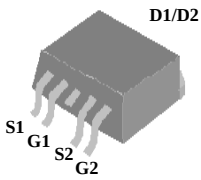
AP4525GEH-A

RoHS-compliant Product

Advanced Power Electronics Corp.

N AND P-CHANNEL ENHANCEMENT MODE POWER MOSFET

- ▼ **Simple Drive Requirement**
- ▼ **Good Thermal Performance**
- ▼ **Fast Switching Performance**

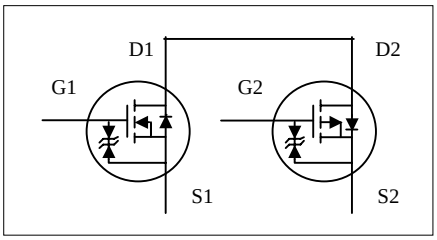


TO-252-4L

N-CH	BV_{DSS}	40V
	$R_{DS(ON)}$	26mΩ
	I_D	8.3A
P-CH	BV_{DSS}	-40V
	$R_{DS(ON)}$	40mΩ
	I_D	-7A

Description

The Advanced Power MOSFETs from APEC provide the designer with the best combination of fast switching, ruggedized device design, low on-resistance and cost-effectiveness.



Absolute Maximum Ratings

Symbol	Parameter	Rating		Units
		N-channel	P-channel	
V_{DS}	Drain-Source Voltage	40	-40	V
V_{GS}	Gate-Source Voltage	±16	±16	V
I_D@T_A=25℃	Continuous Drain Current[3]	8.3	-7.0	A
I_D@T_A=70℃	Continuous Drain Current[3]	6.6	-5.6	A
I_{DM}	Pulsed Drain Current[1]	50	-50	A
P_D@T_A=25℃	Total Power Dissipation	3.125		W
	Linear Derating Factor	0.025		W/℃
T_{STG}	Storage Temperature Range	-55 to 150		℃
T_J	Operating Junction Temperature Range	-55 to 150		℃

Thermal Data

Symbol	Parameter		Value	Unit
Rthj-c	Thermal Resistance Junction-case	Max.	8	℃/W
Rthj-a	Thermal Resistance Junction-ambient[3]	Max.	40	℃/W

N-CH 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	40	-	-	V
$\Delta BV_{DSS}/\Delta T_j$	Breakdown Voltage Temperature Coefficient	Reference to 25℃, I_D=1mA	-	0.03	-	V/℃
$R_{DS(ON)}$	Static Drain-Source On-Resistance[2]	V_{GS}=10V, I_D=6A	-	-	26	mΩ
		V_{GS}=4.5V, I_D=4A	-	-	32	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=6A	-	6	-	S
I_{DSS}	Drain-Source Leakage Current (T_j=25°C)	V_{DS}=40V, V_{GS}=0V	-	-	1	uA
	Drain-Source Leakage Current (T_j=70°C)	V_{DS}=32V, V_{GS}=0V	-	-	25	uA
I_{GSS}	Gate-Source Leakage	V_{GS}=±16V	-	-	±30	uA
Q_g	Total Gate Charge[2]	I_D=6A	-	9	14	nC
Q_{gs}	Gate-Source Charge	V_{DS}=20V	-	1.5	-	nC
Q_{gd}	Gate-Drain ("Miller") Charge	V_{GS}=4.5V	-	4	-	nC
$t_{d(on)}$	Turn-on Delay Time[2]	V_{DS}=20V	-	7	-	ns
t_r	Rise Time	I_D=6A	-	20	-	ns
$t_{d(off)}$	Turn-off Delay Time	R_G=3Ω,V_{GS}=10V	-	20	-	ns
t_f	Fall Time	R_D=3.3Ω	-	4	-	ns
C_{iss}	Input Capacitance	V_{GS}=0V	-	580	930	pF
C_{oss}	Output Capacitance	V_{DS}=25V	-	100	-	pF
C_{rss}	Reverse Transfer Capacitance	f=1.0MHz	-	70	-	pF
R_g	Gate Resistance	f=1.0MHz	-	2	3	Ω

Source-Drain Diode

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
V_{SD}	Forward On Voltage[2]	I_S=15A, V_{GS}=0V	-	-	1.3	V
t_{rr}	Reverse Recovery Time[2]	I_S=6A, V_{GS}=0V	-	20	-	ns
Q_{rr}	Reverse Recovery Charge	dI/dt=100A/μs	-	15	-	nC

