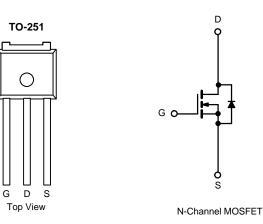


# N-Channel 60 V (D-S) MOSFET

PRODUCT SUMMARY						
V <sub>DS</sub> (V)	R <sub>DS(on)</sub> (Ω)	I <sub>D</sub> (A)	Q <sub>g</sub> (Typ.)			
60	0.032 at $V_{GS}$ = 10 V	35 <sup>d</sup>	21.7			
00	0.037 at V <sub>GS</sub> = 4.5 V	30 <sup>d</sup>	21.7			



#### **FEATURES**

- Halogen-free According to IEC 61249-2-21 Definition
- TrenchFET<sup>®</sup> Power MOSFET ٠
- 100 % R<sub>g</sub> and UIS Tested
  Compliant to RoHS Directive 2002/95/EC

#### **APPLICATIONS**

- Power Supply
- Secondary Synchronous Rectification
- DC/DC Converter

<b>ABSOLUTE MAXIMUM RATINGS</b> $T_C = 25$ °C, unless other Parameter		Symbol	Limit	Unit	
Drain-Source Voltage		V <sub>DS</sub>	60		
Gate-Source Voltage		V <sub>GS</sub>	± 20	- V	
Continuous Drain Current ( $T_1 = 150 \ ^{\circ}C$ )	T <sub>C</sub> = 25 °C	L_	35 <sup>d</sup>		
Continuous Drain Current $(T_j = 150 \text{ C})$	T <sub>C</sub> = 70 °C	I <sub>D</sub>	30 <sup>d</sup>	А	
Pulsed Drain Current		I <sub>DM</sub>	100		
Avalanche Current		I <sub>AS</sub>	40		
Single Avalanche Energy <sup>a</sup>	L = 0.1 mH	E <sub>AS</sub>	80	mJ	
	T <sub>C</sub> = 25 °C	P	59.5 <sup>b</sup>	14/	
Maximum Power Dissipation <sup>a</sup>	T <sub>A</sub> = 25 °C <sup>c</sup>	P <sub>D</sub>	2.7	W	
Operating Junction and Storage Temperature Range		T <sub>J</sub> , T <sub>stg</sub>	- 55 to 150	°C	

THERMAL RESISTANCE RATINGS					
Parameter	Symbol	Limit	Unit		
Junction-to-Ambient (PCB Mount) <sup>c</sup>	R <sub>thJA</sub>	46	°C/W		
Junction-to-Case (Drain)	R <sub>thJC</sub>	2.1			

Notes:

a. Duty cycle  $\leq$  1 %.

b. See SOA curve for voltage derating.c. When mounted on 1" square PCB (FR-4 material).

d. Package limited.

