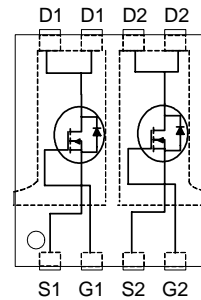


- ▼ Simple Drive Requirement
- ▼ Fast Switching Characteristic
- ▼ RoHS Compliant & Halogen-Free

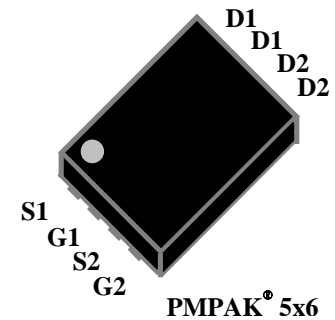
### Description

XP6A038 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 PMPAK® 5x6 package is special for voltage conversion application using standard infrared reflow technique with the backside heat sink to achieve the good thermal performance.



$BV_{DSS}$	60V
$R_{DS(ON)}$	38mΩ



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

Symbol	Parameter	Rating	Units
$V_{DS}$	Drain-Source Voltage	60	V
$V_{GS}$	Gate-Source Voltage	+20	V
$I_D @ T_C=25^\circ\text{C}$	Drain Current, $V_{GS} @ 10\text{V}$	16.2	A
$I_D @ T_A=25^\circ\text{C}$	Drain Current, $V_{GS} @ 10\text{V}^3$	6.7	A
$I_D @ T_A=70^\circ\text{C}$	Drain Current, $V_{GS} @ 10\text{V}^3$	5.3	A
$I_{DM}$	Pulsed Drain Current <sup>1</sup>	30	A
$P_D @ T_A=25^\circ\text{C}$	Total Power Dissipation	3.57	W
$E_{AS}$	Single Pulse Avalanche Energy <sup>4</sup>	18	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
Rthj-c	Maximum Thermal Resistance, Junction-case	6	$^\circ\text{C}/\text{W}$
Rthj-a	Maximum Thermal Resistance, Junction-ambient <sup>3</sup>	35	$^\circ\text{C}/\text{W}$

**Electrical Characteristics @T<sub>j</sub>=25°C(unless otherwise specified)**

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =250uA	60	-	-	V
R <sub>DS(ON)</sub>	Static Drain-Source On-Resistance <sup>2</sup>	V <sub>GS</sub> =10V, I <sub>D</sub> =7A	-	-	38	mΩ
		V <sub>GS</sub> =4.5V, I <sub>D</sub> =4A	-	-	55	mΩ
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250uA	1.3	-	3	V
g <sub>fs</sub>	Forward Transconductance	V <sub>DS</sub> =5V, I <sub>D</sub> =7A	-	22	-	S
I <sub>DSS</sub>	Drain-Source Leakage Current	V <sub>DS</sub> =48V, V <sub>GS</sub> =0V	-	-	25	uA
I <sub>GSS</sub>	Gate-Source Leakage	V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V	-	-	±0.1	uA
Q <sub>g</sub>	Total Gate Charge <sup>5</sup>	I <sub>D</sub> =7A	-	20	32	nC
Q <sub>gs</sub>	Gate-Source Charge <sup>5</sup>	V <sub>DS</sub> =30V	-	5	-	nC
Q <sub>gd</sub>	Gate-Drain ("Miller") Charge <sup>5</sup>	V <sub>GS</sub> =10V	-	4	-	nC
t <sub>d(on)</sub>	Turn-on Delay Time <sup>5</sup>	V <sub>DS</sub> =30V	-	9	-	ns
t <sub>r</sub>	Rise Time <sup>5</sup>	I <sub>D</sub> =1A	-	5.5	-	ns
t <sub>d(off)</sub>	Turn-off Delay Time <sup>5</sup>	R <sub>G</sub> =3.3Ω	-	23	-	ns
t <sub>f</sub>	Fall Time <sup>5</sup>	V <sub>GS</sub> =10V	-	8	-	ns
C <sub>iss</sub>	Input Capacitance <sup>5</sup>	V <sub>GS</sub> =0V	-	1150	1840	pF
C <sub>oss</sub>	Output Capacitance <sup>5</sup>	V <sub>DS</sub> =25V	-	70	-	pF
C <sub>rss</sub>	Reverse Transfer Capacitance <sup>5</sup>	f=1.0MHz	-	52	-	pF
R <sub>g</sub>	Gate Resistance	f=1.0MHz	-	2	4	Ω

