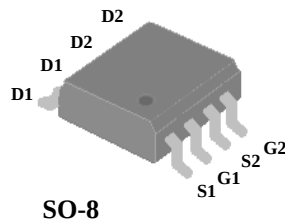


- ▼ Simple Drive Requirement
- ▼ Low Gate Charge
- ▼ Fast Switching Performance
- ▼ RoHS Compliant & Halogen-Free

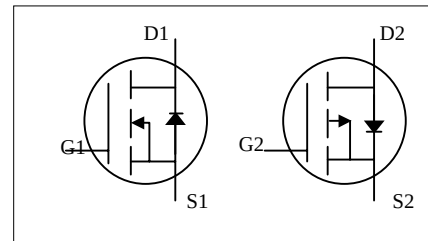


N-CH	BV_{DSS}	60V
	$R_{DS(ON)}$	36m Ω
	I_D^3	5.5A
P-CH	BV_{DSS}	-60V
	$R_{DS(ON)}$	90m Ω
	I_D^3	-3.7A

Description

XP6C036A 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 SO-8 package is widely preferred for all commercial-industrial surface mount applications using infrared reflow technique and suited for voltage conversion or switch applications.



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

Symbol	Parameter	Rating		Units
		N-channel	P-channel	
V_{DS}	Drain-Source Voltage	60	-60	V
V_{GS}	Gate-Source Voltage	± 20	± 20	V
$I_D@T_A=25^\circ\text{C}$	Drain Current, $V_{GS} @ 10V^3$	5.5	-3.7	A
$I_D@T_A=70^\circ\text{C}$	Drain Current, $V_{GS} @ 10V^3$	4.6	-3.1	A
I_{DM}	Pulsed Drain Current ¹	30	-20	A
$P_D@T_A=25^\circ\text{C}$	Total Power Dissipation	2.4		W
E_{AS}	Single Pulse Avalanche Energy ⁵	18		mJ
T_{STG}	Storage Temperature Range	-55 to 175		$^\circ\text{C}$
T_J	Operating Junction Temperature Range	-55 to 175		$^\circ\text{C}$

Thermal Data

Symbol	Parameter	Value	Unit
R_{thj-a}	Maximum Thermal Resistance, Junction-ambient ³	62.5	$^\circ\text{C/W}$

N-CH 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	60	-	-	V
R _{DS(ON)}	Static Drain-Source On-Resistance ²	V _{GS} =10V, I _D =5A	-	-	36	mΩ
		V _{GS} =4.5V, I _D =3A	-	-	42	mΩ
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =250uA	1.4	-	3	V
g _{fs}	Forward Transconductance	V _{DS} =10V, I _D =5A	-	19	-	S
I _{DSS}	Drain-Source Leakage Current	V _{DS} =48V, V _{GS} =0V	-	-	25	uA
I _{GSS}	Gate-Source Leakage	V _{GS} =±20V, V _{DS} =0V	-	-	±0.1	uA
Q _g (V _{GS} =10V)	Total Gate Charge ⁴	I _D =5A V _{DS} =30V	-	33	53	nC
Q _g (V _{GS} =4.5V)	Total Gate Charge ⁴		-	16	26	nC
Q _{gs}	Gate-Source Charge ⁴		-	8	-	nC
Q _{gd}	Gate-Drain ("Miller") Charge ⁴		-	6	-	nC
t _{d(on)}	Turn-on Delay Time ⁴	V _{DS} =30V	-	11	-	ns
t _r	Rise Time ⁴	I _D =1A	-	7	-	ns
t _{d(off)}	Turn-off Delay Time ⁴	R _G =3.3Ω	-	30	-	ns
t _f	Fall Time ⁴	V _{GS} =10V	-	11	-	ns
C _{iss}	Input Capacitance ⁴	V _{GS} =0V	-	1820	2912	pF
C _{oss}	Output Capacitance ⁴	V _{DS} =30V	-	100	-	pF
C _{rss}	Reverse Transfer Capacitance ⁴	f=1.0MHz	-	68	-	pF
R _g	Gate Resistance	f=1.0MHz	-	0.8	2	Ω

Source-Drain Diode

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
V _{SD}	Forward On Voltage ²	I _S =1.9A, V _{GS} =0V	-	-	1.3	V
t _{rr}	Reverse Recovery Time ⁴	I _S =5A, V _{GS} =0V	-	22	-	ns
Q _{rr}	Reverse Recovery Charge ⁴	dI/dt=100A/μs	-	20	-	nC

