

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

PRODUC	T SUMMARY		
V <sub>DS</sub> (V)	<b>R<sub>DS(on)</sub> (</b> Ω <b>)</b>	I <sub>D</sub> (A)	Q <sub>g</sub> (Typ)
- 60	0.061 at V <sub>GS</sub> = - 10 V	- 30	10
- 00	0.072 at $V_{GS}$ = - 4.5 V	- 26	10

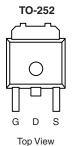
#### FEATURES

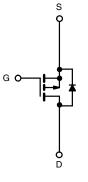
- TrenchFET<sup>®</sup> Power MOSFET
- 100 % UIS Tested

#### **APPLICATIONS**

Load Switch







P-Channel MOSFET

<b>ABSOLUTE MAXIMUM RATINGS</b> $T_{C} = 28$	5 °C, unless othe	rwise noted			
Parameter		Symbol	Limit	Unit	
Gate-Source Voltage		V <sub>GS</sub>	± 20	V	
Continuous Drain Current ( $T_J = 175 \text{ °C}$ )	T <sub>C</sub> = 25 °C	– I <sub>D</sub>	- 30		
Continuous Drain Current $(1) = 175$ C)	T <sub>C</sub> = 100 °C		- 25		
Pulsed Drain Current		I <sub>DM</sub>	- 50	А	
Continuing Source Current (Diode Conduction)		۱ <sub>S</sub>	- 20		
Avalanche Current	lanche Current		- 20		
Single Pulse Avalanche Energy	L = 0.1 mH	E <sub>AS</sub>	7.2	mJ	
Maximum Dawar Dissinction	T <sub>C</sub> = 25 °C	Pn	34 <sup>a</sup>	w	
Maximum Power Dissipation	T <sub>A</sub> = 25 °C	۲D	4 <sup>b</sup>		
Operating Junction and Storage Temperature Range		T <sub>J</sub> , T <sub>stg</sub>	- 55 to 175	°C	

THERMAL RESISTANCE RATINGS					
Parameter		Symbol	Typical	Maximum	Unit
harding to Archive	t ≤ 10 sec	D	20	25	
Junction-to-Ambient <sup>b</sup>	Steady State	R <sub>thJA</sub>	62	75	°C/W
Junction-to-Case		R <sub>thJC</sub>	5	6	

Notes:

a. See SOA curve for voltage derating.

b. Surface Mounted on 1" x 1" FR-4 boad.

<b>SPECIFICATIONS</b> $T_J = 25$	°C, unless	otherwise noted				
Parameter	Symbol	Test Conditions	Min	Typ <sup>a</sup>	Max	Unit
Static		· · · · ·				
Drain-Source Breakdown Voltage	V <sub>(BR)DSS</sub>	$V_{GS} = 0 V, I_D = -250 \mu A$	- 60			V
Gate Threshold Voltage	V <sub>GS(th)</sub>	$V_{DS} = V_{GS}, I_{D} = -250 \ \mu A$	- 1.0	- 2.0	- 3.0	v
Gate-Body Leakage	I <sub>GSS</sub>	$V_{DS} = 0 V, V_{GS} = \pm 20 V$			± 100	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 V, $V_{GS}$ = 0 V, $T_{J}$ = 125 °C			- 50	μA
		$V_{DS}$ = - 60 V, $V_{GS}$ = 0 V, $T_{J}$ = 175 °C			- 150	
On-State Drain Current <sup>b</sup>	I <sub>D(on)</sub>	V <sub>DS</sub> = - 5 V, V <sub>GS</sub> = - 10 V	- 10			А
		V <sub>GS</sub> = - 10 V, I <sub>D</sub> = - 5 A		0.061		
	-	$V_{GS}$ = - 10 V, $I_{D}$ = - 5 A, $T_{J}$ = 125 °C		0.100		A Ω S pF nC
Drain-Source On-State Resistance <sup>b</sup>	r <sub>DS(on)</sub>	$V_{GS}$ = - 10 V, $I_{D}$ = - 5 A, $T_{J}$ = 175 °C		0.150		
		V <sub>GS</sub> = - 4.5 V, I <sub>D</sub> = - 2 A		0.072		
Forward Transconductance <sup>b</sup>	9 <sub>fs</sub>	V <sub>DS</sub> = - 15 V, I <sub>D</sub> = - 5 A		8		S
Dynamic	+	•		•		
Input Capacitance	C <sub>iss</sub>			1000		pF
Output Capacitance	C <sub>oss</sub>	V <sub>DS</sub> = - 25 V, V <sub>GS</sub> = 0 V, f = 1 MHz		120		
Reverse Transfer Capacitance	C <sub>rss</sub>			100		
Total Gate Charge	Qg			10		pF nC
Gate-Source Charge	Q <sub>gs</sub>	$V_{DS} = -30$ V, $V_{GS} = -10$ V, $I_{D} = -8.4$ A		2.1		
Gate-Drain Charge	Q <sub>gd</sub>			3.2		
Gate Resistance	R <sub>g</sub>	f = 1 MHz		8.0		Ω
Turn-On Delay Time <sup>c</sup>	t <sub>d(on)</sub>			6		- ns
Rise Time <sup>c</sup>	t <sub>r</sub>	$V_{DD}$ = - 30 V, $R_{L}$ = 3.57 $\Omega$		15		
Turn-Off Delay Time <sup>c</sup>	t <sub>d(off)</sub>	$\text{I}_{\text{D}}\cong$ - 8.4 A, $\text{V}_{\text{GEN}}$ = - 10 V, $\text{R}_{\text{G}}$ = 2.5 $\Omega$		16		
Fall Time <sup>c</sup>	t <sub>f</sub>			8		
Source-Drain Diode Ratings and Cha	racteristics	(T <sub>C</sub> = 25 °C) <sup>b</sup>				
Pulsed Current	I <sub>SM</sub>				- 50	А
Forward Voltage <sup>b</sup>	V <sub>SD</sub>	$I_{F} = -2 \text{ A}, V_{GS} = 0 \text{ V}$		- 0.9	- 1.3	V
Reverse Recovery Time	t <sub>rr</sub>			50		ns
Reverse Recovery Time	Q <sub>rr</sub>	I <sub>F</sub> = - 8 A, di/dt = 100 A/μs		80		nC

