Halogen-Free Product

Advanced Power Electronics Corp.

P-CHANNEL ENHANCEMENT MODE

POWER MOSFET

▼ **Low Gate Charge**

▼ **Simple Drive Requirement**

▼ **Fast Switching Characteristic**

▼ **RoHS Compliant & Halogen-Free**
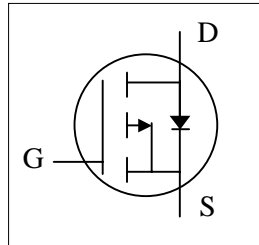
BV_{DSS}	-30V
$R_{DS(ON)}$	50mΩ
I_D	- 20A

G D S TO-252(H)

G D S TO-251(J)

Description

Advanced Power MOSFETs utilized advanced processing techniques to achieve the lowest possible on-resistance, extremely efficient and cost-effectiveness device.

The TO-252/TO-251 package is widely used for commercial-industrial application.
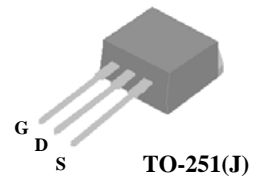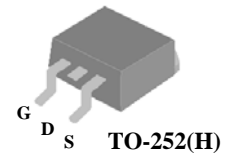
Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	- 30	V
V_{GS}	Gate-Source Voltage	$\pm$20	V
I_D@T_C=25℃	Continuous Drain Current	- 20	A
I_D@T_C=100℃	Continuous Drain Current	-13	A
I_{DM}	Pulsed Drain Current[1]	-60	A
P_D@T_C=25℃	Total Power Dissipation	12.5	W
	Linear Derating Factor	0.1	W/℃
T_{STG}	Storage Temperature Range	-55 to 150	℃
T_J	Operating Junction Temperature Range	-55 to 150	℃

Thermal Data

Symbol	Parameter	Value	Units
Rthj-c	Maximum Thermal Resistance, Junction-case	10	℃/W
Rthj-a	Maximum Thermal Resistance, Junction-ambient (PCB mount)[3]	62.5	℃/W
Rthj-a	Maximum Thermal Resistance, Junction-ambient	110	℃/W

Data and specifications subject to change without notice

Electrical Characteristics@T_j=25°C(unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V, I_D=-250uA	-30	-	-	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance[2]	V_{GS}=-10V, I_D=-10A	-	-	50	mΩ
		V_{GS}=-4.5V, I_D=-5A	-	-	90	mΩ
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D=-250uA	-1	-	-3	V
g_{fs}	Forward Transconductance	V_{DS}=-10V, I_D=-10A	-	10	-	S
I_{DSS}	Drain-Source Leakage Current	V_{DS}=-30V, V_{GS}=0V	-	-	-1	uA
	Drain-Source Leakage Current (T_j=125°C)	V_{DS}=-24V, V_{GS}=0V	-	-	-250	uA
I_{GSS}	Gate-Source Leakage	V_{GS}=± 20V, V_{DS}=0V	-	-	±100	nA
Q_g	Total Gate Charge[2]	I_D=-10A	-	8	16	nC
Q_{gs}	Gate-Source Charge	V_{DS}=-24V	-	1.6	-	nC
Q_{gd}	Gate-Drain ("Miller") Charge	V_{GS}=-4.5V	-	4.3	-	nC
$t_{d(on)}$	Turn-on Delay Time[2]	V_{DS}=-15V	-	6.3	-	ns
t_r	Rise Time	I_D=-10A	-	46	-	ns
$t_{d(off)}$	Turn-off Delay Time	R_G=3.3Ω,V_{GS}=-10V	-	20	-	ns
t_f	Fall Time	R_D=1.5Ω	-	7.4	-	ns
C_{iss}	Input Capacitance	V_{GS}=0V	-	570	740	pF
C_{oss}	Output Capacitance	V_{DS}=-25V	-	80	-	pF
C_{rss}	Reverse Transfer Capacitance	f=1.0MHz	-	75	-	pF

Source-Drain Diode

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
V_{SD}	Forward On Voltage[2]	I_S=-5A, V_{GS}=0V	-	-	-1.3	V
t_{rr}	Reverse Recovery Time[2]	I_S=-10A, V_{GS}=0V,	-	18	-	ns
Q_{rr}	Reverse Recovery Charge	dI/dt=-100A/µs	-	10	-	nC

Notes:

1.Pulse width limited by Max. junction temperature.

