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Si2356DST1-GE3
N-Channel 40 V (D-S) MOSFET

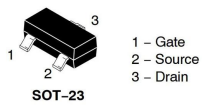
PRODUCT SUMMARY			
V_{DS} (V)	$R_{DS(on)}$ (Ω) Max.	I_D (A)[a]	Q_g (Typ.)
40	0.051 at V_{GS} = 10 V	4.3	3.8 nC
	0.054 at V_{GS} = 4.5 V	4.1	
	0.070 at V_{GS} = 2.5 V	3.6	

FEATURES

- TrenchFET® Power MOSFET
- 100 % R_g Tested
- Material categorization:

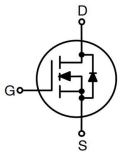
APPLICATIONS

- DC/DC Converter
- Load Switch
- LED Backlighting
- Power Management



SOT-23

1 – Gate
2 – Source
3 – Drain



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Ordering Information:
Si2356DS-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}	40	V
Gate-Source Voltage		V_{GS}	± 12	
Continuous Drain Current (T_J = 150 °C)	T_C = 25 °C	I_D	4.3	A
	T_C = 70 °C		3.4	
	T_A = 25 °C		3.2 [a,b]	
	T_A = 70 °C		2.6 [a,b]	
Pulsed Drain Current (t = 100 µs)		I_{DM}	20	
Continuous Source-Drain Diode Current	T_C = 25 °C	I_S	1.4	
	T_A = 25 °C		0.8 [a,b]	
Maximum Power Dissipation	T_C = 25 °C	P_D	1.7	W
	T_C = 70 °C		1.1	
	T_A = 25 °C		0.96 [a,b]	
	T_A = 70 °C		0.62 [a,b]	
Operating Junction and Storage Temperature Range		T_J, T_{stg}	- 55 to 150	°C

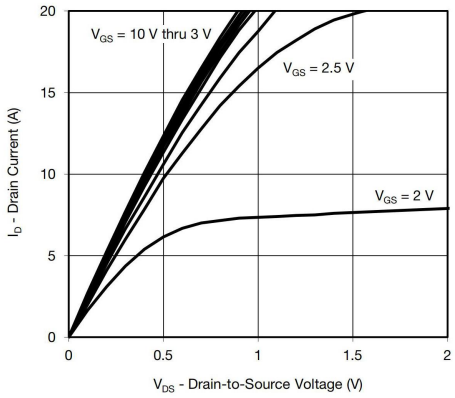
THERMAL RESISTANCE RATINGS					
Parameter		**Symbol**	**Typical**	**Maximum**	**Unit**
Maximum Junction-to-Ambient [a,c]	t ≤ 5 s	R_{thJA}	100	130	°C/W
Maximum Junction-to-Foot (Drain)	Steady State	R_{thJF}	60	75	

