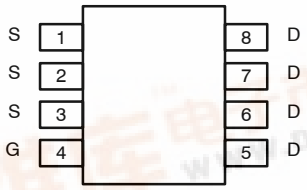
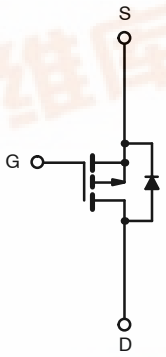
P-Channel 20-V (D-S) MOSFET

PRODUCT SUMMARY		
V_{DS} (V)	$r_{DS(on)}$ (Ω)	I_D (A)
−20	0.040 @ V_{GS} = −4.5 V	−6.2
	0.060 @ V_{GS} = −2.7 V	−5.0

SO-8



Top View



P-Channel MOSFET

Ordering Information: Si9433BDY—E3 (Lead Free)
Si9433BDY-T1—E3 (Lead Free with Tape and Reel)

ABSOLUTE MAXIMUM RATINGS (T_A = 25°C UNLESS OTHERWISE NOTED)					
Parameter		Symbol	10 secs	Steady State	Unit
Drain-Source Voltage		V_{DS}	−20		V
Gate-Source Voltage		V_{GS}	±12		
Continuous Drain Current (T_J = 150°C)[a]	T_A = 25°C	I_D	−6.2	−4.5	A
	T_A = 70°C		−5.0	−3.5	
Pulsed Drain Current		I_{DM}	−20		
Continuous Source Current (Diode Conduction)[a]		I_S	−2.3	−1.2	
Maximum Power Dissipation[a]	T_A = 25°C	P_D	2.5	1.3	W
	T_A = 70°C		1.6	0.8	
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}	45	50	°C/W
	Steady State		80	95	
Maximum Junction-to-Foot (Drain)	Steady State	R_{thJF}	20	24	

Notes:
a. Surface Mounted on FR4 Board, t ≤ 10 sec.

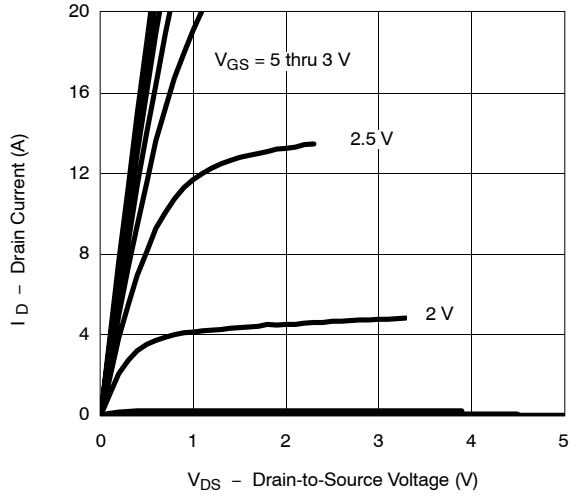
SPECIFICATIONS (T_J = 25°C UNLESS OTHERWISE NOTED)

Parameter	Symbol	Test Condition	Min	Typ[a]	Max	Unit
Static						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = −250 μA	−0.6		−1.5	V
Gate-Body Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ±12 V			±100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = −20 V, V_{GS} = 0 V			−1	μA
		V_{DS} = −20 V, V_{GS} = 0 V, T_J = 70°C			−10	
On-State Drain Current[b]	$I_{D(on)}$	V_{DS} ≤ −5 V, V_{GS} = −4.5 V	−20			A
		V_{DS} ≤ −5 V, V_{GS} = −2.7 V	−5			
Drain-Source On-State Resistance[b]	$r_{DS(on)}$	V_{GS} = −4.5 V, I_D = −6.2 A		0.030	0.040	Ω
		V_{GS} = −2.7 V, I_D = −5.0 A		0.050	0.060	
Forward Transconductance[b]	g_{fs}	V_{DS} = −9 V, I_D = −6.2 A		15		S
Diode Forward Voltage[b]	V_{SD}	I_S = −2.6 A, V_{GS} = 0 V		−0.76	−1.1	V
Dynamic[a]						
Total Gate Charge	Q_g	V_{DS} = −6 V, V_{GS} = −4.5 V, I_D = −6.2 A		8.8	14	nC
Gate-Source Charge	Q_{gs}			1.8		
Gate-Drain Charge	Q_{gd}			2.4		
Gate Resistance	R_g			8.5		Ω
Turn-On Delay Time	$t_{d(on)}$	V_{DD} = −6 V, R_L = 6 Ω I_D ≅ −1 A, V_{GEN} = −4.5 V, R_g = 6 Ω		40	60	ns
Rise Time	t_r			55	85	
Turn-Off Delay Time	$t_{d(off)}$			65	100	
Fall Time	t_f			30	45	
Source-Drain Reverse Recovery Time	t_{rr}	I_F = −2.3 A, di/dt = 100 A/μs		35	55	