2.Pulse test

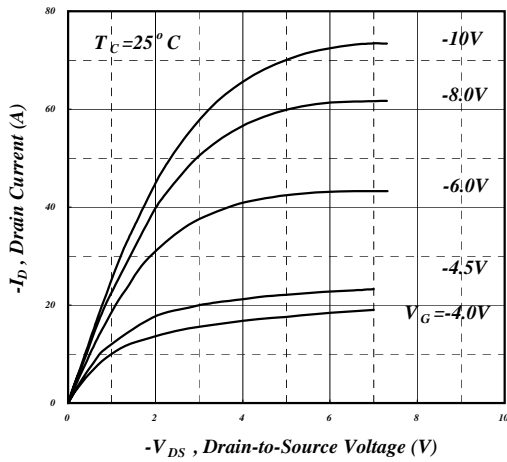3.Surface mounted on 1 in[2] copper pad of FR4 board

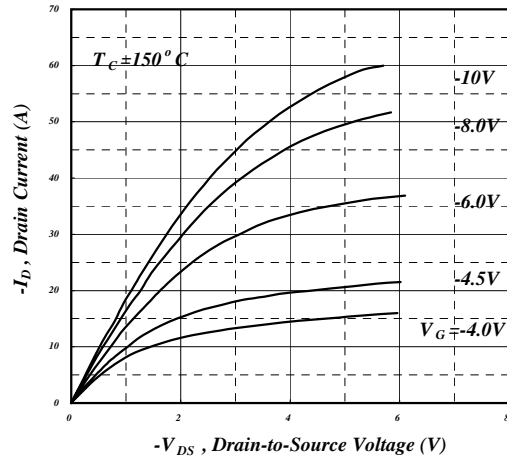**Fig 1. Typical Output Characteristics**
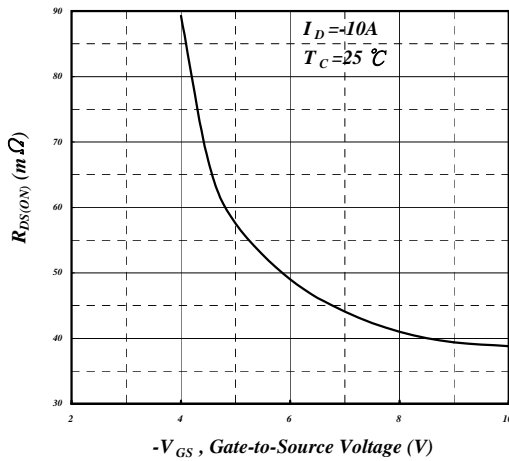

Fig 2. Typical Output Characteristics

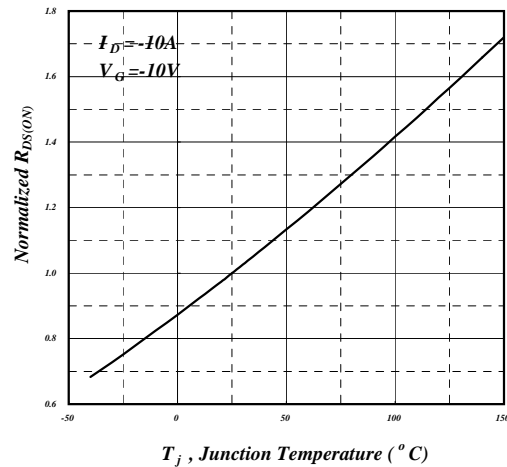**Fig 3. On-Resistance v.s. Gate Voltage**

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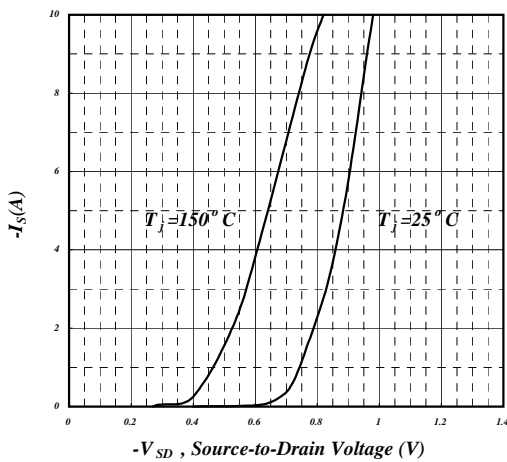v.s. Junction Temperature**
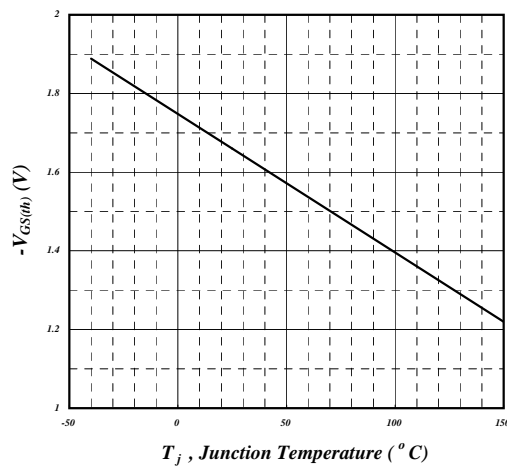

