

SI3460DV-T1-E3-VB Datasheet N-Channel 30 V (D-S) MOSFET

PRODUCT SUMMARY						
V _{DS} (V)	$R_{DS(on)}\left(\Omega\right)$	I _D (A) ^{a, e}	Q _g (Typ.)			
30	0.023 at V _{GS} = 10 V	6	4.2 nC			
30	0.027 at V _{GS} = 4.5 V	6	4.2110			

TSOP-6 D 1 6 D D 2 5 D G 3 4 S Top View

FEATURES

- Halogen-free According to IEC 61249-2-21 Definition
- Trench Power MOSFET
- Low On-Resistance
- 100 % R_g Tested
- Compliant to RoHS Directive 2002/95/EC



APPLICATIONS

• DC/DC Converters, High Speed Switching

Parameter	Symbol	Limit	Unit		
Drain-Source Voltage		V _{DS}	30	V	
Gate-Source Voltage		V _{GS}	± 20	v	
	T _C = 25 °C		6 ^e		
Continuous Proin Current /T 450 °C)	T _C = 70 °C	,	6 ^e		
Continuous Drain Current (T _J = 150 °C)	T _A = 25 °C	- I _D	5.5 ^{b, c}		
	T _A = 70 °C		4.4 ^{b, c}	А	
Pulsed Drain Current (t = 300 µs)		I _{DM}	25		
Continuous Course Dunin Diede Current	T _C = 25 °C		2.1		
Continuous Source-Drain Diode Current	T _A = 25 °C	ls —	1.1 ^{b, c}		
	T _C = 25 °C		2.5		
Manine de Deves Dissination	T _C = 70 °C		1.6	w	
Maximum Power Dissipation	T _A = 25 °C	P _D	1.3 ^{b, c}	VV	
	T _A = 70 °C		0.8 ^{b, c}		
Operating Junction and Storage Temperature	T _J , T _{stg}	- 55 to 150	90		
Soldering Recommendations (Peak Tempera		260	°C		

THERMAL RESISTANCE RATINGS							
Parameter	Symbol	Typical	Maximum	Unit			
Maximum Junction-to-Ambient ^{b, d}	t ≤ 5 s	R _{thJA}	75	100	°C/W		
Maximum Junction-to-Foot (Drain)	Steady State	R_{thJF}	40	50	- 0/00		

Notes:

- a. Based on $T_C = 25$ °C.
- b. Surface mounted on 1" x 1" FR4 board.
- c. t = 5 s
- d. Maximum under steady state conditions is 166 °C/W.
- e. Package limited.

