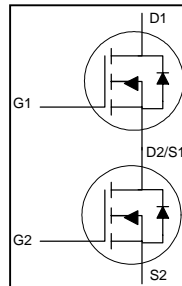


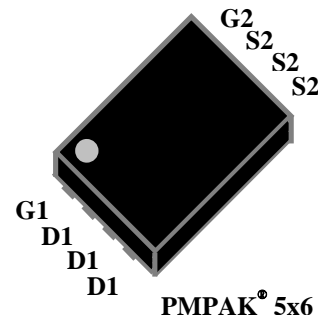
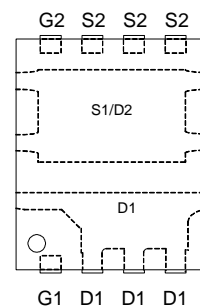
- ▼ Simple Drive Requirement
- ▼ Easy for DC/DC Buck Converter Application
- ▼ RoHS Compliant & Halogen-Free



CH-1	$BV_{DSS}$	30V
	$R_{DS(ON)}$	5.5mΩ
CH-2	$BV_{DSS}$	30V
	$R_{DS(ON)}$	2.5mΩ

### Description

XP6932 series are innovated design and silicon process technology to achieve the lowest possible on-resistance and fast switching performance. It provides the designer with an extreme efficient device for use in a wide range of power applications. The control MOSFET (CH-1) and synchronous MOSFET (CH-2) co-package for synchronous buck converters.



### Absolute Maximum Ratings @ $T_J=25^\circ\text{C}$ (unless otherwise specified)

Symbol	Parameter	Rating		Units
		CH-1	CH-2	
$V_{DS}$	Drain-Source Voltage	30	30	V
$V_{GS}$	Gate-Source Voltage	+20	+20	V
$I_D @ T_C=25^\circ\text{C}$	Drain Current (Package Limited)	28	40	A
$I_D @ T_A=25^\circ\text{C}$	Drain Current, $V_{GS} @ 10V^3$	14.2	22.9	A
$I_D @ T_A=70^\circ\text{C}$	Drain Current, $V_{GS} @ 10V^3$	11.3	18.4	A
$I_{DM}$	Pulsed Drain Current <sup>1</sup>	112	160	A
$P_D @ T_A=25^\circ\text{C}$	Total Power Dissipation <sup>3</sup>	1.78	2.08	W
$E_{AS}$	Single Pulse Avalanche Energy <sup>6</sup>	18	32	mJ
$T_{STG}$	Storage Temperature Range	-55 to 150		$^\circ\text{C}$
$T_J$	Operating Junction Temperature Range	-55 to 150		$^\circ\text{C}$

### Thermal Data

Symbol	Parameter	Rating		Units
		CH-1	CH-2	
Rthj-c	Maximum Thermal Resistance, Junction-case	5	3	$^\circ\text{C}/\text{W}$
Rthj-t	Maximum Thermal Resistance, Junction-top	15	9	$^\circ\text{C}/\text{W}$
Rthj-a	Maximum Thermal Resistance, Junction-ambient <sup>3</sup>	70	60	$^\circ\text{C}/\text{W}$
Rthj-a	Maximum Thermal Resistance, Junction-ambient <sup>4</sup>	130	120	$^\circ\text{C}/\text{W}$

**CH-1 Electrical Characteristics @ $T_j=25^{\circ}\text{C}$ (unless otherwise specified)**

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
$BV_{DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	30	-	-	V
$V_{DSt}$	Drain-Source Breakdown Voltage <sup>7</sup> (transient)	$V_{GS}=0V, I_{AS}=60A,$ $t_{transient} \leq 50ns$	36	-	-	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance <sup>2</sup>	$V_{GS}=10V, I_D=14A$	-	-	5.5	$m\Omega$
		$V_{GS}=4.5V, I_D=7A$	-	-	8.8	$m\Omega$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	1.3	-	2.2	V
$g_{fs}$	Forward Transconductance	$V_{DS}=5V, I_D=14A$	-	52	-	S
$I_{DSS}$	Drain-Source Leakage Current	$V_{DS}=24V, V_{GS}=0V$	-	-	10	$\mu A$
$I_{GSS}$	Gate-Source Leakage	$V_{GS}=+20V, V_{DS}=0V$	-	-	$\pm 0.1$	$\mu A$
$Q_{g(10V)}$	Total Gate Charge <sup>5</sup>	$I_D=16A$ $V_{DS}=15V$	-	19	30.4	nC
$Q_{g(4.5V)}$	Total Gate Charge <sup>5</sup>		-	9	14.4	nC
$Q_{gs}$	Gate-Source Charge <sup>5</sup>		-	4	-	nC
$Q_{gd}$	Gate-Drain ("Miller") Charge <sup>5</sup>		-	3	-	nC
$t_{d(on)}$	Turn-on Delay Time <sup>5</sup>	$V_{DS}=15V$	-	8	-	ns
$t_r$	Rise Time <sup>5</sup>	$I_D=16A$	-	54	-	ns
$t_{d(off)}$	Turn-off Delay Time <sup>5</sup>	$R_G=3\Omega$	-	18	-	ns
$t_f$	Fall Time <sup>5</sup>	$V_{GS}=10V$	-	3	-	ns
$C_{iss}$	Input Capacitance <sup>5</sup>	$V_{GS}=0V$	-	1070	1712	pF
$C_{oss}$	Output Capacitance <sup>5</sup>	$V_{DS}=15V$	-	550	-	pF
$C_{rss}$	Reverse Transfer Capacitance <sup>5</sup>	$f=1.0MHz$	-	30	-	pF
$R_g$	Gate Resistance	$f=1.0MHz$	-	2.2	4.4	$\Omega$

