

60V N-CHANNEL SELF PROTECTED ENHANCEMENT MODE IntelliFET™ MOSFET

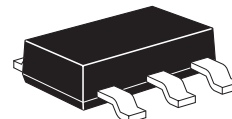
SUMMARY

Continuous drain source voltage $V_{DS}=60V$

On-state resistance $550m\Omega$

Nominal load current 1.6A

Clamping Energy 550mJ



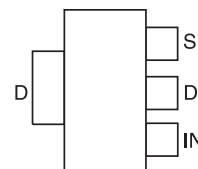
DESCRIPTION

Self protected low side MOSFET. Monolithic over temperature, over current, over voltage (active clamp) and ESD protected logic level power MOSFET intended as a general purpose switch.

SOT223 PACKAGE

FEATURES

- High continuous current rating
- Logic level input
- Input protection (ESD)
- Thermal shutdown with auto restart
- Over load protection
- Short circuit protection with pulse start capability and auto restart
- Over voltage protection (active clamp)
- Load dump protection (actively protects load)

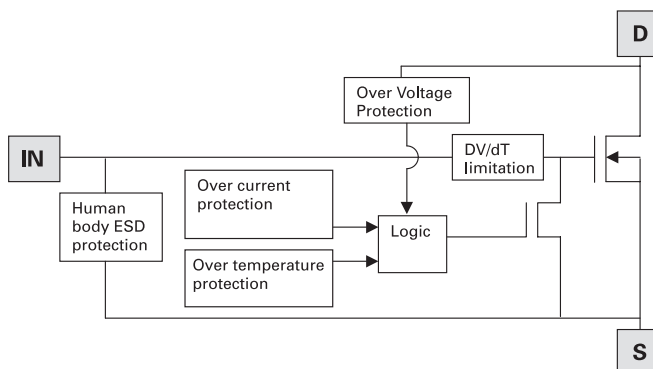


PINOUT DIAGRAM

APPLICATIONS

- Especially suited for loads with a high inrush current such as lamps and motors
- All types of resistive, inductive and capacitive loads in switching applications
- μC compatible power switch for 12V and 24V DC applications and for 42V Powernet
- Automotive rated
- Replaces electromechanical relays and discrete circuits

FUNCTIONAL BLOCK DIAGRAM



BSP75G

ADVANCE INFORMATION

ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	LIMIT	UNIT
Continuous drain-source voltage	V_{DS}	60	V
Drain-source voltage for short circuit protection	$V_{DS(SC)}$	36	V
Continuous input voltage	V_{IN}	-0.2 ... +10	V
Peak input voltage	V_{IN}	-0.2 ... +20	V
Operating temperature range	T_j	-40 to +150	°C
Storage temperature range	T_{stg}	-55 to +150	°C
Power dissipation at $T_A = 25^\circ\text{C}$	P_D	2.5	W
Continuous drain current @ $V_{IN}=10\text{V}$; $T_A=25^\circ\text{C}$ ²	I_D	1.6	A
Pulsed drain current @ $V_{IN}=10\text{V}$	I_{DM}	3	A
Unclamped single pulse inductive energy	E_{AS}	550	mJ
Load dump protection	$V_{LoadDump}$	80	V
Electrostatic discharge (Human Body Model)	V_{ESD}	4000	V

NOTES

² For a device surface mounted on FR4 PCB measured at $t \leq 10\text{s}$

THERMAL RESISTANCE

PARAMETER	SYMBOL	VALUE	UNIT
Junction to ambient (a)	$R_{\theta JA}$	50	°C/W

ADVANCE INFORMATION

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ELECTRICAL CHARACTERISTICS (at $T_{amb} = 25^{\circ}\text{C}$ unless otherwise stated)

