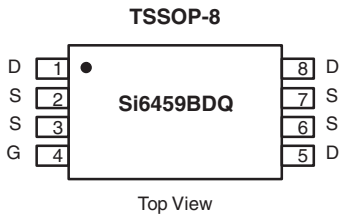
P-Channel 60 V (D-S) MOSFET

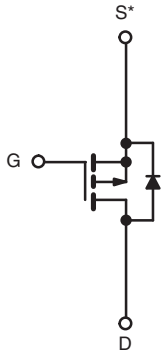
PRODUCT SUMMARY		
V_{DS} (V)	$R_{DS(on)}$ (Ω)	I_D (A)
- 60	0.115 at V_{GS} = - 10 V	- 2.7
	0.150 at V_{GS} = - 4.5 V	- 2.4

FEATURES

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

Pb-free
RoHS COMPLIANT
HALOGEN FREE





* Source Pins 2, 3, 6 and 7 must be tied common.

P-Channel MOSFET

Ordering Information: Si6459BDQ-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}	- 60		V
Gate-Source Voltage		V_{GS}	± 20		
Continuous Drain Current (T_J = 150 °C)[a]	T_A = 25 °C	I_D	- 2.7	- 2.2	A
	T_A = 70 °C		- 2.2	- 1.8	
Pulsed Drain Current (10 µs Pulse Width)		I_{DM}	- 20		
Continuous Source Current (Diode Conduction)[a]		I_S	- 1.25	- 0.83	
Avalanche Current	L = 0.1 mH	I_{AS}	15		
Single Pulse Avalanche Energy		E_{AS}	11		mJ
Maximum Power Dissipation[a]	T_A = 25 °C	P_D	1.50	1.0	W
	T_A = 70 °C		1.0	0.67	
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}	66	83	°C/W
	Steady State		100	120	
Maximum Junction-to-Foot	Steady State	R_{thJF}	50	60	

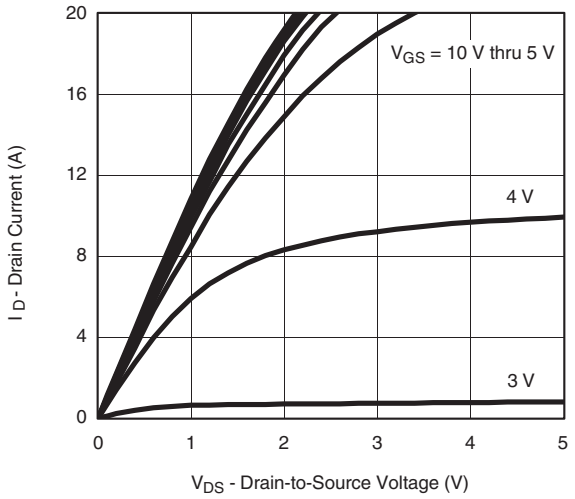
Notes:
a. Surface mounted on 1" x 1" FR4 board.

SPECIFICATIONS (T_J = 25 °C, unless otherwise noted)						
Parameter	**Symbol**	**Test Conditions**	**Min.**	**Typ.**	**Max.**	**Unit**
Static						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$, $I_D = -250$ µA	- 1		- 3	V
Gate-Body Leakage	I_{GSS}	$V_{DS} = 0$ V, $V_{GS} = \pm 20$ V			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = -60$ V, $V_{GS} = 0$ V			- 1	µA
		$V_{DS} = -60$ V, $V_{GS} = 0$ V, $T_J = 70$ °C			- 10	
On-State Drain Current[a]	$I_{D(on)}$	$V_{DS} = -5$ V, $V_{GS} = -10$ V	- 20			A
Drain-Source On-State Resistance[a]	$R_{DS(on)}$	$V_{GS} = -10$ V, $I_D = -2.7$ A		0.092	0.115	Ω
		$V_{GS} = -4.5$ V, $I_D = -2.4$ A		0.120	0.150	
Forward Transconductance[a]	g_{fs}	$V_{DS} = -15$ V, $I_D = -2.7$ A		8		S
Diode Forward Voltage[a]	V_{SD}	$I_S = -1.25$ A, $V_{GS} = 0$ V		- 0.8	- 1.2	V
Dynamic[b]						
Total Gate Charge	Q_g	$V_{DS} = -30$ V, $V_{GS} = -10$ V, $I_D = -2.7$ A		14.5	22	nC
Gate-Source Charge	Q_{gs}			2.2		
Gate-Drain Charge	Q_{gd}			3.7		
Gate Resistance	R_g			14		Ω
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = -30$ V, $R_L = 30$ Ω $I_D \cong -1$ A, $V_{GEN} = -10$ V, $R_g = 6$ Ω		10	15	ns
Rise Time	t_r			15	22	
Turn-Off Delay Time	$t_{d(off)}$			50	75	
Fall Time	t_f			35	55	
Source-Drain Reverse Recovery Time	t_{rr}	$I_F = -1.25$ A, dI/dt = 100 A/µs		30	50	