Notes:

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

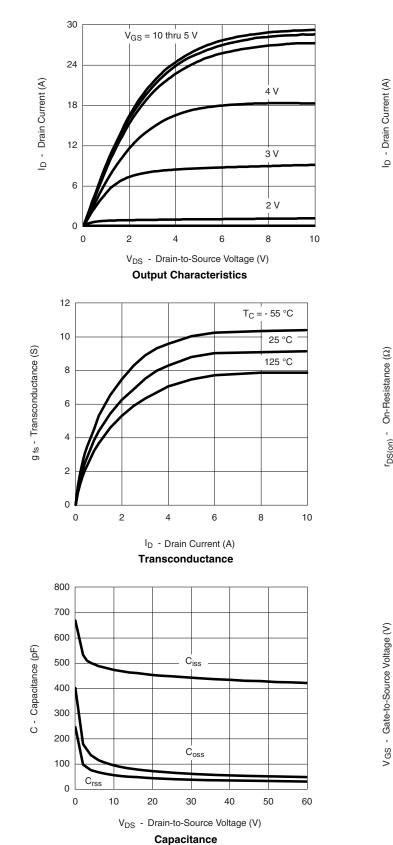
b. Pulse test; pulse width  $\leq$  300  $\mu s,$  duty cycle  $\leq$  2 %.

c. Independent of operating temperature.

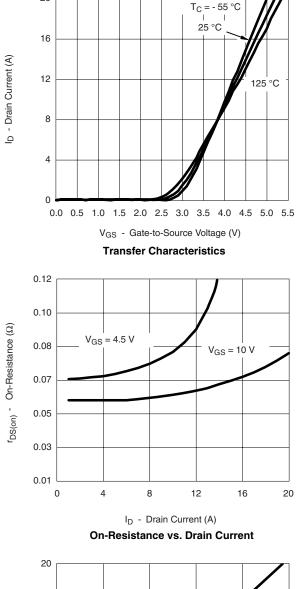
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

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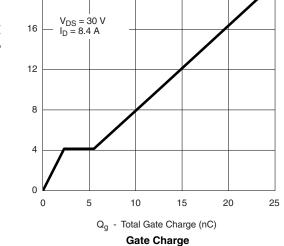




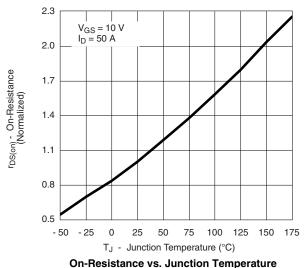
#### TYPICAL CHARACTERISTICS 25 °C unless noted

