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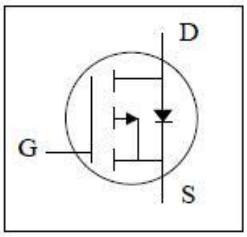
P-CHANNEL ENHANCEMENT MODE POWER MOSFET

❖ GENERAL DESCRIPTION

The TO-252 package is widely preferred for all commercial-industrial surface mount applications and suited for low voltage applications such as DC/DC converters.



❖ FEATURES

- ▼ Simple Drive Requirement
- ▼ Fast Switching Characteristic
- ▼ RoHS Compliant & Halogen-Free

BV_{DSS}	-40V
$R_{DS(ON)}$	90mΩ
I_D	-14A

❖ ABSOLUTE MAXIMUM RATINGS

Characteristics	Symbol	Rating	Unit
Drain-Source Voltage	V_{DS}	-40	V
Gate-Source Voltage	V_{GS}	±20	V
Continuous Drain Current, V_{GS} @ 10V	I_D@T_C=25°C	-14	A
Continuous Drain Current, V_{GS} @ 10V	I_D@T_C=100°C	-8.6	A
Pulsed Drain Current[1]	I_{DM}	-40	A
Total Power Dissipation	P_D@T_C=25°C	26	W
Linear Derating Factor		0.21	W/°C
Storage Temperature Range	T_{STG}	-55 to 150	°C
Operating Junction Temperature Range	T_J	-55 to 150	°C

❖ THERMAL DATA

Characteristics	Symbol	Rating	Unit
Maximum Thermal Resistance, Junction-case	Rthj-c	4.8	°C/W
Maximum Thermal Resistance, Junction-ambient (PCB mount)[3]	Rthj-a	62.5	°C/W
Maximum Thermal Resistance, Junction-ambient	Rthj-a	110	°C/W

❖ ELECTRICAL CHARACTERISTICS

(V_{CC} = 5V, T_A=25°C, unless otherwise specified)

Characteristics	Symbol	Conditions	Min	Typ	Max	Units
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V, I_D=-250uA	-40	-	-	V
Breakdown Voltage Temperature Coefficient	$\Delta BV_{DSS}/\Delta Tj$	Reference to 25°C, I_D=-1mA	-	-0.03	-	V/°C
Static Drain-Source On-Resistance[2]	$R_{DS(ON)}$	V_{GS}=-10V, I_D=-10A	-	-	90	mΩ
		V_{GS}=-4.5V, I_D=-6A			130	mΩ
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=-250uA	-1	-	-3	V
Forward Trans conductance	g_{fs}	V_{DS}=-10V, I_D=-10A	-	7	-	S
Drain-Source Leakage Current	I_{DSS}	V_{DS}=-40V, V_{GS}=0V	-	-	-1	uA
Drain-Source Leakage Current (Tj=125°C)		V_{DS}=-32V, V_{GS}=0V			-250	uA
Gate-Source Leakage	I_{GSS}	V_{GS}= ±20V, V_{DS}=0V			±100	nA
Total Gate Charge[2]	Q_g	I_D=-10A V_{DS}=-30V V_{GS}=-4.5V	-	7	12	nC
Gate-Source Charge	Q_{gs}		-	2	-	nC
Gate-Drain ("Miller") Charge	Q_{gd}		-	4	-	nC
Turn-on Delay Time[2]	$t_{d(on)}$	V_{DS}=-20V I_D=-10A R_G=3.3Ω V_{GS}=-10V R_D=2Ω	-	8	-	sn
Rise Time	t_r		-	20	-	ns
Turn-off Delay Time	$t_{d(off)}$		-	19	-	ns
Fall Time	t_f		-	6	-	ns
Input Capacitance	C_{iss}	V_{GS}=0V V_{DS}=-25V f=1.0MHz	-	490	780	pF
Output Capacitance	C_{oss}		-	80	-	pF
Reverse Transfer Capacitance	C_{rss}		-	65	-	pF
Gate Resistance	R_g	f=1.0MHz	-	5.8	8.7	Ω
Source-Drain Diode						
Forward On Voltage[2]	V_{DS}	I_S=-10A, V_{GS}=0V	-	-	-1.3	V
Reverse Recovery Time[2]	t_{rr}	I_S=-10A, V_{GS}=0V, dI/dt=-100A/μs	-	28	-	ns
Reverse Recovery Charge	Q_{rr}		-	26	-	nC