**Source-Drain Diode**

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
V <sub>SD</sub>	Forward On Voltage <sup>2</sup>	I <sub>S</sub> =2.9A, V <sub>GS</sub> =0V	-	-	1.3	V
t <sub>rr</sub>	Reverse Recovery Time <sup>5</sup>	I <sub>S</sub> =7A, V <sub>GS</sub> =0V	-	14	-	ns
Q <sub>rr</sub>	Reverse Recovery Charge <sup>5</sup>	di/dt=100A/μs	-	8	-	nC

**Notes:**

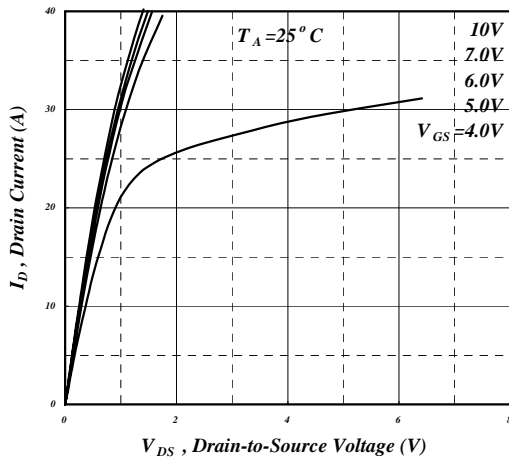
- 1.Pulse width limited by Max. junction temperature.
- 2.Pulse test
- 3.Surface mounted on 1 in<sup>2</sup> copper pad of FR4 board, t ≤10sec ; 85 °C/W on steady state.
- 4.Starting T<sub>j</sub>=25°C , V<sub>DD</sub>=30V , L=1mH , R<sub>G</sub>=25Ω , V<sub>GS</sub>=10V , I<sub>AS</sub>=6A
- 5.Guaranteed by design.

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

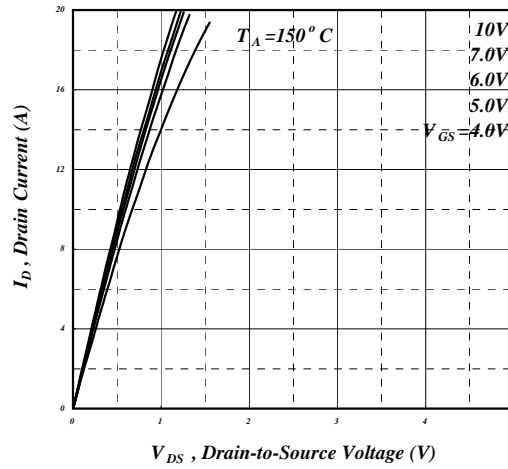
USE OF THIS PRODUCT AS A CRITICAL COMPONENT IN LIFE SUPPORT, AUTOMOTIVE OR OTHER SIMILAR SYSTEMS IS NOT AUTHORIZED.

XSEMI DOES NOT ASSUME ANY LIABILITY ARISING OUT OF THE APPLICATION OR USE OF ANY PRODUCT OR CIRCUIT DESCRIBED HEREIN; NEITHER DOES IT CONVEY ANY LICENSE UNDER ITS PATENT RIGHTS, NOR THE RIGHTS OF OTHERS.