P-CH 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	-60	-	-	V
R _{DS(ON)}	Static Drain-Source On-Resistance ²	V _{GS} =-10V, I _D =-4A	-	-	90	mΩ
		V _{GS} =-4.5V, I _D =-3A	-	-	125	mΩ
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =-250uA	-1.4	-	-3	V
g _{fs}	Forward Transconductance	V _{DS} =-10V, I _D =-4A	-	8	-	S
I _{DSS}	Drain-Source Leakage Current	V _{DS} =-48V, V _{GS} =0V	-	-	-25	uA
I _{GSS}	Gate-Source Leakage	V _{GS} =±20V, V _{DS} =0V	-	-	±0.1	uA
Q _g (V _{GS} =-10V)	Total Gate Charge ⁴	I _D =-4A V _{DS} =-30V	-	18	29	nC
Q _g (V _{GS} =-4.5V)	Total Gate Charge ⁴		-	9	15	nC
Q _{gs}	Gate-Source Charge ⁴		-	4	-	nC
Q _{gd}	Gate-Drain ("Miller") Charge ⁴		-	3.5	-	nC
t _{d(on)}	Turn-on Delay Time ⁴	V _{DS} =-30V	-	11	-	ns
t _r	Rise Time ⁴	I _D =-1A	-	5	-	ns
t _{d(off)}	Turn-off Delay Time ⁴	R _G =3.3Ω	-	31	-	ns
t _f	Fall Time ⁴	V _{GS} =-10V	-	9	-	ns
C _{iss}	Input Capacitance ⁴	V _{GS} =0V	-	930	1488	pF
C _{oss}	Output Capacitance ⁴	V _{DS} =-30V	-	55	-	pF
C _{rss}	Reverse Transfer Capacitance ⁴	f=1.0MHz	-	50	-	pF
R _g	Gate Resistance	f=1.0MHz	-	9	18	Ω

Source-Drain Diode

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
V _{SD}	Forward On Voltage ²	I _S =-1.9A, V _{GS} =0V	-	-	-1.3	V
t _{rr}	Reverse Recovery Time ⁴	I _S =-4A, V _{GS} =0V dI/dt=-100A/μs	-	16	-	ns
Q _{rr}	Reverse Recovery Charge ⁴		-	12	-	nC

Notes:

- 1.Pulse width limited by Max. junction temperature.
- 2.Pulse test
- 3.Surface mounted on 1 in² copper pad of FR4 board, t ≤10sec ; 135 °C/W when mounted on Min. copper pad.
- 4.Guaranteed by design.
- 5.Starting T_j=25°C , V_{DD}=50V , L=1mH , R_G=25Ω , V_{GS}=10V , I_{AS}=6A
- 6.These curves are based on the junction-to-case thermal impedance which is measured with the device mounted to a large heatsink, assuming a maximum junction temperature of T_{J(MAX)}=175°C.

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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XSEMI RESERVES THE RIGHT TO MAKE CHANGES WITHOUT FURTHER NOTICE TO ANY PRODUCTS HEREIN TO IMPROVE RELIABILITY, FUNCTION OR DESIGN.

