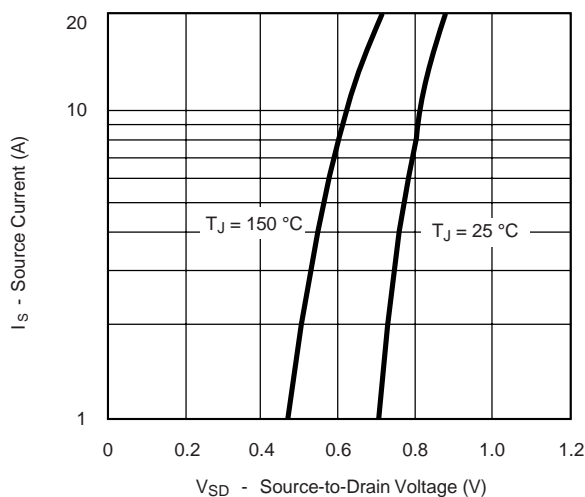
Capacitance



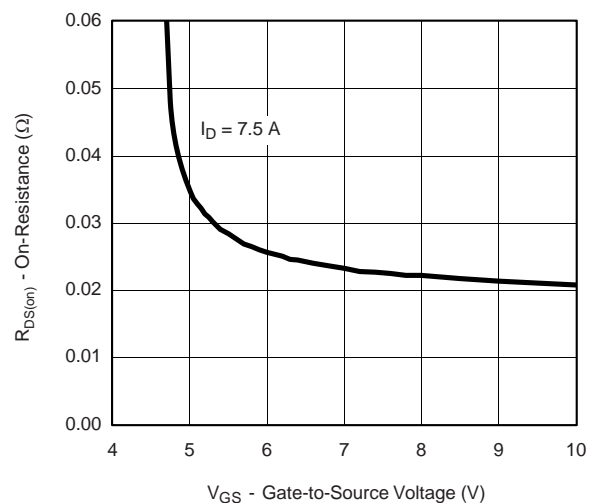
Gate Charge



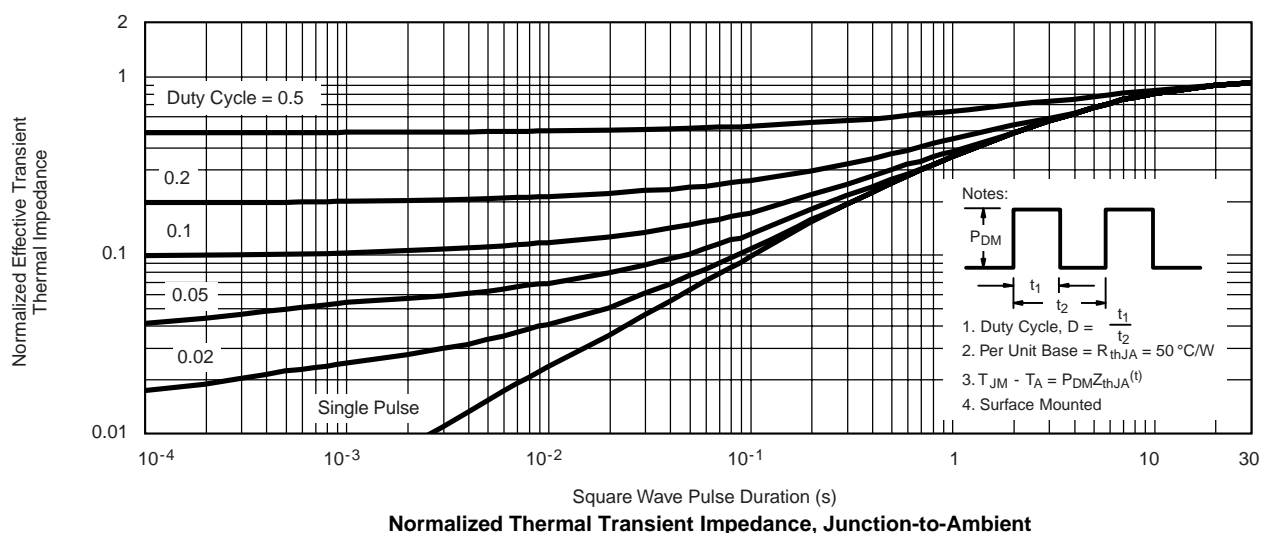
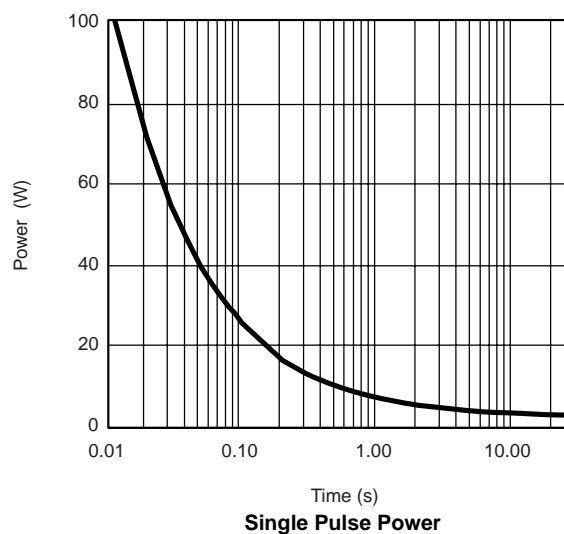
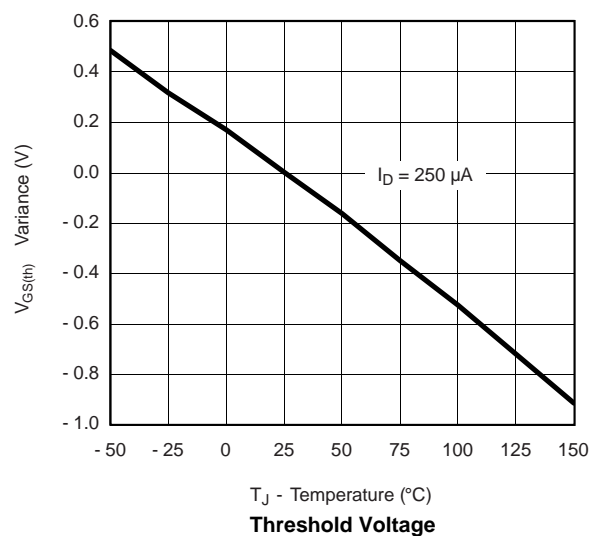
On-Resistance vs. Junction Temperature



Source-Drain Diode Forward Voltage



On-Resistance vs. Gate-to-Source Voltage

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

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