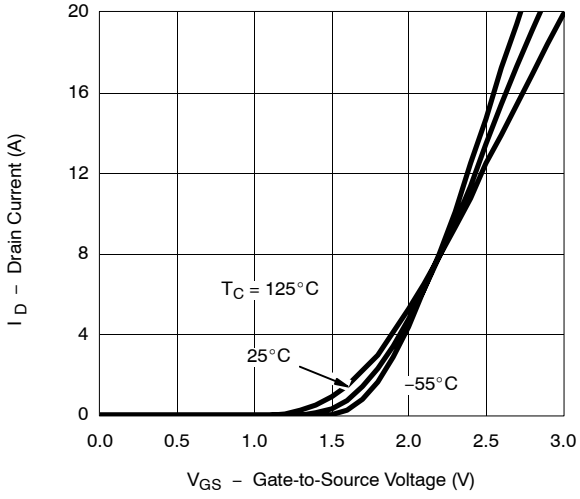
Notes
a. For design aid only; not subject to production testing.
b. Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2%.

TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

Output Characteristics

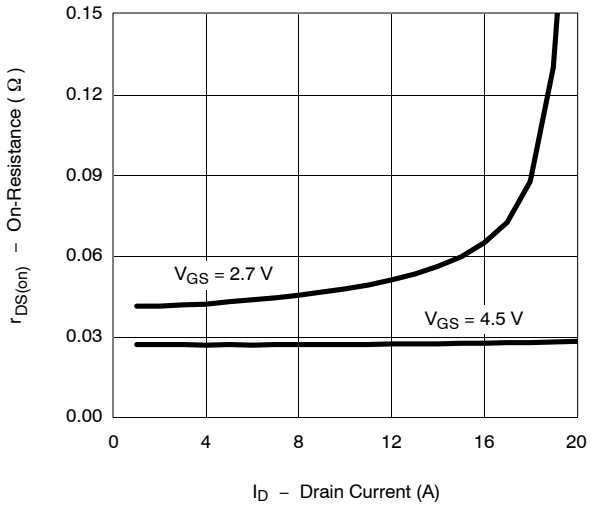


Transfer Characteristics

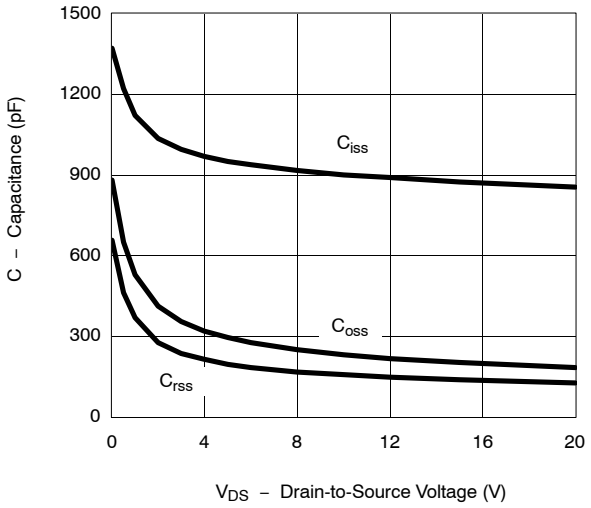


TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

