P-Channel 150-V (D-S) MOSFET

PRODUCT SUMMARY		
V_{DS} (V)	$r_{DS(on)}$ (Ω)	I_D (A)
−150	0.090 @ V_{GS} = −10 V	−5.2
	0.095 @ V_{GS} = −6 V	−5.0

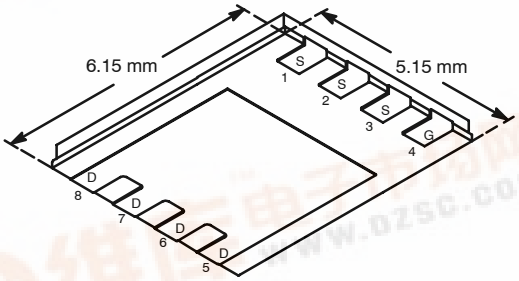
FEATURES

- TrenchFET® Power MOSFETS
- Ultra-Low On-Resistance Critical for Application
- Low Thermal Resistance PowerPAK® Package with Low 1.07-mm Profile
- 100% R_g and Avalanche Tested

APPLICATIONS

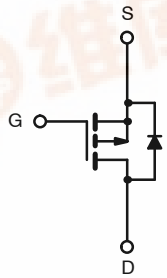
- Active Clamp in Intermediate DC/DC Power Supplies

PowerPAK SO-8



Bottom View

Ordering Information: Si7439DP-T1—E3



P-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS (T_A = 25°C UNLESS OTHERWISE NOTED)					
Parameter		Symbol	10 secs	Steady State	Unit
Drain-Source Voltage		V_{DS}	−150		V
Gate-Source Voltage		V_{GS}	±20		V
Continuous Drain Current (T_J = 150°C)[a]	T_A = 25°C	I_D	−5.2	−3.0	A
	T_A = 70°C		−4.1	−2.4	
Pulsed Drain Current		I_{DM}	−50		A
Continuous Source Current (Diode Conduction)[a]		I_S	−4.2	−1.6	A
Single Pulse Avalanche Current	L = 0.1 mH	I_{AS}	−40		A
Single Pulse Avalanche Energy	L = 0.1 mH	E_{AS}	80		mJ
Maximum Power Dissipation[a]	T_A = 25°C	P_D	5.4	1.9	W
	T_A = 70°C		3.4	1.2	
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 sec	R_{thJA}	18	23	°C/W
	Steady State		50	65	
Maximum Junction-to-Case (Drain)	Steady State	R_{thJC}	1.0	1.5	

Notes

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

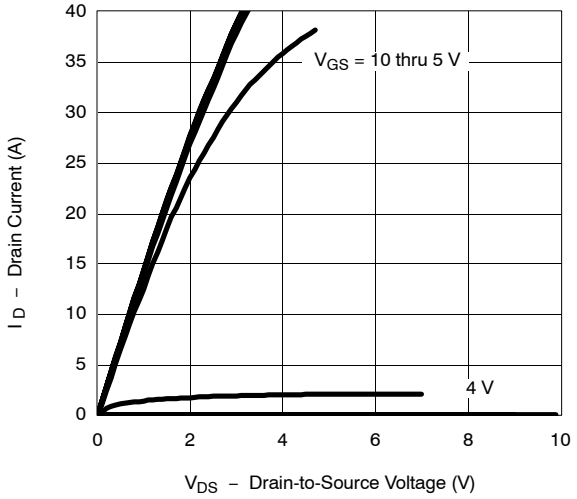
SPECIFICATIONS (T_J = 25°C UNLESS OTHERWISE NOTED)

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Static						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$, $I_D = -250\ \mu A$	−2.0		−4.0	V
Gate-Body Leakage	I_{GSS}	$V_{DS} = 0$ V, $V_{GS} = \pm 20$ V			±100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = -150$ V, $V_{GS} = 0$ V			−1	μA
		$V_{DS} = -150$ V, $V_{GS} = 0$ V, $T_J = 70°C$			−10	
On-State Drain Current[a]	$I_{D(on)}$	$V_{DS} = -10$ V, $V_{GS} = -10$ V	−30			A
Drain-Source On-State Resistance[a]	$r_{DS(on)}$	$V_{GS} = -10$ V, $I_D = -5.2$ A		0.073	0.090	Ω
		$V_{GS} = -6$ V, $I_D = -5.0$ A		0.077	0.095	
Forward Transconductance[a]	g_{fs}	$V_{DS} = -15$ V, $I_D = -5.2$ A		19		S
Diode Forward Voltage[a]	V_{SD}	$I_S = -4.2$ A, $V_{GS} = 0$ V		−0.78	−1.2	V
Dynamic[b]						
Total Gate Charge	Q_g	$V_{DS} = -75$ V, $V_{GS} = -10$ V, $I_D = -5.2$ A		88	135	nC
Gate-Source Charge	Q_{gs}			17.5		
Gate-Drain Charge	Q_{gd}			26.5		
Gate Resistance	R_g		1.5	3	4.5	Ω
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = -75$ V, $R_L = 15.5\ \Omega$ $I_D \cong -4.8$ A, $V_{GEN} = -10$ V, $R_g = 6\ \Omega$		25	40	ns
Rise Time	t_r			46	70	
Turn-Off Delay Time	$t_{d(off)}$			115	180	
Fall Time	t_f			64	100	
Source-Drain Reverse Recovery Time	t_{rr}	$I_F = -2.9$ A, di/dt = 100 A/μs		100	150	