P-CH 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	-40	-	-	V
$\Delta BV_{DSS}/\Delta T_j$	Breakdown Voltage Temperature Coefficient	Reference to 25℃,I_D=-1mA	-	-0.03	-	V/℃
$R_{DS(ON)}$	Static Drain-Source On-Resistance[2]	V_{GS}=-10V, I_D=-5A	-	-	40	mΩ
		V_{GS}=-4.5V, I_D=-3A	-	-	60	mΩ
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D=-250uA	-0.8	-	-2.5	V
g_{fs}	Forward Transconductance	V_{DS}=-10V, I_D=-5A	-	5	-	S
I_{DSS}	Drain-Source Leakage Current (T_j=25°C)	V_{DS}=-40V, V_{GS}=0V	-	-	-1	uA
	Drain-Source Leakage Current (T_j=70°C)	V_{DS}=-32V, V_{GS}=0V	-	-	-25	uA
I_{GSS}	Gate-Source Leakage	V_{GS}=±16V	-	-	±30	uA
Q_g	Total Gate Charge[2]	I_D=-5A	-	9	24	nC
Q_{gs}	Gate-Source Charge	V_{DS}=-20V	-	2	-	nC
Q_{gd}	Gate-Drain ("Miller") Charge	V_{GS}=-4.5V	-	5	-	nC
$t_{d(on)}$	Turn-on Delay Time[2]	V_{DS}=-20V	-	8.5	-	ns
t_r	Rise Time	I_D=-5A	-	15	-	ns
$t_{d(off)}$	Turn-off Delay Time	R_G=3Ω,V_{GS}=-10V	-	27	-	ns
t_f	Fall Time	R_D=4Ω	-	25	-	ns
C_{iss}	Input Capacitance	V_{GS}=0V	-	760	1220	pF
C_{oss}	Output Capacitance	V_{DS}=-25V	-	150	-	pF
C_{rss}	Reverse Transfer Capacitance	f=1.0MHz	-	105	-	pF
R_g	Gate Resistance	f=1.0MHz	-	6	9	Ω

Source-Drain Diode

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
V_{SD}	Forward On Voltage[2]	I_S=-12A, V_{GS}=0V	-	-	-1.3	V
t_{rr}	Reverse Recovery Time[2]	I_S=-5A, V_{GS}=0V	-	20	-	ns
Q_{rr}	Reverse Recovery Charge	dI/dt=-100A/μs	-	16	-	nC

Notes:

1.Pulse width limited by Max. junction temperature.

2.Pulse test.

3.N-CH , P-CH are same , mounted on 2oz FR4 board t ≦10s.

