SI6433DQ-T1-E3-VB Datasheet

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

PRODUCT SUMMARY		
V_{DS} (V)	$R_{DS(on)}$ (Ω)	I_D (A)
-20	0.010 at V_{GS} = - 4.5 V	- 9.0
	0.012 at V_{GS} = - 2.5 V	- 7.8
	0.016 at V_{GS} = - 1.8 V	- 6.0

FEATURES

- **Halogen-free**
- Trench Power MOSFETs

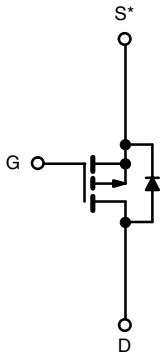
Pb-free Available

RoHS* COMPLIANT

TSSOP-8



Top View



P-Channel MOSFET

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

ABSOLUTE MAXIMUM RATINGS T_A = 25 °C, unless otherwise noted					
Parameter		**Symbol**	**10 s**	**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	- 9.0	-7.8	A
	T_A = 70 °C		- 6.8	-5.8	
Pulsed Drain Current (10 µs Pulse Width)		I_{DM}	- 30		
Continuous Source Current (Diode Conduction)[a]		I_S	- 1.35	- 0.95	
Maximum Power Dissipation[a]	T_A = 25 °C	P_D	1.5	1.05	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}	65	83	°C/W
	Steady State		100	120	
Maximum Junction-to-Foot (Drain)	Steady State	R_{thJF}	43	52	

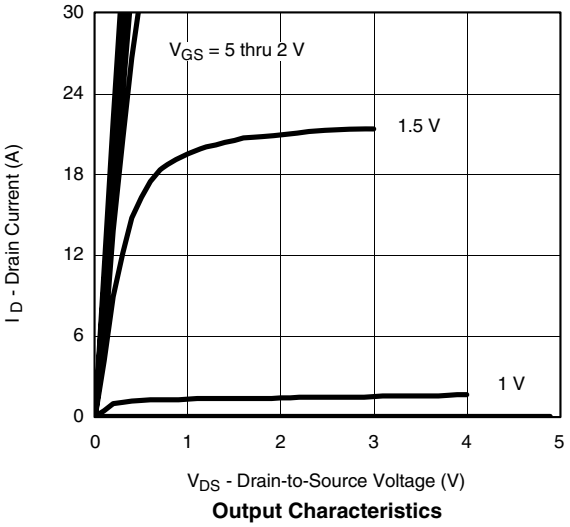
Notes:
a. Surface Mounted on 1" x 1" FR4 board.

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 = - 450 µA	- 0.45	-	1.0	V
Gate-Body Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ± 8 V			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = - 20 V, V_{GS} = 0 V			- 1	µA
		V_{DS} = -20V, V_{GS} = 0 V, T_J = 70 °C			- 25	
On-State Drain Current[a]	$I_{D(on)}$	V_{DS} = - 5 V, V_{GS} = - 4.5 V	- 20			A
Drain-Source On-State Resistance[a]	$R_{DS(on)}$	V_{GS} = - 4.5 V, I_D = - 8.0 A		0.010		Ω
		V_{GS} = - 2.5 V, I_D = - 7.0 A		0.012		
		V_{GS} = - 1.8 V, I_D = - 5.8 A		0.016		
Forward Transconductance[a]	g_{fs}	V_{DS} = - 5 V, I_D = - 8.0 A		44		S
Diode Forward Voltage[a]	V_{SD}	I_S = - 1.5 A, V_{GS} = 0 V		- 0.56	- 1.1	V
Dynamic[b]						
Total Gate Charge	Q_g	V_{DS} = - 10 V, V_{GS} = - 4.5 V, I_D = - 8.0 A		46	70	nC
Gate-Source Charge	Q_{gs}			5		
Gate-Drain Charge	Q_{gd}			15.5		
Turn-On Delay Time	$t_{d(on)}$	V_{DD} = - 10 V, R= 6 Ω I_D ≅ - 1 A, V_{GEN} = - 4.5 V, R_g = 6 Ω		45	70	ns
Rise Time	t_r			85	130	
Turn-Off Delay Time	$t_{d(off)}$			220	400	
Fall Time	t_f			155	235	
Source-Drain Reverse Recovery Time	t_{rr}	I_F = - 1.5 A, di/dt = 100 A/µs		140	210	