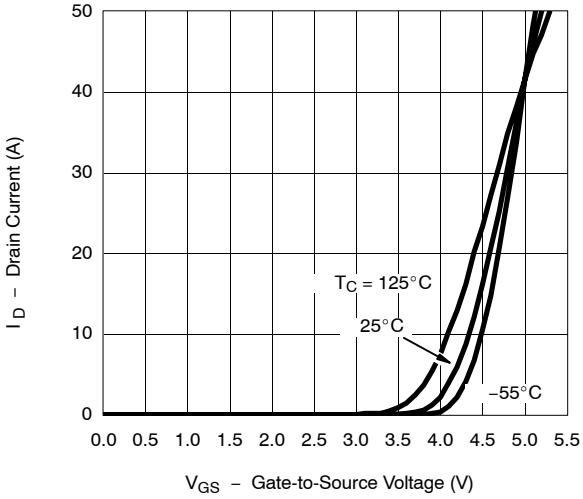
Notes
a. Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2%.
b. Guaranteed by design, not subject to production testing.

TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

Output Characteristics

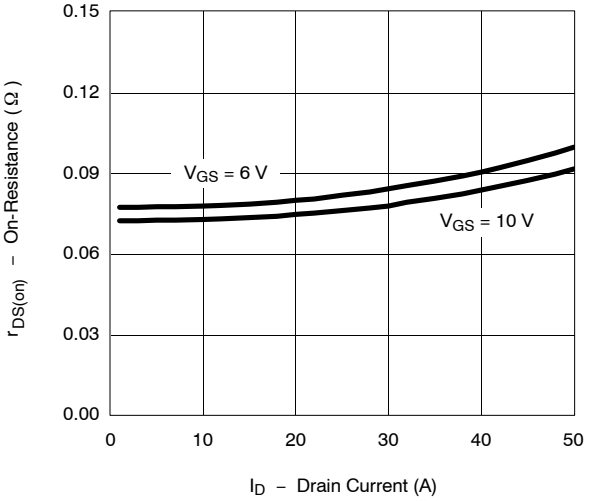


Transfer Characteristics

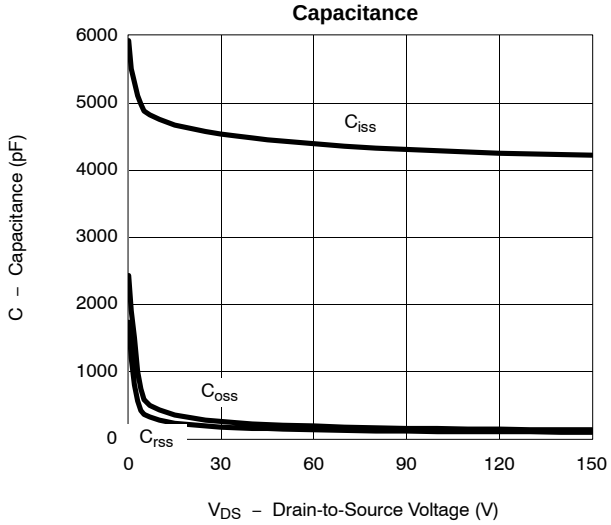


TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

