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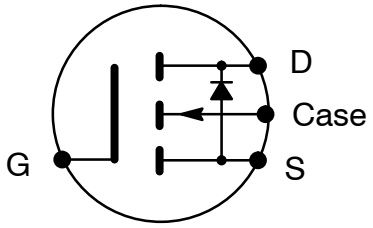
NTE2386
MOSFET
N–Channel Enhancemen Mode,
High Speed Switch
TO3 Type Package

Description:

The NTE2386 Power MOSFET features advantages such as voltage control, very fast switching, ease of paralleling and temperature stability, and is suited for applications such as switching power supplies, motor controls, inverters, choppers, audio amplifiers, and high energy pulse circuits.

Features:

- Repetitive Avalanche Ratings
- Dynamic dv/dt Rating
- Simple Drive Requirements
- Ease of Paralleling



Absolute Maximum Ratings:

Continuous Drain Current, I_D
(T_C = +25°C) 6.2A
(T_C = +100°C) 2.8A
Pulsed Drain Current (Note 1), I_{DM} 25A
Maximum Power Dissipation (T_C = +25°C), P_D 125W
(Derate linearly above +25°C) . . . . . 1.0W/°C
Gate–to–Source Voltage, V_{GS} 20V
Single Pulse Avalanche Energy (Note 2), E_{AS} 670mJ
Avalanche Current (Repetitive or Non–Repetitive, Note 1), I_{AR} 6.2A
Repetitive Avalanche Energy (Note 1), E_{AR} 13mJ
Peak Diode Recovery (Note 3), dv/dt 3.0V/mS
Operating Junction Temperature Range, T_J . . . . . –55° to +150°C
Storage Temperature Range, T_{stg} . . . . . –55° to +150°C
Lead Temperature (During Soldering, 0.063 in. (1.6mm) from case for 10s), T_L . . . . . +300°C

Electrical Characteristics: (T_J = +25°C unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Breakdown Voltage Drain−to−Source	BV_{DSS}	V_{GS} = 0V, I_D = 250μA	600	–	–	V
Static Drain−to−Source On−State Resistance	$R_{DS(on)}$	V_{GS} = 10V, I_D = 3.4A, Note 4	–	0.97	1.2	Ω
On−State Drain Current	$I_{D(on)}$	V_{DS} > I_D(on) x R_{DS}(on) Max, V_{GS} = 10V, Note 4	6.2	–	–	A
Gate Threshold Voltage	$V_{GS(HL)}$	V_{DS} = V_{GS}, I_D = 250μA	2.0	–	4.0	V
Forward Transconductance	gs	V_{DS} = 60V, I_{DC} = 3.4A, Note 4	4.7	70	–	mhos
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = Max. Rating V_{CS} = 0V	–	–	250	μA
		V_{DS} = 0.8 x Max Rating , V_{SS} = 0V, T_J = 125°C	–	–	1000	
Forward Leakage Current Gate−to−Source	I_{GSS}	V_{GS} = 20V	–	–	100	nA
Reverse Leakage Current Gate−to−Source	I_{GSS}	V_{GS} = −20V	–	–	−100	nA
Total Gate Charge	Q_g	V_{GS} = 10V, I_D = 6.2A, V_{DS} = 0.8 x Max Rating (independent of operating temperature)	–	4.0	80	nC
Gate−to−Source Charge	Qgs		–	6.5	8.2	nC
Gate−to−Drain (“Miller”) Charge	Qgd		–	20	30	nC
Turn−On Delay Time	$t_{d(on)}$	V_{DD} = 300V, f_D = 6.2A, R_G = 9.1Ω, R_D = 47Ω (independent at operating temperature)	–	1.3	20	ns
Rise Time	t_r		–	18	27	
Turn−Off Delay Time	$t_{d(off)}$		–	65	83	
Fall Time	t_f		–	20	20	
Internal Drain Inductance	L_D	Measured from the drain lead, 6mm (0.25 In) from packaged to center of die.	–	5.0	–	nH
Internal Source Inductance	L_S	Measured from the source lead, 6mm (0.25 in) from package to source bonding pad.	–	18	–	
Input Capacitance	C_{iss}	V_{GS} = 0V, V_{DS} = 25V, f = 1.0MHz	–	1300	–	pF
Output Capacitance	C_{oss}		–	150	–	
Reverse Transfer Capacitance	C_{rss}		–	30	–	

Source−Drain Diode Ratings and Characteristics:

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Continuous Source Current (Body Diode)	I_S		–	–	6.2	A
Pulsed Source Current (Body Diode)	I_{SM}	Note 1	–	–	26	A
Diode Forward Voltage	V_{SO}	T_J = 25°C, I_S = 6.2A, V_{GS} = 0V, Note 4	–	–	1.5	V
Reverse Recovery Time	t_{rr}	T_J = 25°C, I_F = 6.2A di/dt = 100A/μs	1.8	3.6	7.9	μC
Forward Turn−On Time	t_{on}	Intrinsic turn−on time is negligible Turn on speed is substantially controlled by L_S + L_D				

Thermal Resistance:

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Junction−to−Case	R_{thJC}		−	−	1.0	℃/W
Case−to−Sink	R_{thCS}	Mounting surface flat, smooth, and greased	−	0.12	−	℃/W
Junction−to−Ambient	R_{thJA}	Typical socket mount	−	−	30	℃/W

Note 1. Repetitive Rating: Pulse Width limited by maximum junction temperature.
Note 2. V_{DD} = 60V, Starting T_J = 25℃, L = 27mH, R_G = 25Ω, Peak I_C = 6.2A
Note 3. I_{SD} , 6.2A, di/dt = 80A/μs V_{DD} , $3V_{DSS}$, T_J , 150℃, Suggested R_G = 9.1Ω
Note 4. Pulse width , 300μs: Duty Cycle , 2%.