

N-Channel 250 V (D-S) MOSFET

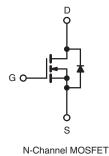
PRODUCT SUMMA	RY	
V _{DS} (V)	250)
R _{DS(on)} (Ω)	$V_{GS} = 10 V$	2.0
Q _g (Max.) (nC)	8.2	
Q _{gs} (nC)	1.8	
Q _{gd} (nC)	4.5	
Configuration	Sing	le

FEATURES

- Surface mount
- Available in tape and reel
- Dynamic dV/dt rating
- Repetitive avalanche rated
- · Fast switching
- Ease of paralleling
- Simple drive requirements







ABSOLUTE MAXIMUM RATINGS (T _C =	= 25 °C, unless otherwis	se noted)			
PARAMETER		SYMBOL	LIMIT	UNIT	
Drain-Source Voltage		V _{DS}	250	v	
Gate-Source Voltage		V _{GS}	± 20	v	
Continuous Drain Current	V_{GS} at 10 V $T_C = 25 \degree C$	1	0.79		
Continuous Drain Current	$T_{\rm C} = 100 ^{\circ}{\rm C}$	Ι _D	0.50	А	
Pulsed Drain Current ^a		I _{DM}	6.3		
Linear Derating Factor			0.025	W/°C	
Linear Derating Factor (PCB Mount) ^e			0.017	W/ C	
Single Pulse Avalanche Energy ^b		E _{AS}	50	mJ	
Repetitive Avalanche Current ^a		I _{AR}	0.79	А	
Repetitive Avalanche Energy ^a		E _{AR}	0.31	mJ	
Maximum Power Dissipation	T _C = 25 °C	Р	3.1	w	
Maximum Power Dissipation (PCB Mount) e	T _A = 25 °C	P _D 3.1 2.0		vv	
Peak Diode Recovery dV/dt ^c		dV/dt	4.8	V/ns	
Operating Junction and Storage Temperature Range	ction and Storage Temperature Range T _J , T _{stg} -55 to +150		℃		
Soldering Recommendations (Peak Temperature) ^d	for 10 s				

Notes

a. Repetitive rating; pulse width limited by maximum junction temperature (see fig. 11). b. $V_{DD} = 50$ V, starting $T_J = 25$ °C, L = 128 mH, $R_g = 25 \Omega$, $I_{AS} = 0.79$ A (see fig. 12). c. $I_{SD} \le 2.7$ A, dI/dt ≤ 65 A/µs, $V_{DD} \le V_{DS}$, $T_J \le 150$ °C.

d. 1.6 mm from case.

e. When mounted on 1" square PCB (FR-4 or G-10 material).



THERMAL RESISTANCE RAT	INGS				
PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT
Maximum Junction-to-Ambient (PCB Mount) ^a	R _{thJA}	-	-	60	°C/W
Maximum Junction-to-Case (Drain)	R _{thJC}	-	-	40	

Note

a. When mounted on 1" square PCB (FR-4 or G-10 material).