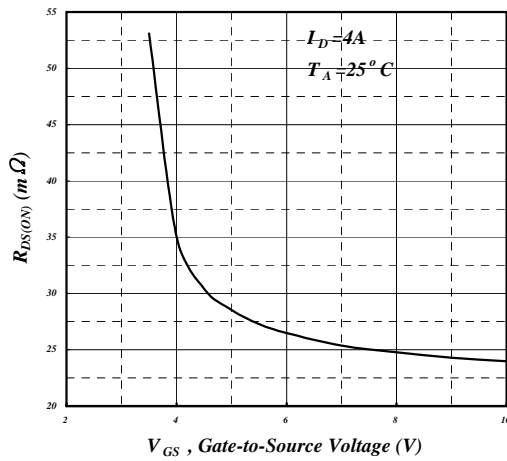
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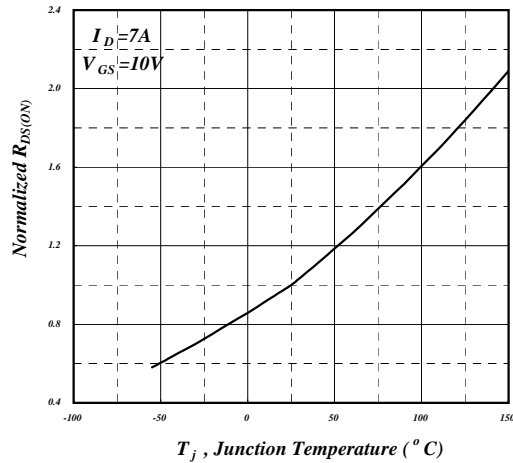
**Fig 1. Typical Output Characteristics**



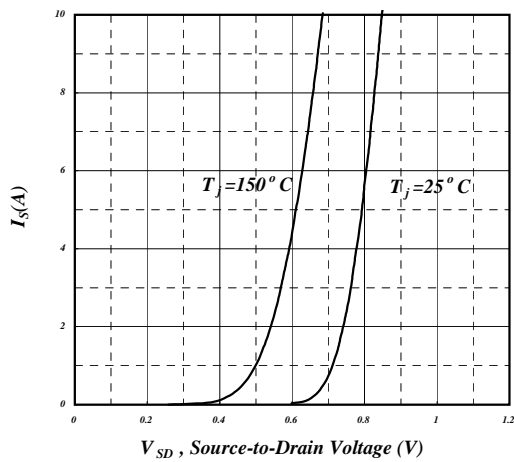
**Fig 2. Typical Output Characteristics**



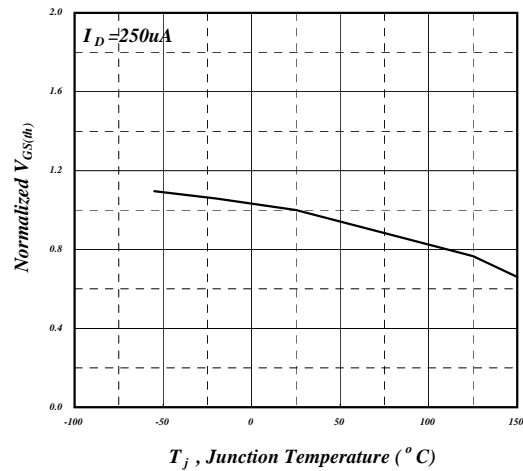
**Fig 3. On-Resistance v.s. Gate Voltage**



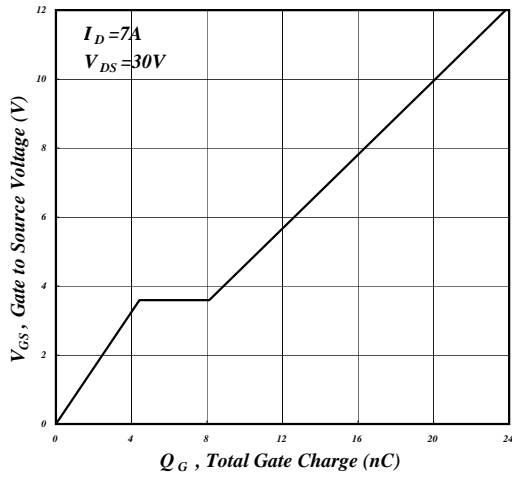
**Fig 4. Normalized On-Resistance v.s. Junction Temperature**