**Source-Drain Diode**

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
$V_{SD}$	Forward On Voltage <sup>2</sup>	$I_S=16A, V_{GS}=0V$	-	-	1.2	V
$t_{rr}$	Reverse Recovery Time <sup>5</sup>	$I_S=16A, V_{GS}=0V$ $di/dt=100A/\mu s$	-	23	-	ns
$Q_{rr}$	Reverse Recovery Charge <sup>5</sup>		-	13	-	nC

**CH-2 Electrical Characteristics @ $T_j=25^{\circ}\text{C}$ (unless otherwise specified)**

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
$BV_{DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	30	-	-	V
$V_{DSt}$	Drain-Source Breakdown Voltage <sup>7</sup> (transient)	$V_{GS}=0V, I_{AS}=80A,$ $t_{transient} \leq 50ns$	36	-	-	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance <sup>2</sup>	$V_{GS}=10V, I_D=20A$	-	-	2.5	m $\Omega$
		$V_{GS}=4.5V, I_D=12A$	-	-	3.9	m $\Omega$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	1.3	-	2.2	V
$g_{fs}$	Forward Transconductance	$V_{DS}=5V, I_D=20A$	-	92	-	S
$I_{DSS}$	Drain-Source Leakage Current	$V_{DS}=24V, V_{GS}=0V$	-	-	10	$\mu A$
$I_{GSS}$	Gate-Source Leakage	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	$\pm 0.1$	$\mu A$
$Q_{g(10V)}$	Total Gate Charge <sup>5</sup>	$I_D=20A$ $V_{DS}=15V$	-	40	64	nC
$Q_{g(4.5V)}$	Total Gate Charge <sup>5</sup>		-	19	30.4	nC
$Q_{gs}$	Gate-Source Charge <sup>5</sup>		-	9	-	nC
$Q_{gd}$	Gate-Drain ("Miller") Charge <sup>5</sup>		-	5	-	nC
$t_{d(on)}$	Turn-on Delay Time <sup>5</sup>	$V_{DS}=15V$	-	10	-	ns
$t_r$	Rise Time <sup>5</sup>	$I_D=20A$	-	47	-	ns
$t_{d(off)}$	Turn-off Delay Time <sup>5</sup>	$R_G=3\Omega$	-	28	-	ns
$t_f$	Fall Time <sup>5</sup>	$V_{GS}=10V$	-	6	-	ns
$C_{iss}$	Input Capacitance <sup>5</sup>	$V_{GS}=0V$	-	2450	3920	pF
$C_{oss}$	Output Capacitance <sup>5</sup>	$V_{DS}=15V$	-	1450	-	pF
$C_{rss}$	Reverse Transfer Capacitance <sup>5</sup>	$f=1.0MHz$	-	50	-	pF
$R_g$	Gate Resistance	$f=1.0MHz$	-	1.2	2.4	$\Omega$

**Source-Drain Diode**

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
$V_{SD}$	Forward On Voltage <sup>2</sup>	$I_S=20A, V_{GS}=0V$	-	-	1.2	V
$t_{rr}$	Reverse Recovery Time <sup>5</sup>	$I_S=20A, V_{GS}=0V$ $di/dt=100A/\mu s$	-	40	-	ns
$Q_{rr}$	Reverse Recovery Charge <sup>5</sup>		-	38	-	nC

**Notes:**

- Pulse width limited by Max. junction temperature.
- Pulse test
- Surface mounted on 1 in<sup>2</sup> copper pad of FR4 board, on steady-state
- Surface mounted on Min. copper pad of FR4 board, on steady-state
- Guaranteed by design.
- Starting  $T_j=25^{\circ}\text{C}$ ,  $V_{DD}=30V$ ,  $L=0.01mH$ ,  $R_G=25\Omega$ ,  $V_{GS}=10V$
- $T_j=25^{\circ}\text{C}$ . Expected voltage stress during 100% EAS test. Production datalog is not available.

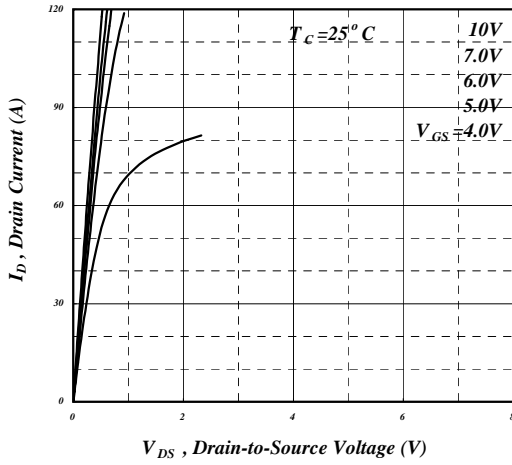
THIS PRODUCT IS SENSITIVE TO ELECTROSTATIC DISCHARGE, PLEASE HANDLE WITH CAUTION.

