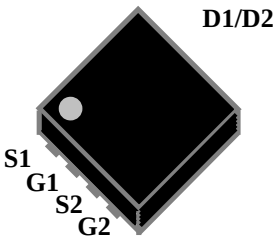
Complementary N and P-channel Enhancement-mode Power MOSFETs

Simple Drive Requirement

Fast Switching Performance

Good Thermal Performance

RoHS-compliant, halogen-free



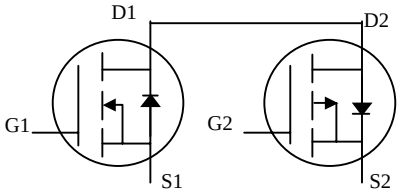
PMPAK® 3x3

N-CH	BV_{DSS}	30V
	$R_{DS(ON)}$	30mΩ
	I_D	7.3A
P-CH	BV_{DSS}	-30V
	$R_{DS(ON)}$	60mΩ
	I_D	-5.3A

Description

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

The AP4537GYT-HF-3 is in the PMPAK®3x3 package, which is specially designed for applications requiring good thermal and electrical performance in a small footprint with a backside heat sink and a low package profile.



Absolute Maximum Ratings

Symbol	Parameter	Rating		Units
		N-channel	P-channel	
V_{DS}	Drain-Source Voltage	30	-30	V
V_{GS}	Gate-Source Voltage	±20	±20	V
I_D at T_A=25°C	Continuous Drain Current[3]	7.3	-5.3	A
I_D at T_A=70°C	Continuous Drain Current[3]	5.8	-4.2	A
I_{DM}	Pulsed Drain Current[1]	28	-20	A
P_D at T_A=25°C	Total Power Dissipation	2.5		W
	Linear Derating Factor	0.02		W/°C
T_{STG}	Storage Temperature Range	-55 to 150		°C
T_J	Operating Junction Temperature Range	-55 to 150		°C

Thermal Data

Symbol	Parameter		Value	Unit
Rthj-c	Thermal Resistance Junction-case	Max.	10	°C/W
Rthj-a	Thermal Resistance Junction-ambient[3]	Max.	50	°C/W

Ordering Information

AP4537GYT-HF-3TR RoHS-compliant halogen-free PMPAK®3x3, shipped on tape and reel (3000 pcs/reel)

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N-channel Electrical Specifications at 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=4A	-	-	30	mΩ
		V_{GS}=4.5V, I_D=3A	-	-	48	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=4A	-	8.5	-	S
I_{DSS}	Drain-Source Leakage Current	V_{DS}=24V, V_{GS}=0V	-	-	1	uA
I_{GSS}	Gate-Source Leakage	V_{GS}=±20V, V_{DS}=0V	-	-	±100	nA
Q_g	Total Gate Charge[2]	I_D=4A	-	4.5	7.2	nC
Q_{gs}	Gate-Source Charge	V_{DS}=15V	-	1	-	nC
Q_{gd}	Gate-Drain ("Miller") Charge	V_{GS}=4.5V	-	2.5	-	nC
$t_{d(on)}$	Turn-on Delay Time[2]	V_{DS}=15V	-	8	-	ns
t_r	Rise Time	I_D=1A	-	9	-	ns
$t_{d(off)}$	Turn-off Delay Time	R_G=3.3Ω	-	16	-	ns
t_f	Fall Time	V_{GS}=10V	-	3	-	ns
C_{iss}	Input Capacitance	V_{GS}=0V	-	250	400	pF
C_{oss}	Output Capacitance	V_{DS}=25V	-	55	-	pF
C_{rss}	Reverse Transfer Capacitance	f=1.0MHz	-	50	-	pF

Source-Drain Diode

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
V_{SD}	Forward On Voltage[2]	I_S=1.2A, V_{GS}=0V	-	-	1.2	V
t_{rr}	Reverse Recovery Time[2]	I_S=4A, V_{GS}=0V	-	15	-	ns
Q_{rr}	Reverse Recovery Charge	dI/dt=100A/μs	-	7	-	nC

Notes:

1.Pulse width limited by maximum junction temperature.

2.Pulse width≤300us, duty cycle≤ 2%.

