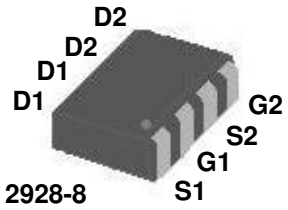
Complementary N and P-channel Enhancement-mode Power MOSFETs

Simple Drive Requirement

Low On-resistance

Fast Switching Performance

RoHS-compliant, halogen-free

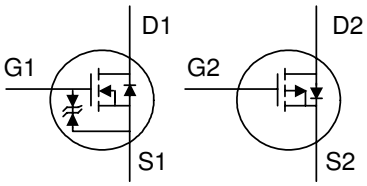


N-CH	BV_{DSS}	30V
	$R_{DS(ON)}$	20mΩ
	I_D	6.5A
P-CH	BV_{DSS}	-30V
	$R_{DS(ON)}$	45mΩ
	I_D	-4.5A

Description

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

The AP2530GY-HF-3 is in a 2928-8 J-lead package, which is used in commercial and industrial surface-mount applications where it offers improved on-resistance and thermal performance when compared with similar-sized traditional packages like the SOT-26.



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℃	Continuous Drain Current[3]	6.5	-4.5	A
I_D at T_A=70℃	Continuous Drain Current[3]	5.2	-3.6	A
I_{DM}	Pulsed Drain Current[1]	30	-20	A
P_D at T_A=25℃	Total Power Dissipation	1.38		W
	Linear Derating Factor	0.011		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-a	Maximum Thermal Resistance, Junction-ambient[3]	90	℃/W

Ordering Information

AP4501AGEY-HF-3TR : in RoHS-compliant, halogen-free 2928-8, shipped on tape and reel (3000pcs/reel)

N-channel Electrical Specifications at T_j=25℃ (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=6A	-	15.9	20	mΩ
		V_{GS}=4.5V, I_D=4A	-	22.4	30	mΩ
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D=250uA	1	1.43	3	V
g_{fs}	Forward Transconductance	V_{DS}=10V, I_D=6A	-	14	-	S
I_{DSS}	Drain-Source Leakage Current	V_{DS}=24V, V_{GS}=0V	-	-	10	uA
I_{GSS}	Gate-Source Leakage	V_{GS}=±20V, V_{DS}=0V	-	-	±30	uA
Q_g	Total Gate Charge	I_D=6A	-	7.2	11.5	nC
Q_{gs}	Gate-Source Charge	V_{DS}=15V	-	2.2	-	nC
Q_{gd}	Gate-Drain ("Miller") Charge	V_{GS}=4.5V	-	3.2	-	nC
$t_{d(on)}$	Turn-on Delay Time	V_{DS}=15V	-	8	-	ns
t_r	Rise Time	I_D=1A	-	6	-	ns
$t_{d(off)}$	Turn-off Delay Time	R_G=3.3Ω	-	18	-	ns
t_f	Fall Time	V_{GS}=10V	-	3	-	ns
C_{iss}	Input Capacitance	V_{GS}=0V	-	770	1230	pF
C_{oss}	Output Capacitance	V_{DS}=15V	-	80	-	pF
C_{rss}	Reverse Transfer Capacitance	f=1.0MHz	-	70	-	pF
R_g	Gate Resistance	f=1.0MHz	-	1.3	2.6	Ω

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	I_S=6A, V_{GS}=0V	-	13	-	ns
Q_{rr}	Reverse Recovery Charge	dI/dt=100A/μs	-	6	-	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; 210℃/W at steady state.