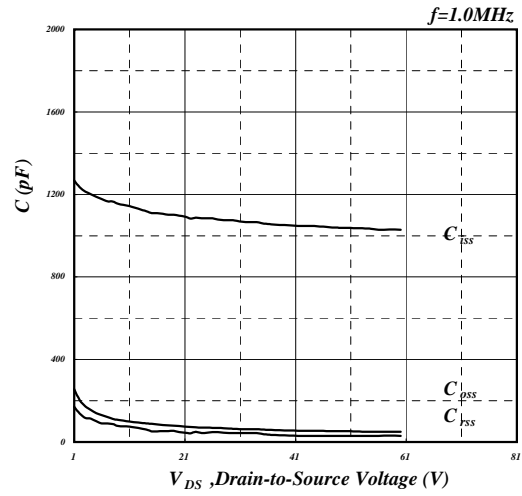
**Fig 5. Forward Characteristic of Reverse Diode**



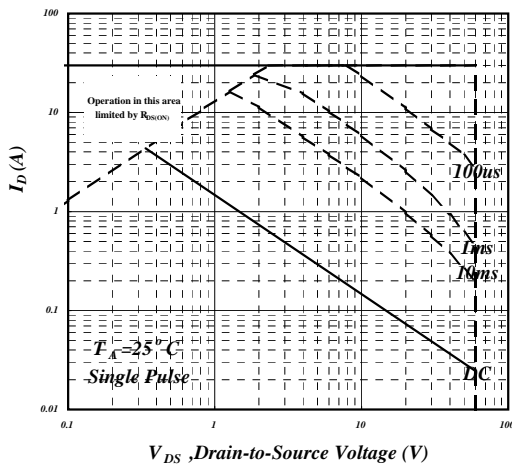
**Fig 6. Gate Threshold Voltage v.s. Junction Temperature**



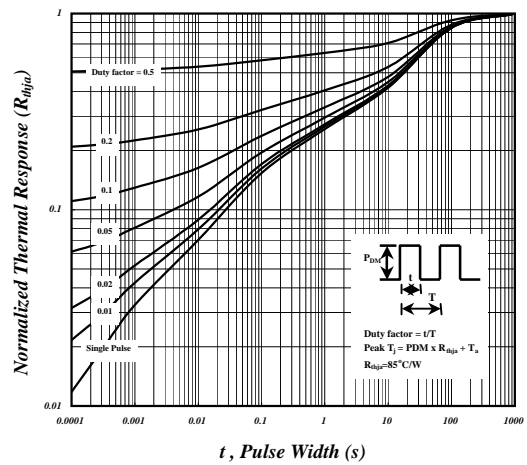
**Fig 7. Gate Charge Characteristics**



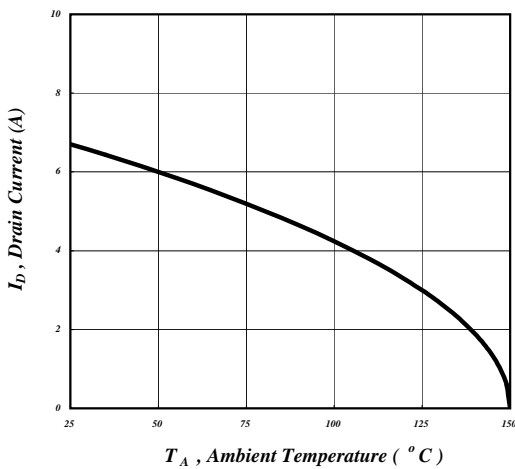
**Fig 8. Typical Capacitance Characteristics**