Notes:

1. Pulse width limited by Max. junction temperature.
2. Pulse test
3. Surface mounted on 1 in2 copper pad of FR4 board AM9569D

❖ TYPICAL CHARACTERISTICS

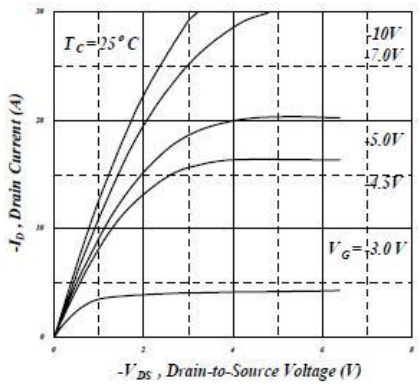


Fig 1. Typical Output Characteristics

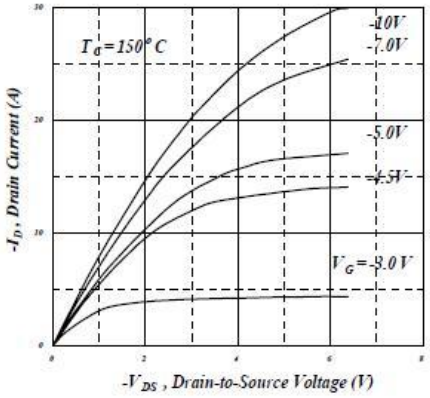


Fig 2. Typical Output Characteristics

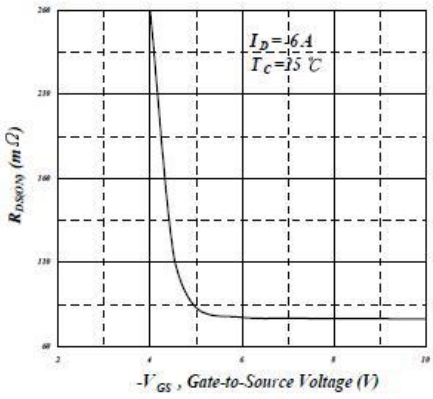


Fig 3. On-Resistance v.s. Gate Voltage

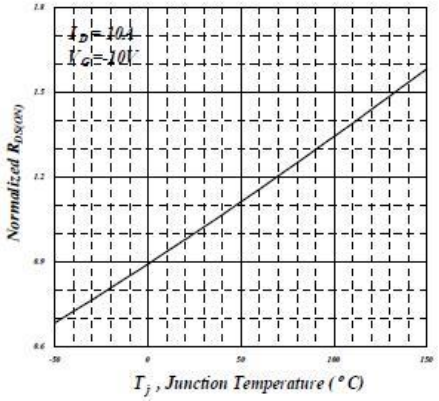


Fig 4. Normalized On-Resistance v.s. Junction Temperature

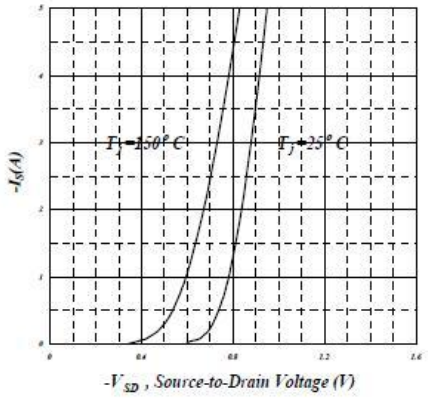


Fig 5. Forward Characteristic of Reverse Diode

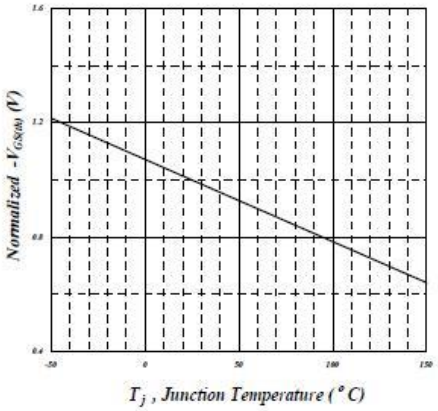


Fig 6. Gate Threshold Voltage v.s. Junction Temperature

❖ TYPICAL CHARACTERISTICS (COUNTINOUS)