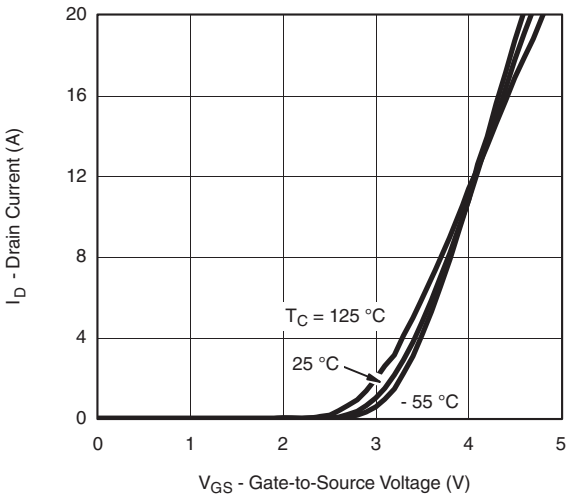
Notes:
a. Pulse test; pulse width ≤ 300 µs, duty cycle ≤ 2 %.
b. Guaranteed by design, not subject to production testing.

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)

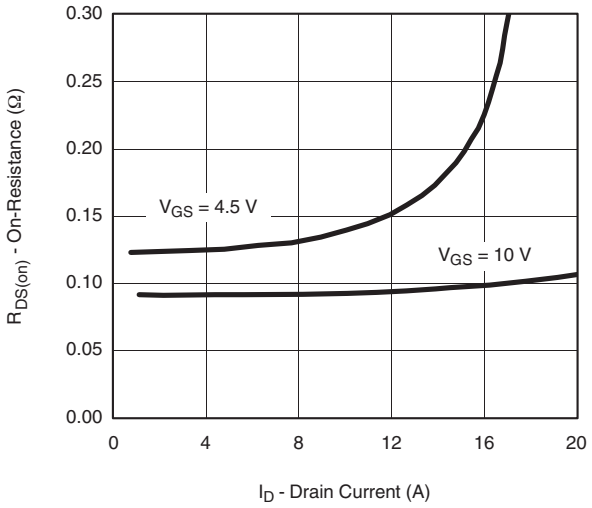


Output Characteristics

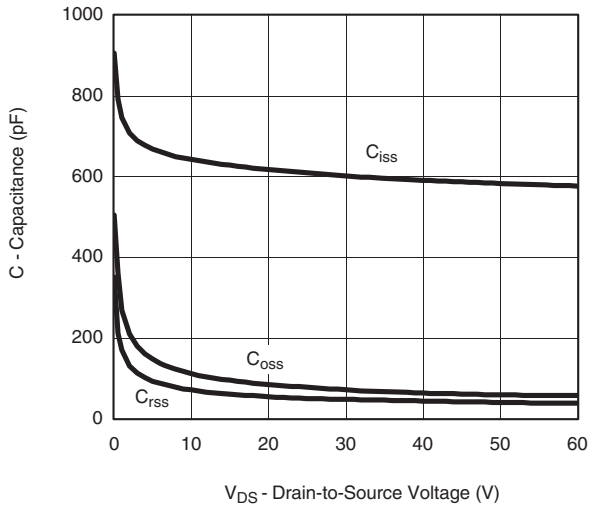


Transfer Characteristics

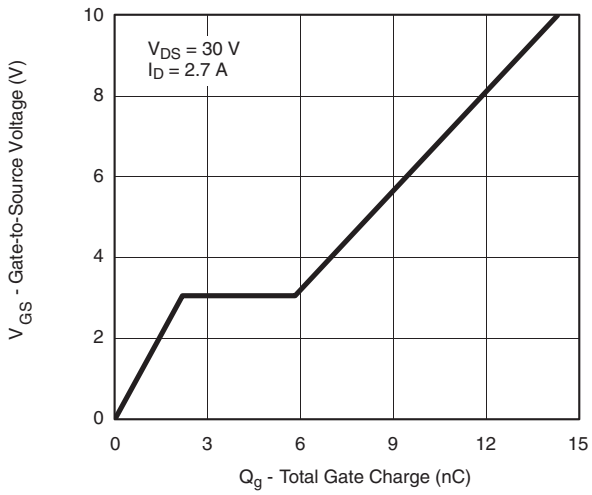
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