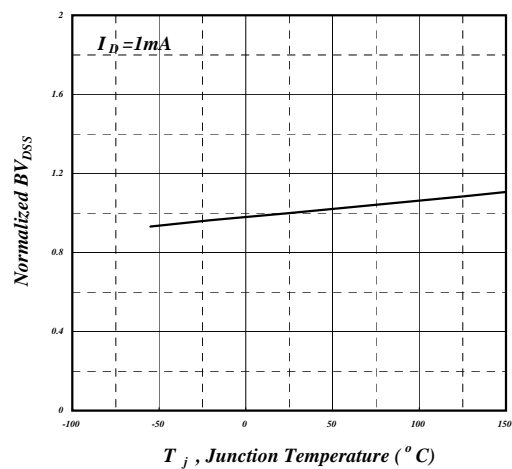
**Fig 9. Maximum Safe Operating Area**



**Fig 10. Effective Transient Thermal Impedance**



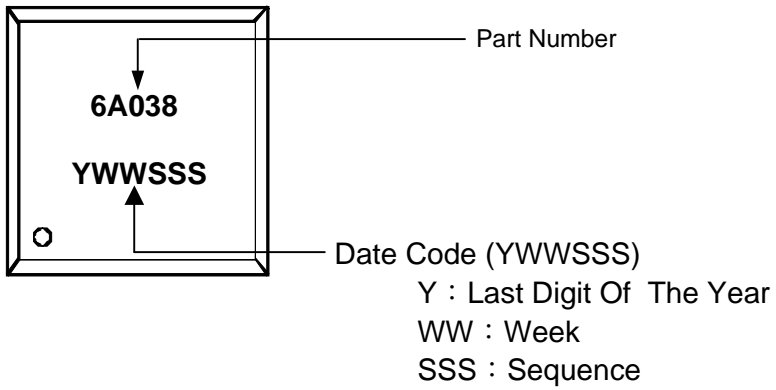
**Fig 11. Drain Current v.s. Ambient Temperature**



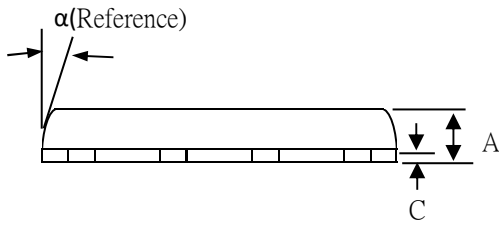
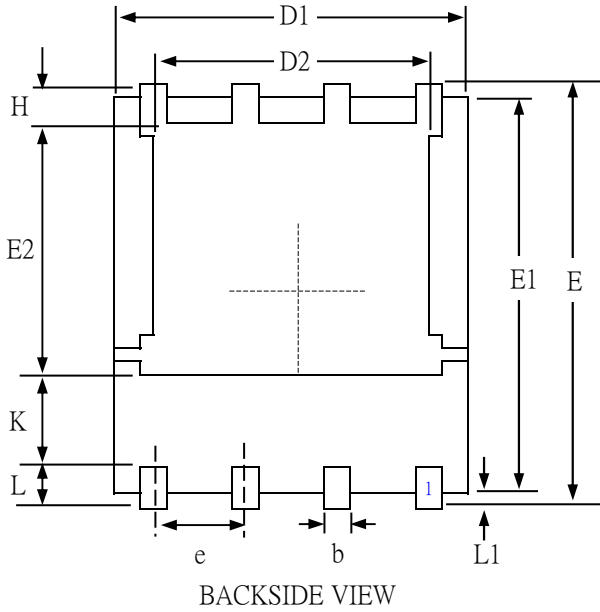
**Fig 12. Normalized  $BV_{DSS}$  v.s. Junction Temperature**