FREE



Parameter	Symbol	Test Conditions	Min.	Тур.	Max.	Unit	
Static							
Drain-Source Breakdown Voltage	V <sub>DS</sub>	$V_{DS} = 0 \text{ V}, I_{D} = 250 \mu\text{A}$	60			V	
Gate Threshold Voltage	V <sub>GS(th)</sub>	$V_{DS} = V_{GS}, I_{D} = 250 \ \mu A$	2.0		3.5	V	
Gate-Body Leakage	I <sub>GSS</sub>	$V_{DS} = 0 V, V_{GS} = \pm 20 V$			± 250	nA	
		$V_{DS} = 60 \text{ V}, \text{ V}_{GS} = 0 \text{ V}$			1		
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	$V_{DS} = 60 \text{ V}, \text{ V}_{GS} = 0 \text{ V}, \text{ T}_{J} = 125 \text{ °C}$			50	μA	
		V <sub>DS</sub> = 60 V, V <sub>GS</sub> = 0 V, T <sub>J</sub> = 150 °C			250		
On-State Drain Current <sup>a</sup>	I <sub>D(on)</sub>	$V_{DS} \ge 10 \text{ V}, V_{GS} = 10 \text{ V}$	50			А	
Durin Courses On State Desistence	<b>D</b>	V <sub>GS</sub> = 10 V, I <sub>D</sub> = 12 A		0.032		Ω	
Drain-Source On-State Resistance <sup>a</sup>	R <sub>DS(on)</sub>	V <sub>GS</sub> = 4.5 V, I <sub>D</sub> = 10 A		0.037			
Forward Transconductance <sup>a</sup>	9 <sub>fs</sub>	V <sub>DS</sub> = 15 V, I <sub>D</sub> = 10 A		110		S	
Dynamic <sup>b</sup>	•			•	•		
Input Capacitance	C <sub>iss</sub>			1100		pF	
Output Capacitance	C <sub>oss</sub>	V <sub>GS</sub> = 0 V, V <sub>DS</sub> = 30 V, f = 1 MHz		281			
Reverse Transfer Capacitance	C <sub>rss</sub>			130			
Tatal Cata Charge	Qg	$V_{DS} = 30 \text{ V}, \text{ V}_{GS} = 10 \text{ V}, \text{ I}_{D} = 10 \text{ A}$		46			
Total Gate Charge <sup>c</sup>				28		nC	
Gate-Source Charge <sup>c</sup>	Q <sub>gs</sub>	$V_{DS}$ = 30 V, $V_{GS}$ = 4.5 V, $I_{D}$ = 10 A		7			
Gate-Drain Charge <sup>c</sup>	Q <sub>gd</sub>			6.7			
Gate Resistance	Rg	f = 1 MHz	0.4	2	4	Ω	
Turn-On Delay Time <sup>c</sup>	t <sub>d(on)</sub>			8	16		
Rise Time <sup>c</sup>	t <sub>r</sub>	$V_{DD} = 30 \text{ V}, \text{ R}_{1} = 1.5 \Omega$		9	18	- ns	
Turn-Off Delay Time <sup>c</sup>	t <sub>d(off)</sub>	$I_D \cong 10$ Å, $V_{GEN} = 10$ V, $R_g = 1$ $\Omega$		35	53		
Fall Time <sup>c</sup>	t <sub>f</sub>			9	18		
Drain-Source Body Diode Ratings a	nd Characteris	stics T <sub>C</sub> = 25 °C <sup>b</sup>		1			
Continuous Current	۱ <sub>S</sub>				50		
Pulsed Current	I <sub>SM</sub>				100	A	
Forward Voltage <sup>a</sup>	V <sub>SD</sub>	I <sub>F</sub> = 10 A, V <sub>GS</sub> = 0 V		0.75	1.5	V	
Reverse Recovery Time	t <sub>rr</sub>			34	51	ns	
Peak Reverse Recovery Current	I <sub>RM(REC)</sub>	I <sub>F</sub> = 10 A, dl/dt = 100 A/μs		2	3	А	
Reverse Recovery Charge	Q <sub>rr</sub>			34	51	nC	

Notes:

a. Pulse test; pulse width  $\leq$  300 µs, duty cycle  $\leq$  2 %.

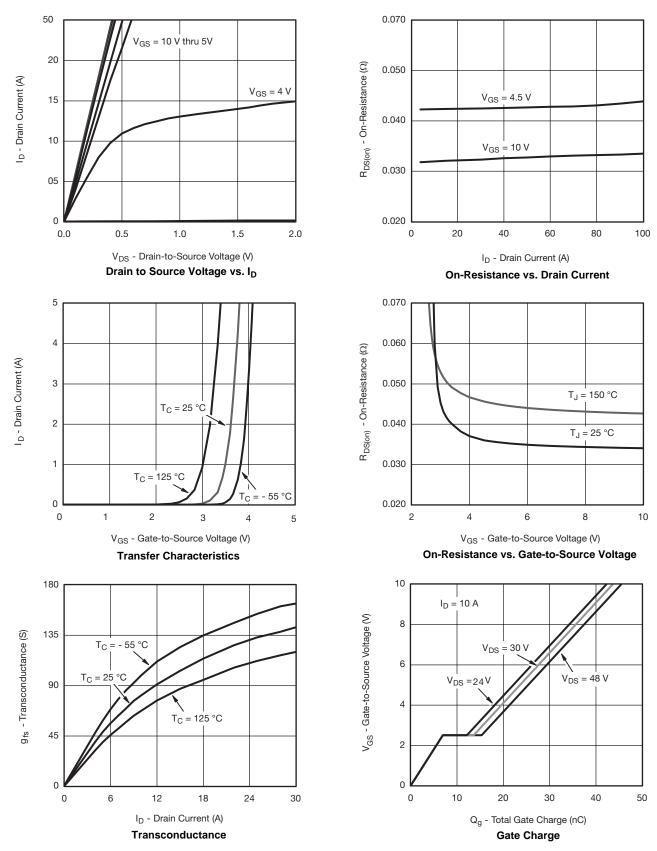
b. Guaranteed by design, not subject to production testing.

c. Independent of operating temperature.