N-Channel

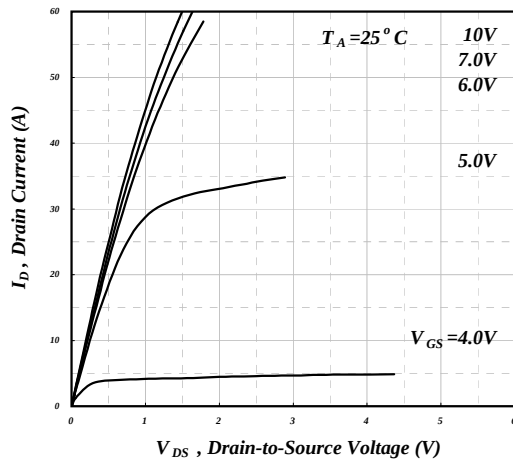


Fig 1. Typical Output Characteristics

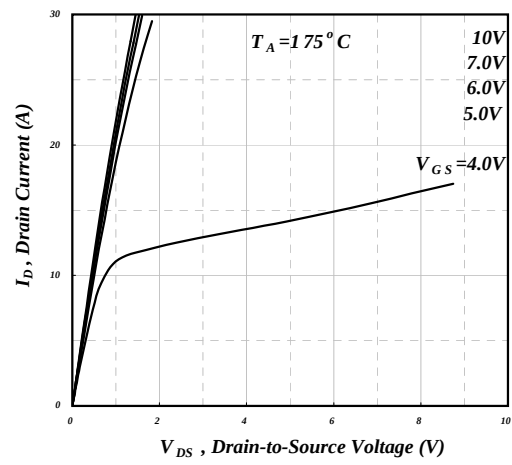


Fig 2. Typical Output Characteristics

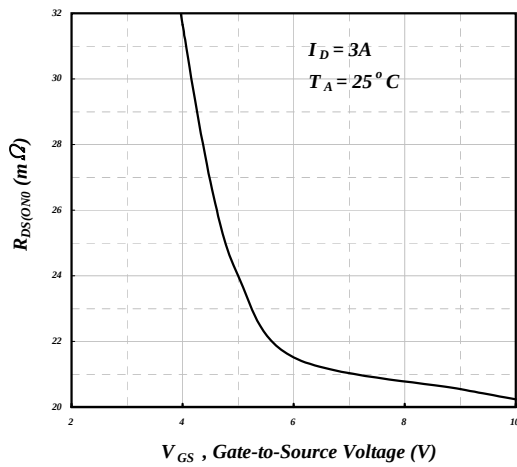
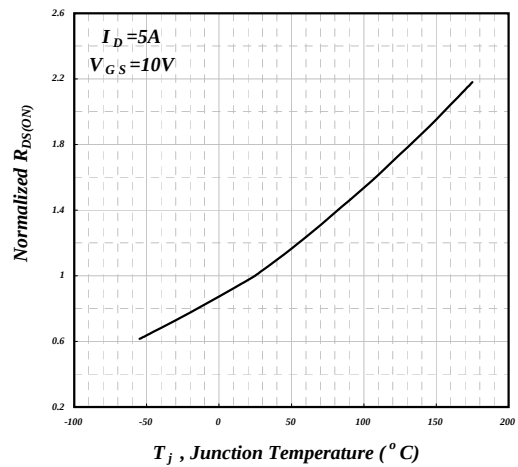
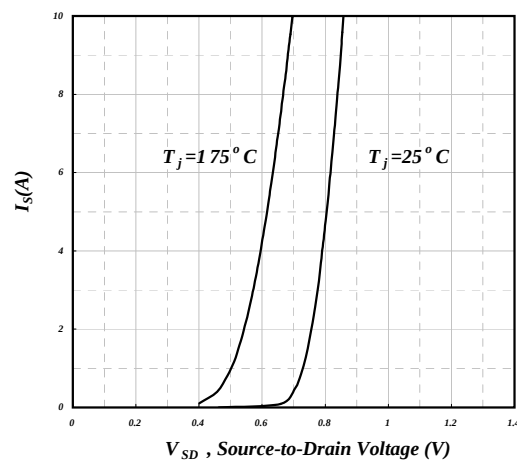