3.Surface mounted on 1 in^2 copper pad of FR4 board , t <10sec ; 90°C at steady state.

THIS PRODUCT IS SENSITIVE TO ELECTROSTATIC DISCHARGE, PLEASE HANDLE WITH CAUTION.

USE OF THIS PRODUCT AS A CRITICAL COMPONENT IN LIFE SUPPORT OR OTHER SIMILAR SYSTEMS IS NOT AUTHORIZED.

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P-channel Electrical Specifications at T_j=25°C (unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
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=-4A	-	-	60	mΩ
		V_{GS}=-4.5V, I_D=-3A	-	-	80	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=-4A	-	9	-	S
I_{DSS}	Drain-Source Leakage Current	V_{DS}=-24V, V_{GS}=0V	-	-	-1	uA
I_{GSS}	Gate-Source Leakage	V_{GS}=±20V, V_{DS}=0V	-	-	±100	nA
Q_g	Total Gate Charge[2]	I_D=-4A	-	7	11.2	nC
Q_{gs}	Gate-Source Charge	V_{DS}=-15V	-	1.5	-	nC
Q_{gd}	Gate-Drain ("Miller") Charge	V_{GS}=-4.5V	-	3.5	-	nC
$t_{d(on)}$	Turn-on Delay Time[2]	V_{DS}=-15V	-	10	-	ns
t_r	Rise Time	I_D=-1A	-	11	-	ns
$t_{d(off)}$	Turn-off Delay Time	R_G=3.3Ω	-	22	-	ns
t_f	Fall Time	V_{GS}=-10V	-	9	-	ns
C_{iss}	Input Capacitance	V_{GS}=0V	-	570	910	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.	Unit
V_{SD}	Forward On Voltage[2]	I_S=-1.2A, V_{GS}=0V	-	-	-1.2	V
t_{rr}	Reverse Recovery Time[2]	I_S=-4A, V_{GS}=0V	-	19	-	ns
Q_{rr}	Reverse Recovery Charge	dI/dt=-100A/μs	-	13	-	nC

Notes:

1.Pulse width limited by maximum junction temperature.

2.Pulse width≤300us, duty cycle≤ 2%.

3.Surface mounted on 1 in^2 copper pad of FR4 board , t ≤10sec ; 90°C at steady state.

THIS PRODUCT IS SENSITIVE TO ELECTROSTATIC DISCHARGE, PLEASE HANDLE WITH CAUTION.

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Typical N-channel Electrical Characteristics