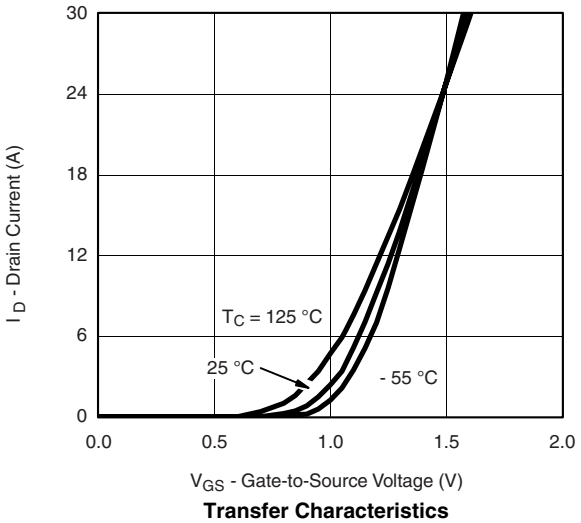
Notes:
a. Pulse test; pulse width ≤ 300 µs, duty cycle ≤ 2 %.
b. Guaranteed by design, not subject to production testing.

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

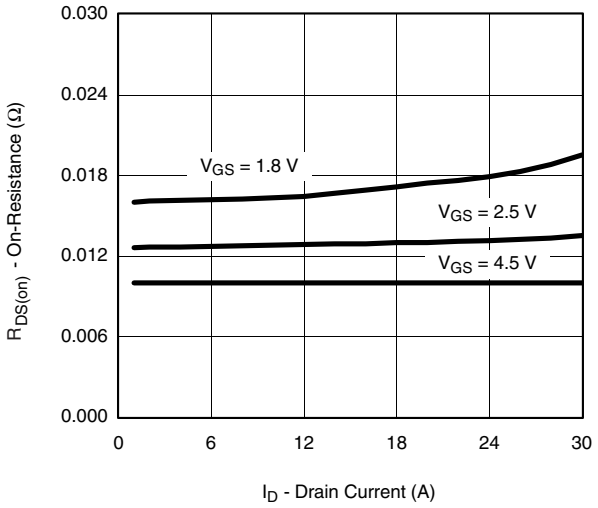


Output Characteristics

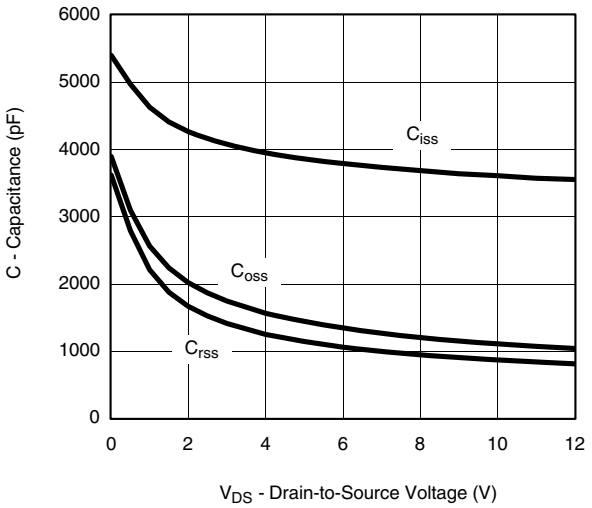


Transfer Characteristics

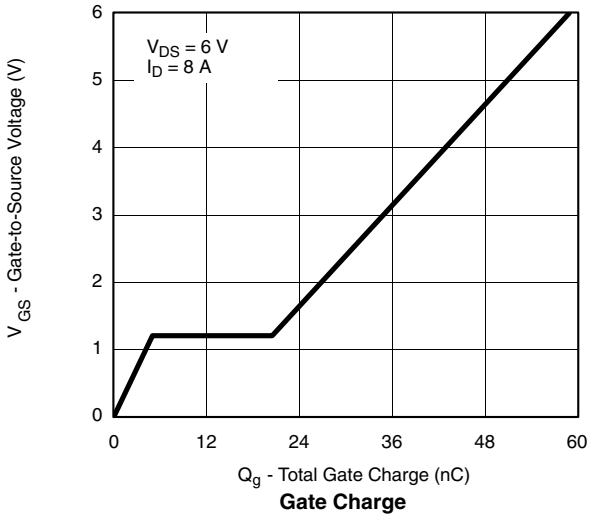
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



