

30V P-Channel MOSFET

General Description

These P-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These devices are well suited for high efficiency fast switching applications.

TO-252 Pin Configuration



Product Summary

BV _{DSS}	BV _{DSS} R _{DS(ON)} Max.	
20.1/	5.5 mΩ @ -10 V	60 4
-30 V	8.5 mΩ @ -4.5 V	-00 A

Features

- V_{DS} = -30 V, I_D = -50 A
- $R_{DS(ON)} < 8 \text{ m}\Omega @ V_{GS} = -10 \text{ V}$ $R_{DS(ON)} < 13 \text{ m}\Omega @ V_{GS} = -4.5 \text{ V}$
- High density cell design for ultra low Rdson
- Fully characterized avalanche voltage and current
- Excellent package for good heat dissipation
- Pb free terminal plating
- RoHS compliant
- Halogen free

Applications

- High side switch for full bridge converter
- DC/DC converter for LCD display

Absolute Maximum Ratings (Tc = 25°C unless otherwise noted)

Symbol	Parameter	Rating	Units
V _{DS}	Drain-Source Voltage	-30	V
V_{GS}	Gate-Source Voltage	±20	V
1_	Drain Current – Continuous ($T_c = 25^{\circ}C$)	-60	А
I _D	Drain Current – Continuous ($T_c = 100^{\circ}C$)	-42	А
I _{DM}	Drain Current – Pulsed ¹	-240	А
PD	Maximum Power Dissipation	110	W
Eas	Single pulse avalanche energy ⁵	450	mJ
T _{STG}	Storage Temperature Range	-55 to 175	°C
TJ	Operating Junction Temperature Range	-55 to 175	C°

Thermal Characteristics

Symbol	Parameter	Тур.	Max.	Unit
Rejc	Thermal Resistance Junction to Case ²		1.34	°C/W

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Electrical Characteristics (T_J = 25°C, unless otherwise noted)

Off Characteristics

Symbol	Parameter	Conditions	Min.	Тур.	Max.	Unit
BV _{DSS}	Drain-Source Breakdown Voltage	V_{GS} = 0 V , I_{D} = -250 μA	-30			V
IDSS	Drain-Source Leakage Current	V_{DS} = -30 V, V_{GS} = 0 V , T_{J} = 25°C			-1	μA
lgss	Gate-Source Leakage Current	$V_{GS} = \pm 20$ V, $V_{DS} = 0$ V			±100	nA

On Characteristics

Symbol	Parameter	Conditions	Min.	Тур.	Max.	Unit
	Statia Drain Source On Desistance	V_{GS} = -10 V, I_D = -20 A		6	8	
RDS(ON)		$V_{GS} = -4.5 \text{ V}, \text{ I}_{D} = -15 \text{ A}$		9	13	11122
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS} = V_{DS} , I_D = -250 μ A	-1.0	-1.5	-2.0	V

Dynamic and switching Characteristics⁴

Symbol	Parameter	Conditions	Min.	Тур.	Max.	Unit
Qg	Total Gate Charge			45		
Q _{gs}	Gate-Source Charge	$V_{DS} = -15 V, V_{GS} = -10 V,$ $I_{D} = -15 A$		8		nC
Q_gd	Gate-Drain Charge			12		
T _{d(on)}	Turn-On Delay Time	$V_{DD} = -15V, V_{GS} = -10V, R_{GEN} = 2.5 \Omega, I_D = -15A$		19		
Tr	Rise Time			15		'nÇ
T _{d(off)}	Turn-Off Delay Time			65		113
T _f	Fall Time			36		
Ciss	Input Capacitance			4320		
Coss	Output Capacitance	− V _{DS} = -15 V, V _{GS} = 0 V, - f = 1 MHz		534		pF
Crss	Reverse Transfer Capacitance			493		

Drain-Source Diode Characteristics and Maximum Ratings

Symbol	Parameter	Conditions	Min.	Тур.	Max.	Unit
Vsd	Diode Forward Voltage	$V_{GS} = 0 V$, $I_{S} = 1 A$, $T_{J} = 25^{\circ}C$			-1.2	V

Notes :

1. Repetitive Rating: Pulse width limited by maximum junction temperature.

2. Surface Mounted on FR4 Board, $t \le 10$ sec.

- 3. Pulse Test: Pulse Width \leq 300µs, Duty Cycle \leq 2%.
- 4. Guaranteed by design, not subject to production.
- 5. E_{AS} condition: Tj = 25°C, V_{DD} = -15 V, V_{G} = -10 V, L = 0.5 mH, Rg = 25 Ω



Test Circuit

1) E_{AS} Test Circuits



2) Gate Charge Test Circuit



3) Switch Time Test Circuit





Typical Characteristics























Typical Characteristics (Continued)



Fig.7 Normalized Breakdown Voltage vs. Junction Temperature







Fig.11 Maximum Effective Transient Thermal Impedance, Junction-to-Ambient



Junction Temperature



Fig.10 Maximum Continuous Drain Current vs. Ambient Temperature



Package Information

TO-252



Symbol	Dimensions	Dimensions In Millimeters		In Inches	
Symbol	Min.	Max.	Min.	Max.	
A	2.200	2.400	0.087	0.094	
A1	0.000	0.127	0.000	0.005	
b	0.660	0.860	0.026	0.034	
С	0.460	0.580	0.018	0.023	
D	6.500	6.700	0.256	0.264	
D1	5.100	5.460	0.201	0.215	
D2	4.830	REF.	0.190 REF.		
E	6.000	6.200	0.236	0.244	
е	2.186	2.386	0.086	0.094	
L	9.800	10.400	0.386	0.409	
L1	2.900 REF.		0.114 F	REF.	
L2	1.400	1.700	0.055	0.067	
L3	1.600	1.600 REF.		REF.	
L4	0.600	1.000	0.024	0.039	
Φ	1.100	1.300	0.043	0.051	
θ	0°	8°	0°	8°	
h	0.000	0.300	0.000	0.012	
V	5.350) REF.	0.211 REF.		

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