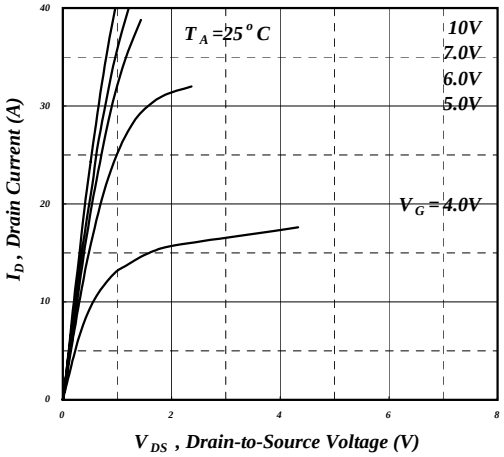

Fig 1. Typical Output Characteristics

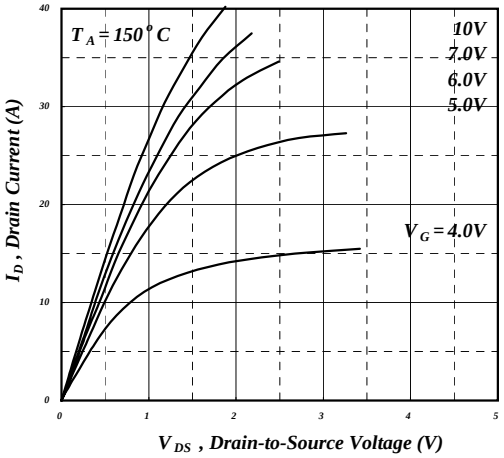

Fig 2. Typical Output Characteristics

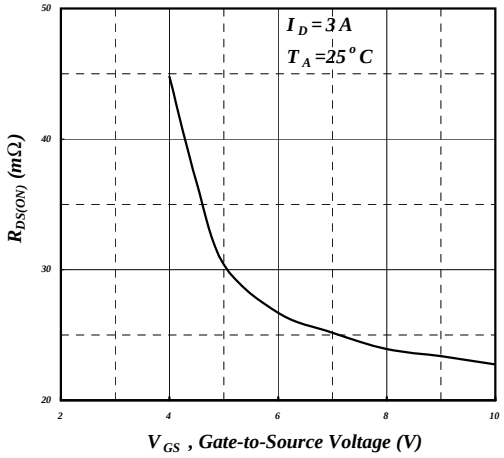

Fig 3. On-Resistance vs. Gate Voltage

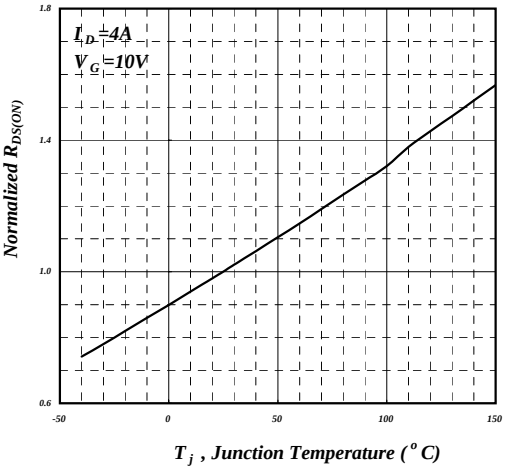

Fig 4. Normalized On-Resistance vs. Junction Temperature

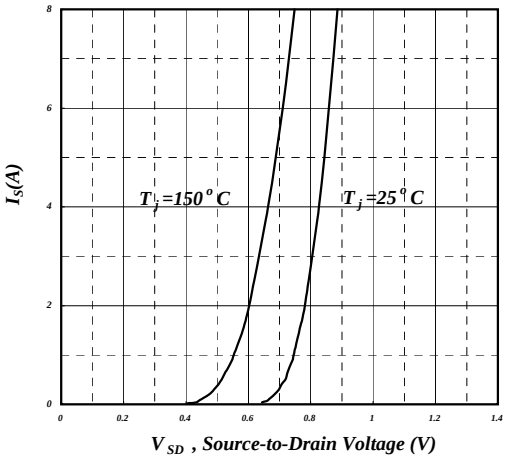

Fig 5. Forward Characteristic of Reverse Diode

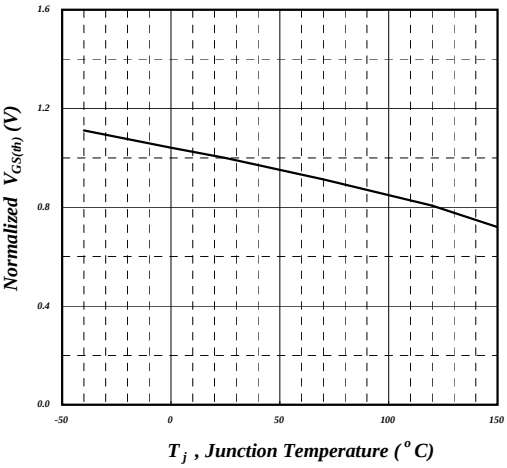

Fig 6. Gate Threshold Voltage vs. Junction Temperature

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Typical N-channel Electrical Characteristics (cont.)