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

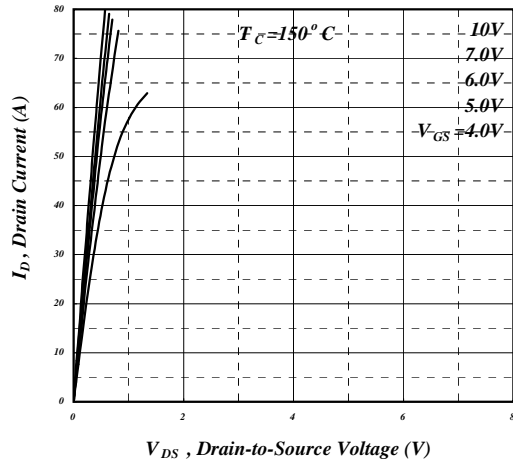
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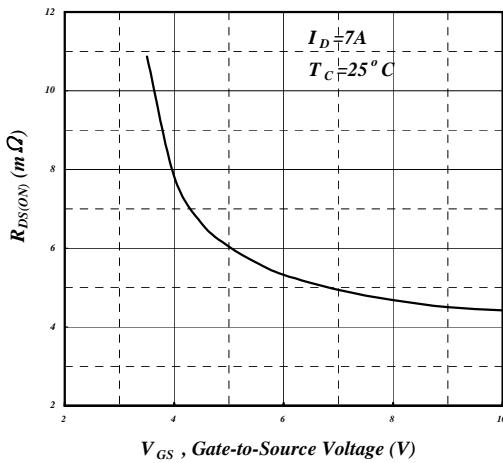
**Channel-1**



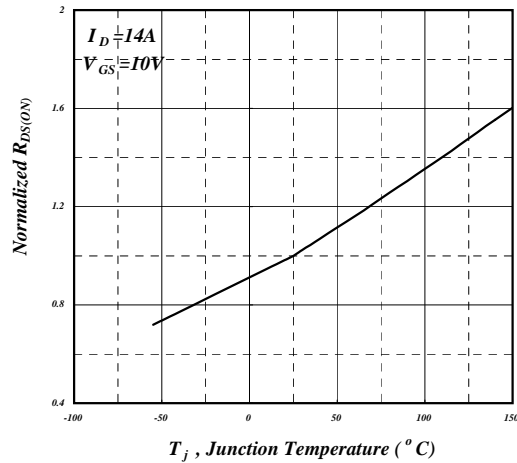
**Fig 1. Typical Output Characteristics**



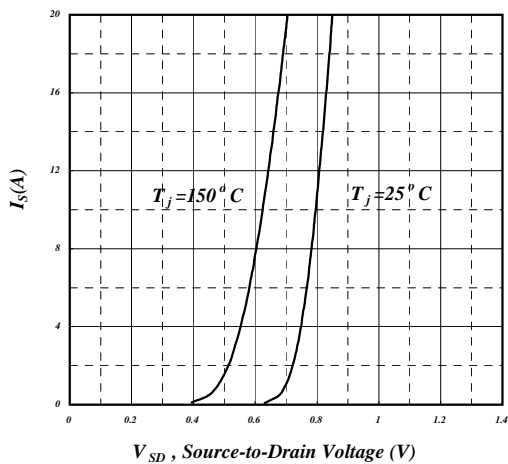
**Fig 2. Typical Output Characteristics**



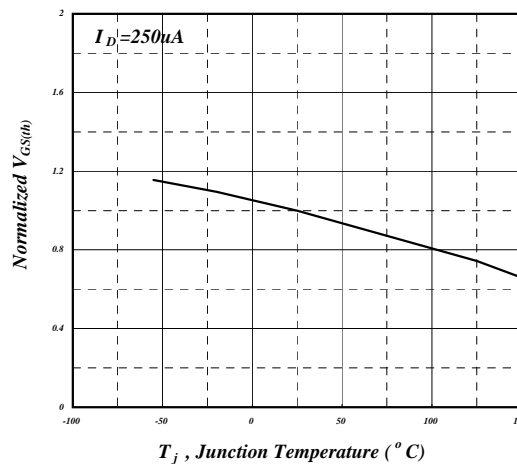
**Fig 3. On-Resistance v.s. Gate Voltage**