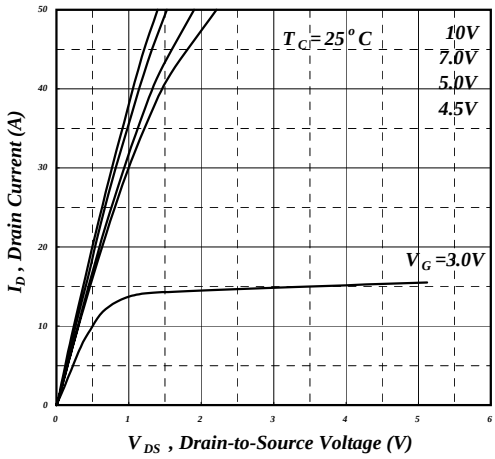


Fig 1. Typical Output Characteristics

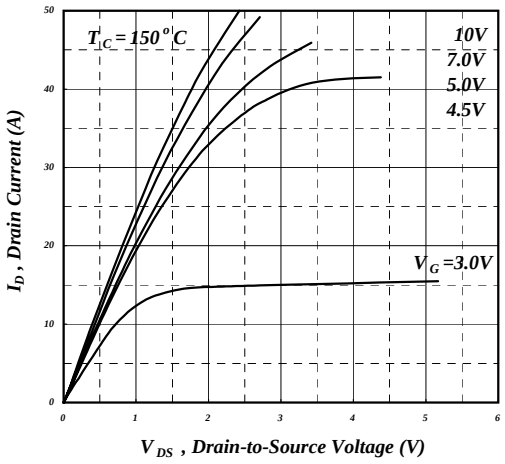


Fig 2. Typical Output Characteristics

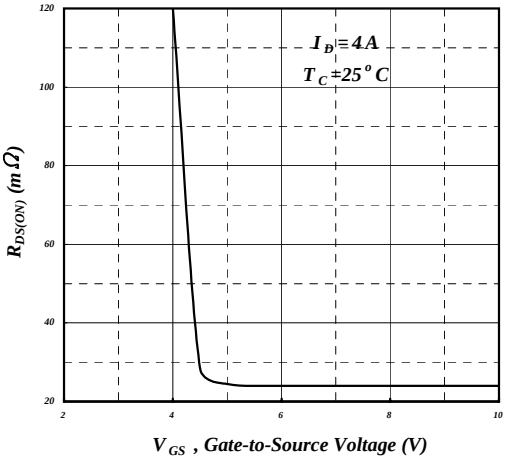


Fig 3. On-Resistance v.s. Gate Voltage

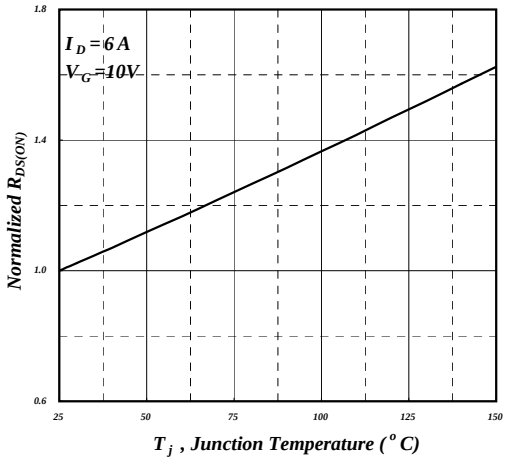


Fig 4. Normalized On-Resistance v.s. Junction Temperature

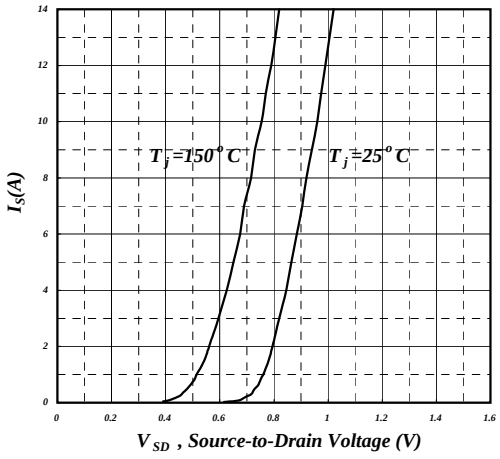


Fig 5. Forward Characteristic of Reverse Diode