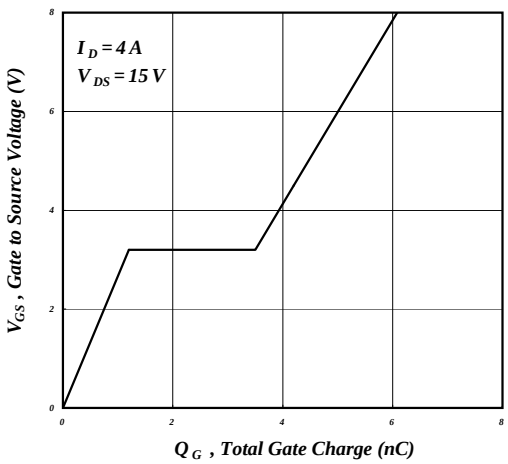

Fig 7. Gate Charge Characteristics

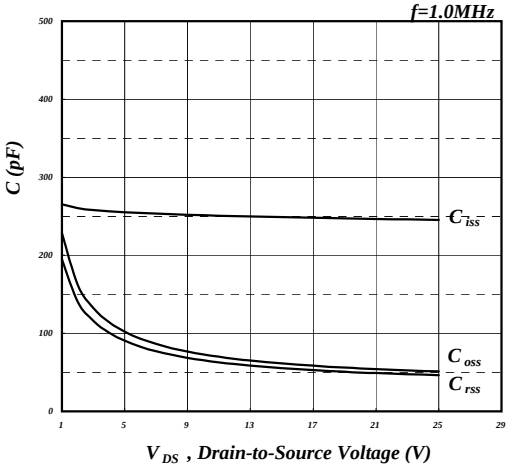

Fig 8. Typical Capacitance Characteristics

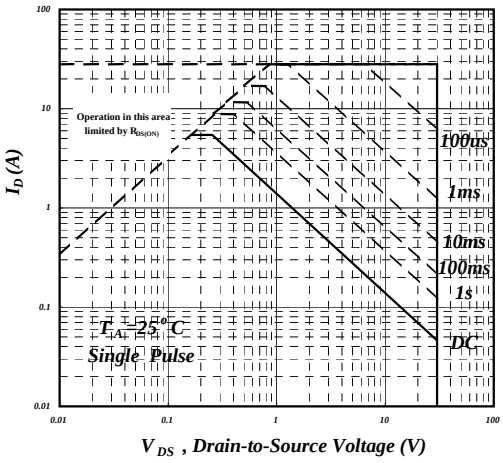

Fig 9. Maximum Safe Operating Area

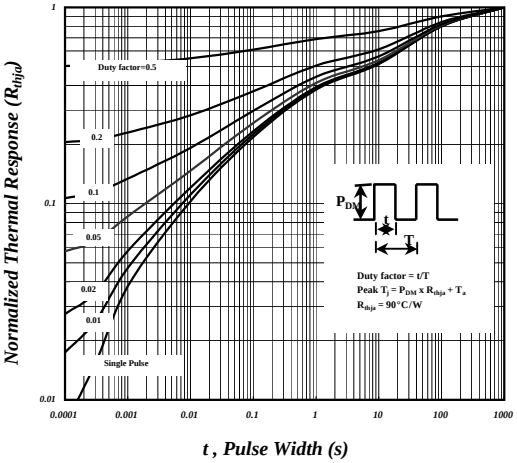

Fig 10. Effective Transient Thermal Impedance

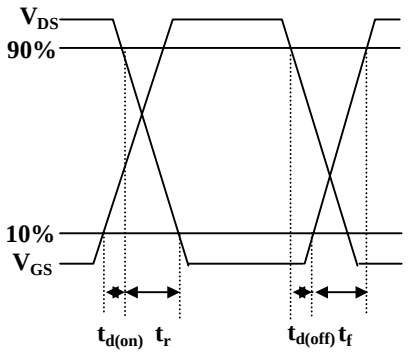

Fig 11. Switching Time Waveform

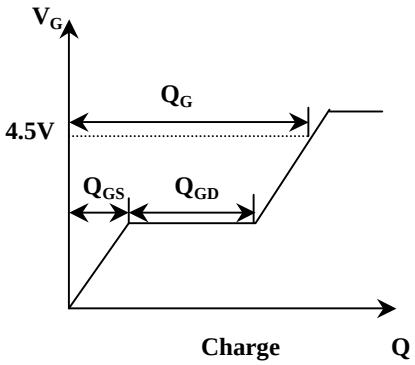

Fig 12. Gate Charge Waveform

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Typical P-channel Electrical Characteristics