PARAMETER	SYMBOL	TES	T CONDITIONS	MIN.	TYP.	MAX.	UNIT
Static							
Drain-Source Breakdown Voltage	V _{DS}	V _{GS} =	= 0 V, I _D = 250 μA	250	-	-	V
V _{DS} Temperature Coefficient	$\Delta V_{DS}/T_{J}$	Reference	e to 25 °C, I _D = 1 mA	-	0.39	-	V/°C
Gate-Source Threshold Voltage	V _{GS(th)}	V _{DS} =	· V _{GS} , I _D = 250 μA	2.0	-	4.0	V
Gate-Source Leakage	I _{GSS}		$V_{GS} = \pm 20 \text{ V}$	-	-	± 100	nA
Zero Gate Voltage Drain Current	I _{DSS}		250 V, V _{GS} = 0 V , V _{GS} = 0 V, T _J = 125 °C	-	-	25 250	μA
Drain-Source On-State Resistance	R _{DS(on)}	V _{GS} = 10 V	I _D = 0.47 A ^b	-	2.0	-	Ω
Forward Transconductance	9 _{fs}	V _{DS} =	50 V, I _D = 0.47 A	0.50	-	-	S
Dynamic							
Input Capacitance	Ciss	$V_{GS} = 0 V,$		-	140	-	
Output Capacitance	C _{oss}		$V_{DS} = 25 V,$	-	42	-	pF
Reverse Transfer Capacitance	C _{rss}	f = 1	0 MHz, see fig. 5	-	9.6	-	
Total Gate Charge	Qg			-	-	8.2	
Gate-Source Charge	Q _{gs}	V _{GS} = 10 V	I _D = 2.7 A, V _{DS} = 200 V, see fig. 6 and 13 ^b	-	-	1.8	nC
Gate-Drain Charge	Q _{gd}		see lig. 0 aliu 13 *	-	-	4.5	
Turn-On Delay Time	t _{d(on)}			-	7.0	-	
Rise Time	t _r	- V _{DD} =	125 V, I _D = 2.7 A,	-	7.6	-	
Turn-Off Delay Time	t _{d(off)}	$R_g = 24 \Omega$,	$R_D = 45 \Omega$, see fig. 10 ^b	-	16	-	ns
Fall Time	t _f			-	7.0	-	
Internal Drain Inductance	L _D	Between lead		-	4.0	-	
Internal Source Inductance	L _S	6 mm (0.25") from package and center of die contact		-	6.0	-	nH
Drain-Source Body Diode Characteristic	s	<u>.</u>					
Continuous Source-Drain Diode Current	I _S	MOSFET sym showing the			-	0.79	
Pulsed Diode Forward Current ^a	I _{SM}	integral revers		-	-	6.3	A
Body Diode Voltage	V _{SD}	T _J = 25 °C,	$I_{\rm S}$ = 0.79 A, $V_{\rm GS}$ = 0 V ^b	-	-	2.0	V
Body Diode Reverse Recovery Time	t _{rr}			-	190	390	ns
Body Diode Reverse Recovery Charge	Q _{rr}	$T_J = 25 \text{ °C}, I_F = 2.7 \text{ A}, dI/dt = 100 \text{ A}/\mu\text{s}^{\text{b}}$		-	0.64	1.3	μC
Forward Turn-On Time	t _{on}	Intrinsic tu	rn-on time is negligible (turn	-on is dor	ninated b	v Ls and	Ln)

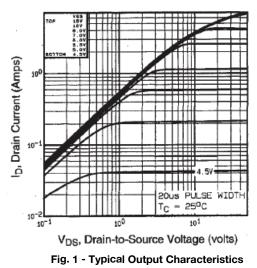
Notes

a. Repetitive rating; pulse width limited by maximum junction temperature (see fig. 11).