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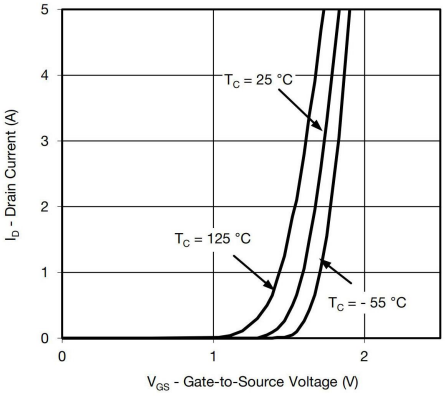
SPECIFICATIONS (T_J = 25 °C, unless otherwise noted)						
Parameter	**Symbol**	**Test Conditions**	**Min.**	**Typ.**	**Max.**	**Unit**
Static						
Drain-Source Breakdown Voltage	V_{DS}	V_{GS} = 0 V, I_D = 250 µA	40			V
V_{DS} Temperature Coefficient	$\Delta V_{DS}/T_J$	I_D = 250 µA		43		mV/°C
$V_{GS(th)}$ Temperature Coefficient	$\Delta V_{GS(th)}/T_J$			- 3.8		
Gate-Source Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS} , I_D = 250 µA	0.6		1.5	V
Gate-Source Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ± 12 V			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 40 V, V_{GS} = 0 V			1	µA
		V_{DS} = 40 V, V_{GS} = 0 V, T_J = 55 °C			10	
On-State Drain Current[a]	$I_{D(on)}$	$V_{DS} \geq$ 5 V, V_{GS} = 10 V	10			A
Drain-Source On-State Resistance[a]	$R_{DS(on)}$	V_{GS} = 10 V, I_D = 3.2 A		0.042	0.051	Ω
		V_{GS} = 4.5 V, I_D = 3.1 A		0.045	0.054	
		V_{GS} = 2.5 V, I_D = 2 A		0.056	0.070	
Forward Transconductance[a]	g_{fs}	V_{DS} = 15 V, I_D = 3.2 A		13		S
Dynamic[b]						
Input Capacitance	C_{iss}	V_{DS} = 20 V, V_{GS} = 0 V, f = 1 MHz		370		pF
Output Capacitance	C_{oss}			50		
Reverse Transfer Capacitance	C_{rss}			17		
Total Gate Charge	Q_g	V_{DS} = 20 V, V_{GS} = 10 V, I_D = 3.2 A		8.1	13	nC
		V_{DS} = 20 V, V_{GS} = 4.5 V, I_D = 3.2 A		3.8	5.7	
Gate-Source Charge	Q_{gs}			0.72		
Gate-Drain Charge	Q_{gd}			0.81		
Gate Resistance	R_g	f = 1 MHz	0.2	0.7	1.4	Ω
Turn-On Delay Time	$t_{d(on)}$	V_{DD} = 20 V, R_L = 7.7 Ω $I_D \cong$ 2.6 A, V_{GEN} = 10 V, R_g = 1 Ω		6	12	ns
Rise Time	t_r			12	20	
Turn-Off Delay Time	$t_{d(off)}$			13	20	
Fall Time	t_f			6	12	
Turn-On Delay Time	$t_{d(on)}$	V_{DD} = 20 V, R_L = 7.7 Ω $I_D \cong$ 2.6 A, V_{GEN} = 4.5 V, R_g = 1 Ω		10	20	
Rise Time	t_r			52	78	
Turn-Off Delay Time	$t_{d(off)}$			18	27	
Fall Time	t_f			53	80	
Drain-Source Body Diode Characteristics						
Continuous Source-Drain Diode Current	I_S	T_C = 25 °C			1.4	A
Pulse Diode Forward Current (t = 100 µs)	I_{SM}				20	
Body Diode Voltage	V_{SD}	I_S = 2.6 A, V_{GS} = 0 V		0.8	1.2	V
Body Diode Reverse Recovery Time	t_{rr}	I_F = 2.6 A, dI/dt = 100 A/µs, T_J = 25 °C		12	20	ns
Body Diode Reverse Recovery Charge	Q_{rr}			5	10	nC
Reverse Recovery Fall Time	t_a			8.5		ns
Reverse Recovery Rise Time	t_b			3.5		

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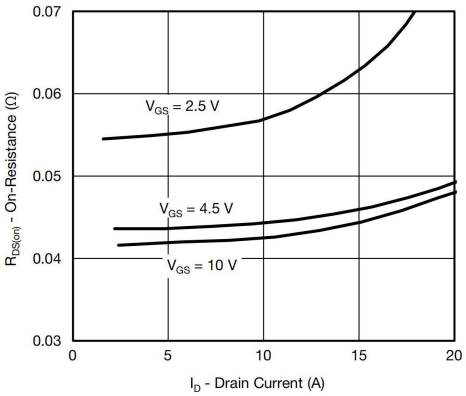
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