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	CONDITIONS
STATIC						
Drain-source clamp voltage	$V_{DS(AZ)}$	60	70	75	V	$I_D=10\text{mA}$
Off state drain current	I_{DSS}		0.1	3	μA	$V_{DS}=12\text{V}$, $V_{IN}=0\text{V}$
Off state drain current	I_{DSS}		3	15	μA	$V_{DS}=32\text{V}$, $V_{IN}=0\text{V}$
Input threshold voltage	$V_{IN(th)}$	1	2.1	2.5	V	$I_D=10\text{mA}$
Input current	I_{IN}		0.7	1.2	mA	$V_{IN}=+5\text{V}$
Input current	I_{IN}		1.5	2.7	mA	$V_{IN}=+7\text{V}$
Input current	I_{IN}		4	7	mA	$V_{IN}=+10\text{V}$
Static drain-source on-state resistance	$R_{DS(on)}$		520	675	$\text{m}\Omega$	$V_{IN}=5\text{V}$, $I_D=0.7\text{A}$
Static drain-source on-state resistance	$R_{DS(on)}$		385	550	$\text{m}\Omega$	$V_{IN}=10\text{V}$, $I_D=0.7\text{A}$
Continuous load current ²	I_D			1.6	A	$V_{IN}=10\text{V}$
Continuous load current ²	I_D			1	A	$V_{IN}=5\text{V}$
Current limit ³	$I_{D(LIM)}$	0.7	1.1	1.75	A	$V_{IN}=5\text{V}$, $V_{DS}>5\text{V}$
Current limit ³	$I_{D(LIM)}$	2	3	4	A	$V_{IN}=10\text{V}$, $V_{DS}>5\text{V}$
DYNAMIC						
Turn-on time (V_{IN} to 90% I_D)	t_{on}		4	20	μs	$R_L=22\Omega$, $V_{IN}=0$ to 10V , $V_{BB}=12\text{V}$
Turn-off time (V_{IN} to 90% I_D)	t_{off}		10	20	μs	$R_L=22\Omega$, $V_{IN}=10\text{V}$ to 0V , $V_{BB}=12\text{V}$
Slew rate on (70 to 50% V_{BB})	$-dV_{DS}/dt_{on}$		6.5	20	$\text{V}/\mu\text{s}$	$R_L=22\Omega$, $V_{IN}=0$ to 10V , $V_{BB}=12\text{V}$
Slew rate off (50 to 70% V_{BB})	DV_{DS}/dt_{on}		3.2	10	$\text{V}/\mu\text{s}$	$R_L=22\Omega$, $V_{IN}=10\text{V}$ to 0V , $V_{BB}=12\text{V}$
PROTECTION FUNCTIONS¹						
Required input voltage for over temperature protection	V_{PROT}	4.5			V	
Thermal overload trip temperature	T_{JT}	150	175		$^{\circ}\text{C}$	
Thermal hysteresis			10		$^{\circ}\text{C}$	
Unclamped single pulse inductive energy $T_j=25^{\circ}\text{C}$	E_{AS}	550			mJ	$I_{D(ISO)}=0.7\text{A}$, $V_{BB}=32\text{V}$

NOTES

¹ Integrated protection functions are designed to prevent IC destruction under fault conditions described in the datasheet. Fault conditions are considered as "outside" normal operating range. Protection functions are not designed for continuous, repetitive operation.

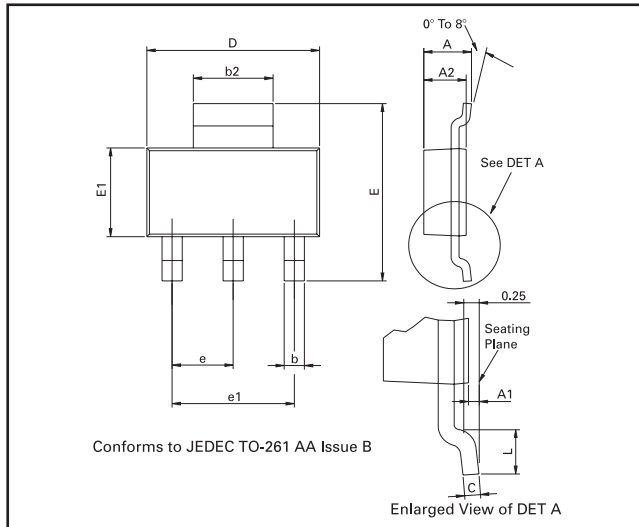
² For a device surface mounted on FR4 PCB measured at $t \leq 10\text{s}$.

³ The drain current is limited to a reduced value when V_{ds} exceeds a safe value.

BSP75G

ADVANCE INFORMATION

PACKAGE OUTLINE



PACKAGE DIMENSIONS

DIM	Millimeters		DIM	Millimeters	
	MIN	MAX		MIN	MAX
A	—	1.80	D	6.30	6.70
A1	0.02	0.10	e	2.30 BASIC	
A2	1.55	1.65	e1	4.60 BASIC	
b	0.66	0.84	E	6.70	7.30
b2	2.90	3.10	E1	3.30	3.70

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DRAFT ISSUE C - NOVEMBER 2003