**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

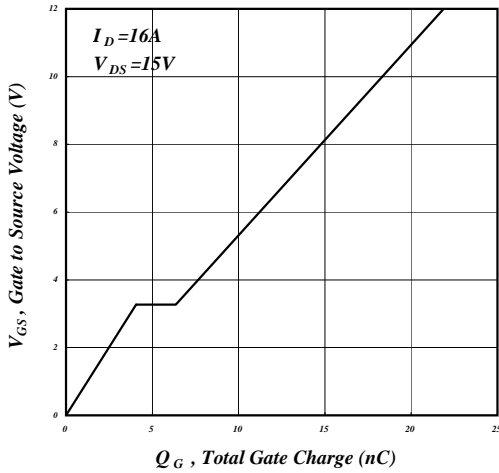


Fig 7. Gate Charge Characteristics

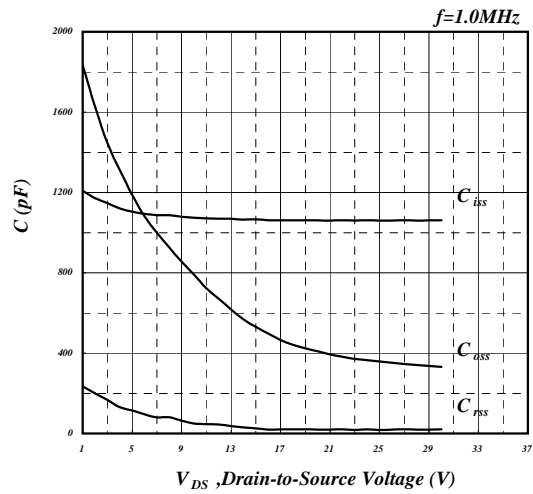


Fig 8. Typical Capacitance Characteristics

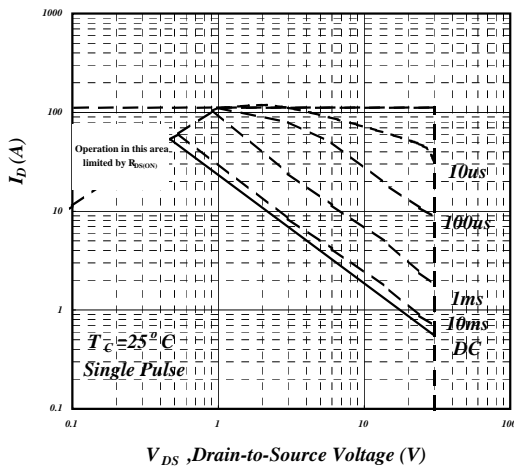


Fig 9. Maximum Safe Operating Area

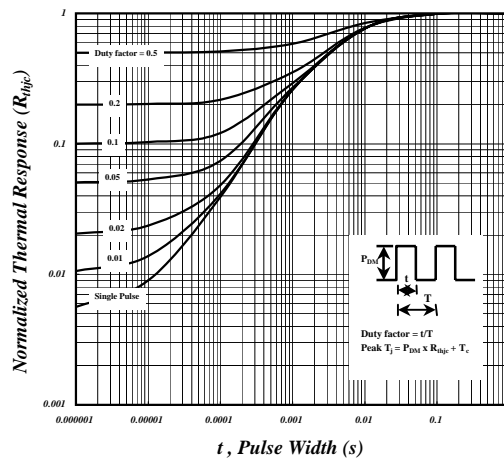


Fig 10. Effective Transient Thermal Impedance

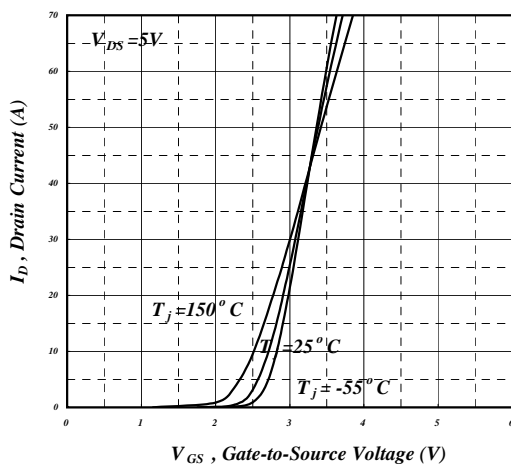


Fig 11. Transfer Characteristics

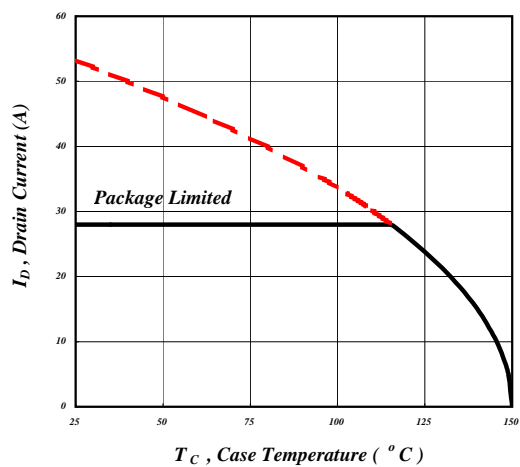
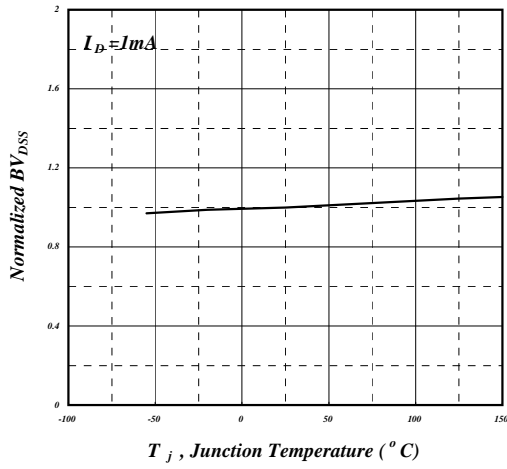
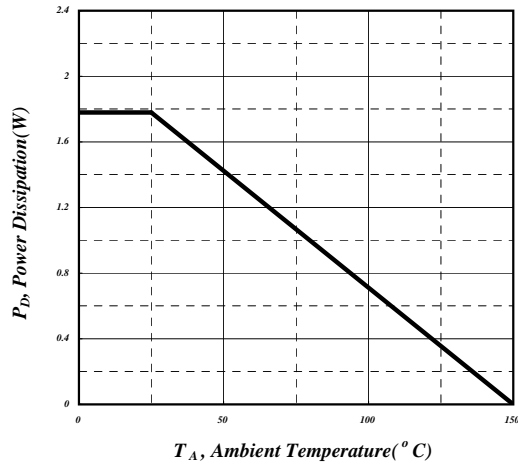