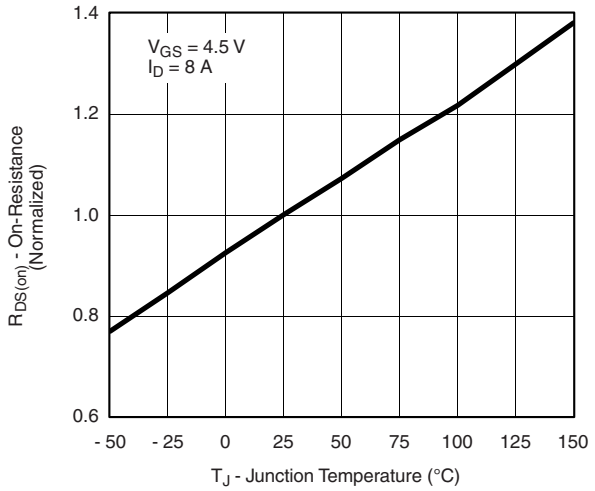
On-Resistance vs. Drain Current



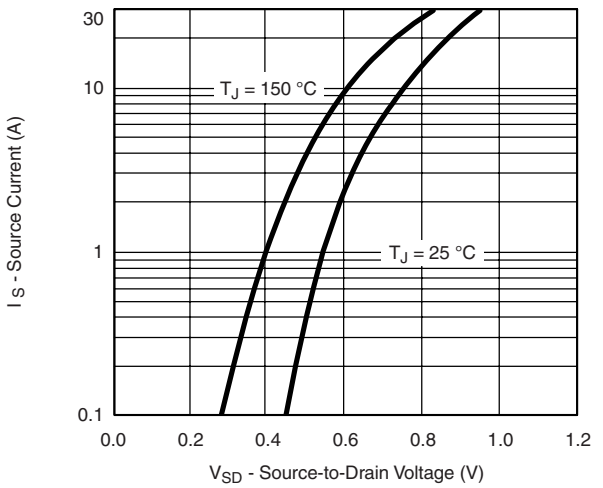
Capacitance



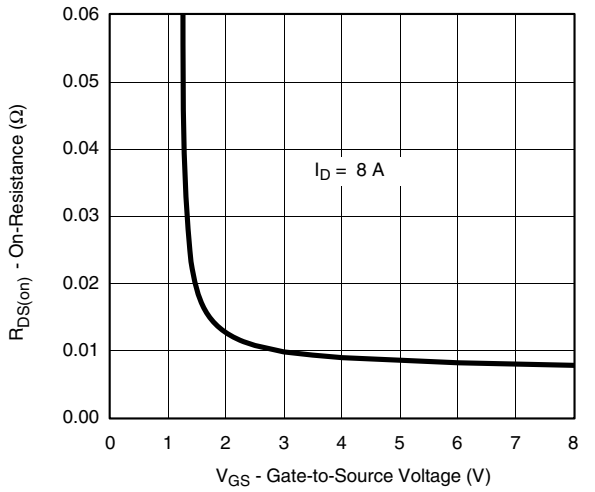
Gate Charge



On-Resistance vs. Junction Temperature

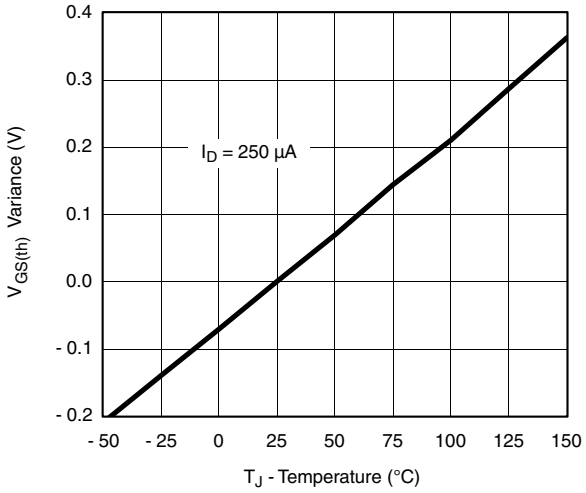


Source-Drain Diode Forward Voltage

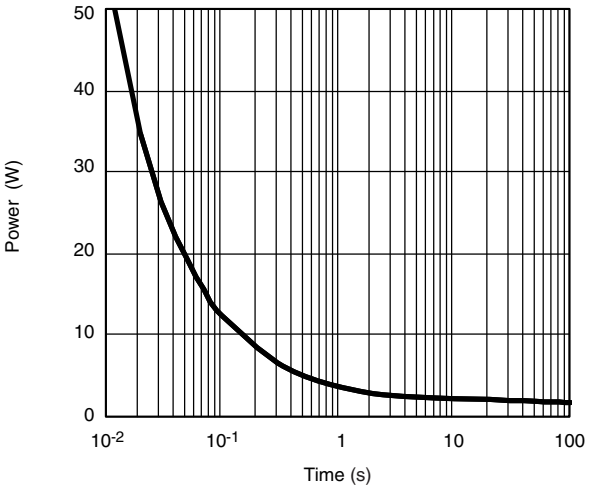