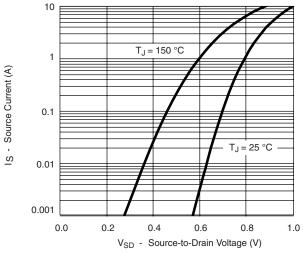


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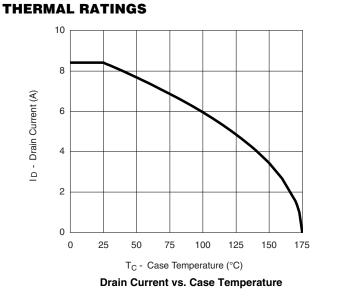


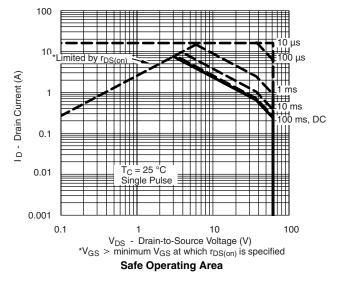
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Source-Drain Diode Forward Voltage



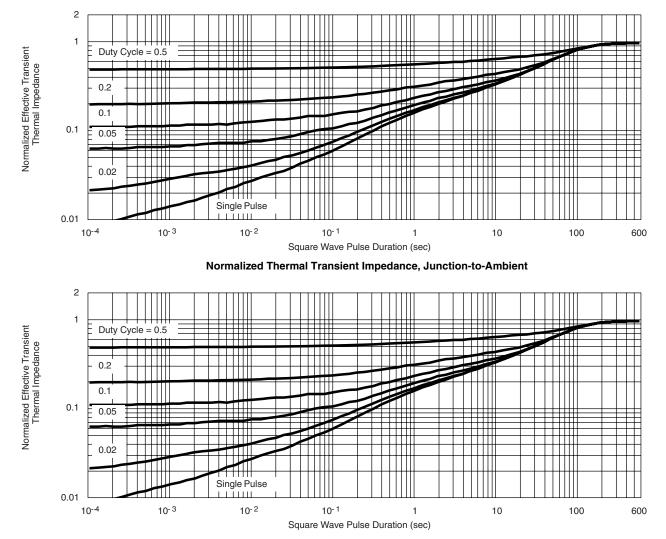




### STD10PF06T4



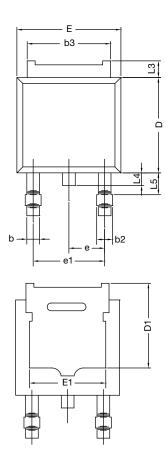
#### THERMAL RATINGS

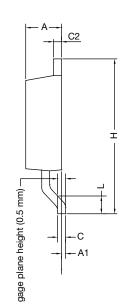


Normalized Thermal Transient Impedance, Junction-to-Case



# **TO-252AA CASE OUTLINE**





	MILLI	MILLIMETERS		HES		
DIM.	MIN.	MAX.	MIN.	MAX		
А	2.18	2.38	0.086	0.094		
A1	-	0.127	-	0.005		
b	0.64	0.88	0.025	0.035		
b2	0.76	1.14	0.030	0.045		
b3	4.95	5.46	0.195	0.215		
С	0.46	0.61	0.018	0.024		
C2	0.46	0.89	0.018	0.035		
D	5.97	6.22	0.235	0.245		
D1	5.21	-	0.205	-		
Е	6.35	6.73	0.250	0.265		
E1	4.32	-	0.170	-		
Н	9.40	10.41	0.370	0.410		
е	2.28	BSC	0.090	BSC		
e1	4.56 BSC		0.180	0.180 BSC		
L	1.40	1.78	0.055 0.0			
L3	0.89	1.27	0.035 0.			
L4	-	1.02	-	0.040		
L5	1.14	1.52	0.045	0.060		
ECN: X12- DWG: 534	0247-Rev. M, 7	24-Dec-12	-			

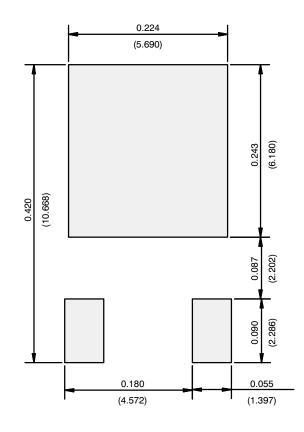
Note

• Dimension L3 is for reference only.

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#### **RECOMMENDED MINIMUM PADS FOR DPAK (TO-252)**



Recommended Minimum Pads Dimensions in Inches/(mm)



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