P-channel Electrical Specifications at T_j=25℃ (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	-	35	45	mΩ
		V_{GS}=-4.5V, I_D=-3A	-	55	72	mΩ
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D=-250uA	-1	-1.54	-3	V
g_{fs}	Forward Transconductance	V_{DS}=-10V, I_D=-4A	-	8	-	S
I_{DSS}	Drain-Source Leakage Current	V_{DS}=-24V, V_{GS}=0V	-	-	-10	uA
I_{GSS}	Gate-Source Leakage	V_{GS}=±20V, V_{DS}=0V	-	-	±100	nA
Q_g	Total Gate Charge	I_D=-4A	-	6	9.6	nC
Q_{gs}	Gate-Source Charge	V_{DS}=-15V	-	1.5	-	nC
Q_{gd}	Gate-Drain ("Miller") Charge	V_{GS}=-4.5V	-	2.5	-	nC
$t_{d(on)}$	Turn-on Delay Time	V_{DS}=-15V	-	7.5	-	ns
t_r	Rise Time	I_D=-1A	-	6	-	ns
$t_{d(off)}$	Turn-off Delay Time	R_G=3.3Ω	-	18	-	ns
t_f	Fall Time	V_{GS}=-10V	-	8	-	ns
C_{iss}	Input Capacitance	V_{GS}=0V	-	470	750	pF
C_{oss}	Output Capacitance	V_{DS}=-15V	-	100	-	pF
C_{rss}	Reverse Transfer Capacitance	f=1.0MHz	-	90	-	pF
R_g	Gate Resistance	f=1.0MHz	-	8	16	Ω

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	I_S=-4A, V_{GS}=0V	-	17	-	ns
Q_{rr}	Reverse Recovery Charge	dI/dt=-100A/μs	-	10	-	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; 210℃/W at steady state.