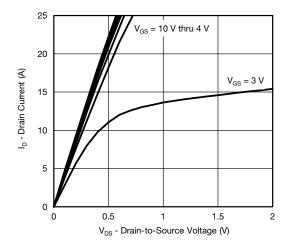


Parameter	Symbol	Test Conditions	Min.	Тур.	Max.	Unit
Static					L	
Drain-Source Breakdown Voltage	V _{DS}	$V_{GS} = 0 \text{ V, I}_{D} = 250 \mu\text{A}$	30			V
V _{DS} Temperature Coefficient	$\Delta V_{DS}/T_{J}$	I 250 · · A		30		mV/°C
V _{GS(th)} Temperature Coefficient	$\Delta V_{GS(th)}/T_J$	I _D = 250 μA		- 4.8		
Gate-Source Threshold Voltage	V _{GS(th)}	$V_{DS} = V_{GS}$, $I_D = 250 \mu A$	0.5		1.5	V
Gate-Source Leakage	I _{GSS}	$V_{DS} = 0 \text{ V}, V_{GS} = \pm 20 \text{ V}$			± 100	nA
		$V_{DS} = 30 \text{ V}, V_{GS} = 0 \text{ V}$			1	μΑ
Zero Gate Voltage Drain Current	I _{DSS}	$V_{DS} = 30 \text{ V}, V_{GS} = 0 \text{ V}, T_{J} = 70 ^{\circ}\text{C}$			10	
On-State Drain Current ^a	I _{D(on)}	$V_{DS} \le 5 \text{ V}, V_{GS} = 10 \text{ V}$	20			А
		$V_{GS} = 10 \text{ V}, I_D = 5.5 \text{ A}$		0.023		Ω
Drain-Source On-State Resistance ^a	R _{DS(on)}	V _{GS} = 4.5 V, I _D = 5 A		0.027		
Forward Transconductance ^a	9 _{fs}	V _{DS} = 15 V, I _D = 5.5 A		24		S
Dynamic ^b				<u> </u>		
Input Capacitance	C _{iss}			424		
Output Capacitance	C _{oss}	$V_{DS} = 15 \text{ V}, V_{GS} = 0 \text{ V}, f = 1 \text{ MHz}$		100		pF
Reverse Transfer Capacitance	C _{rss}			42		
	Q _g	V _{DS} = 15 V, V _{GS} = 10 V, I _D = 5.5 A		8.2	13	nC
Total Gate Charge		20 7 00 7 2		4.2	7	
Gate-Source Charge	Q _{gs}	$V_{DS} = 15 \text{ V}, V_{GS} = 4.5 \text{ V}, I_{D} = 5.5 \text{ A}$		1.4		
Gate-Drain Charge	Q _{gd}			1.4		
Gate Resistance	R _g	f = 1 MHz	2.5	12.6	25.2	Ω
Turn-On Delay Time	t _{d(on)}			6	12	_
Rise Time	t _r	$V_{DD} = 15 \text{ V, R}_{1} = 3.4 \Omega$		20	30	
Turn-Off Delay Time	t _{d(off)}	$I_D \approx 4.4 \text{ A}, V_{GEN} = 4.5 \text{ V}, R_q = 1 \Omega$		14	21	
Fall Time	t _f	-		10	20	
Turn-On Delay Time	t _{d(on)}			3	6	ns
Rise Time	t _r	$V_{DD} = 15 \text{ V}, R_1 = 3.4 \Omega$		11	20	
Turn-Off Delay Time	t _{d(off)}	$I_D \approx 4.4 \text{ A}, V_{GEN} = 10 \text{ V}, R_a = 1 \Omega$		20	30	
Fall Time	t _f	3		7	14	
Drain-Source Body Diode Characteristic	CS .			L		
Continuous Source-Drain Diode Current	I _S	T _C = 25 °C			2.1	
Pulse Diode Forward Current	I _{SM}				25	A
Body Diode Voltage	V _{SD}	$I_S = 4.4 \text{ A}, V_{GS} = 0 \text{ V}$		0.82	1.2	V
Body Diode Reverse Recovery Time	t _{rr}			13	20	ns
Body Diode Reverse Recovery Charge	Q _{rr}			6	12	nC
Reverse Recovery Fall Time	t _a	$I_F = 4.4 \text{ A}, \text{ dI/dt} = 100 \text{ A/}\mu\text{s}, T_J = 25 ^{\circ}\text{C}$		8		
Reverse Recovery Rise Time	t _b			5		ns

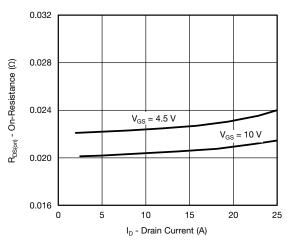
- a. Pulse test; pulse width \leq 300 µs, duty cycle \leq 2 %. b. Guaranteed by design, not subject to production testing.

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.

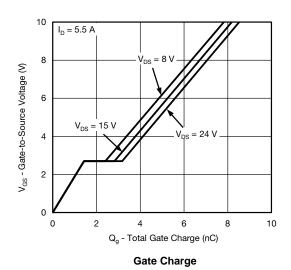




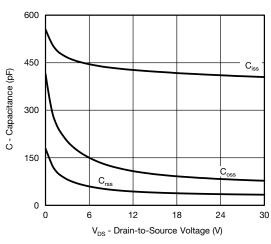
Output Characteristics



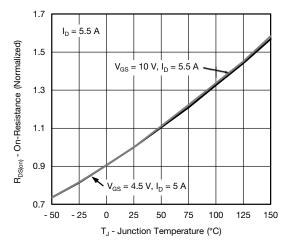
On-Resistance vs. Drain Current and Gate Voltage



Transfer Characteristics

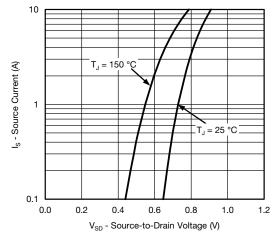


Capacitance

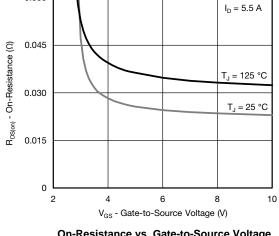


On-Resistance vs. Junction Temperature



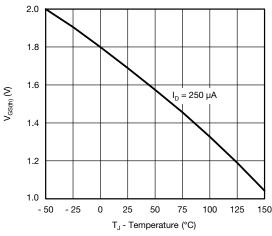


Source-Drain Diode Forward Voltage

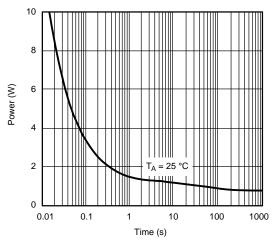


0.060

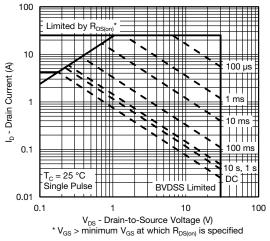
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage

