AP6950GYT-HF

Advanced Power Electronics Corp.

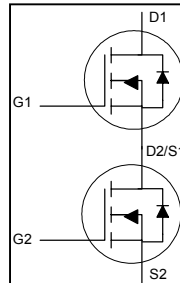*DUAL N-CHANNEL ENHANCEMENT MODE POWER MOSFET*

▼ **Simple Drive Requirement**

▼ **Easy for Synchronous Buck**

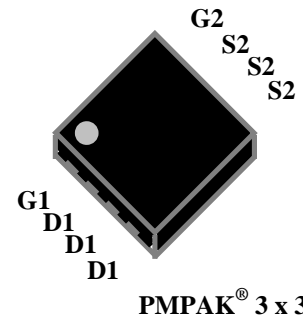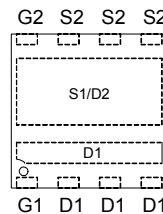   **Converter Application**

▼ **RoHS Compliant & Halogen-Free**

CH-1	BV_{DSS}	30V
	$R_{DS(ON)}$	18mΩ
	I_D	21A
CH-2	BV_{DSS}	30V
	$R_{DS(ON)}$	10.5mΩ
	I_D	39A

Description

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

The control MOSFET (CH-1) and synchronous MOSFET (CH-2) co-package for synchronous buck converters.

PMPAK® 3 x 3

Absolute Maximum Ratings@T_j=25°C(unless otherwise specified)

Symbol	Parameter	Rating CH-1	Rating CH-2	Units
V_{DS}	Drain-Source Voltage	30	30	V
V_{GS}	Gate-Source Voltage	$\pm$20	$\pm$12	V
I_D@T_C=25℃	Drain Current (Chip Limited)	21	39	A
I_D@T_A=25℃	Drain Current, V_{GS} @ 10V[3]	8.3	11.8	A
I_D@T_A=70℃	Drain Current, V_{GS} @ 10V[3]	6.6	9.5	A
I_{DM}	Pulsed Drain Current[1]	40	40	A
P_D@T_A=25℃	Total Power Dissipation[3]	1.9	2.2	W
T_{STG}	Storage Temperature Range	-55 to 150		℃
T_J	Operating Junction Temperature Range	-55 to 150		℃

Thermal Data

Symbol	Parameter	Rating CH-1	Rating CH-2	Units
Rthj-c	Maximum Thermal Resistance, Junction-case	10	5	℃/W
Rthj-a	Maximum Thermal Resistance, Junction-ambient[3]	65	55	℃/W
Rthj-a	Maximum Thermal Resistance, Junction-ambient[4]	180	145	℃/W

CH-1 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$_D$=8A	-	14	18	mΩ
		V$_{GS}$=4.5V, I$_D$=5A	-	23.2	30	mΩ
V$_{GS(th)}$	Gate Threshold Voltage	V$_{DS}$=V$_{GS}$, I$_D$=250uA	1	1.4	3	V
g$_{fs}$	Forward Transconductance	V$_{DS}$=10V, I$_D$=8A	-	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	-	-	±100	nA
Q$_g$	Total Gate Charge	I$_D$=8A	-	4.2	6.7	nC
Q$_{gs}$	Gate-Source Charge	V$_{DS}$=15V	-	1.8	-	nC
Q$_{gd}$	Gate-Drain ("Miller") Charge	V$_{GS}$=4.5V	-	1.9	-	nC
t$_{d(on)}$	Turn-on Delay Time	V$_{DS}$=15V	-	6.5	-	ns
t$_r$	Rise Time	I$_D$=1A	-	6	-	ns
t$_{d(off)}$	Turn-off Delay Time	R$_G$=3.3Ω	-	15	-	ns
t$_f$	Fall Time	V$_{GS}$=10V	-	3	-	ns
C$_{iss}$	Input Capacitance	V$_{GS}$=0V	-	450	720	pF
C$_{oss}$	Output Capacitance	V$_{DS}$=15V	-	70	-	pF
C$_{rss}$	Reverse Transfer Capacitance	f=1.0MHz	-	50	-	pF
R$_g$	Gate Resistance	f=1.0MHz	-	1.2	2.4	Ω