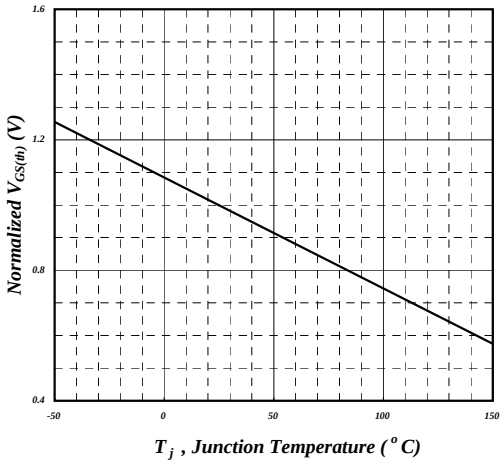


Fig 6. Gate Threshold Voltage v.s. Junction Temperature

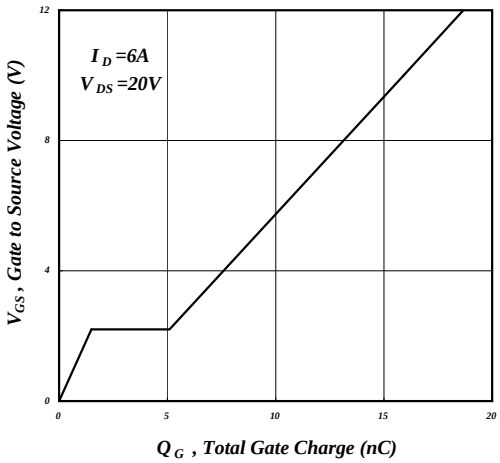


Fig 7. Gate Charge Characteristics

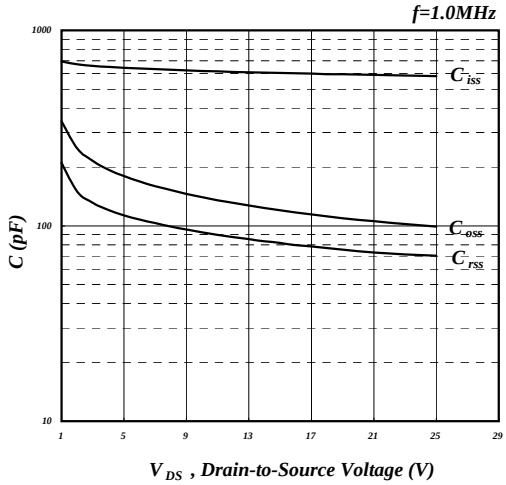


Fig 8. Typical Capacitance Characteristics

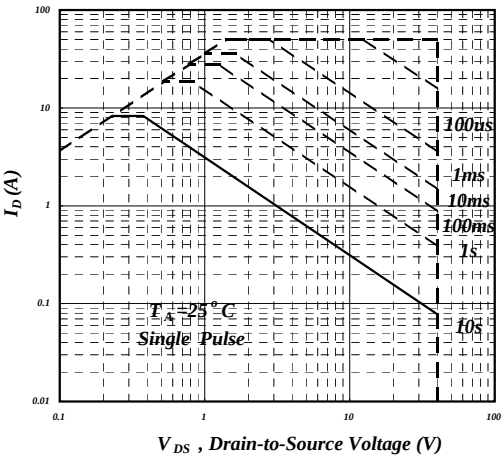


Fig 9. Maximum Safe Operating Area

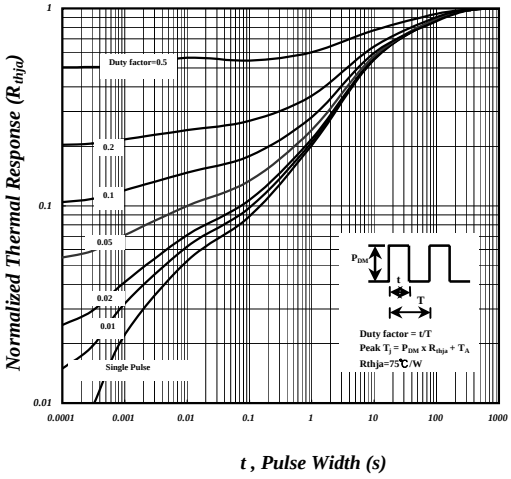


Fig 10. Effective Transient Thermal Impedance