Fig 12. Drain Current v.s. Case Temperature

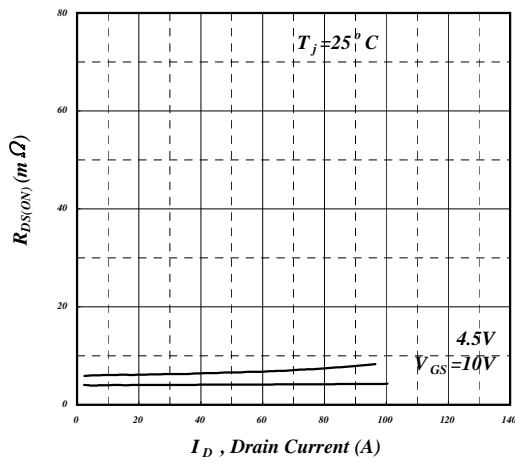
**Channel-1**



**Fig 13. Normalized  $BV_{DSS}$  v.s. Junction Temperature**

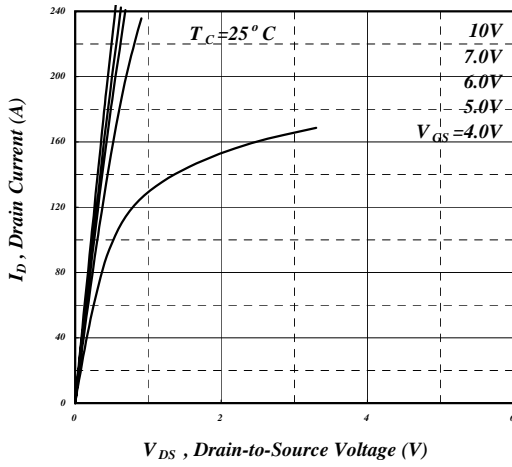


**Fig 14. Total Power Dissipation**

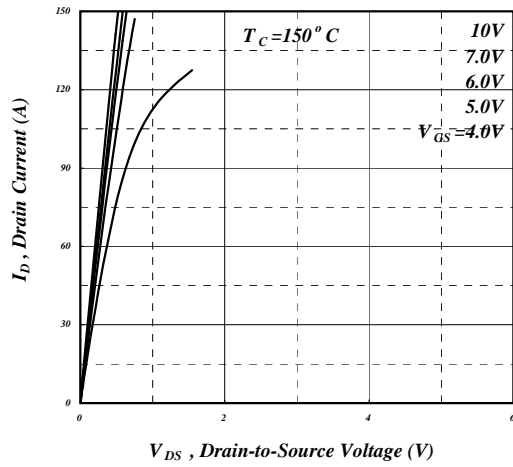


**Fig 15. Typ. Drain-Source on State Resistance**

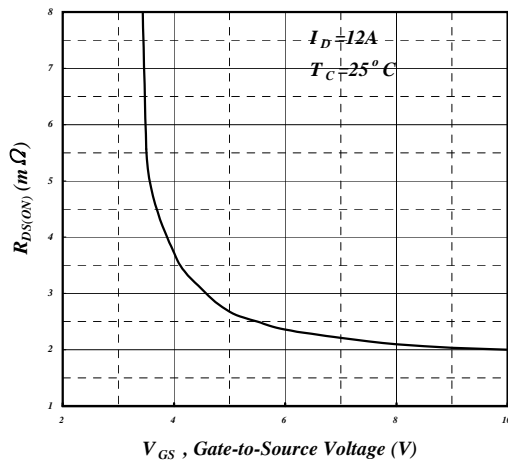
**Channel-2**



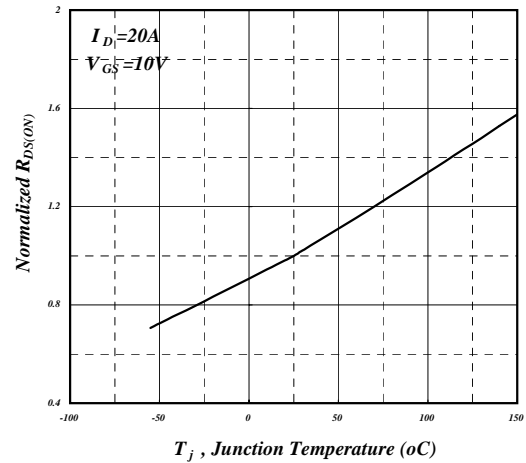
**Fig 1. Typical Output Characteristics**



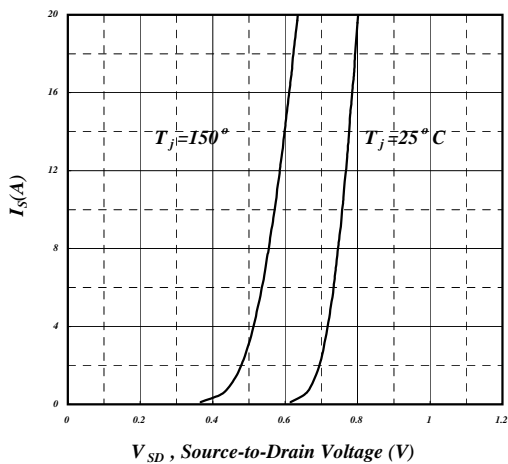
**Fig 2. Typical Output Characteristics**