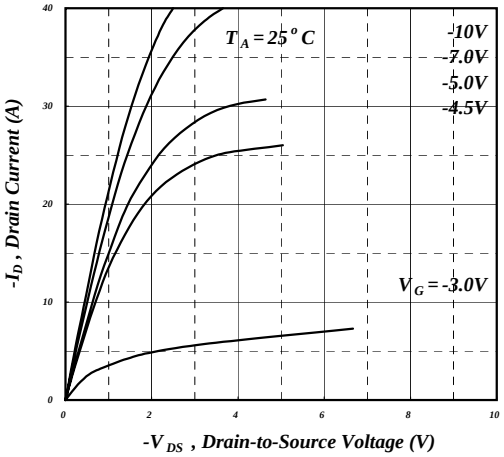

Fig 1. Typical Output Characteristics

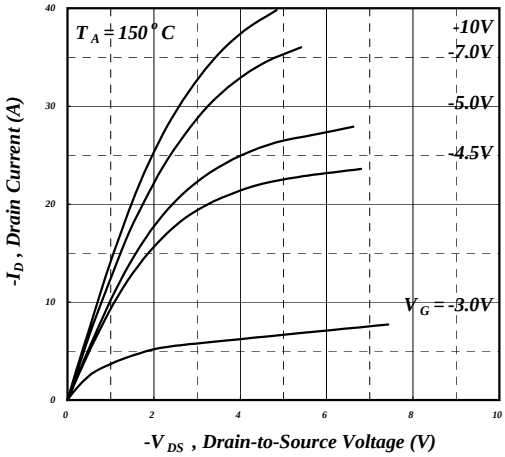

Fig 2. Typical Output Characteristics

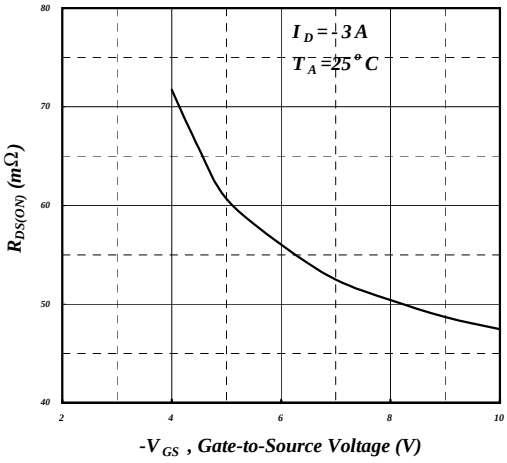

Fig 3. On-Resistance vs. Gate Voltage

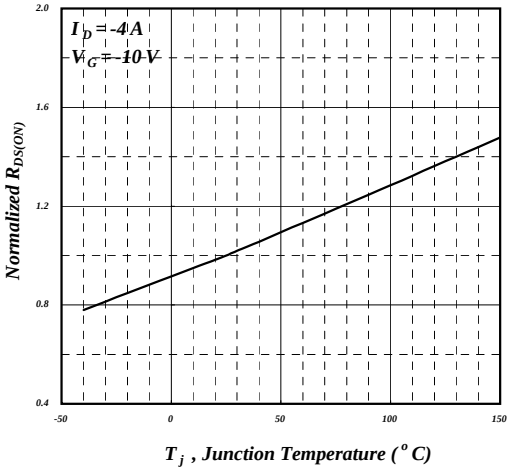

Fig 4. Normalized On-Resistance vs. Junction Temperature

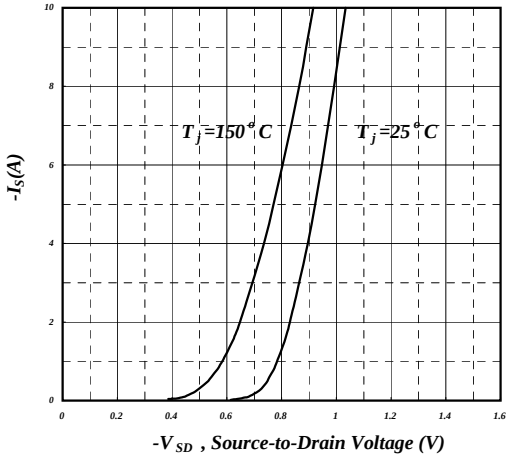

Fig 5. Forward Characteristic of Reverse Diode

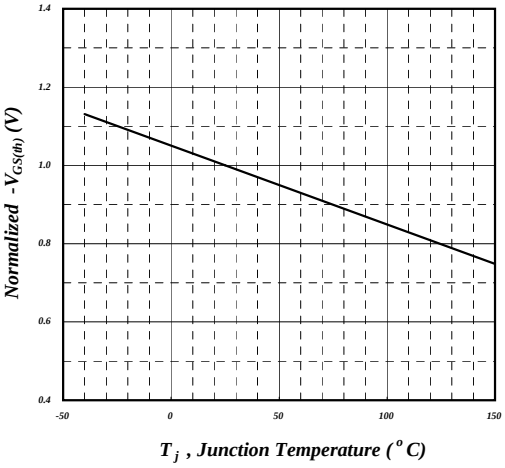

Fig 6. Gate Threshold Voltage vs. Junction Temperature

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Typical P-channel Electrical Characteristics (cont.)