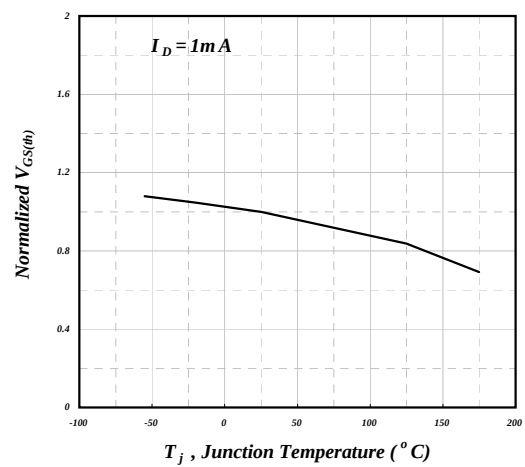
Fig 3. On-Resistance v.s. Gate Voltage



**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**

N-Channel

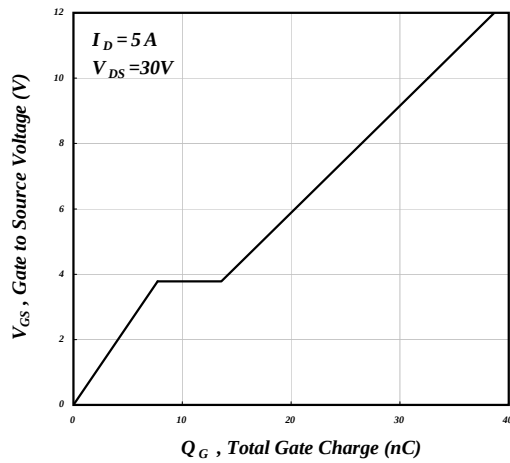


Fig 7. Gate Charge Characteristics

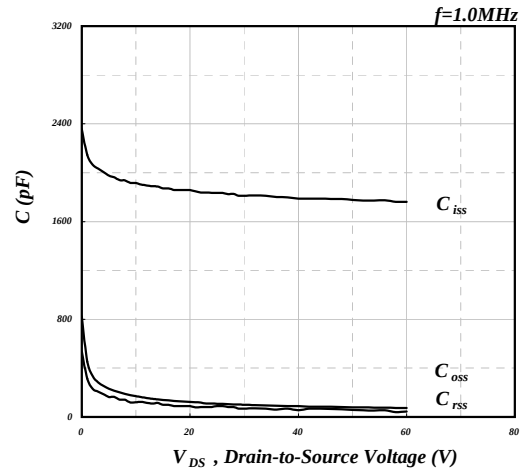


Fig 8. Typical Capacitance Characteristics

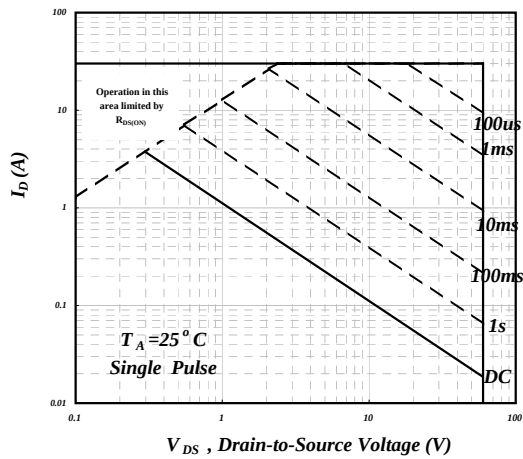


Fig 9. Maximum Safe Operating Area⁶

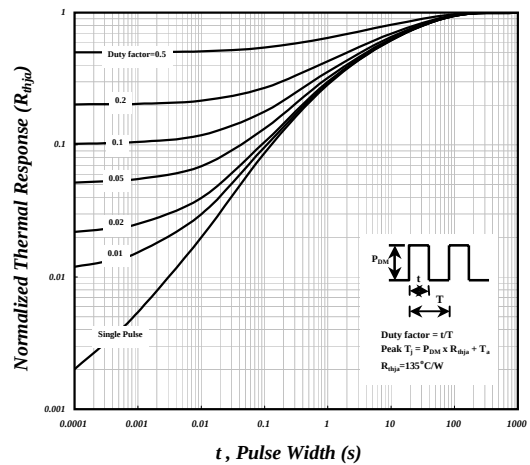


Fig 10. Effective Transient Thermal Impedance