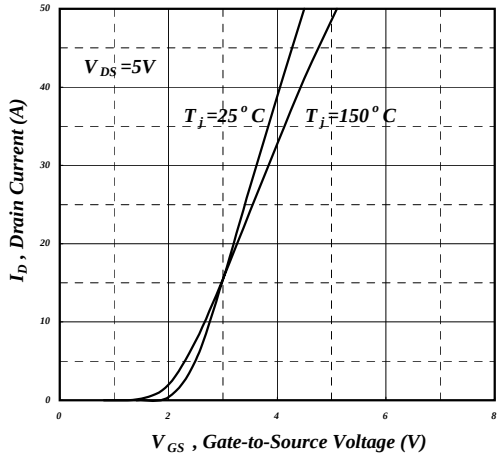


Fig 11. Transfer Characteristics

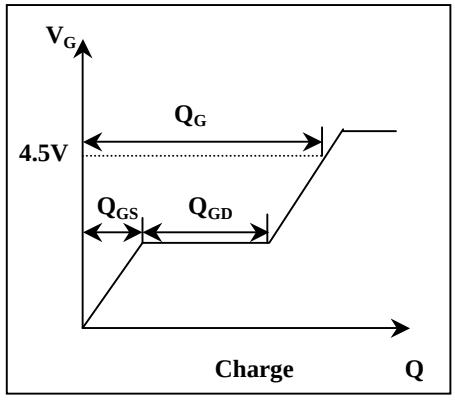


Fig 12. Gate Charge Waveform

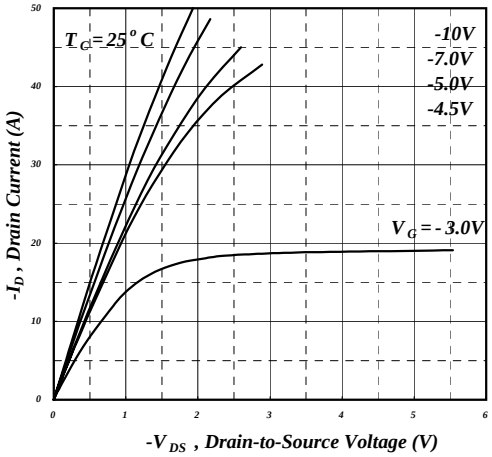


Fig 1. Typical Output Characteristics

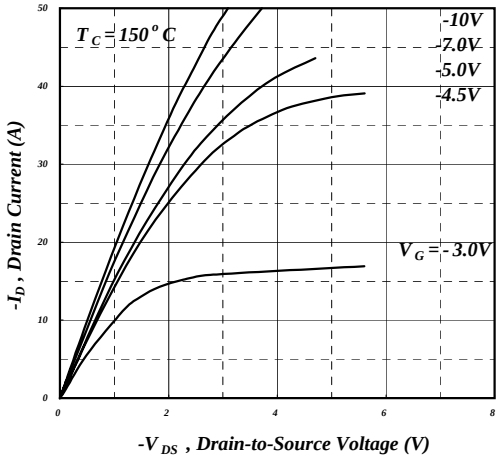


Fig 2. Typical Output Characteristics

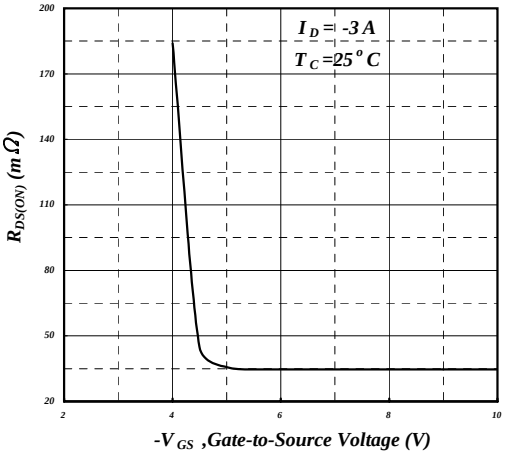


Fig 3. On-Resistance v.s. Gate Voltage

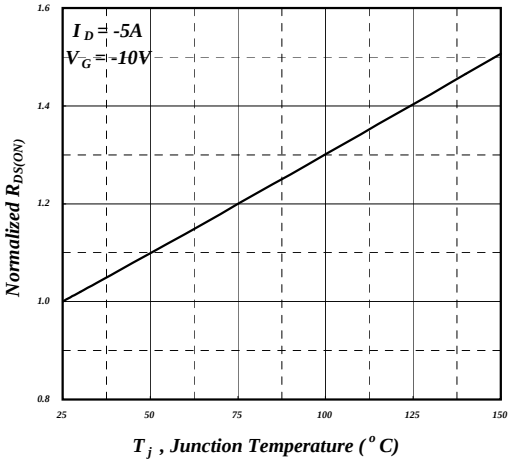