Typical N-channel Electrical Characteristics

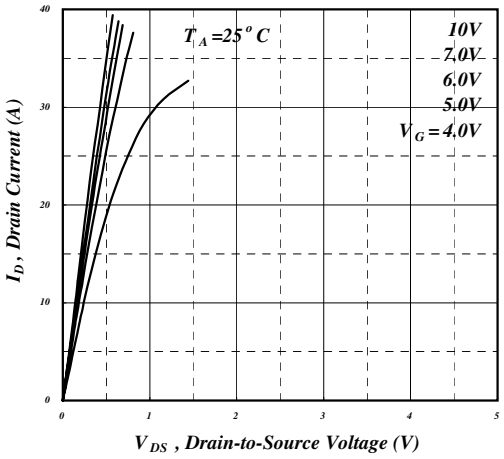


Fig 1. Typical Output Characteristics

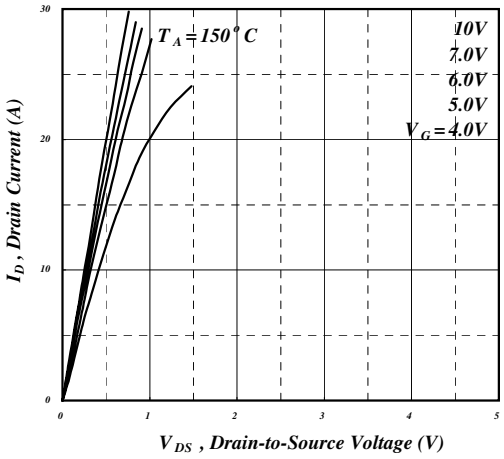


Fig 2. Typical Output Characteristics

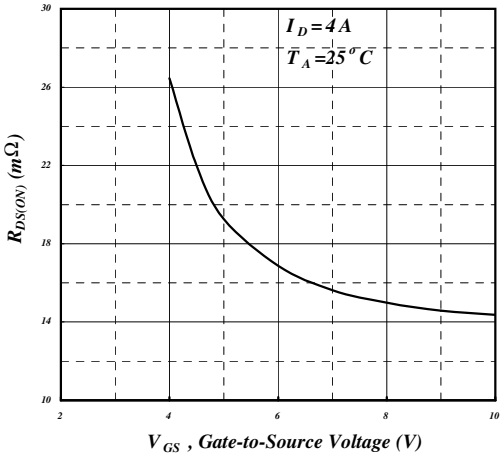


Fig 3. On-Resistance vs. Gate Voltage

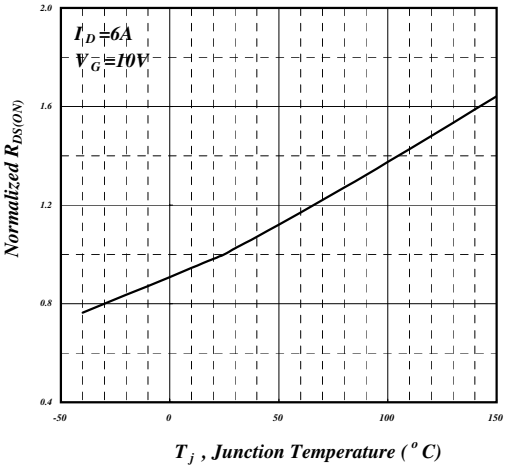


Fig 4. Normalized On-Resistance vs. Junction Temperature

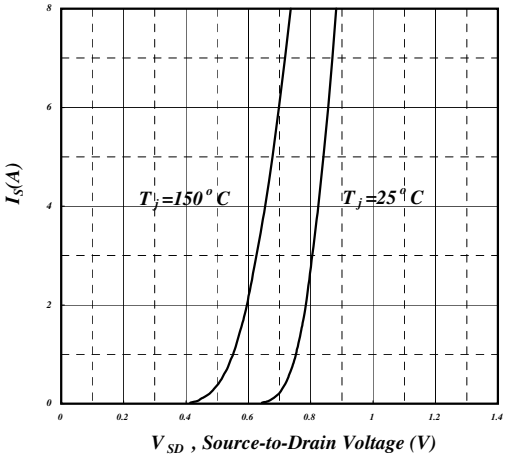


Fig 5. Forward Characteristic of Reverse Diode

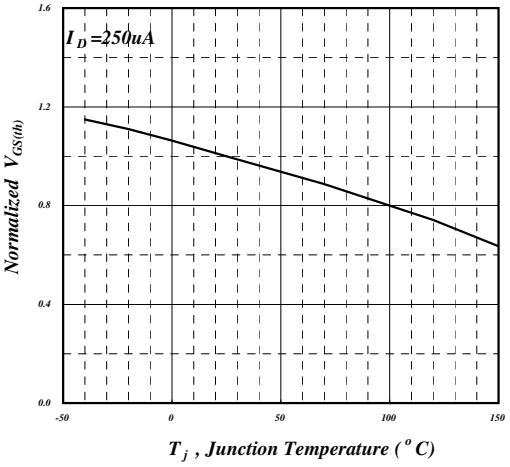


Fig 6. Gate Threshold Voltage vs. Junction Temperature

Typical N-channel Electrical Characteristics (cont.)