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.



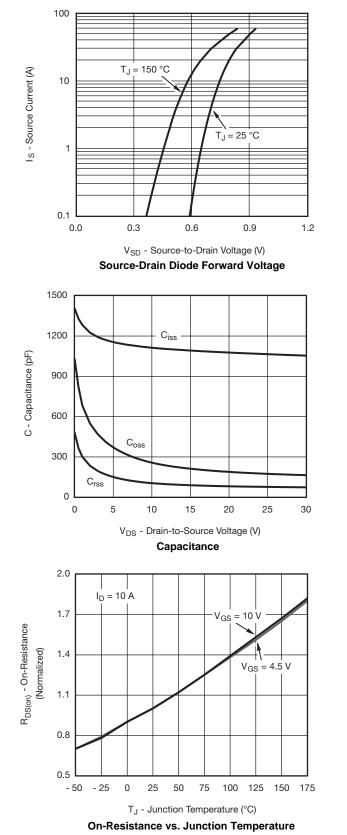
#### TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted

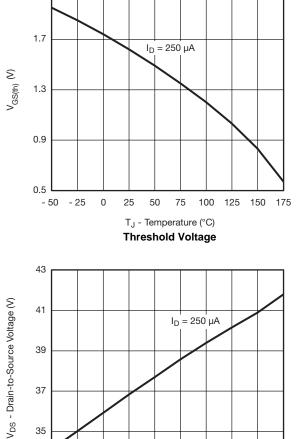


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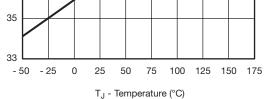


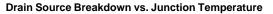
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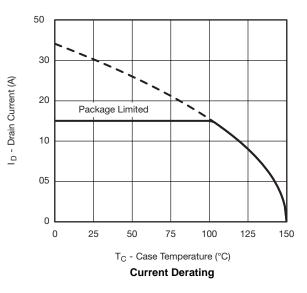




2.1

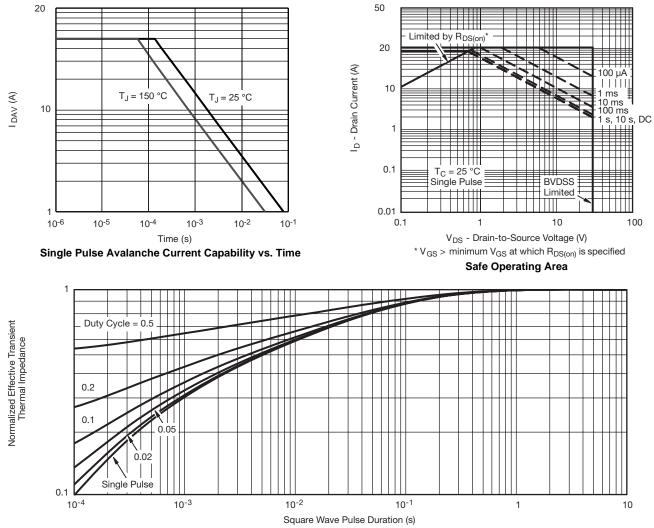








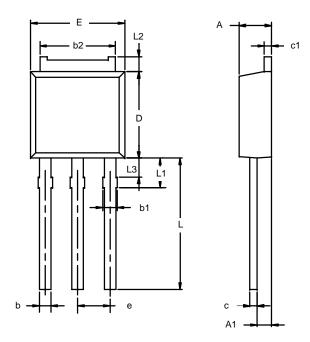
#### TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



Normalized Thermal Transient Impedance, Junction-to-Case



#### TO-251AA (DPAK)



Note: Dimension L3 is for reference only.

	MILLIMETERS		INCHES		
Dim	Min	Мах	Min	Max	
Α	2.21	2.38	0.087	0.094	
A1	0.89	1.14	0.035	0.045	
b	0.71	0.89	0.028	0.035	
b1	0.76	1.14	0.030	0.045	
b2	5.23	5.43	0.206	0.214	
С	0.46	0.58	0.018	0.023	
c1	0.46	0.58	0.018	0.023	
D	5.97	6.22	0.235	0.245	
Е	6.48	6.73	0.255	0.265	
е	2.28 BSC		0.090 BSC		
L	8.89	9.53	0.350	0.375	
L1	1.91	2.28	0.075	0.090	
L2	0.89	1.27	0.035	0.050	
L3	1.15	1.52	0.045	0.060	
	3946—Rev. E		0.045	0.060	



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