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**MARKING INFORMATION**



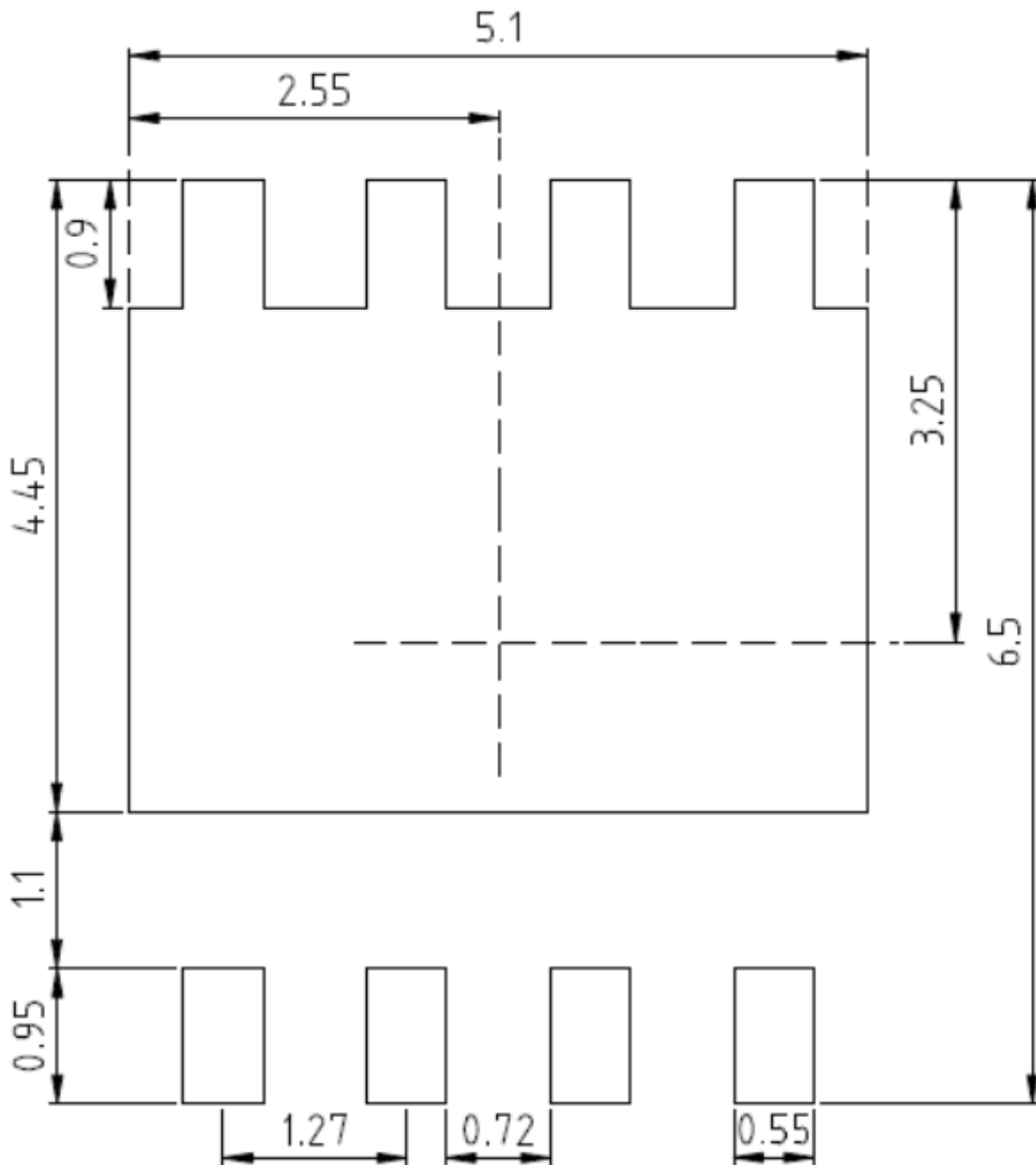
**Package Outline : PMPAK 5x6**



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