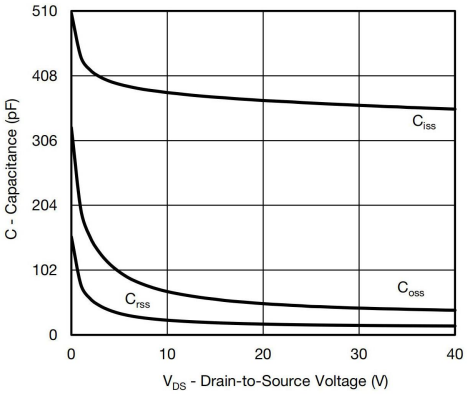
Output Characteristics



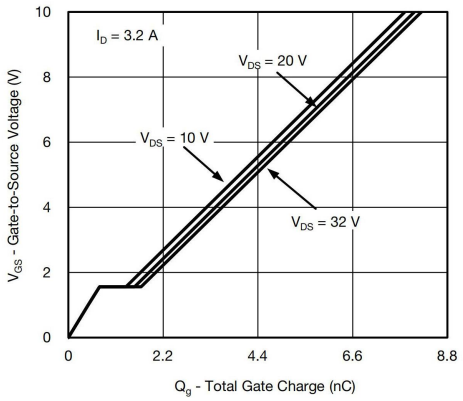
Transfer Characteristics



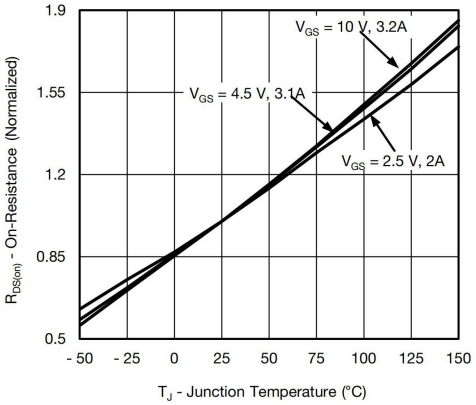
On-Resistance vs. Drain Current and Gate Voltage



Capacitance



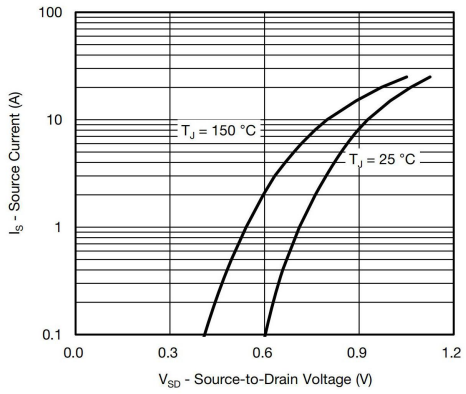
Gate Charge



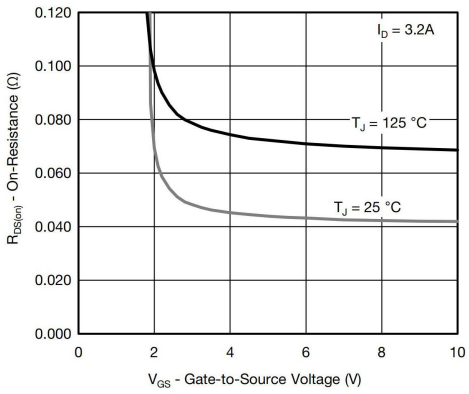
On-Resistance vs. Junction Temperature

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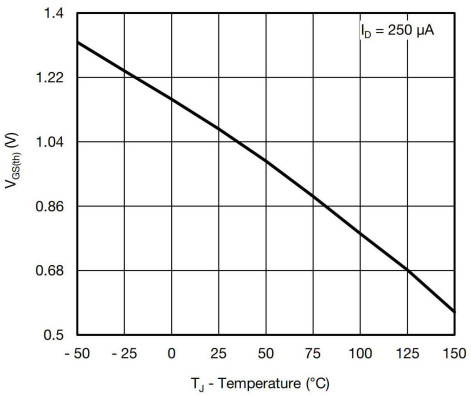
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