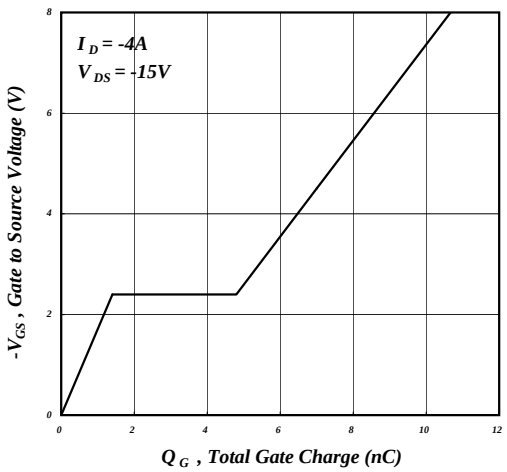

Fig 7. Gate Charge Characteristics

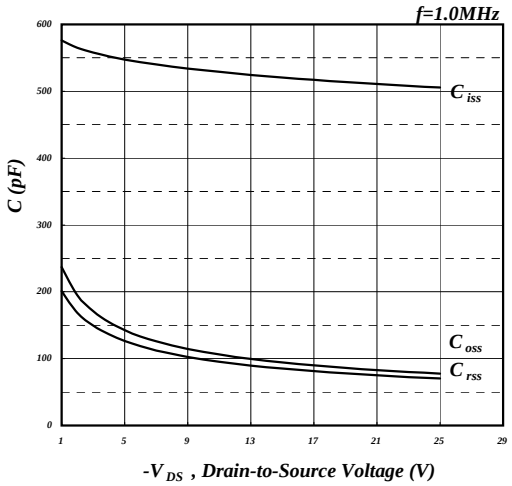

Fig 8. Typical Capacitance Characteristics

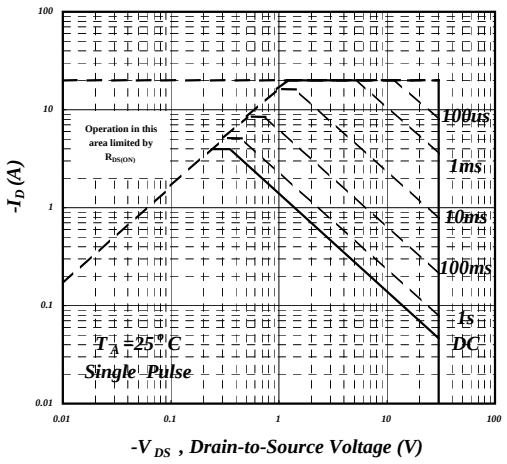

Fig 9. Maximum Safe Operating Area

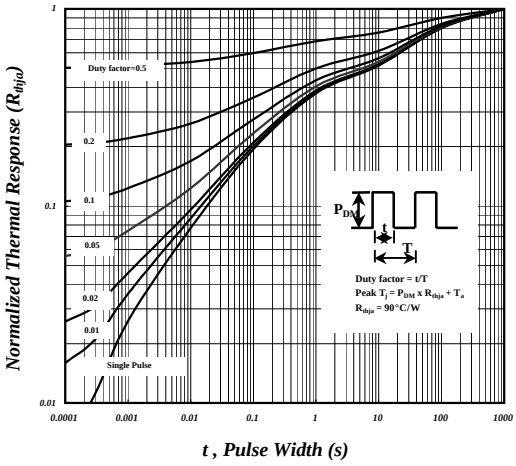

Fig 10. Effective Transient Thermal Impedance

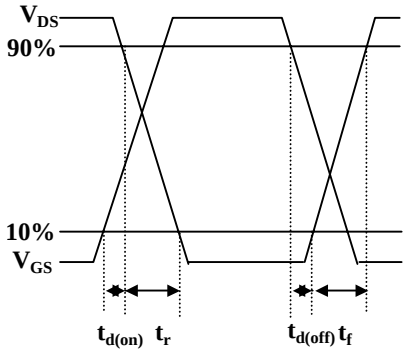

Fig 11. Switching Time Waveform

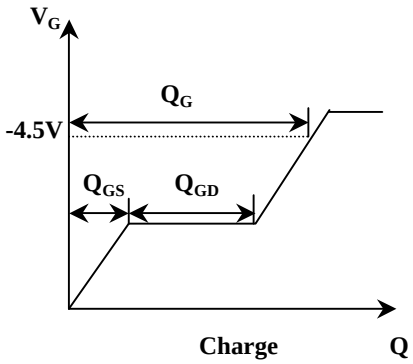

Fig 12. Gate Charge Waveform

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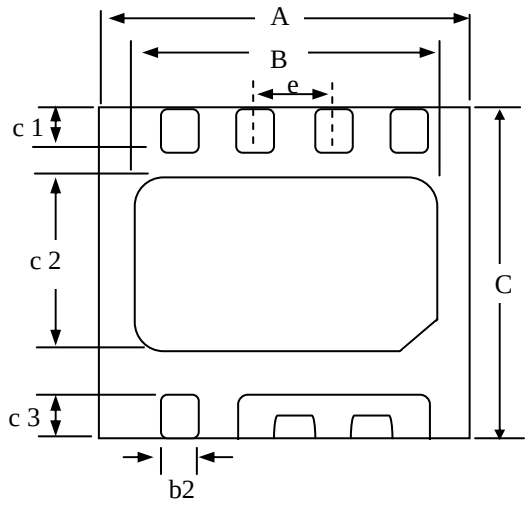