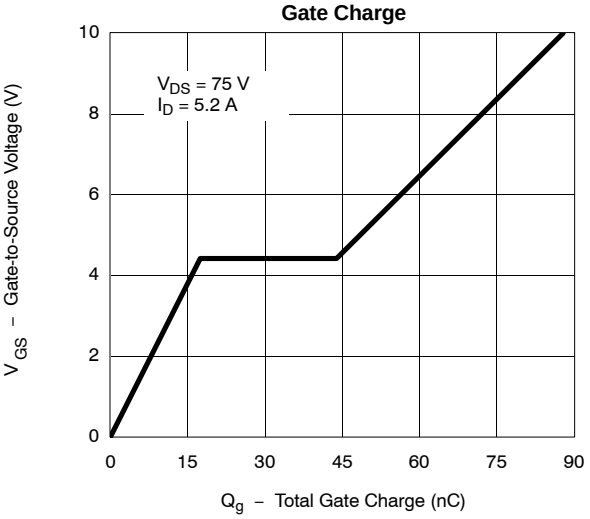
On-Resistance vs. Drain Current



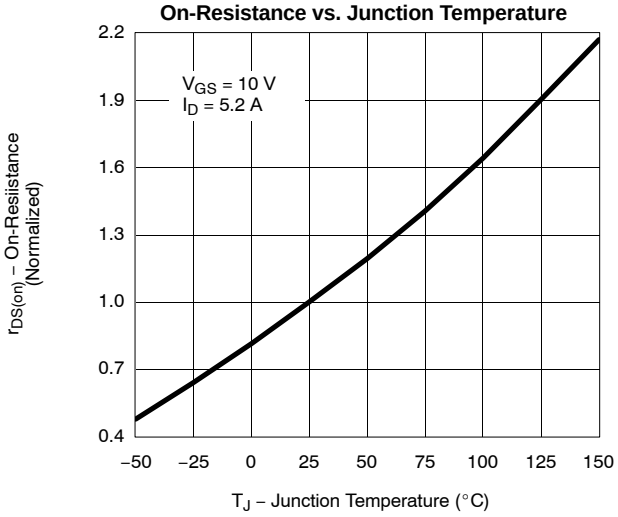
Capacitance



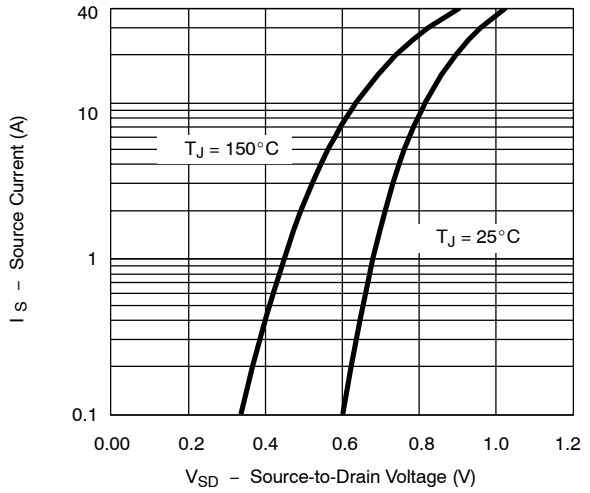
Gate Charge



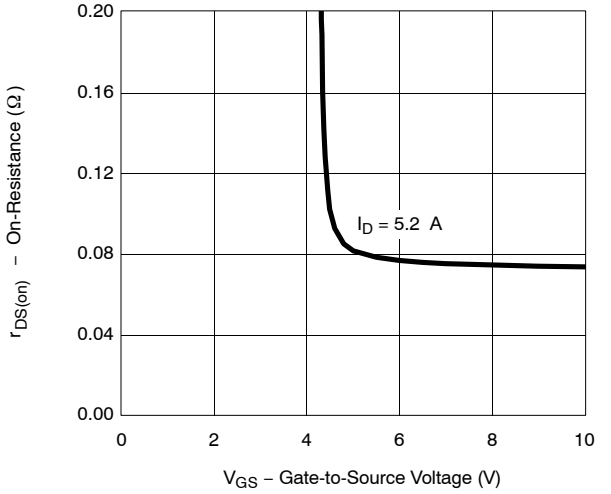
On-Resistance vs. Junction Temperature



Source-Drain Diode Forward Voltage

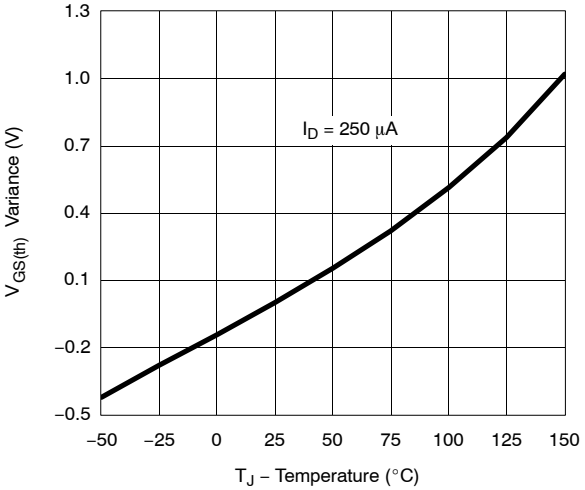