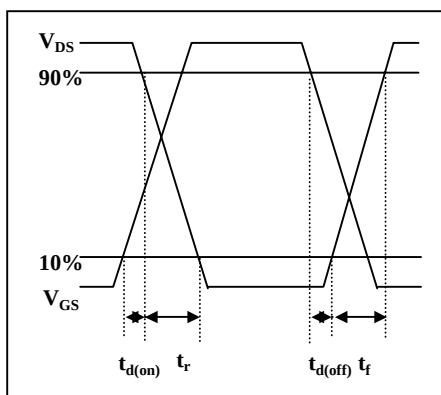


Fig 11. Switching Time Waveform

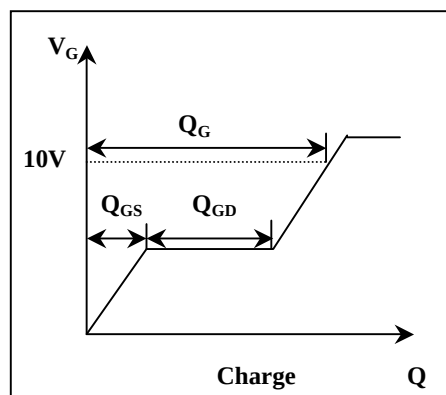


Fig 12. Gate Charge Waveform

N-Channel

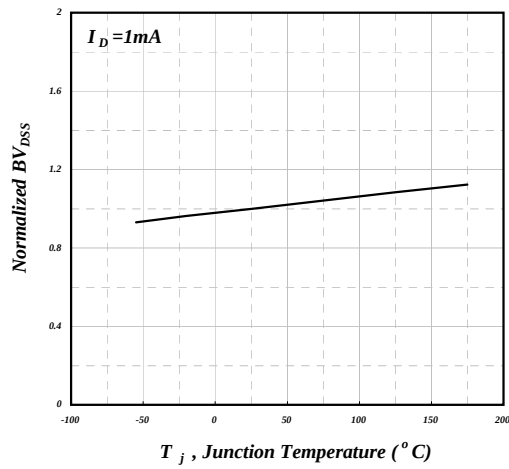


Fig 13. Normalized BV_{DSS} v.s. Junction Temperature

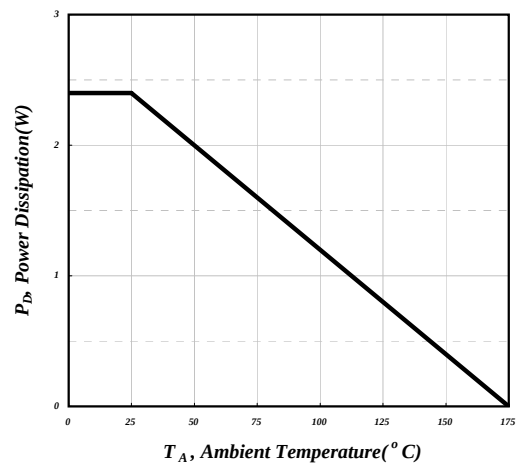


Fig 14. Total Power Dissipation

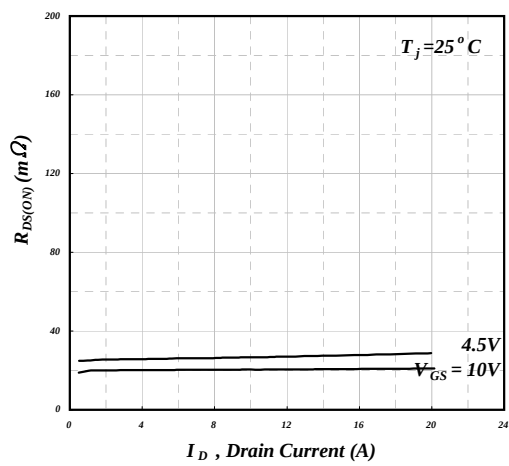


Fig 15. Typ. Drain-Source on State Resistance

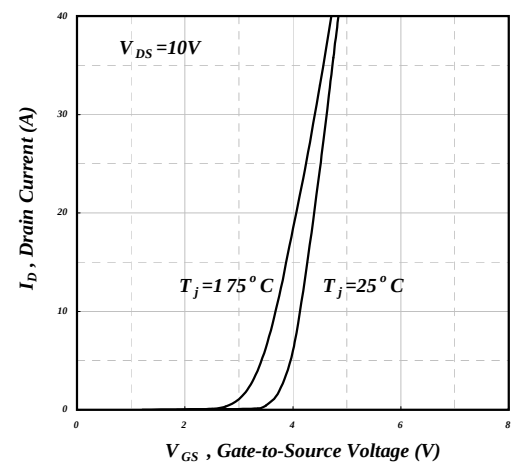


Fig 16. Transfer Characteristics