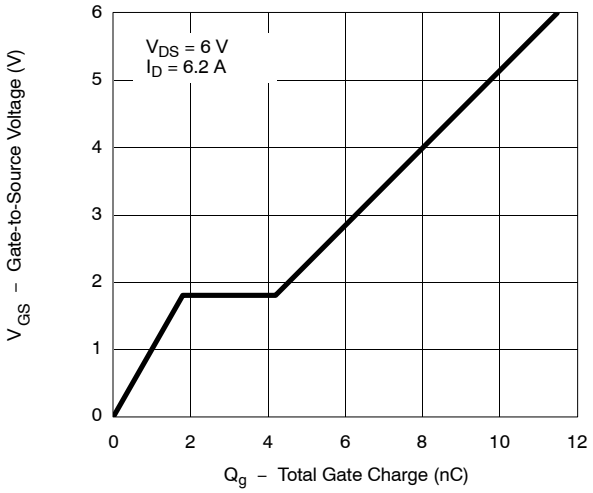
On-Resistance vs. Drain Current



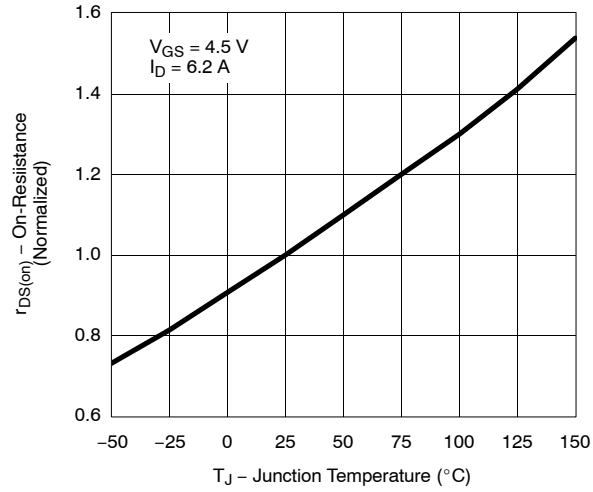
Capacitance



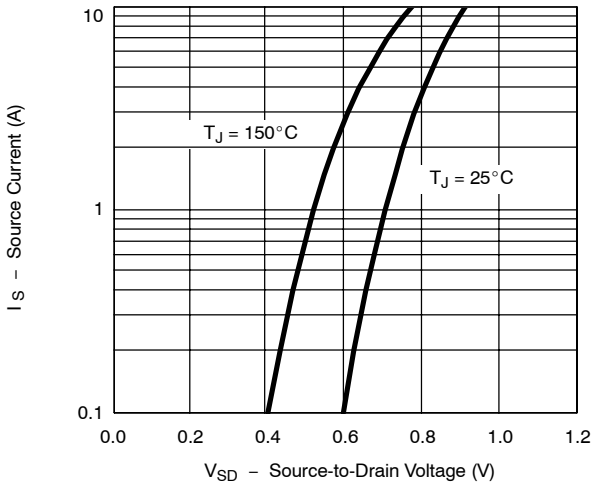
Gate Charge



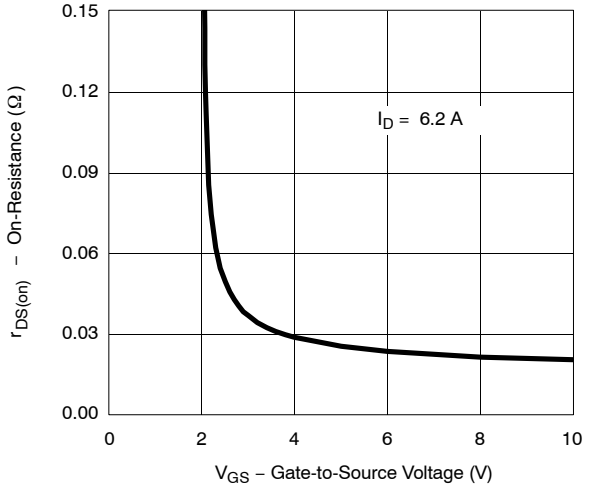
On-Resistance vs. Junction Temperature



Source-Drain Diode Forward Voltage

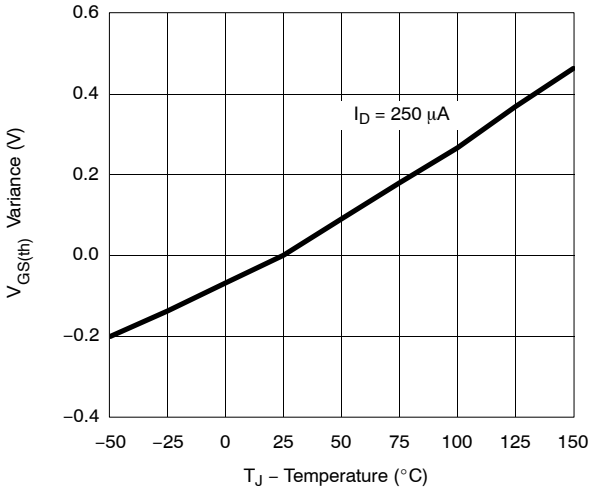