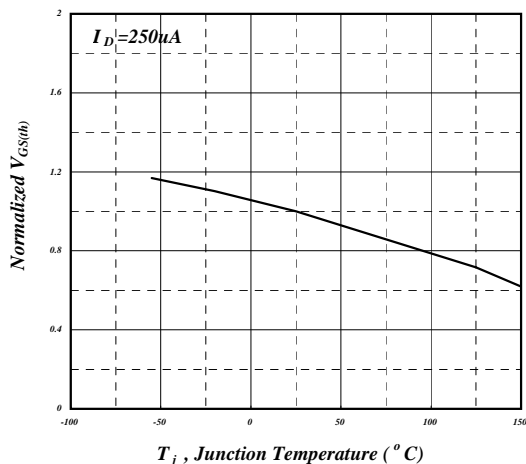
**Fig 3. On-Resistance v.s. Gate Voltage**



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

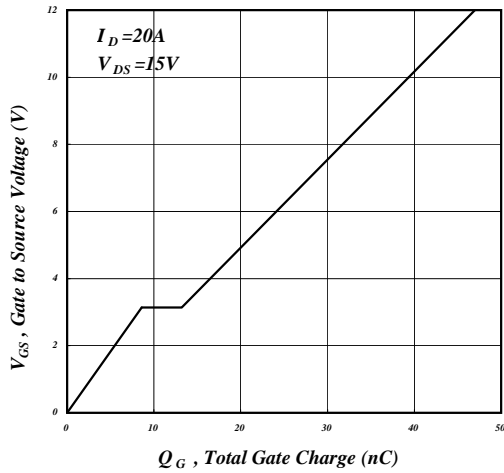


**Fig 5. Forward Characteristic of Reverse Diode**

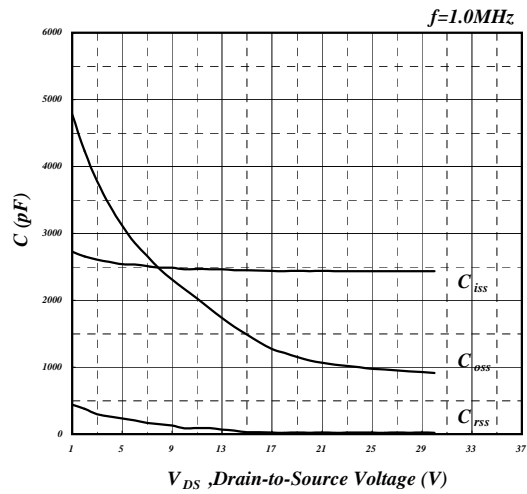


**Fig 6. Gate Threshold Voltage v.s. Junction Temperature**

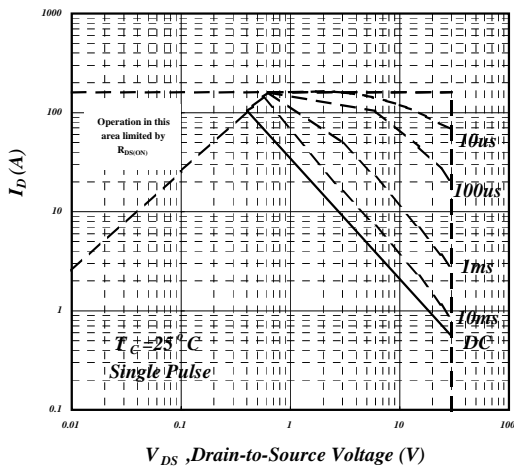
**Channel-2**



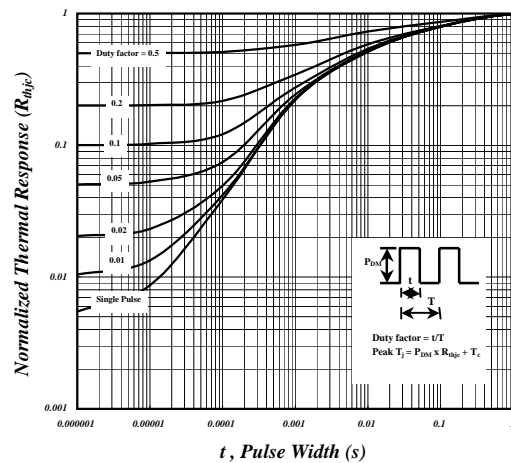
**Fig 7. Gate Charge Characteristics**



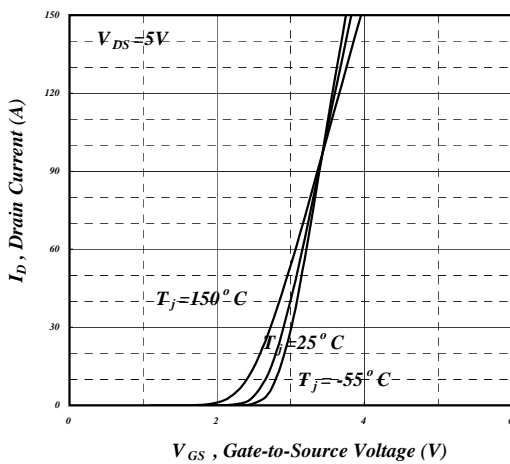
**Fig 8. Typical Capacitance Characteristics**