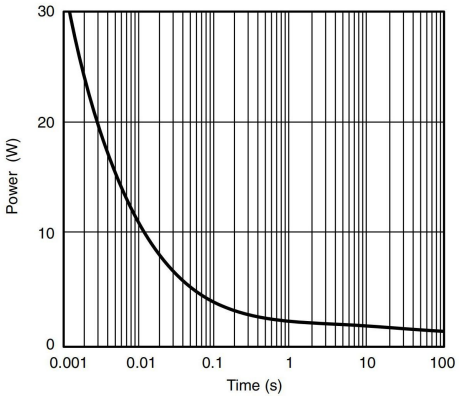
Source-Drain Diode Forward Voltage



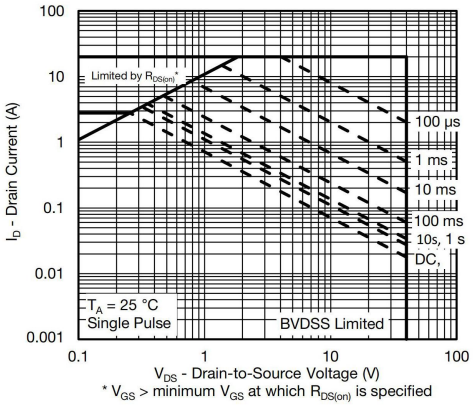
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage



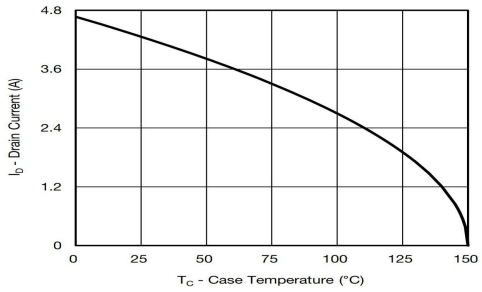
Single Pulse Power (Junction-to-Ambient)



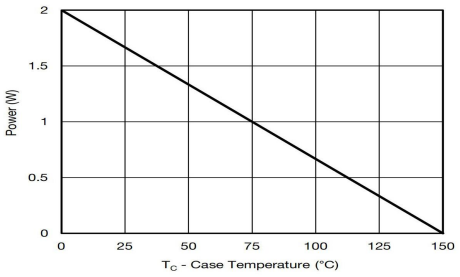
Safe Operating Area, Junction-to-Ambient

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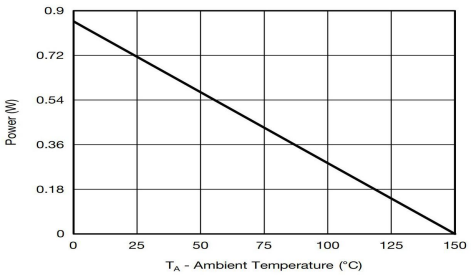
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