On-Resistance vs. Gate-to-Source Voltage

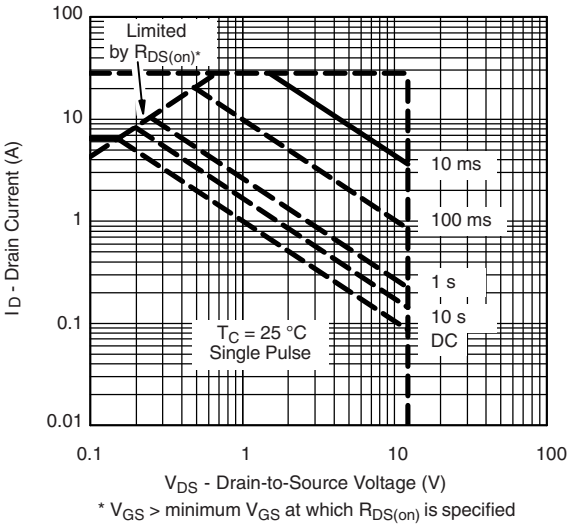
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



Threshold Voltage

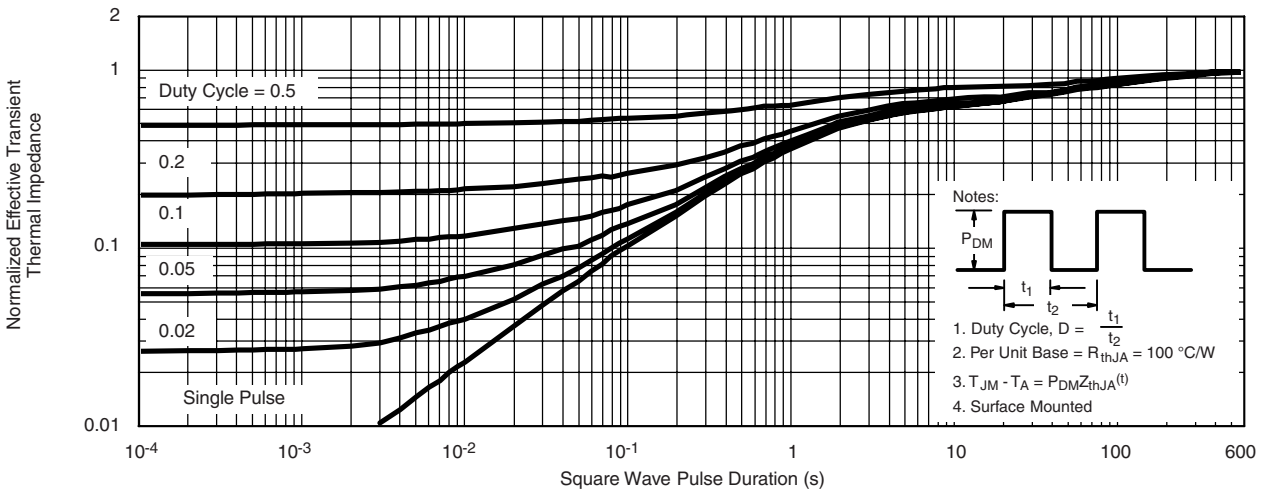


Single Pulse Power, Junction-to-Ambient



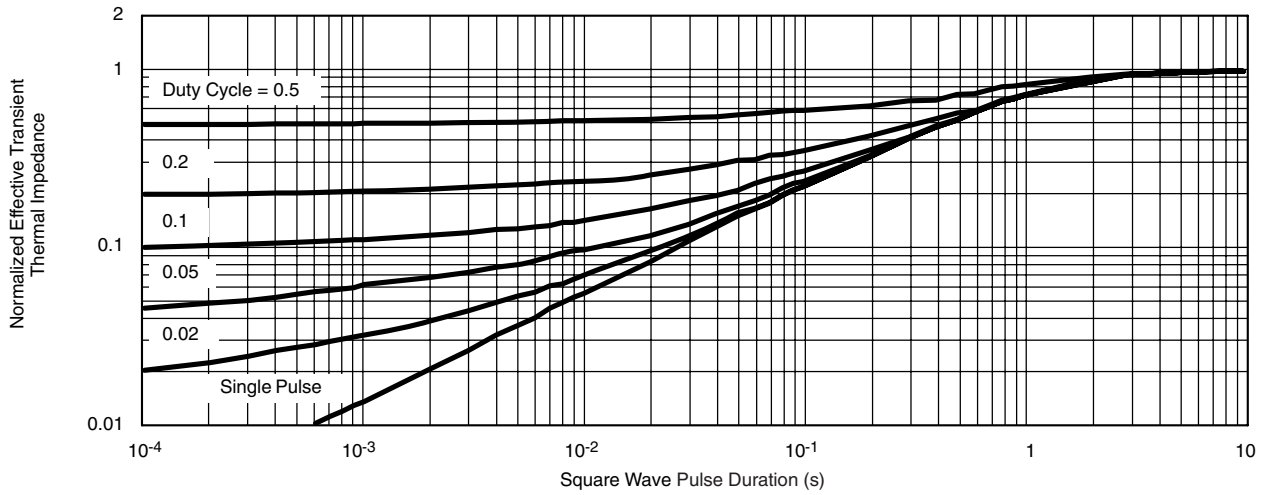
* V_{GS} > minimum V_{GS} at which $R_{DS(on)}$ is specified