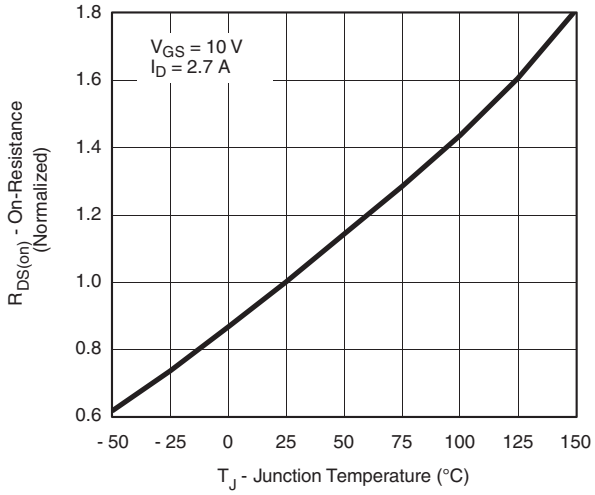
On-Resistance vs. Drain Current



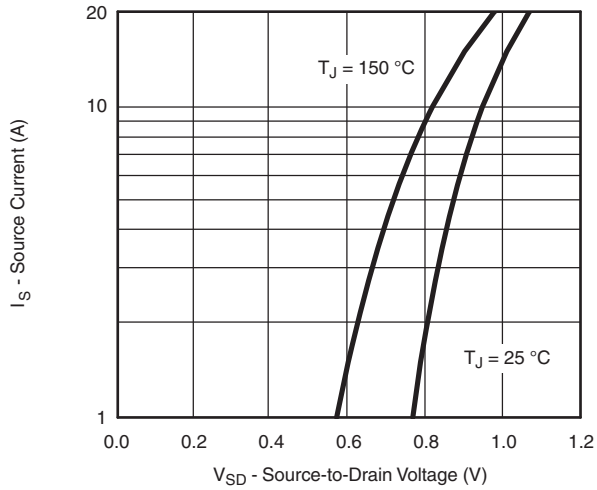
Capacitance



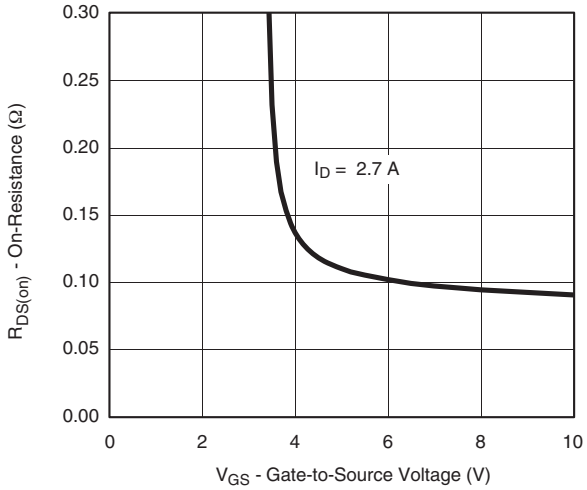
Gate Charge



On-Resistance vs. Junction Temperature