Source-Drain Diode

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
V$_{SD}$	Forward On Voltage[2]	I$_S$=8A, V$_{GS}$=0V	-	-	1.2	V
t$_{rr}$	Reverse Recovery Time	I$_S$=8A, V$_{GS}$=0V,	-	13	-	ns
Q$_{rr}$	Reverse Recovery Charge	dI/dt=100A/µs	-	6	-	nC

CH-2 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$_D$=11A	-	8	10.5	mΩ
		V$_{GS}$=4.5V, I$_D$=7A	-	13.3	16.5	mΩ
V$_{GS(th)}$	Gate Threshold Voltage	V$_{DS}$=V$_{GS}$, I$_D$=250uA	1	1.4	3	V
g$_{fs}$	Forward Transconductance	V$_{DS}$=10V, I$_D$=11A	-	20	-	S
I$_{DSS}$	Drain-Source Leakage Current	V$_{DS}$=24V, V$_{GS}$=0V	-	-	10	uA
I$_{GSS}$	Gate-Source Leakage	V$_{GS}$=$\pm$12V, V$_{DS}$=0V	-	-	$\pm$100	nA
Q$_g$	Total Gate Charge	I$_D$=11A	-	7.5	12	nC
Q$_{gs}$	Gate-Source Charge	V$_{DS}$=15V	-	3	-	nC
Q$_{gd}$	Gate-Drain ("Miller") Charge	V$_{GS}$=4.5V	-	3	-	nC
t$_{d(on)}$	Turn-on Delay Time	V$_{DS}$=15V	-	9	-	ns
t$_r$	Rise Time	I$_D$=1A	-	5	-	ns
t$_{d(off)}$	Turn-off Delay Time	R$_G$=3.3Ω	-	20	-	ns
t$_f$	Fall Time	V$_{GS}$=10V	-	4	-	ns
C$_{iss}$	Input Capacitance	V$_{GS}$=0V	-	970	1550	pF
C$_{oss}$	Output Capacitance	V$_{DS}$=15V	-	120	-	pF
C$_{rss}$	Reverse Transfer Capacitance	f=1.0MHz	-	80	-	pF
R$_g$	Gate Resistance	f=1.0MHz	-	1.2	2.4	Ω

Source-Drain Diode

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
V$_{SD}$	Forward On Voltage[2]	I$_S$=11A, V$_{GS}$=0V	-	-	1.2	V
t$_{rr}$	Reverse Recovery Time	I$_S$=11A, V$_{GS}$=0V,	-	16	-	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, t $\leq$10sec.

4.Surface mounted on min. copper pad of FR4 board, on steady-state
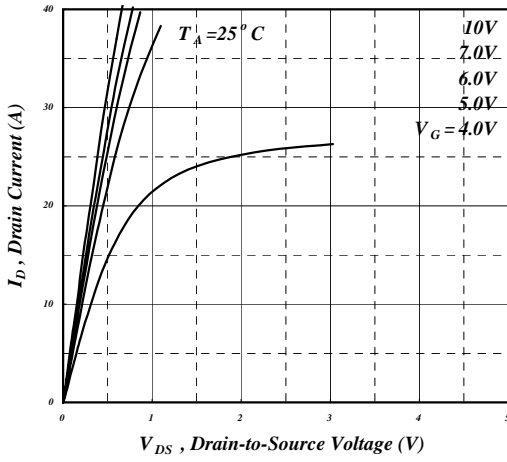
Channel-1
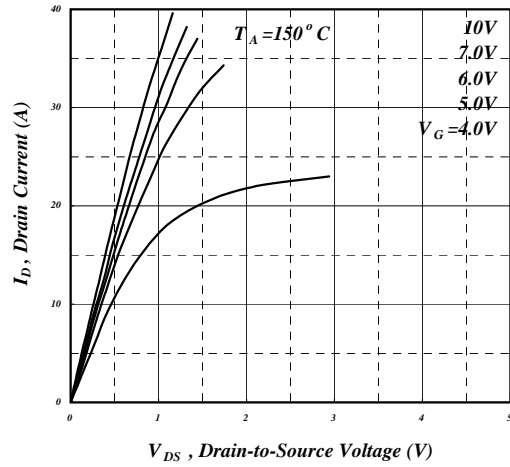