On-Resistance vs. Gate-to-Source Voltage

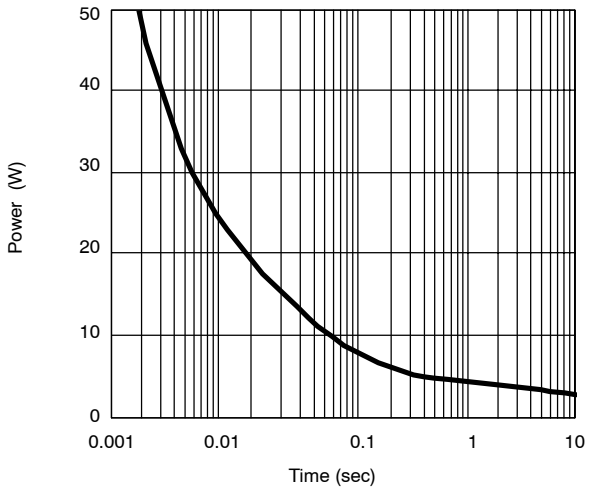


TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

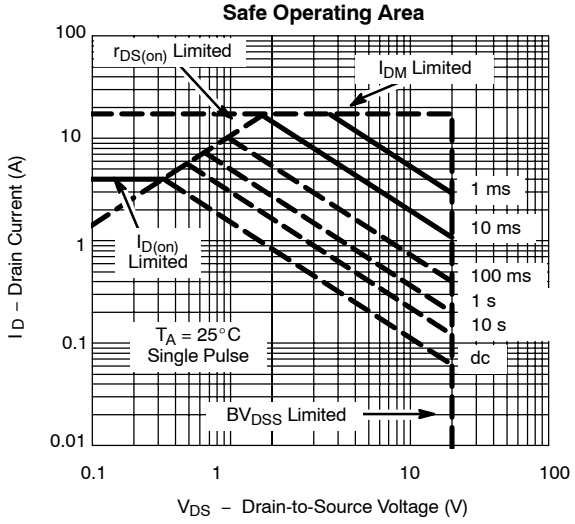
Threshold Voltage



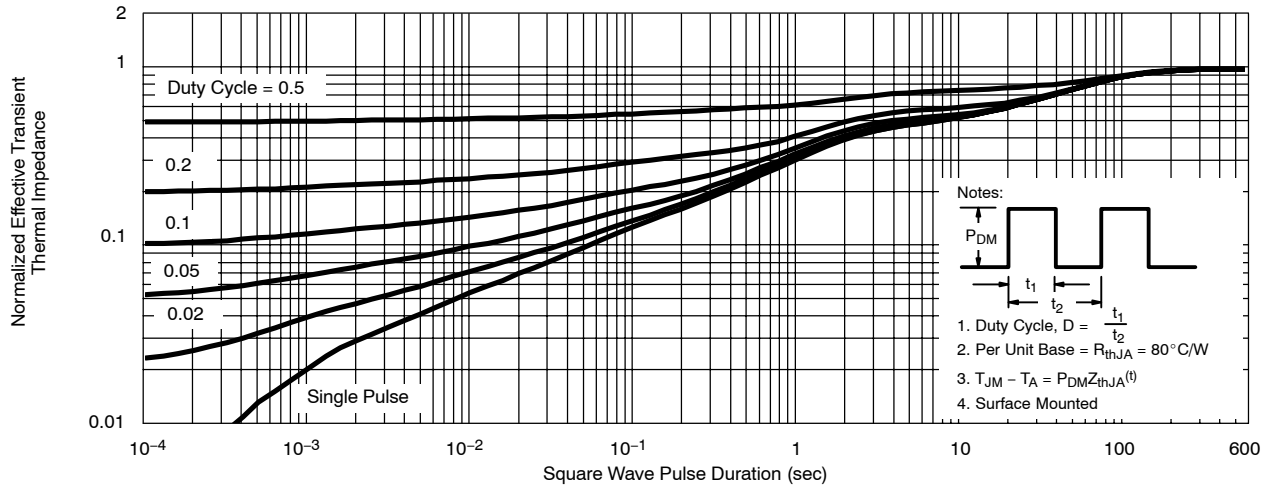
Single Pulse Power



Safe Operating Area



Normalized Thermal Transient Impedance, Junction-to-Ambient



TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)