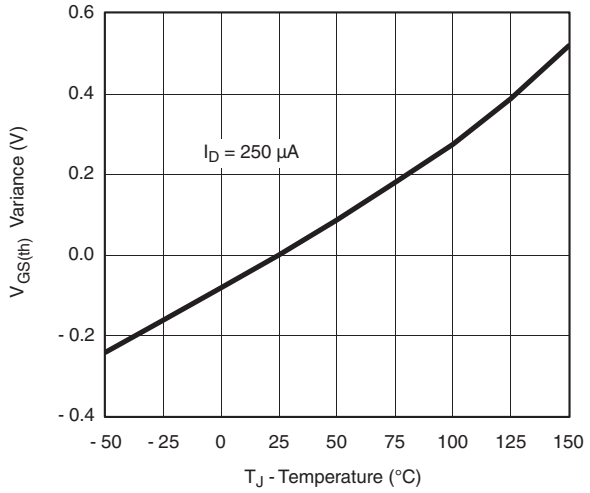


Source-Drain Diode Forward Voltage

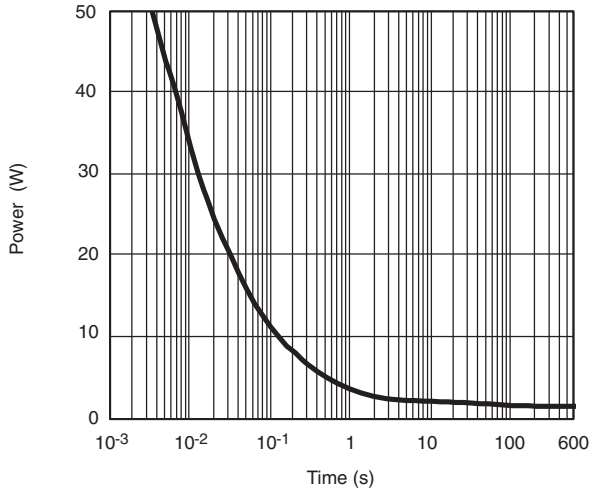


On-Resistance vs. Gate-to-Source Voltage

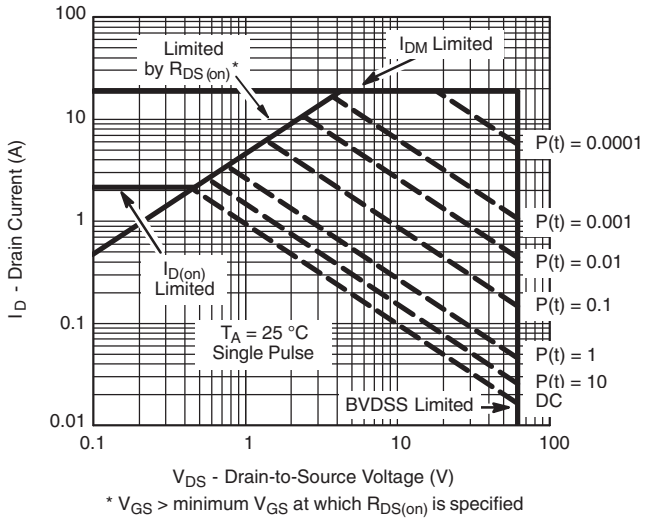
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