Fig 1. Typical Output Characteristics

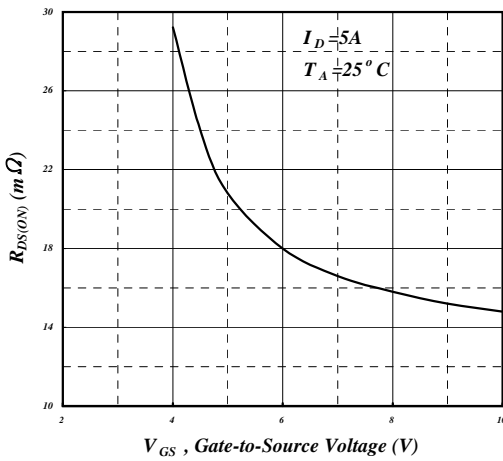Fig 2. Typical Output Characteristics

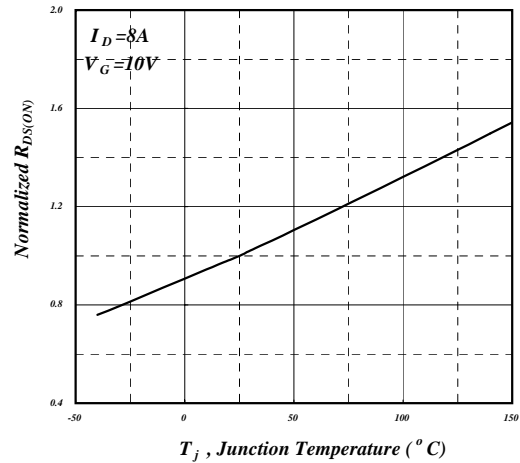Fig 3. On-Resistance v.s. Gate Voltage

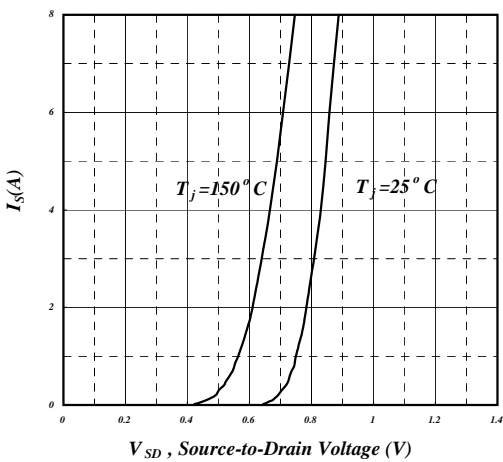

Fig 4. Normalized On-Resistance
v.s. Junction Temperature
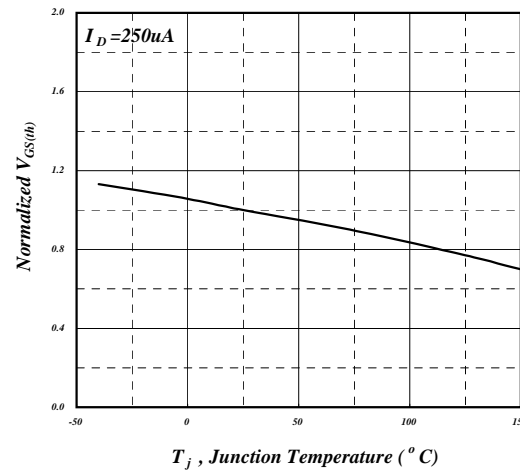

