

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

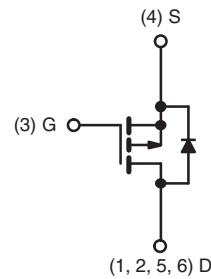
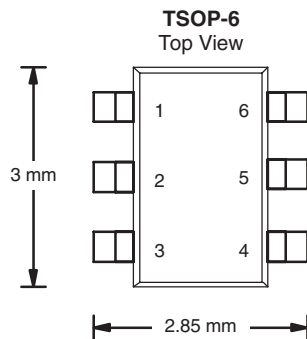
PRODUCT SUMMARY		
$V_{DS}$ (V)	$R_{DS(on)}$ ( $\Omega$ )	$I_D$ (A)
- 60	0.220 at $V_{GS} = - 10$ V	$\pm 2.2$
	0.310 at $V_{GS} = - 4.5$ V	$\pm 1.9$

### FEATURES

- Halogen-free According to IEC 61249-2-21 Definition
- TrenchFET<sup>®</sup> Power MOSFET
- Compliant to RoHS Directive 2002/95/EC



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



Ordering Information: Si3459DV-T1-E3 (Lead (Pb)-free)  
Si3459DV-T1-GE3 (Lead (Pb)-free and Halogen-free)

P-Channel MOSFET

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, b</sup>	$I_D$	$T_C = 25$ °C	$\pm 2.2$
		$T_C = 70$ °C	$\pm 1.7$
Pulsed Drain Current	$I_{DM}$	$\pm 10$	A
Single Avalanche Current ( $L = 0.1$ mH)	$I_{AS}$	- 7	
Maximum Power Dissipation <sup>b</sup>	$P_D$	$T_A = 25$ °C	2
		$T_A = 70$ °C	1.3
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 <sup>a</sup>	$t \leq 5$ s	$R_{thJA}$	106	62.5	°C/W
	Steady State				
Maximum Junction-to-Lead	Steady State	$R_{thJL}$	35		

Notes:

a. Surface Mounted on FR4 board.

b.  $t \leq 5$  s.

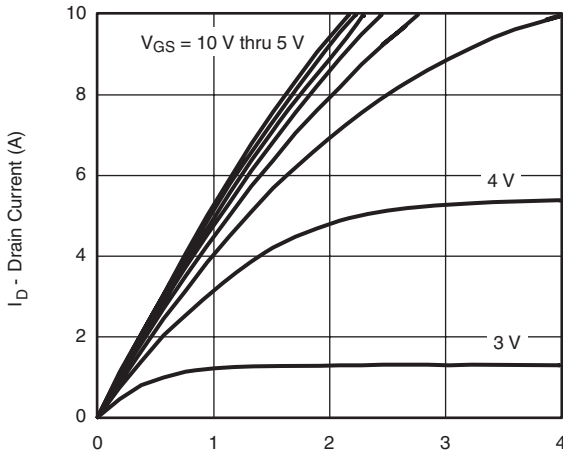
SPECIFICATIONS $T_J = 25\text{ }^\circ\text{C}$ , unless otherwise noted						
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
<b>Static</b>						
Drain-Source Breakdown Voltage	$V_{DS}$	$V_{GS} = 0\text{ V}, I_D = -250\text{ }\mu\text{A}$	- 60			V
Gate-Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = -250\text{ }\mu\text{A}$	- 1			
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	$\mu\text{A}$
		$V_{DS} = -60\text{ V}, V_{GS} = 0\text{ V}, T_J = 150\text{ }^\circ\text{C}$			- 50	
On-State Drain Current <sup>a</sup>	$I_{D(on)}$	$V_{DS} = -5\text{ V}, V_{GS} = -10\text{ V}$	- 10			A
Drain-Source On-State Resistance <sup>a</sup>	$R_{DS(on)}$	$V_{GS} = -10\text{ V}, I_D = -2.2\text{ A}$		0.190	0.220	$\Omega$
		$V_{GS} = -4.5\text{ V}, I_D = -1.9\text{ A}$		0.265	0.310	
Forward Transconductance <sup>a</sup>	$g_{fs}$	$V_{DS} = -4.5\text{ V}, I_D = -2.2\text{ A}$		4		S
<b>Dynamic<sup>b</sup></b>						
Total Gate Charge	$Q_g$	$V_{DS} = -30\text{ V}, V_{GS} = -10\text{ V}, I_D = -2.2\text{ A}$		7	14	nC
Gate-Source Charge	$Q_{gs}$			1.6		
Gate-Drain Charge	$Q_{gd}$			1.2		
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = -30\text{ V}, R_L = 30\text{ }\Omega$ $I_D \cong -1\text{ A}, V_{GEN} = -10\text{ V}, R_g = 6\text{ }\Omega$		8	16	ns
Rise Time	$t_r$			12	24	
Turn-Off Delay Time	$t_{d(off)}$			23	45	
Fall Time	$t_f$			12	25	
<b>Source-Drain Rating Characteristics<sup>b</sup></b>						
Continuous Current	$I_S$				- 1.7	A
Pulsed Current	$I_{SM}$				- 10	
Diode Forward Voltage <sup>a</sup>	$V_{SD}$	$I_S = -1.7\text{ A}, V_{GS} = 0\text{ V}$		- 0.8	- 1.2	V
Source-Drain Reverse Recovery Time	$t_{rr}$	$I_F = -1.7\text{ A}, di/dt = 100\text{ A}/\mu\text{s}$		50	90	ns