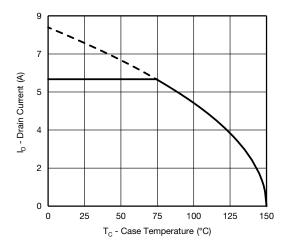


Single Pulse Power (Junction-to-Ambient)

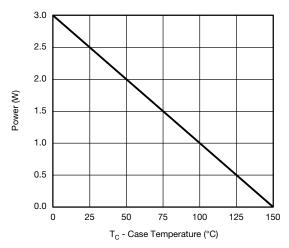


Safe Operating Area, Junction-to-Ambient

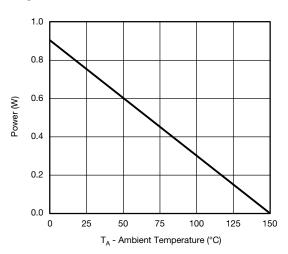




Current Derating*



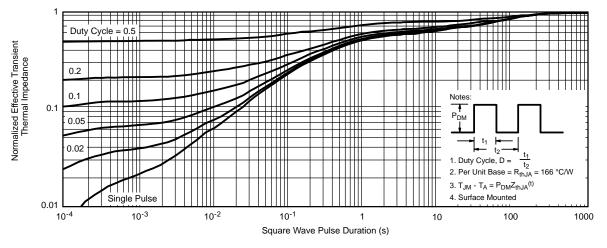




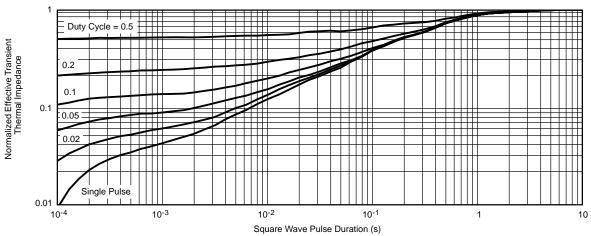
Power Derating, Junction-to-Ambient

^{*} The power dissipation P_D is based on $T_{J(max.)}$ = 150 °C, using junction-to-case thermal resistance, and is more useful in settling the upper dissipation limit for cases where additional heatsinking is used. It is used to determine the current rating, when this rating falls below the package limit.





Normalized Thermal Transient Impedance, Junction-to-Ambient

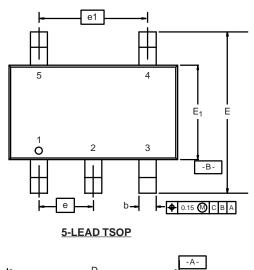


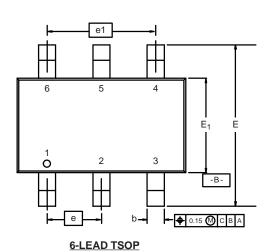
Normalized Thermal Transient Impedance, Junction-to-Foot



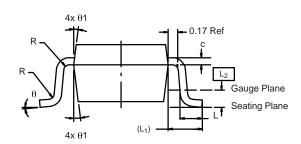
TSOP: 5/6-LEAD

JEDEC Part Number: MO-193C





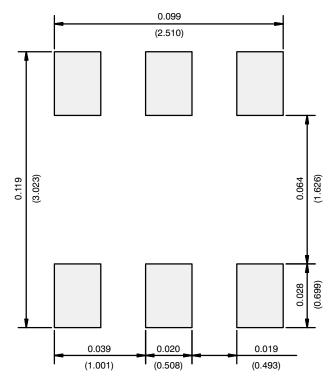
D A₂ A
Seating Plane



	MIL	LIMETER	RS	INCHES			
Dim	Min	Nom	Max	Min	Nom	Max	
Α	0.91	-	1.10	0.036	-	0.043	
A ₁	0.01	-	0.10	0.0004	-	0.004	
A ₂	0.90	-	1.00	0.035	0.038	0.039	
b	0.30	0.32	0.45	0.012	0.013	0.018	
С	0.10	0.15	0.20	0.004	0.006	0.008	
D	2.95	3.05	3.10	0.116	0.120	0.122	
Е	2.70	2.85	2.98	0.106	0.112	0.117	
E ₁	1.55	1.65	1.70	0.061	0.065	0.067	
е		0.95 BSC		0.0374 BSC			
e ₁	1.80 1.90 2.00			0.071	0.075	0.079	
L	0.32	-	0.50	0.012	-	0.020	
L ₁	0.60 Ref			0.024 Ref			
L ₂	0.25 BSC			0.010 BSC			
R	0.10	-	-	0.004	-	-	
θ	0°	4°	8°	0°	4°	8°	
θ1	7° Nom			7° Nom			
ECN: C		ev. I, 18-Dec	c-06	•			



RECOMMENDED MINIMUM PADS FOR TSOP-6



Recommended Minimum Pads Dimensions in Inches/(mm)



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