b. Pulse width $\leq 300~\mu s;~duty~cycle \leq 2~\%.$







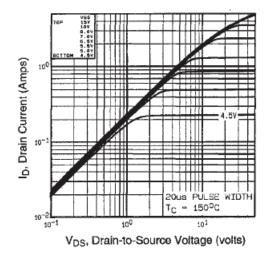


Fig. 2 - Typical Output Characteristics

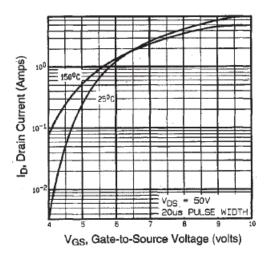


Fig. 3 - Typical Transfer Characteristics

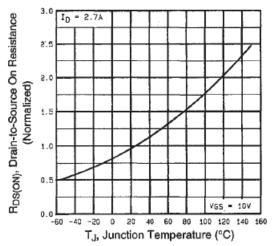


Fig. 4 - Normalized On-Resistance vs. Temperature

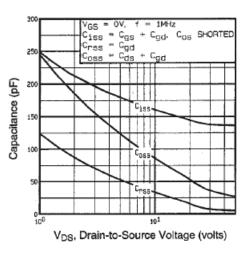


Fig. 5 - Typical Capacitance vs. Drain-to-Source Voltage

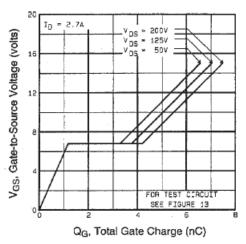


Fig. 6 - Typical Gate Charge vs. Gate-to-Source Voltage



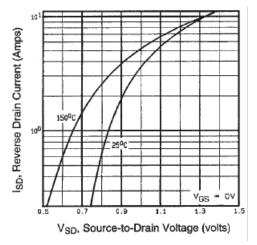


Fig. 7 - Typical Source-Drain Diode Forward Voltage

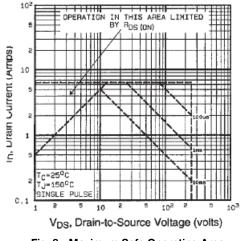


Fig. 8 - Maximum Safe Operating Area

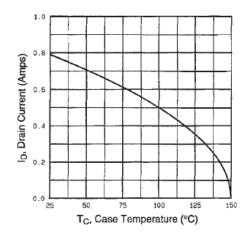


Fig. 9 - Maximum Drain Current vs. Case Temperature

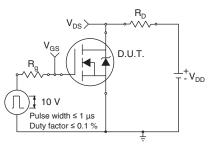


Fig. 10a - Switching Time Test Circuit

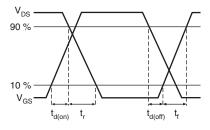


Fig. 10b - Switching Time Waveforms

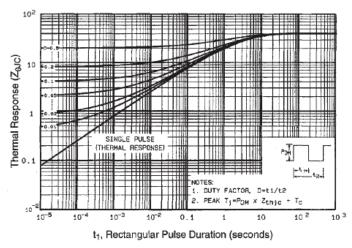


Fig. 11 - Maximum Effective Transient Thermal Impedance, Junction-to-Case



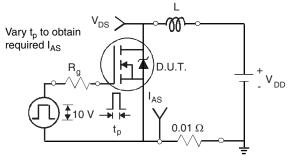


Fig. 12a - Unclamped Inductive Test Circuit

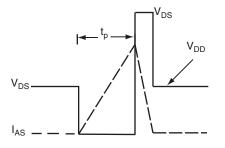


Fig. 12b - Unclamped Inductive Waveforms

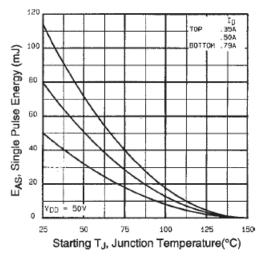


Fig. 12c - Maximum Avalanche Energy vs. Drain Current

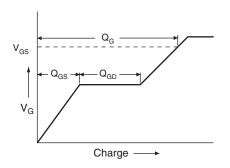


Fig. 13a - Basic Gate Charge Waveform

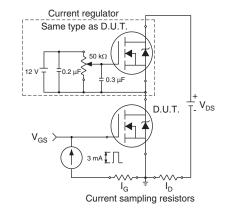
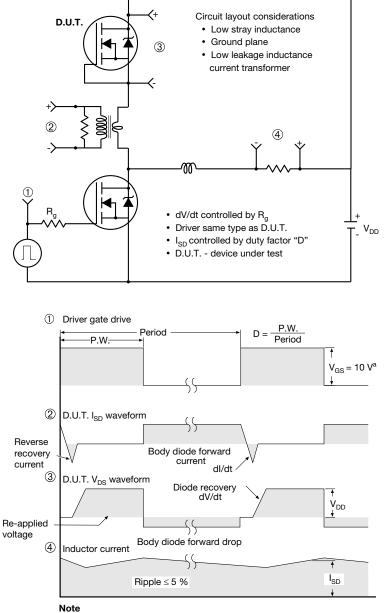


Fig. 13b - Gate Charge Test Circuit



Peak Diode Recovery dV/dt Test Circuit

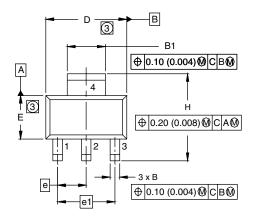


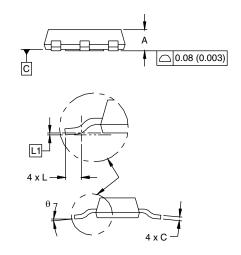
a. V_{GS} = 5 V for logic level devices

Fig.14 - For N-Channel



SOT-223 (HIGH VOLTAGE)





	MILLIMETERS		INC	HES	
DIM.	MIN.	MAX.	MIN.	MAX.	
А	1.55	1.80	0.061	0.071	
В	0.65	0.85	0.026	0.033	
B1	2.95	3.15	0.116	0.124	
С	0.25	0.35	0.010	0.014	
D	6.30	6.70	0.248	0.264	
E	3.30	3.70	0.130	0.146	
е	2.30	2.30 BSC		0.0905 BSC	
e1	4.60	BSC	0.181	BSC	
Н	6.71	7.29	0.264	0.287	
L	0.91	-	0.036	-	
L1	0.06	0.061 BSC		4 BSC	
θ	-	10'	-	10'	

Notes

1. Dimensioning and tolerancing per ASME Y14.5M-1994.

2. Dimensions are shown in millimeters (inches).

3. Dimension do not include mold flash.

4. Outline conforms to JEDEC outline TO-261AA.



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