Current Derating*

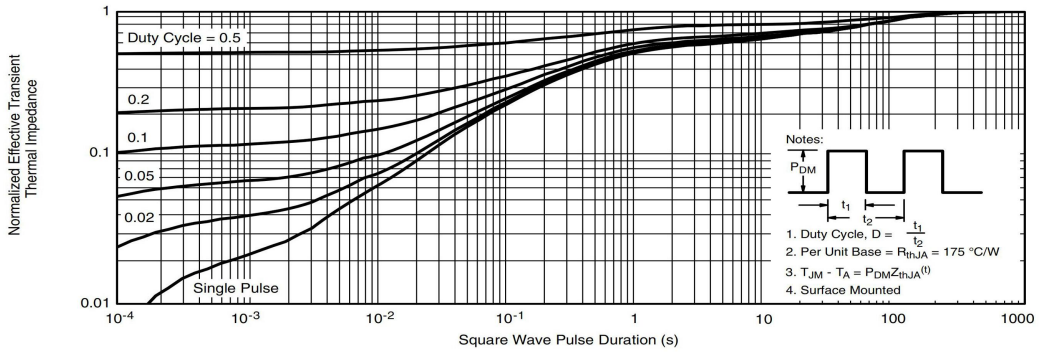


Power Junction-to-Foot

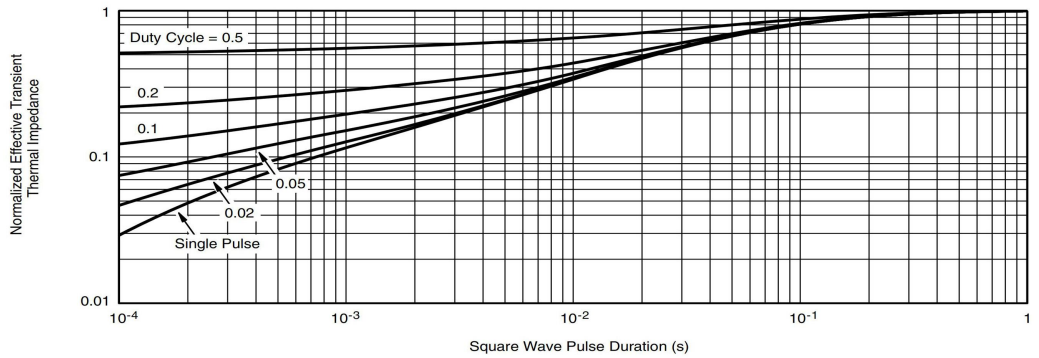


Power Junction-to-Ambient

TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



Normalized Thermal Transient Impedance, Junction-to-Ambient



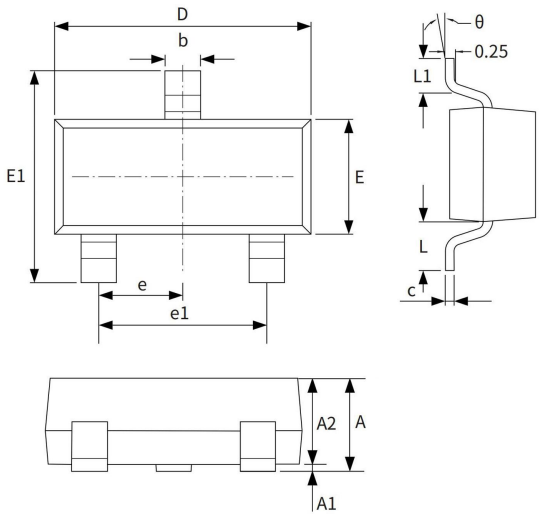
Normalized Thermal Transient Impedance, Junction-to-Foot

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Ordering Information

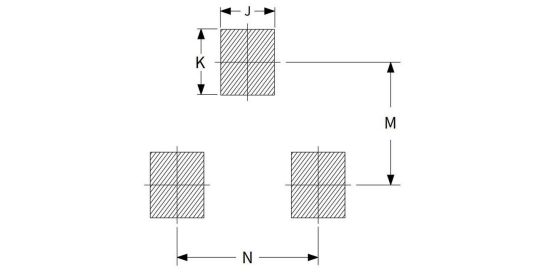
PACKAGE	PACKAGE CODE	UNIT WEIGHT(g)	REEL(pcs)	BOX(pcs)	CARTON(pcs)	DELIVERY MODE
SOT-23	R1	0.008	3000	30000	240000	7''

Package Outline Dimensions (SOT-23)



Symbol	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	0.90	1.15	0.035	0.045
A1	-	0.10	-	0.004
A2	0.90	1.05	0.035	0.041
b	0.30	0.50	0.012	0.020
c	0.10	0.20	0.004	0.008
D	2.80	3.00	0.110	0.118
E	1.20	1.40	0.047	0.055
E1	2.25	2.55	0.089	0.100
e	0.950TYP		0.037TYP	
e1	1.80	2.00	0.071	0.079
L	0.550REF		0.022REF	
L1	0.30	0.50	0.012	0.020
θ	-	8°	-	8°

Suggested Pad Layout



Symbol	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
J	0.75	0.85	0.030	0.033
K	0.85	0.95	0.033	0.037
M	1.95	2.05	0.077	0.081
N	1.85	1.95	0.073	0.077