**Fig5. Forward Characteristic of
Reverse Diode**
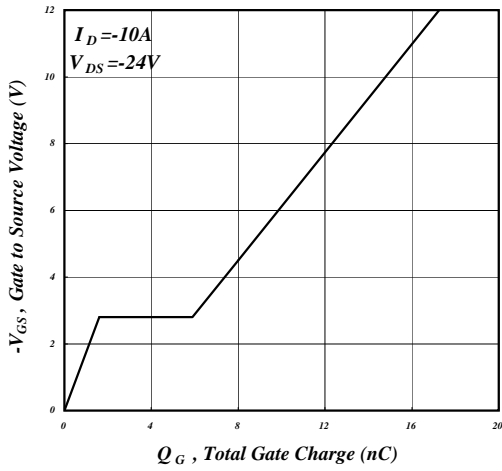

**Fig 6. Gate Threshold Voltage v.s.
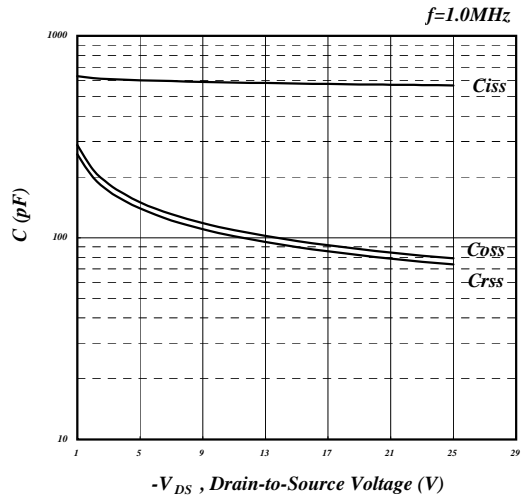Junction Temperature**

Fig 7. Gate Charge Characteristics

Fig 8. Typical Capacitance Characteristics
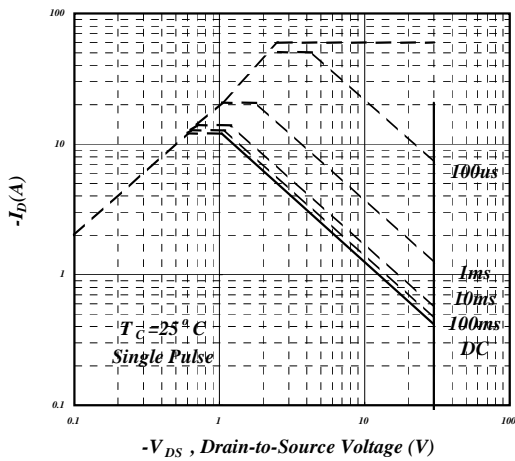

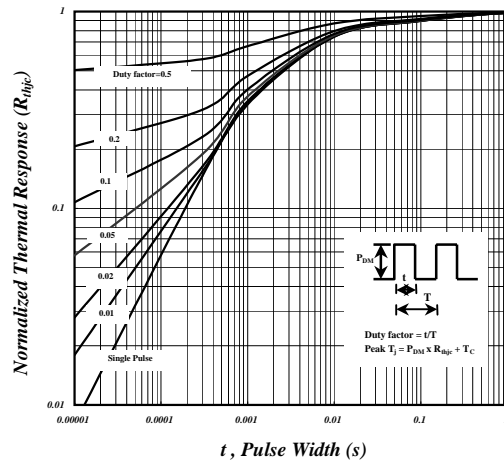**Fig 9. Maximum Safe Operating Area**
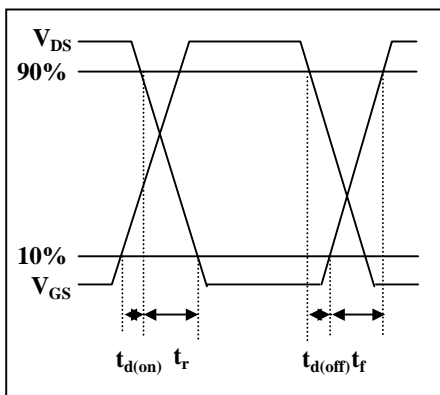

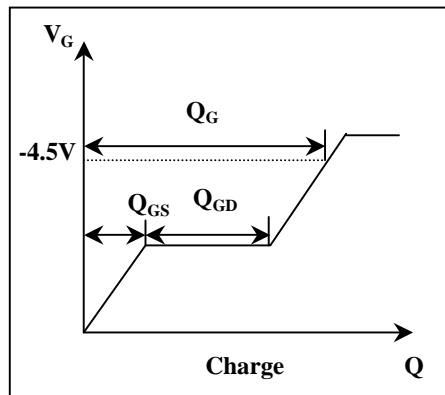**Fig 10. Effective Transient Thermal Impedance**

Fig 11. Switching Time Waveform

Fig 12. Gate Charge Waveform