Safe Operating Area, Junction-to-Case



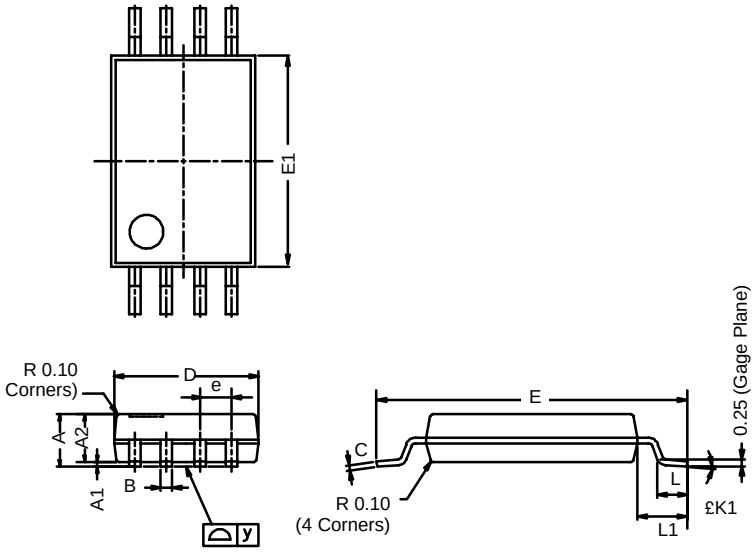
Normalized Thermal Transient Impedance, Junction-to-Ambient

TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



Normalized Thermal Transient Impedance, Junction-to-Foot

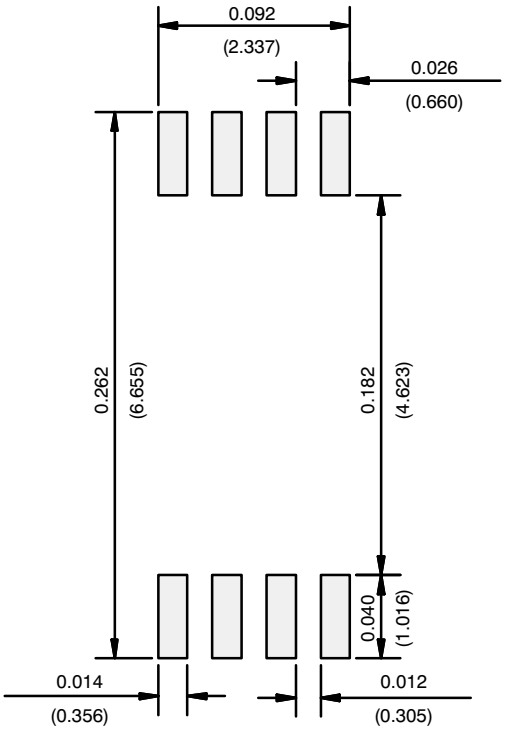
TSSOP: 8-LEAD
JEDEC Part Number: MO-153



Dim	MILLIMETERS		
	Min	Nom	Max
A	–	–	1.20
A_1	0.05	0.10	0.15
A_2	0.80	1.00	1.05
B	0.19	0.28	0.30
C	–	0.127	–
D	2.90	3.00	3.10
E	6.20	6.40	6.60
E_1	4.30	4.40	4.50
e	–	0.65	–
L	0.45	0.60	0.75
L_1	0.90	1.00	1.10
Y	–	–	0.10
£K1	0°	3°	6°

ECN: S-03946—Rev. G, 09-Jul-01
DWG: 5844

RECOMMENDED MINIMUM PADS FOR TSSOP-8



Recommended Minimum Pads
Dimensions in Inches/(mm)

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