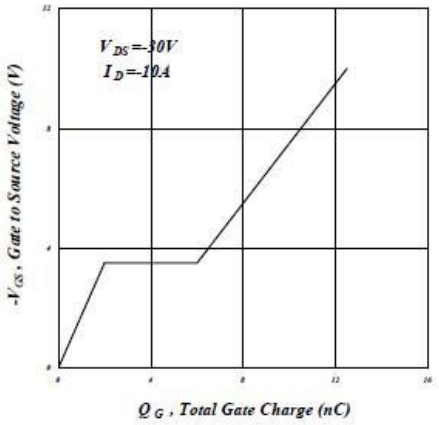


Fig 1. Typical Output Characteristics

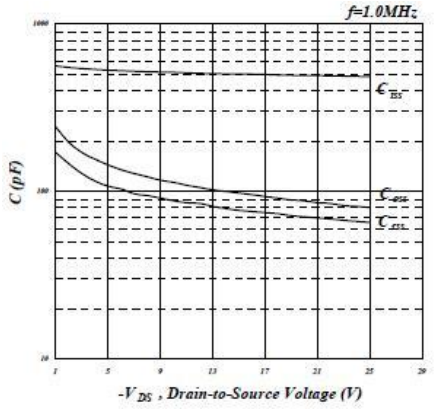


Fig 2. Typical Output Characteristics

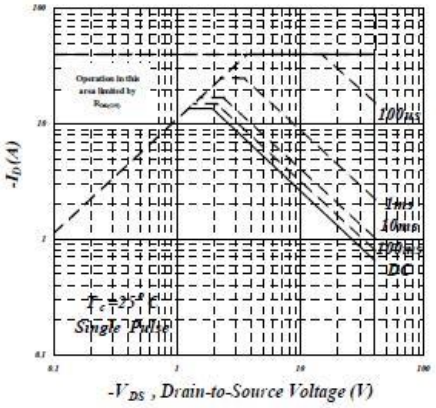


Fig 3. On-Resistance v.s. Gate Voltage

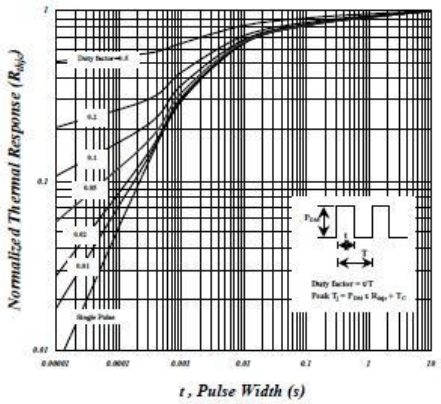


Fig 4. Normalized On-Resistance v.s. Junction Temperature

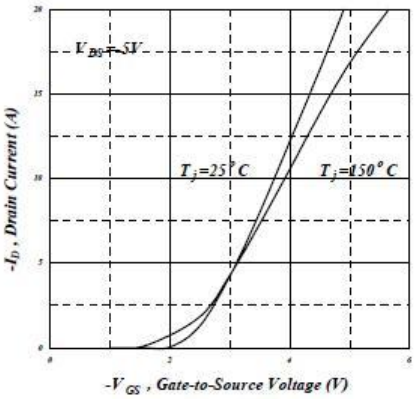


Fig 5. Forward Characteristic of Reverse Diode

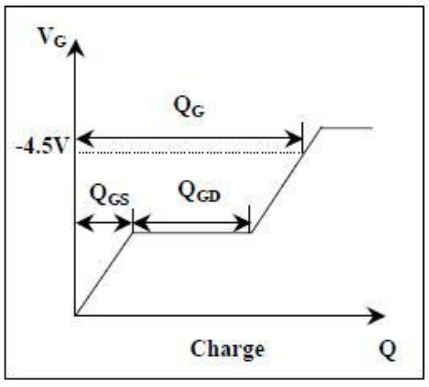
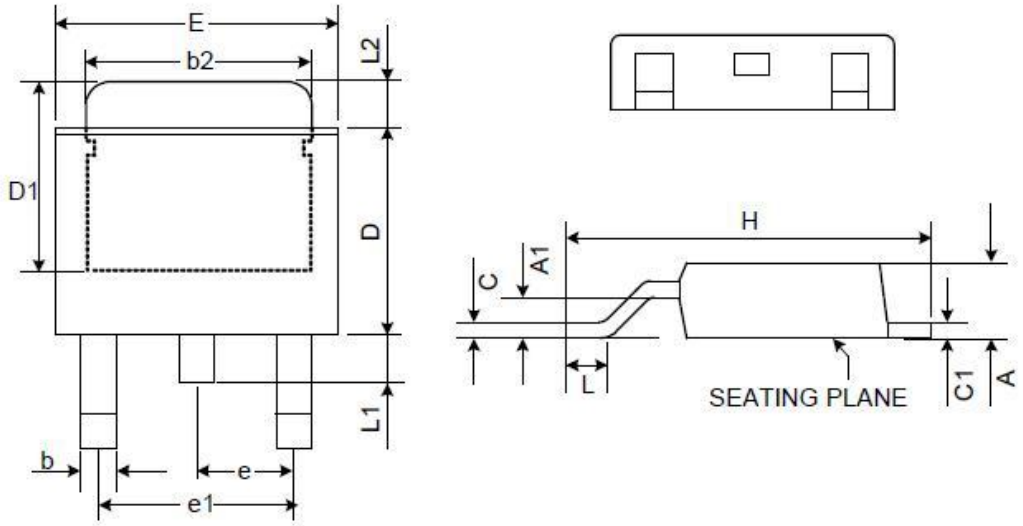


Fig 6. Gate Threshold Voltage v.s. Junction Temperature

❖ PACKAGE OUTLINES



Symbol	Dimensions in Millimeters			Dimensions in Inches		
	Min.	Nom.	Max.	Min.	Nom.	Max.
A	2.18	2.29	2.40	0.086	0.090	0.094
A1	0.89	-	1.14	0.035	-	0.045
b		0.61 TYP.			0.024 TYP.	
b2	5.20	5.35	5.50	0.205	0.211	0.217
C	0.45	0.52	0.58	0.018	0.020	0.023
C1	0.45	0.52	0.58	0.018	0.020	0.023
D	5.40	5.57	6.20	0.213	0.219	0.244
D1	4.57	4.77	4.97	0.180	0.188	0.196
E	6.35	6.58	6.80	0.250	0.259	0.268
e		2.28 BSC.			0.090 BSC.	
e1		4.57 BSC.			0.180 BSC.	
H	9.00	9.70	10.40	0.354	0.382	0.409
L	0.51	-	-	0.020	-	-
L1	0.64	0.83	1.02	0.025	0.033	0.040
L2	0.88	-	1.27	0.035	-	0.050

Part Marking Information and Packing: TO-252

Laser Marking