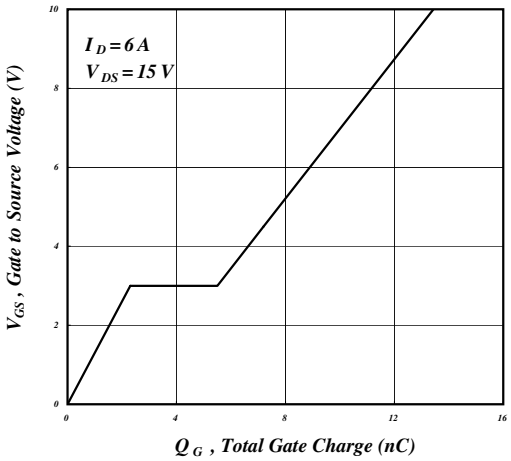


Fig 7. Gate Charge Characteristics

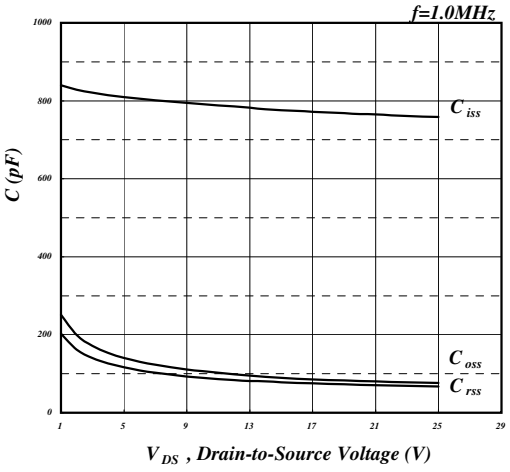


Fig 8. Typical Capacitance Characteristics

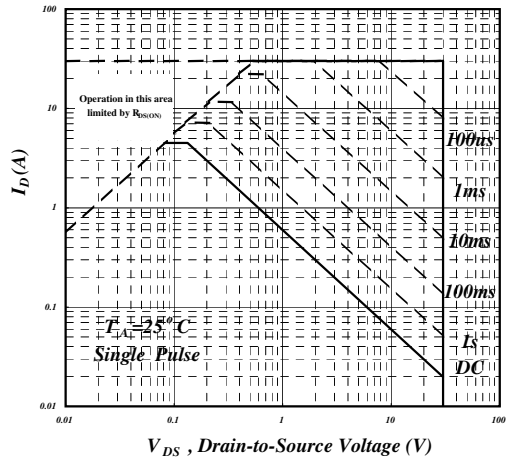


Fig 9. Maximum Safe Operating Area

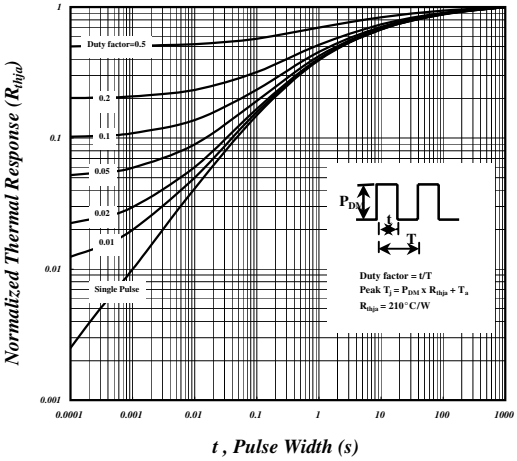


Fig 10. Effective Transient Thermal Impedance

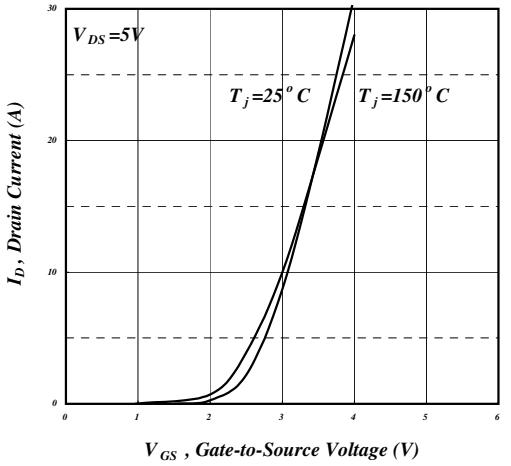


Fig 11. Transfer Characteristics

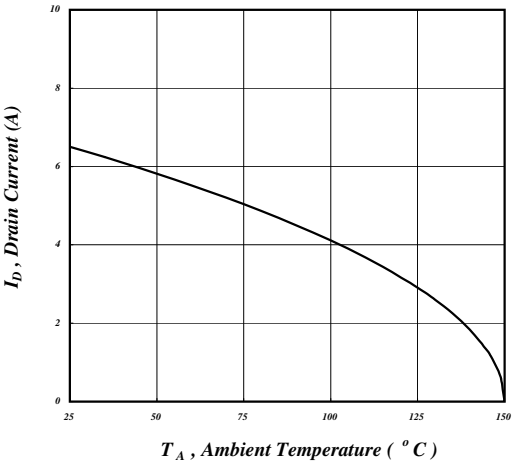


Fig 12. Gate Charge Waveform

Typical P-channel Electrical Characteristics

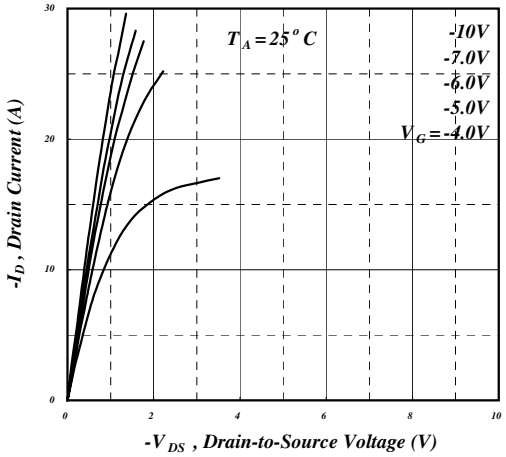