Fig 5. Forward Characteristic of
Reverse Diode

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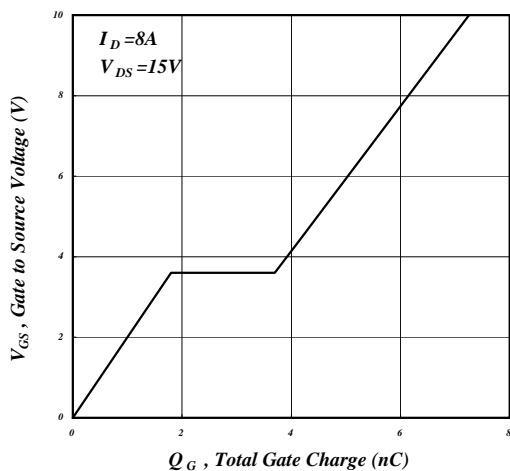Junction Temperature

Channel-1

Fig 7. Gate Charge Characteristics

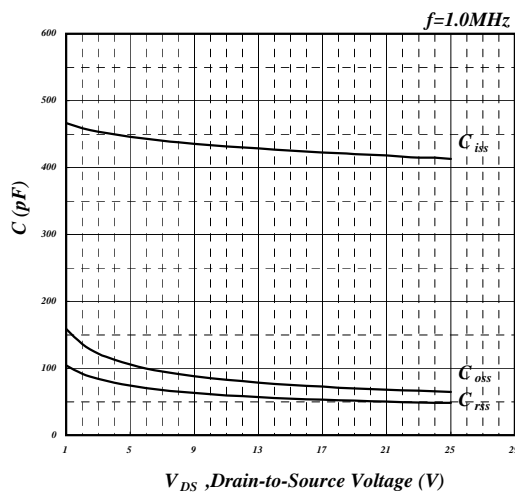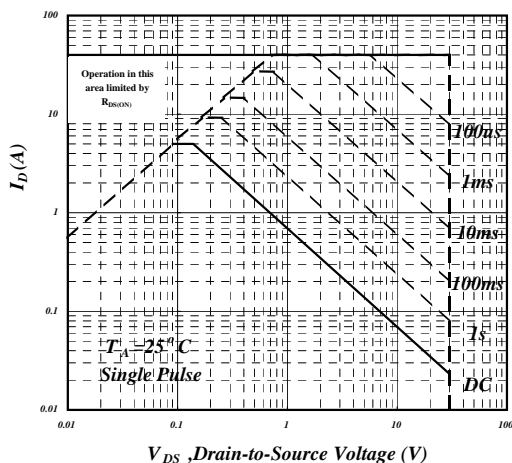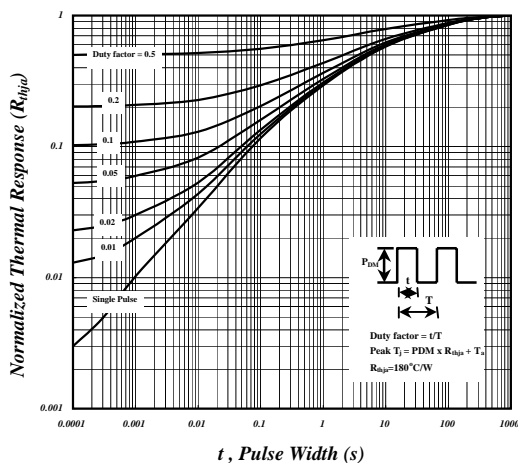Fig 8. Typical Capacitance Characteristics