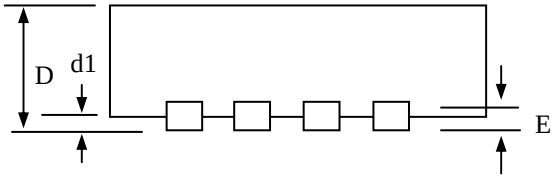
Package Dimensions: PMPAK®3x3

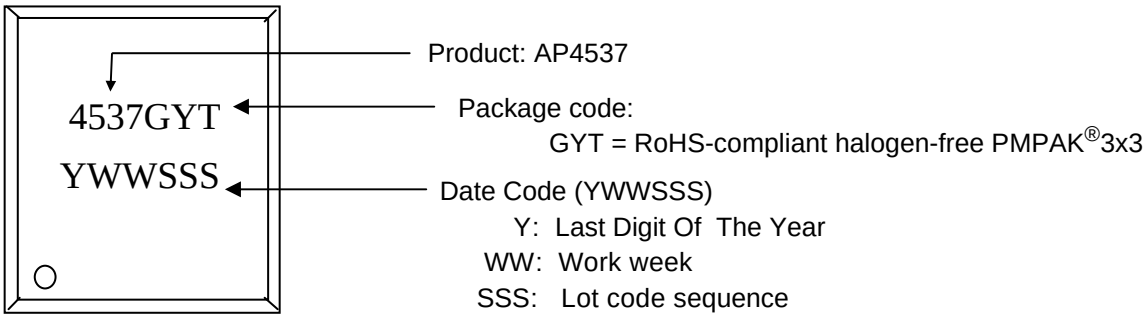


SYMBOLS	Millimeters		
	MIN	NOM	MAX
A	2.95	3.00	3.05
B	2.35	2.40	2.45
e	0.65 (ref.)		
b2	0.30	0.35	0.40
C	2.95	3.00	3.05
c1	0.37	0.42	0.47
c2	1.65	1.70	1.75
c3	0.37	0.42	0.47
D	0.80	0.85	0.95
d1	0.00	-	0.05
E	0.178	0.203	0.228



1. All dimensions are in millimeters.
2. Dimensions do not include mold protrusions.

Marking Information:



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