P-Channel

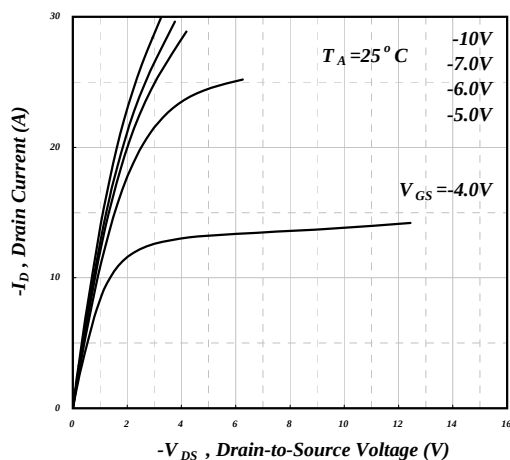


Fig 1. Typical Output Characteristics

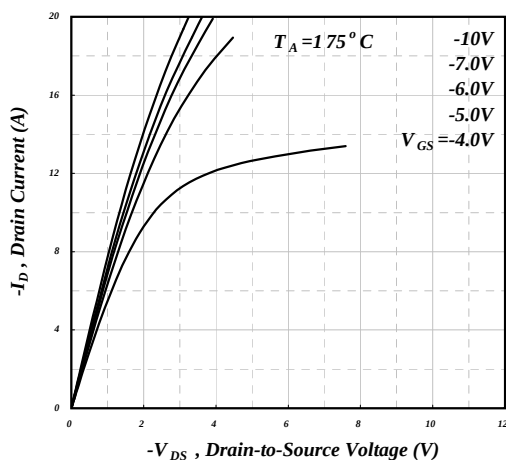


Fig 2. Typical Output Characteristics

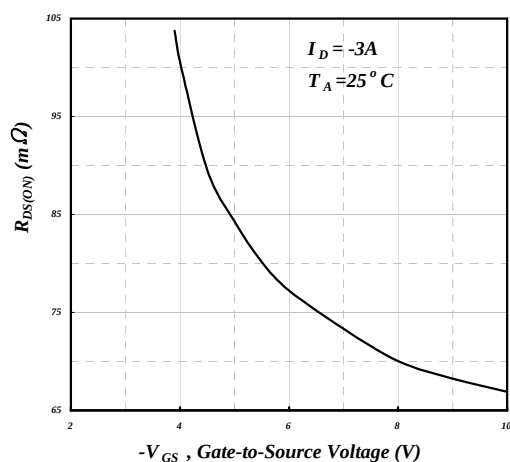


Fig 3. On-Resistance v.s. Gate Voltage

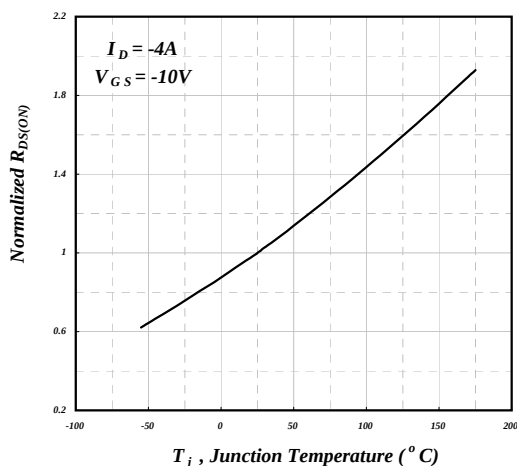


Fig 4. Normalized On-Resistance v.s. Junction Temperature

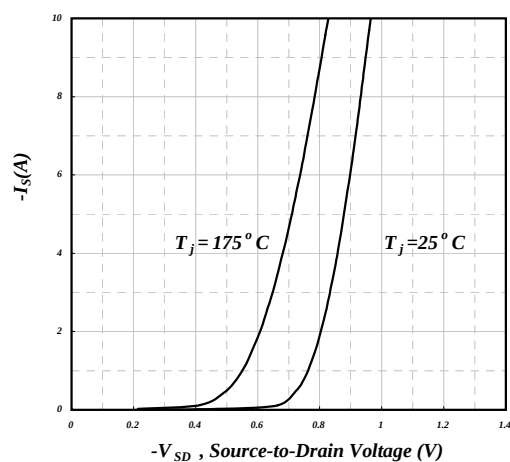


Fig 5. Forward Characteristic of Reverse Diode

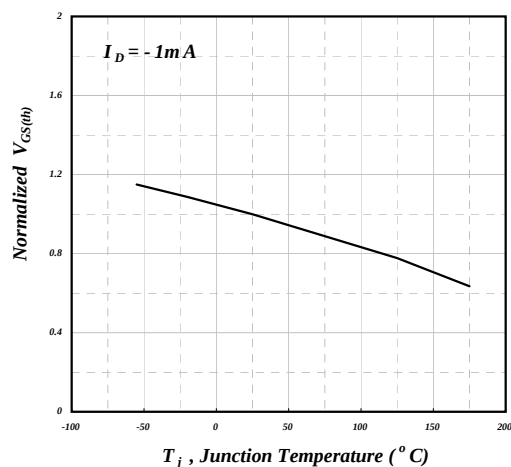