Fig 9. Maximum Safe Operating Area
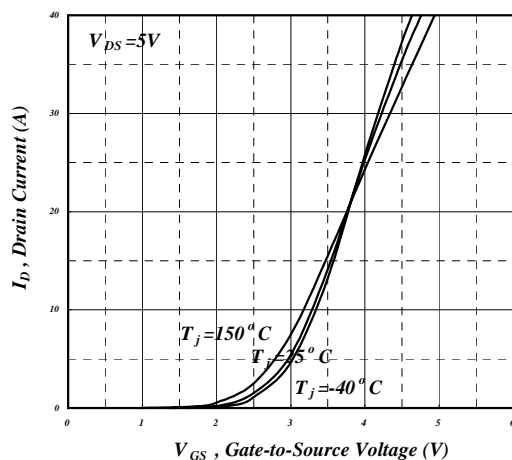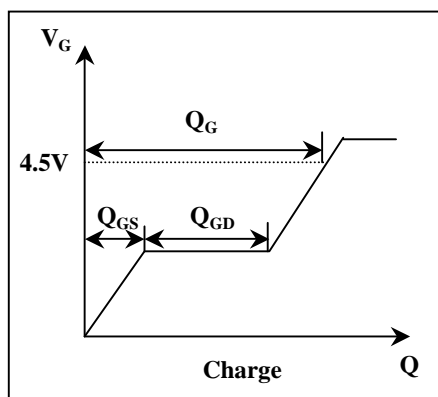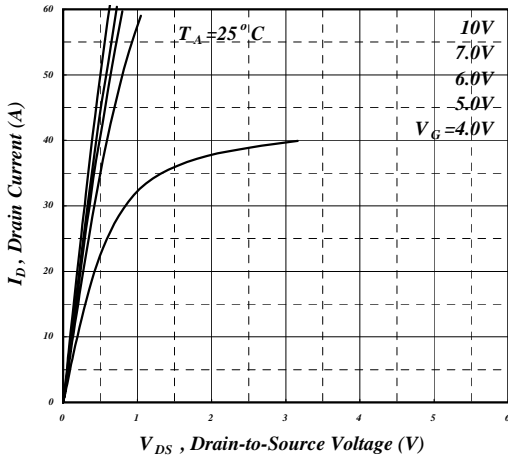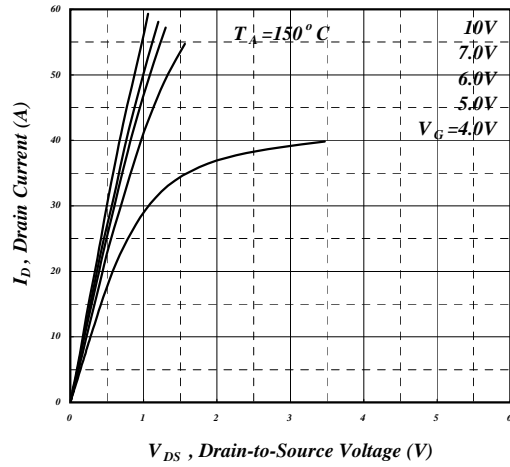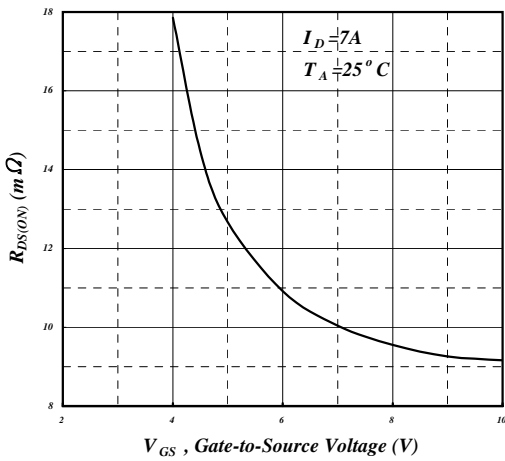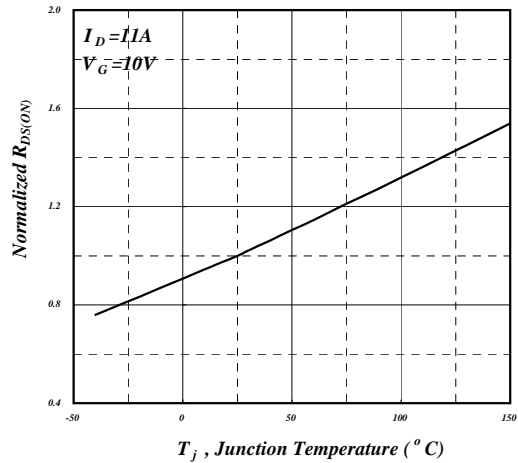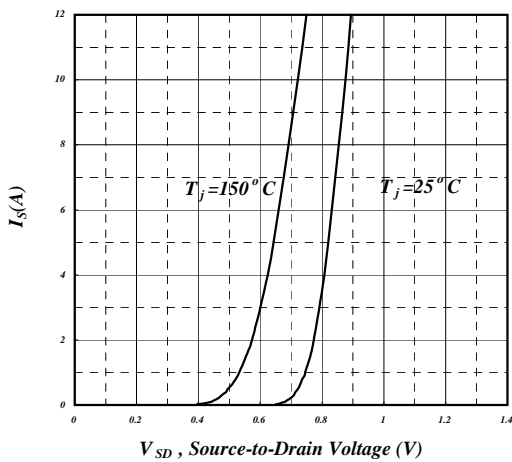