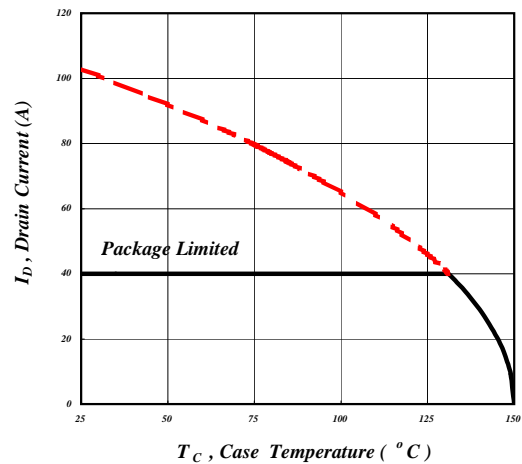
**Fig 9. Maximum Safe Operating Area**



**Fig 10. Effective Transient Thermal Impedance**



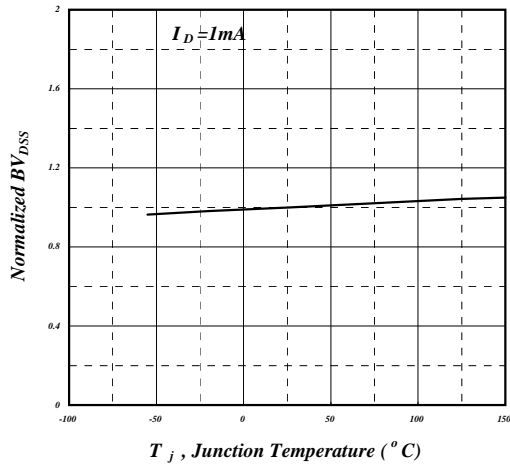
**Fig 11. Transfer Characteristics**



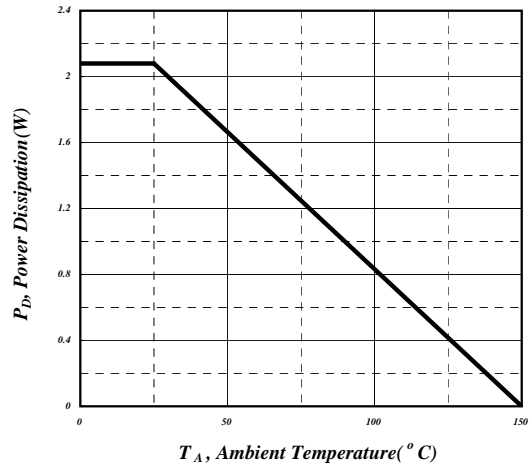
**Fig 12. Drain Current v.s. Case Temperature**



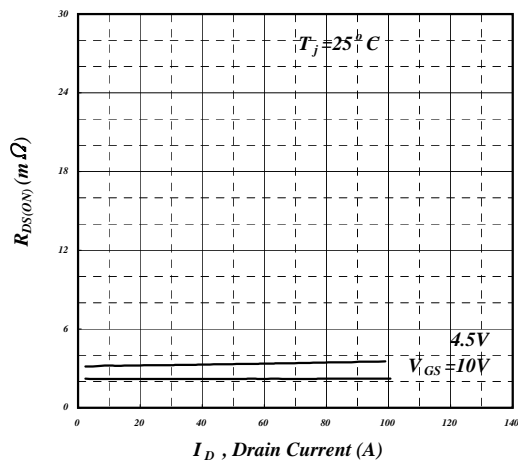
**Channel-2**



**Fig 13. Normalized  $BV_{DSS}$  v.s. Junction Temperature**



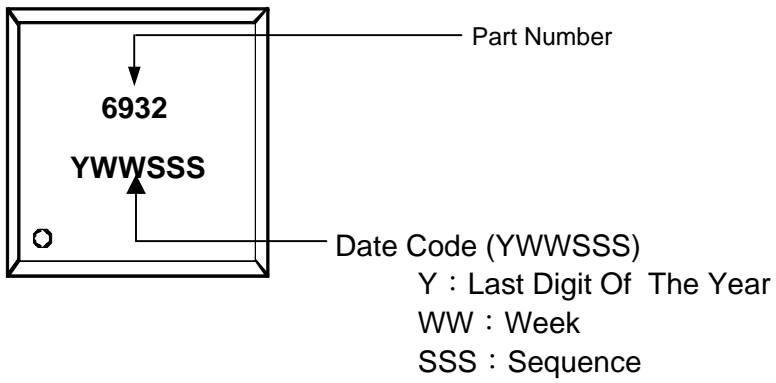
**Fig 14. Total Power Dissipation**



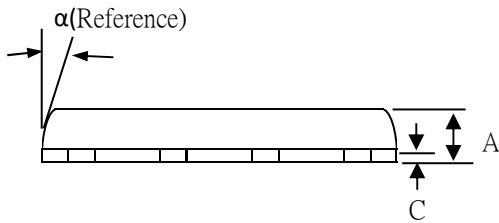
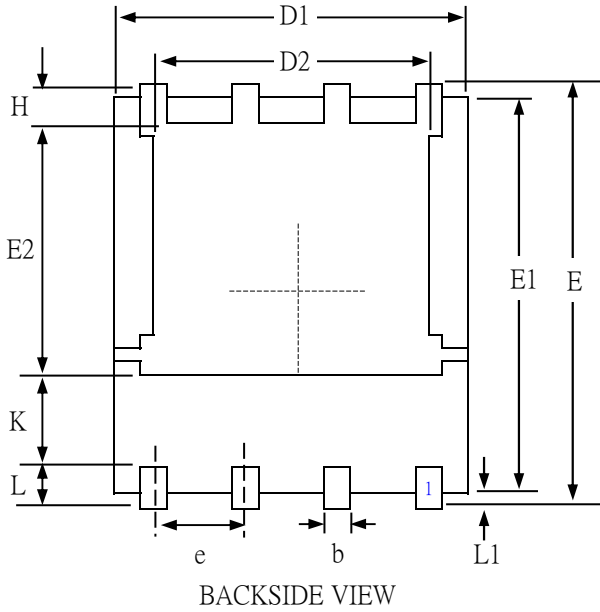
**Fig 15. Typ. Drain-Source on State Resistance**