Fig 1. Typical Output Characteristics

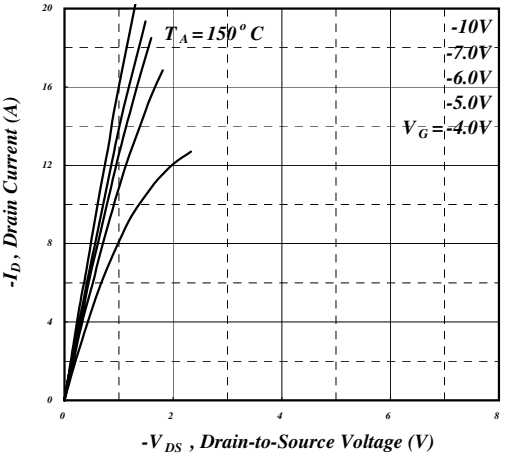


Fig 2. Typical Output Characteristics

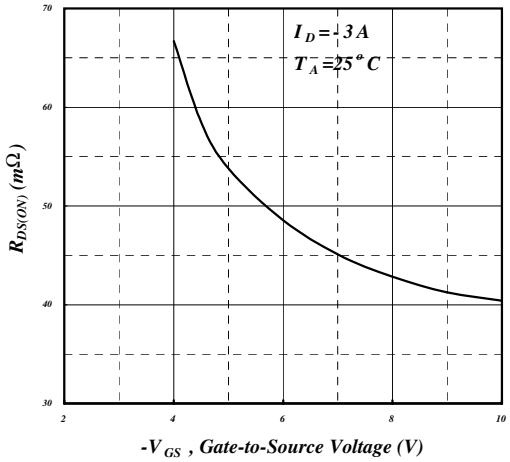


Fig 3. On-Resistance vs. Gate Voltage

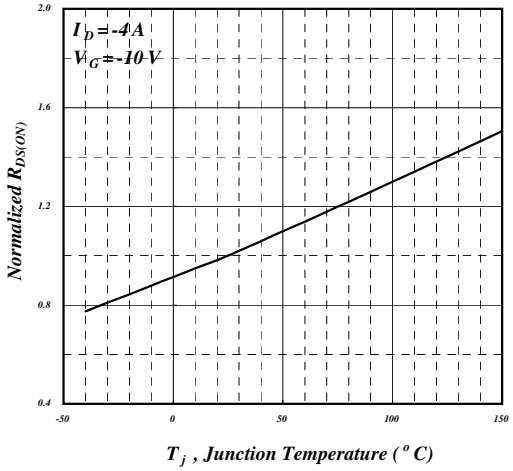


Fig 4. Normalized On-Resistance vs. Junction Temperature

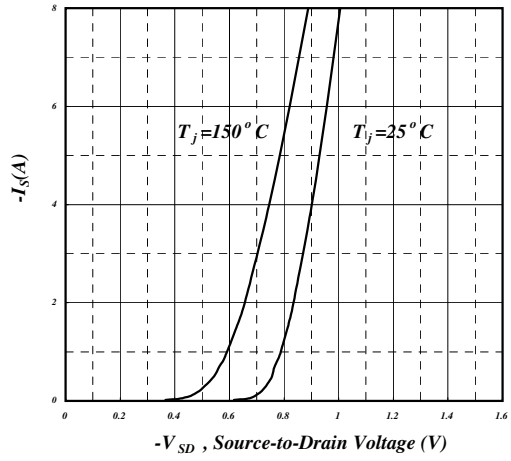


Fig 5. Forward Characteristic of Reverse Diode

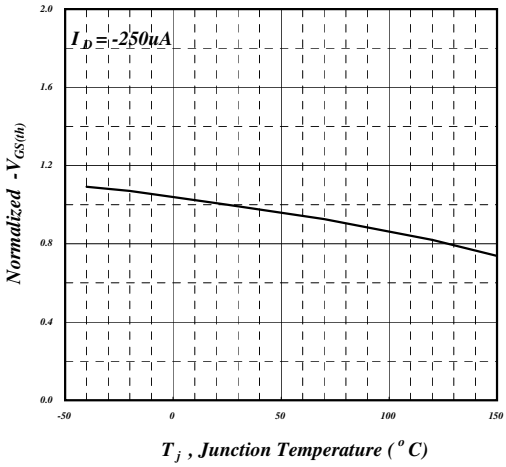


Fig 6. Gate Threshold Voltage vs. Junction Temperature

Typical P-channel Electrical Characteristics (cont.)