Fig 10. Effective Transient Thermal Impedance

Fig 11. Transfer Characteristics

Fig 12. Gate Charge Waveform

Channel-2

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
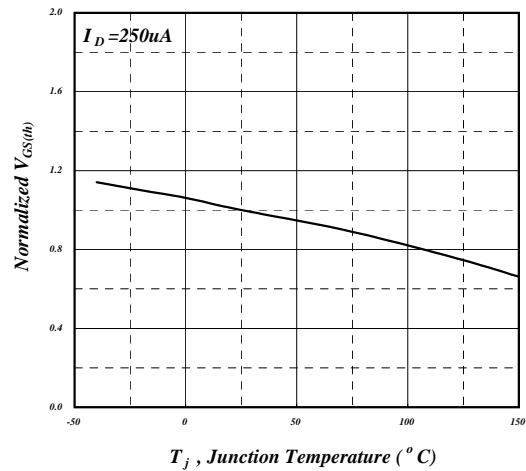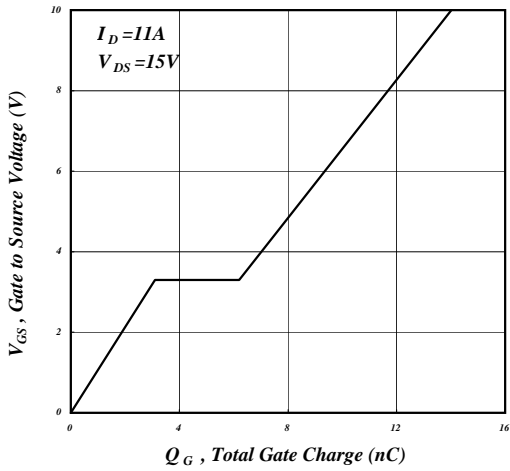