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**MARKING INFORMATION**



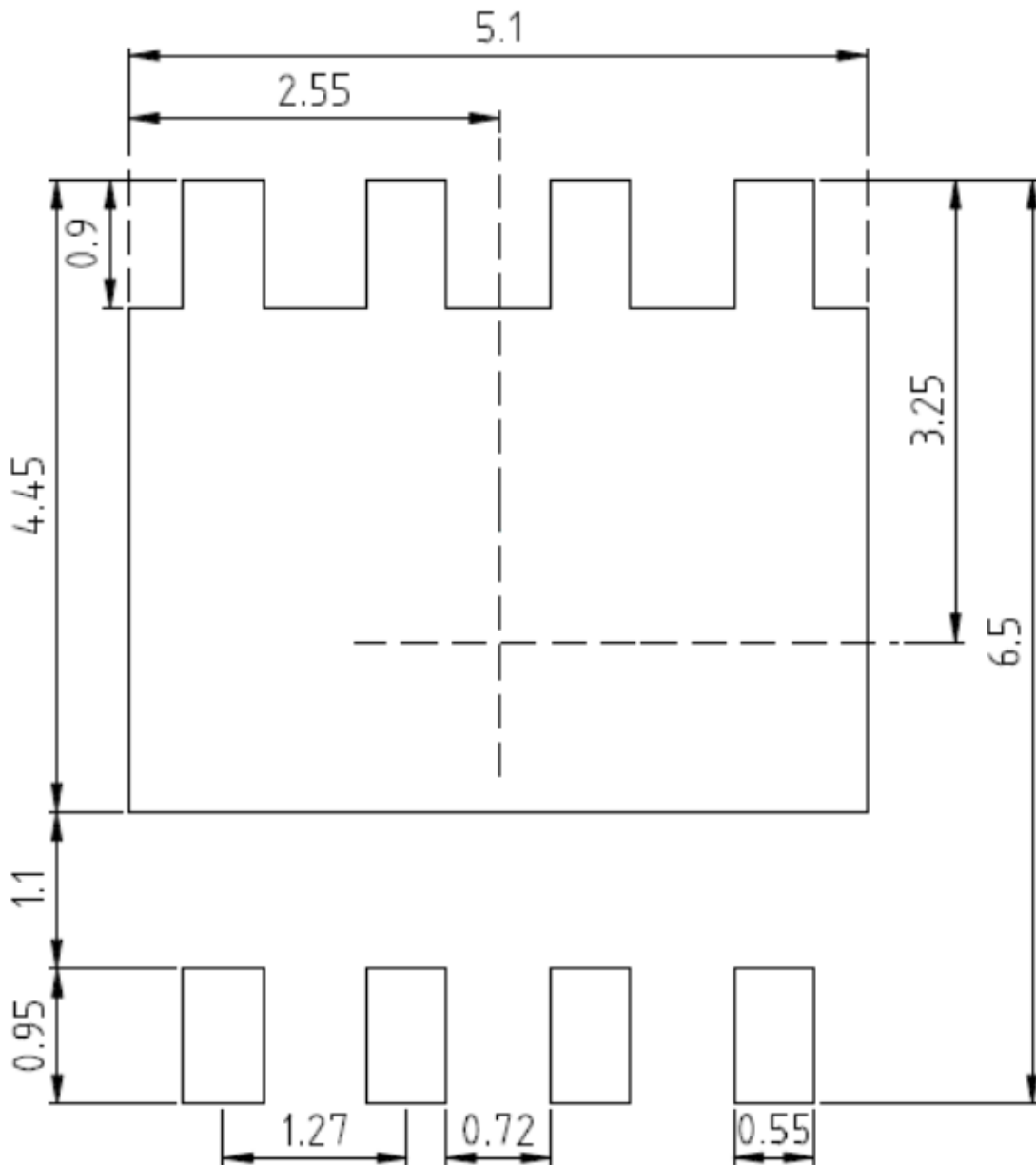
**Package Outline : PMPAK 5x6**



SYMBOLS	Millimeters		
	MIN	NOM	MAX
A	0.90	1.10	1.30
b	0.33	0.41	0.51
C	0.254(Ref.)		
D1	4.80	4.90	5.10
D2	3.61	4.00	4.40
E	5.80	6.03	6.25
E1 (Ref.)	5.60	5.75	5.90
E2 (Ref.)	3.30	3.55	3.80
e	1.27 BSC		
H	0.35	—	0.90
K (Ref.)	1.00	1.275	—
L	0.35	0.55	0.75
L1	0.06	0.13	0.20
$\alpha$ (Ref.)	0°	—	12°

- 1.All dimension are in millimeters.
- 2.Dimension does not include burrs and mold flash/protrusions.
- 3.The outline schematic is not to scale and slightly different from the actual product appearance.

**PMPAK 5X6(E-TYPE) FOOTPRINT :**



UNIT: mm