On-Resistance vs. Gate-to-Source Voltage

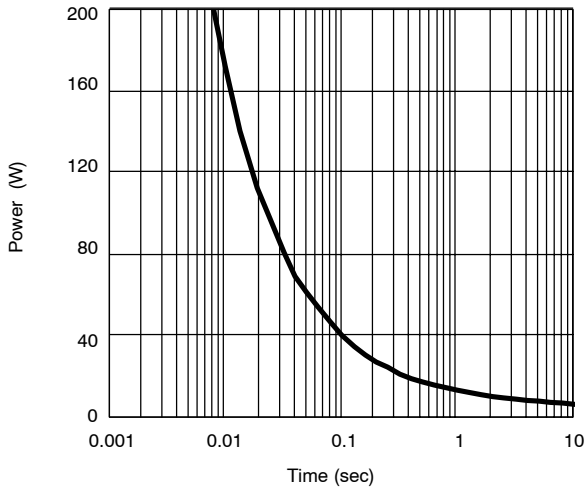


TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

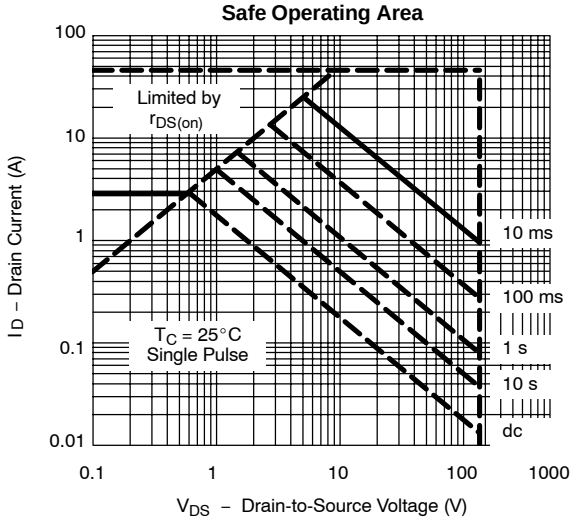
Threshold Voltage



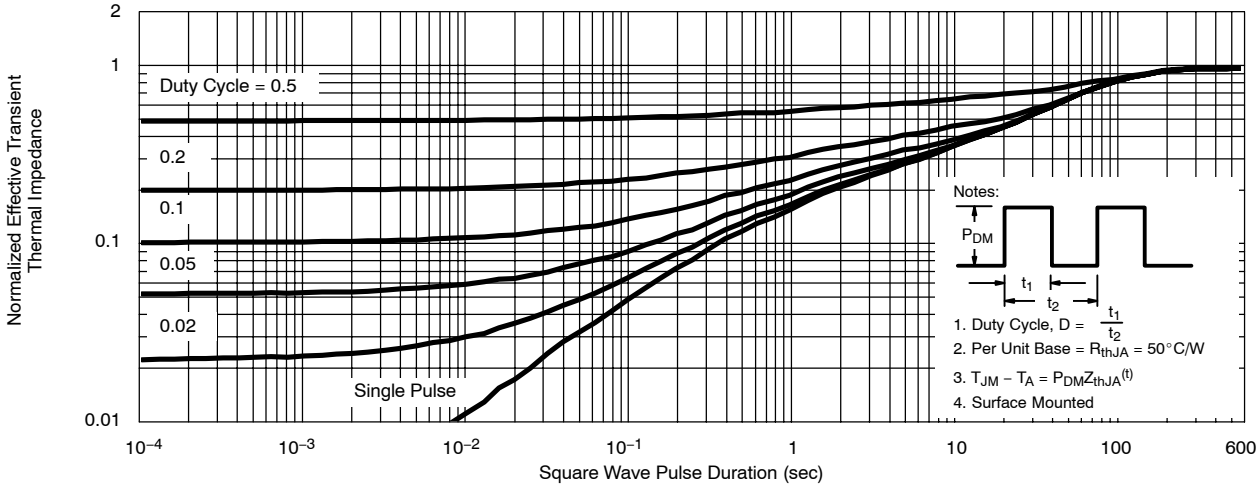
Single Pulse Power



Safe Operating Area



Normalized Thermal Transient Impedance, Junction-to-Ambient



TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)