Fig 5. Forward Characteristic of
Reverse Diode

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

AP6950GYT-HF

Channel-2

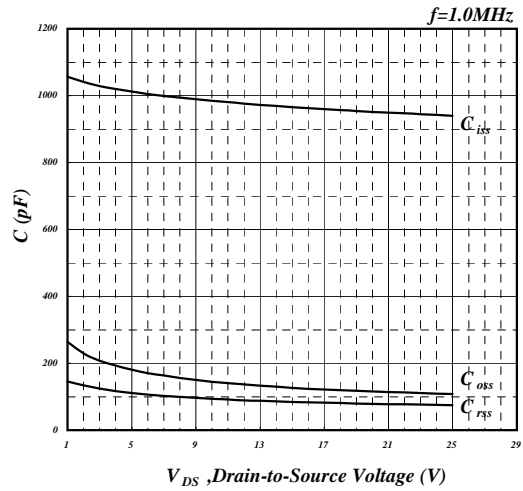Fig 7. Gate Charge Characteristics

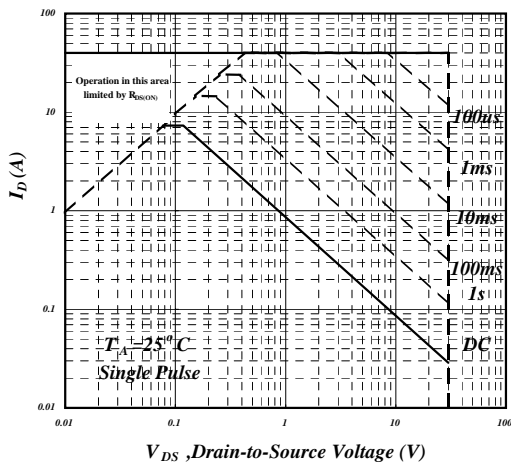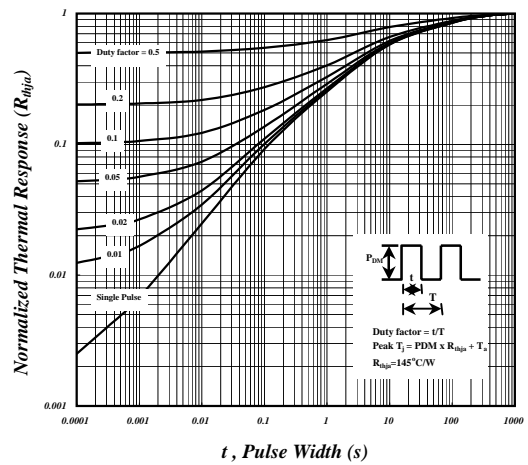Fig 8. Typical Capacitance Characteristics

Fig 9. Maximum Safe Operating Area

Fig 10. Effective Transient Thermal Impedance
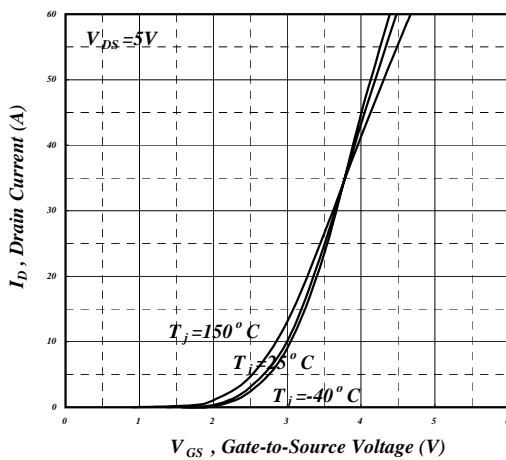

Fig 11. Transfer Characteristics
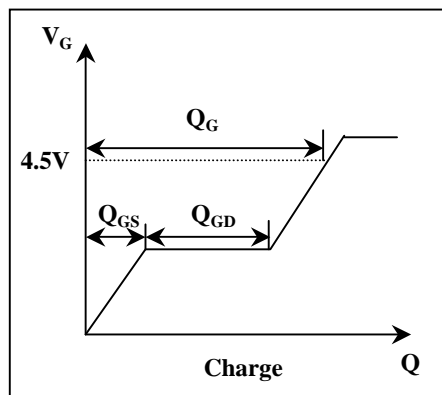

Fig 12. Gate Charge Waveform

MARKING INFORMATION

6950GYT

Part Number

meet Rohs requirement
for low voltage MOSFET only

Package Code : YT

YWWSSS

Date Code (YWWSSS)
Y：Last Digit Of The Year
WW：Week
SSS：Sequence