## Notes:

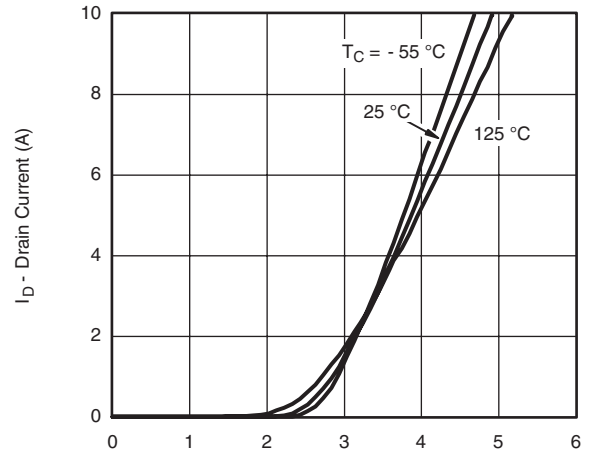
- a. Pulse test; pulse width  $\leq 300\text{ }\mu\text{s}$ , duty cycle  $\leq 2\%$ .  
b. Guaranteed by design, not subject to production testing.

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.

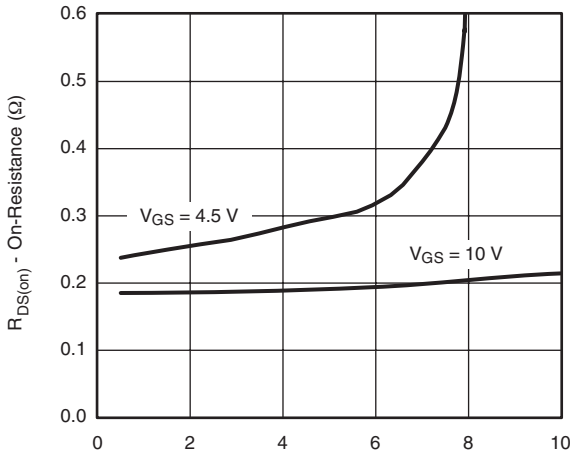
**TYPICAL CHARACTERISTICS** 25 °C, unless otherwise noted



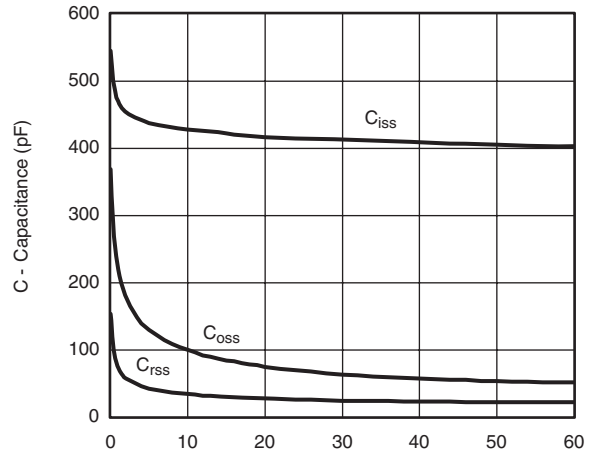
$V_{GS} = 10\text{ V thru } 5\text{ V}$   
**Output Characteristics**