Fig 6. Gate Threshold Voltage v.s. Junction Temperature

P-Channel

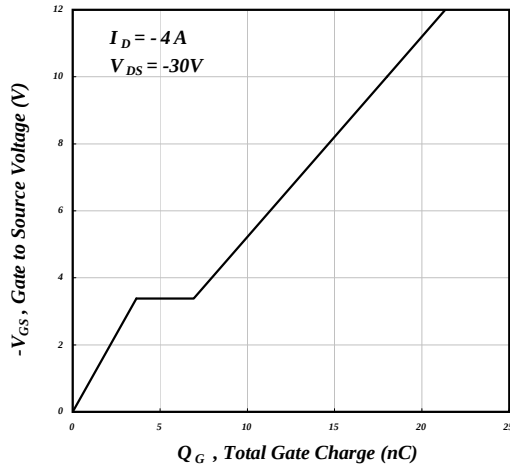


Fig 7. Gate Charge Characteristics

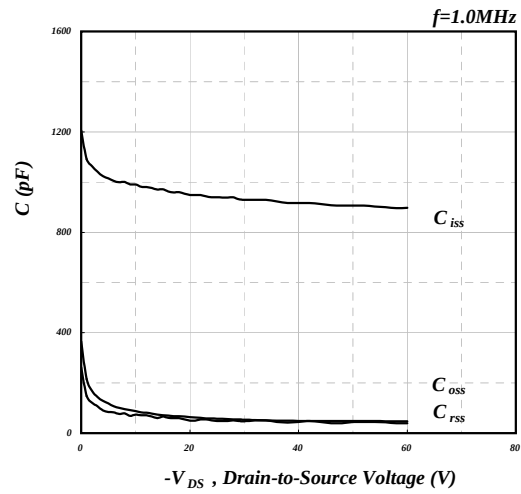


Fig 8. Typical Capacitance Characteristics

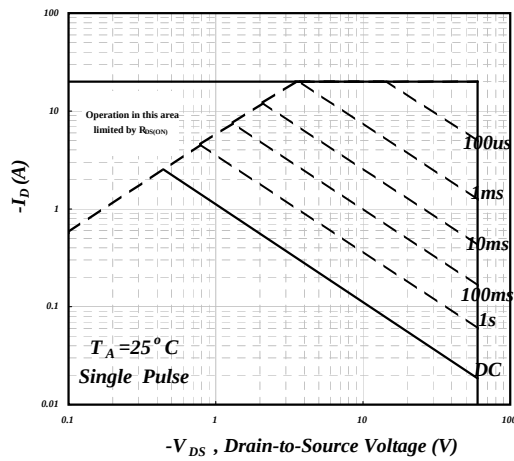


Fig 9. Maximum Safe Operating Area⁶

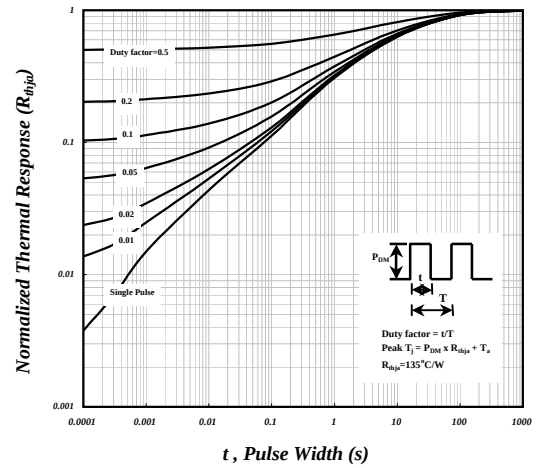


Fig 10. Effective Transient Thermal Impedance

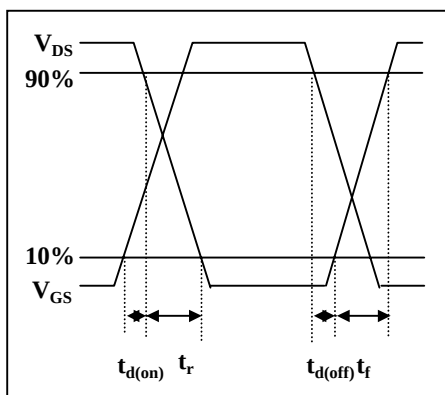


Fig 11. Switching Time Waveform