Threshold Voltage

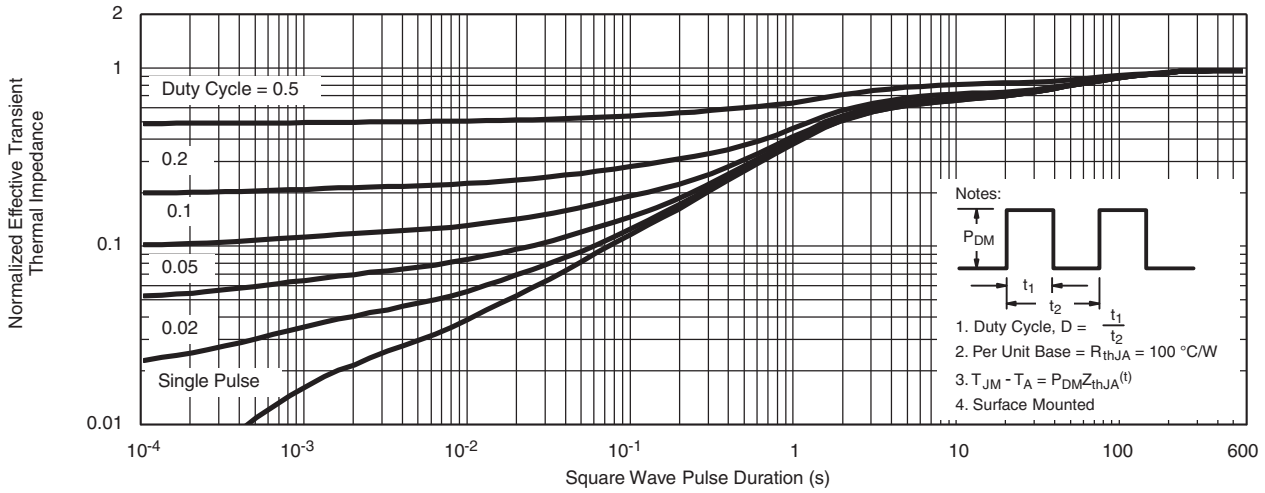


Single Pulse Power



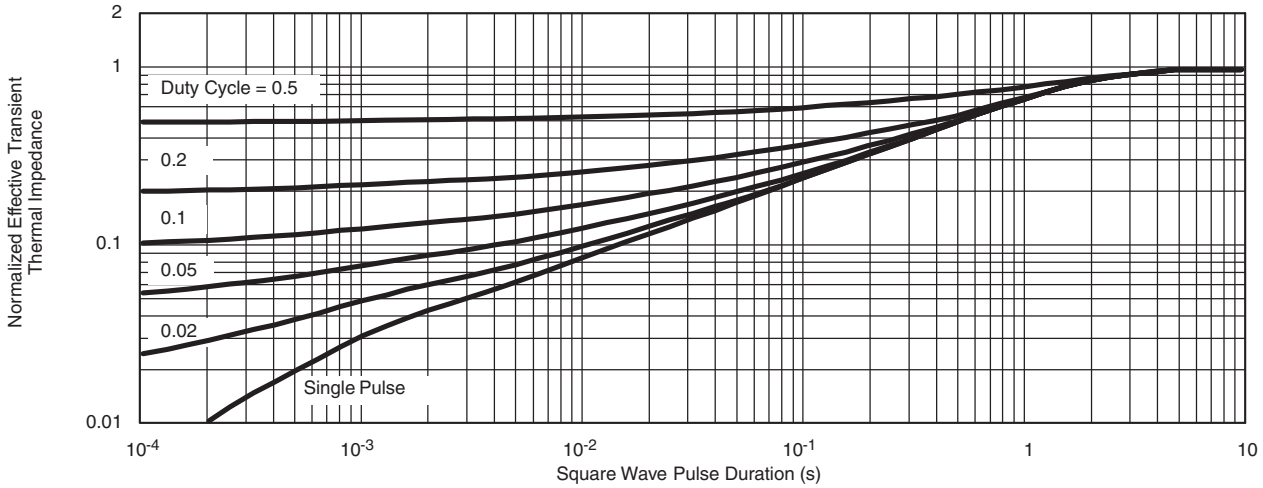
* V_{GS} > minimum V_{GS} at which $R_{DS(on)}$ is specified

Safe Operating Area, Junction-to-Case



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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