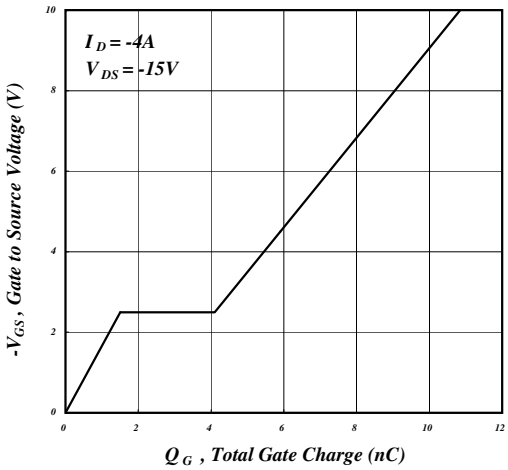


Fig 7. Gate Charge Characteristics

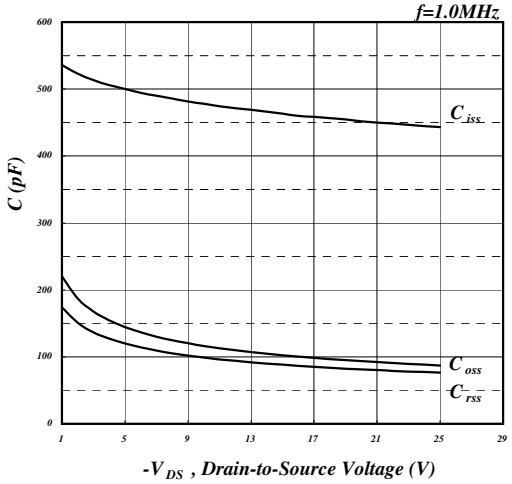


Fig 8. Typical Capacitance Characteristics

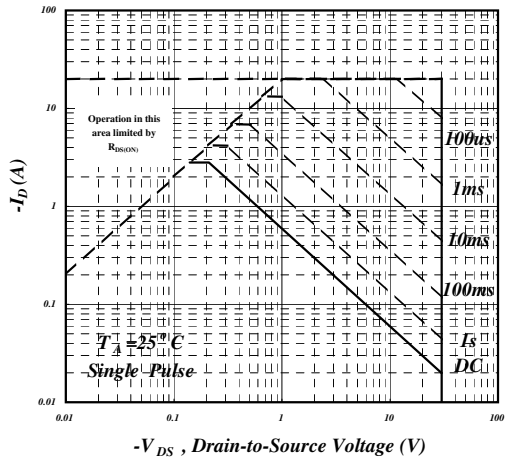


Fig 9. Maximum Safe Operating Area

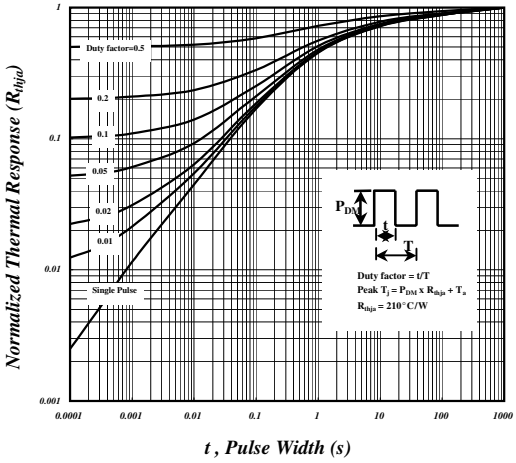


Fig 10. Effective Transient Thermal Impedance

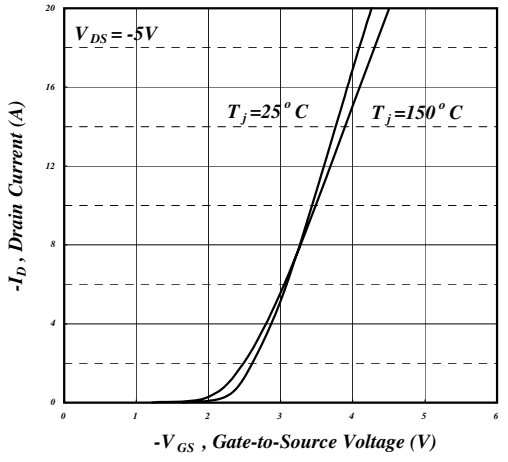


Fig 11. Transfer Characteristics

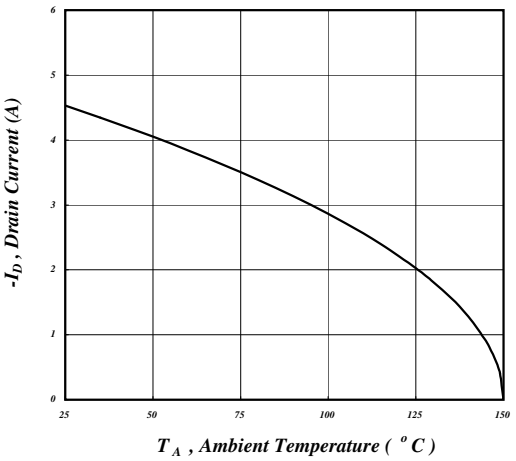
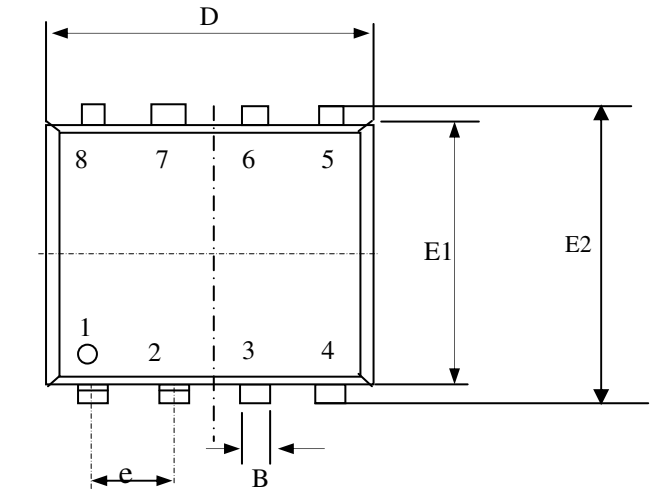
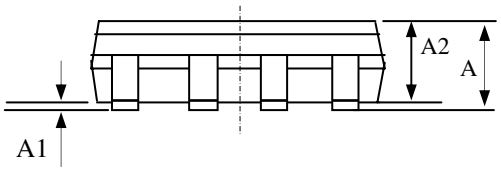


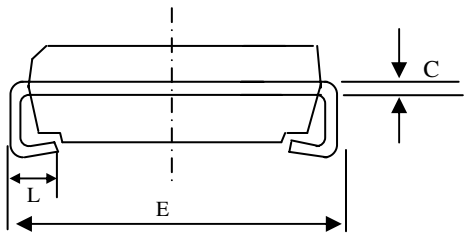
Fig 12. Gate Charge Waveform

Package Dimensions: 2928-8 J-lead



SYMBOLS	Millimeters		
	MIN	NOM	MAX
E	2.50	----	3.00
E1	2.30	2.40	2.50
E2	2.65	2.85	3.05
L	0.30	0.45	0.60
A	0.93	---	1.10
A1	0.01	---	0.10
A2	0.92	---	1.00
D	2.95	3.05	3.10
B	0.25	0.32	0.40
C	0.10	0.15	0.20
e	0.65BSC		



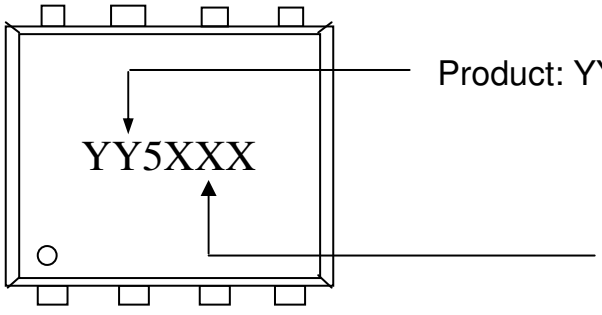


Note: 1. All dimensions are in millimeters.

2. Package body size excludes mold flash, protrusions or gate burrs.
   Mold flash, protrusions or gate burrs shall not exceed 0.10mm per side.
3. Package body size is determined at the outermost extremes of the plastic body, exclusive of mold flash, tie bar burrs, gate burrs and interlead flash, but including any mismatch between the top and bottom of the plastic body.
4. The package top may be smaller than the package bottom.
5. Dimension"B" does not include dambar protrusion. Allowable dambar protrusion shall be 0.08mm total in excess of the lead width dimension "B" at maximum material condition. The dambar cannot be located on the lower radius of the foot.

Marking Information

Laser Marking



Product: YY5= AP4501AGEY-HF-3

XXX = Date/lot code
For details of how to convert this to standard YYWW date code format, please contact us directly.