Fig 4. Normalized On-Resistance v.s. Junction Temperature

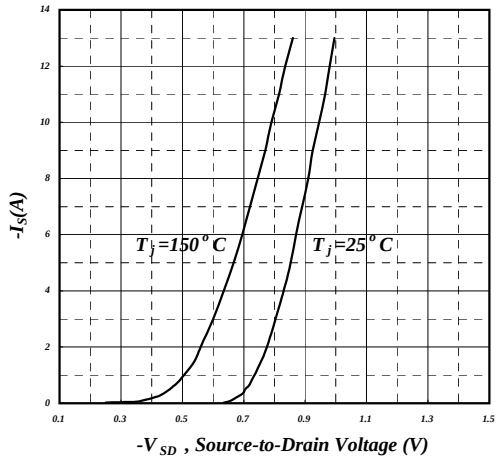


Fig 5. Forward Characteristic of Reverse Diode

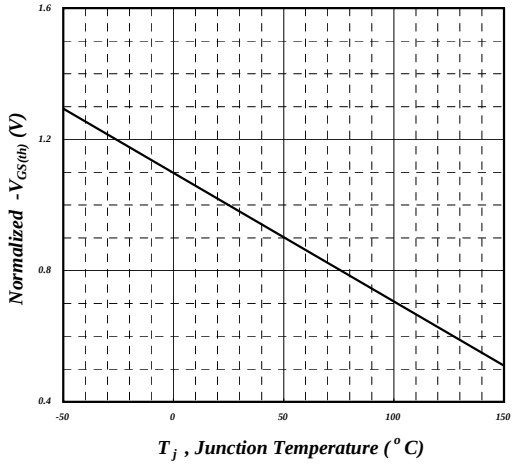


Fig 6. Gate Threshold Voltage v.s. Junction Temperature

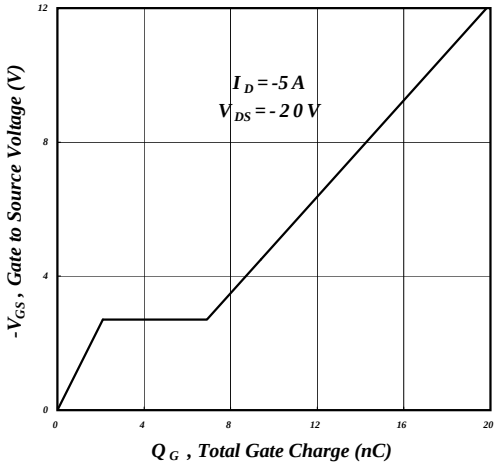
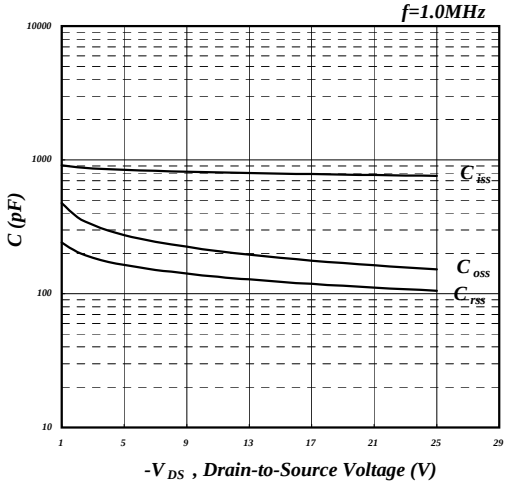


Fig 7. Gate Charge Characteristics



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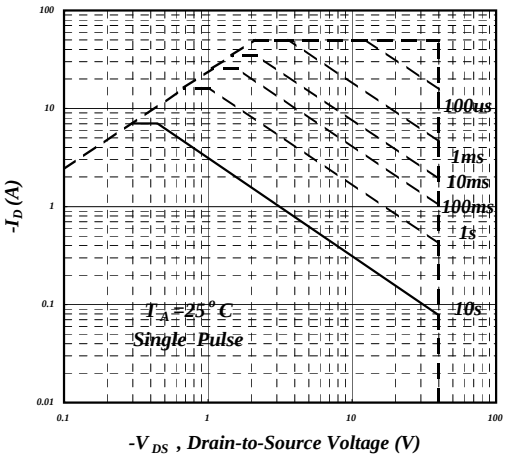