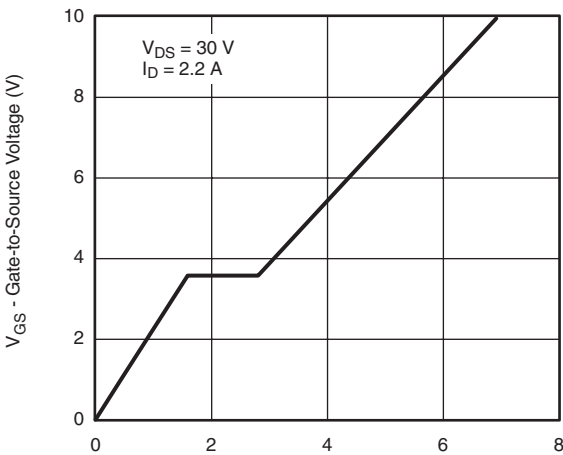
$T_C = -55\text{ }^\circ\text{C}$   
 $25\text{ }^\circ\text{C}$   
 $125\text{ }^\circ\text{C}$   
**Transfer Characteristics**



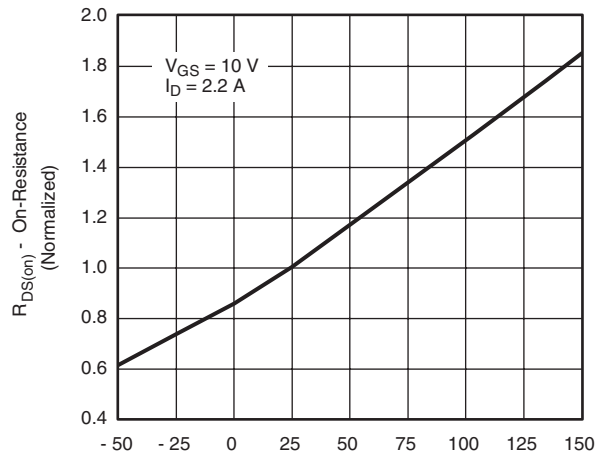
$V_{GS} = 4.5\text{ V}$   
 $V_{GS} = 10\text{ V}$   
**On-Resistance vs. Drain Current**



$C_{iss}$   
 $C_{oss}$   
 $C_{rss}$   
**Capacitance**

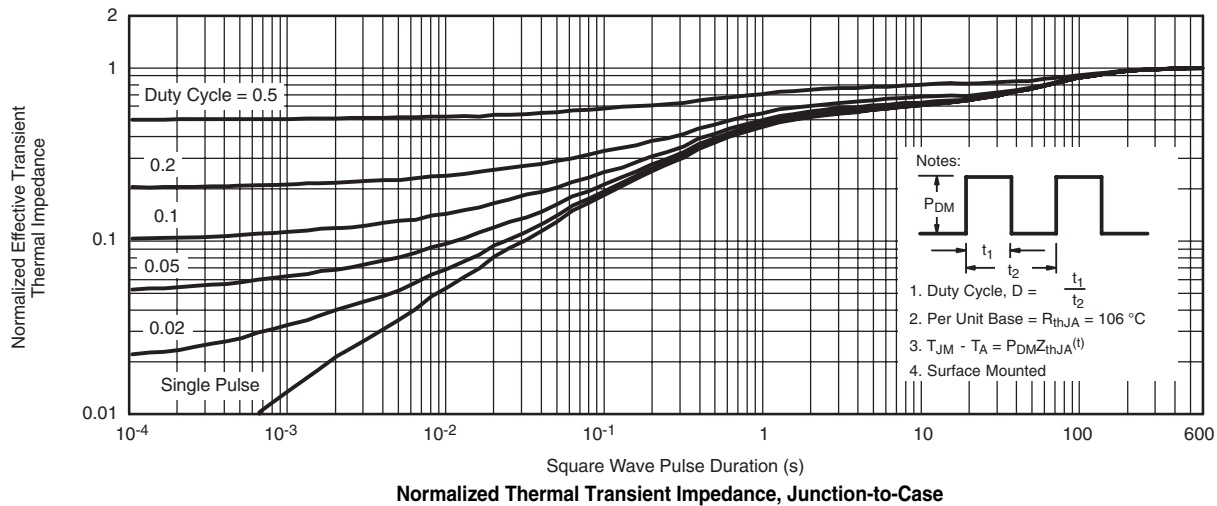
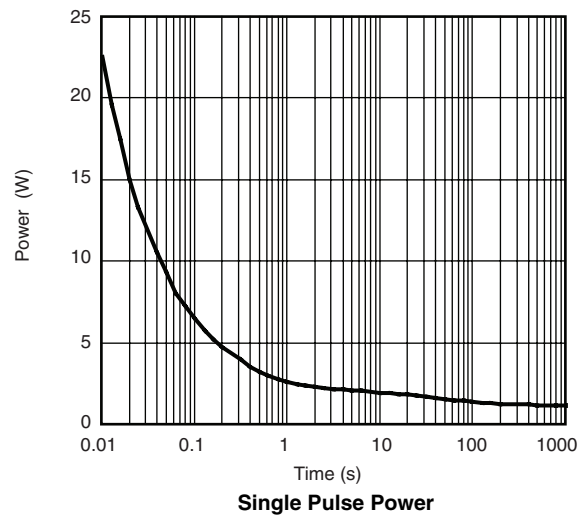
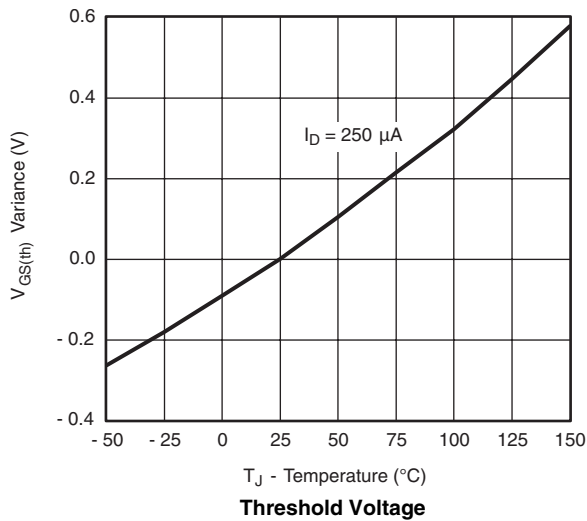
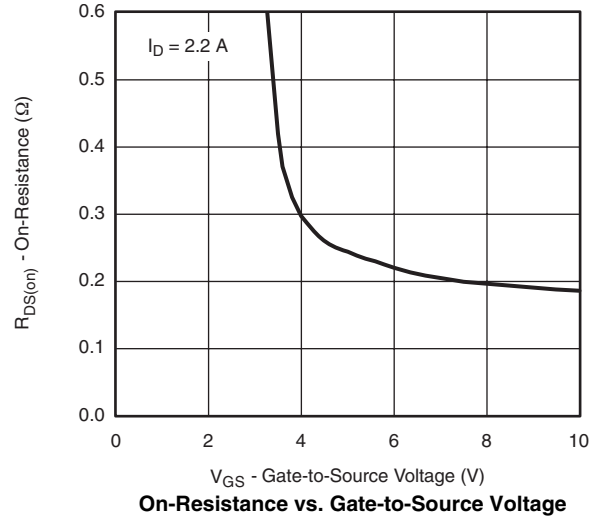
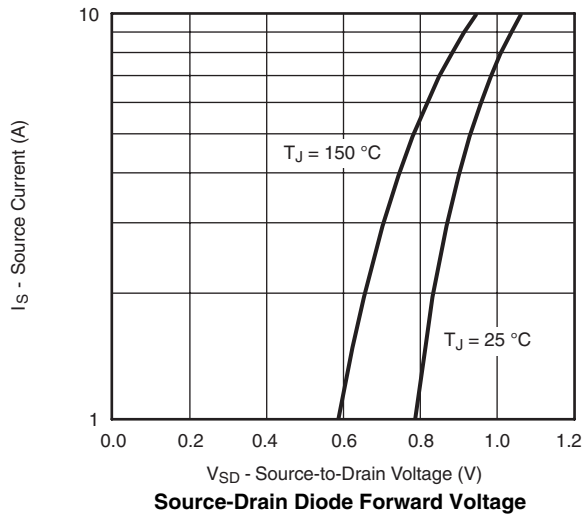


$V_{DS} = 30\text{ V}$   
 $I_D = 2.2\text{ A}$   
**Gate Charge**



$V_{GS} = 10\text{ V}$   
 $I_D = 2.2\text{ A}$   
**On-Resistance vs. Junction Temperature**

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



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