Fig 9. Maximum Safe Operating Area

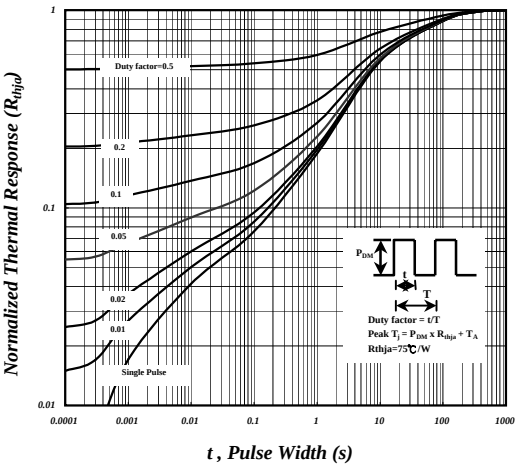


Fig 10. Effective Transient Thermal Impedance

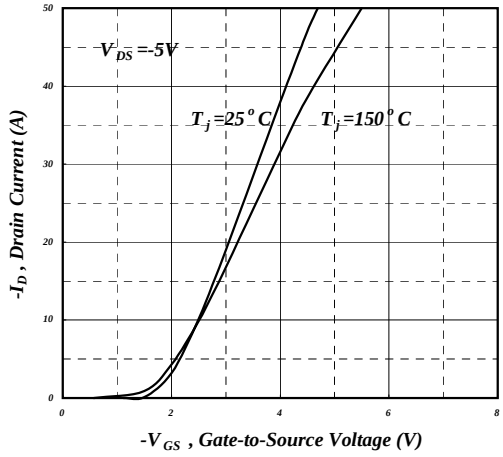


Fig 11. Transfer Characteristics

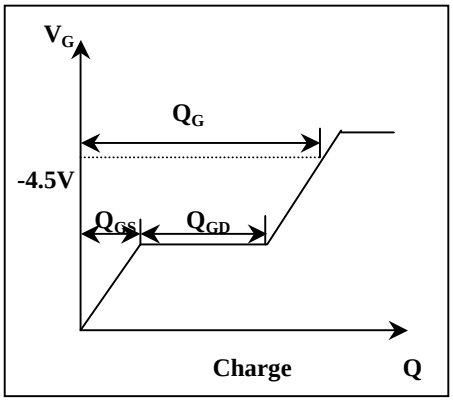
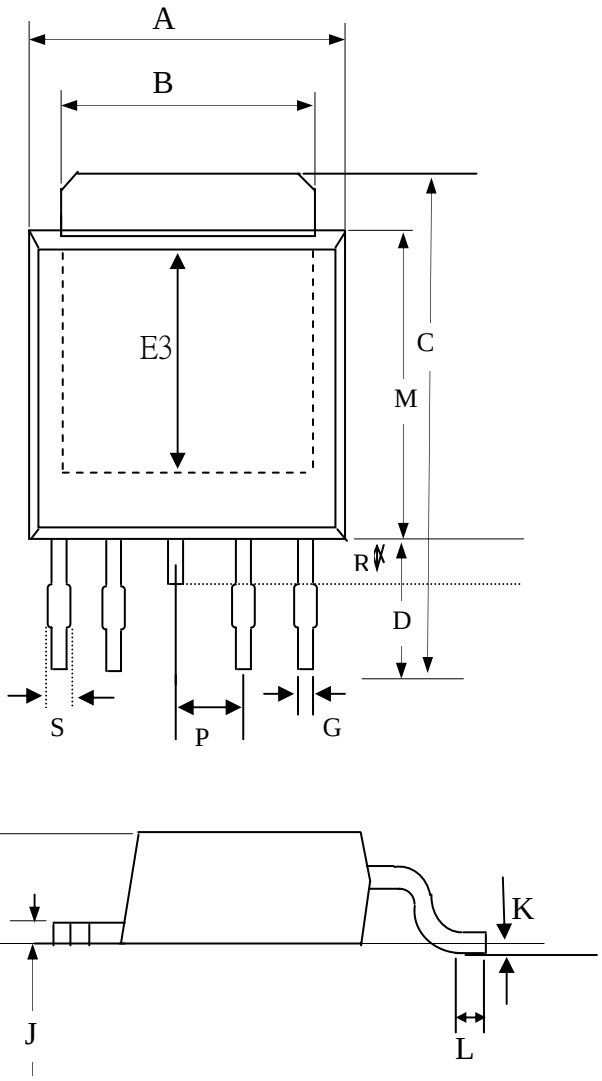


Fig 12. Gate Charge Waveform

Package Outline : TO-252(4L)



SYMBOLS	Millimeters		
	MIN	NOM	MAX
A	6.40	6.6	6.80
B	5.2	5.35	5.50
C	9.40	9.80	10.20
D	2.40	2.70	3.00
P		1.27 REF.	
S	0.50	0.65	0.80
E3	3.50	4.00	4.50
R	0.80	1.00	1.20
G	0.40	0.50	0.60
H	2.20	2.30	2.40
J	0.45	0.50	0.55
K	0.00	0.075	0.15
L	0.90	1.20	1.50
M	5.40	5.60	5.80

1.All Dimensions Are in Millimeters.

2.Dimension Does Not Include Mold Protrusions.

Part Marking Information & Packing : TO-252(4L)