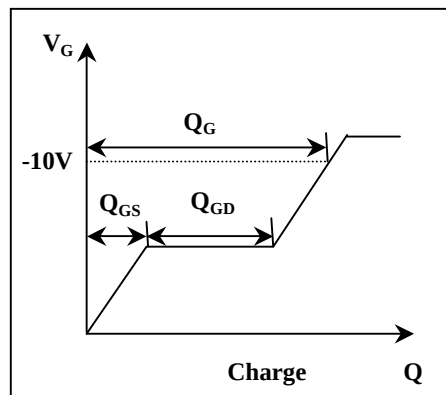


Fig 12. Gate Charge Waveform

P-Channel

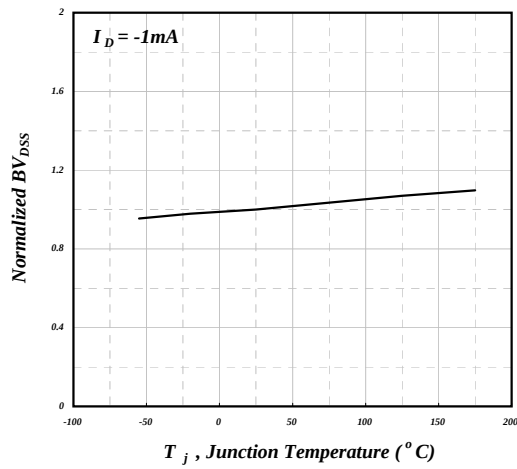


Fig 13. Normalized BV_{DSS} v.s. Junction Temperature

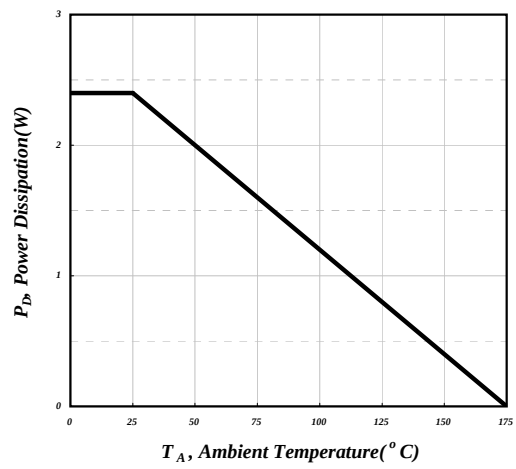


Fig 14. Total Power Dissipation

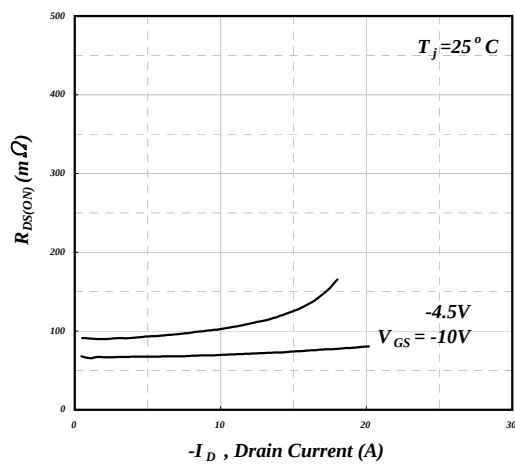


Fig 15. Typ. Drain-Source on State Resistance

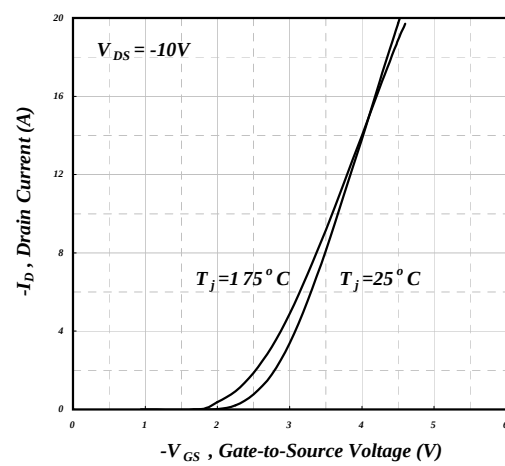
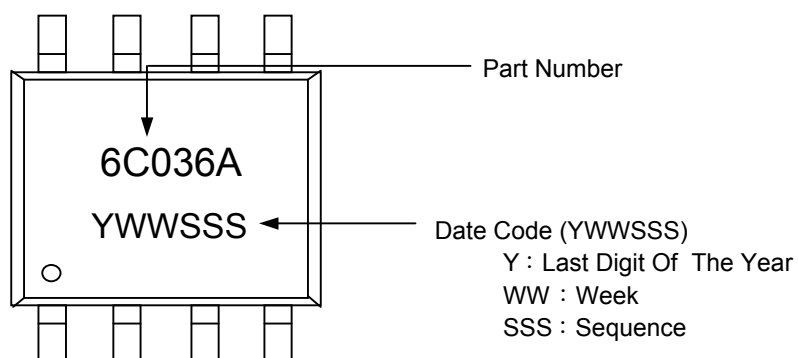
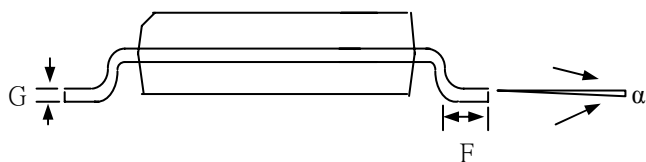
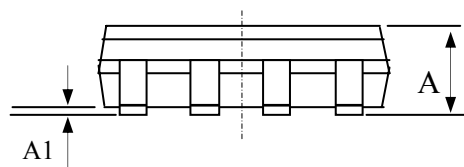
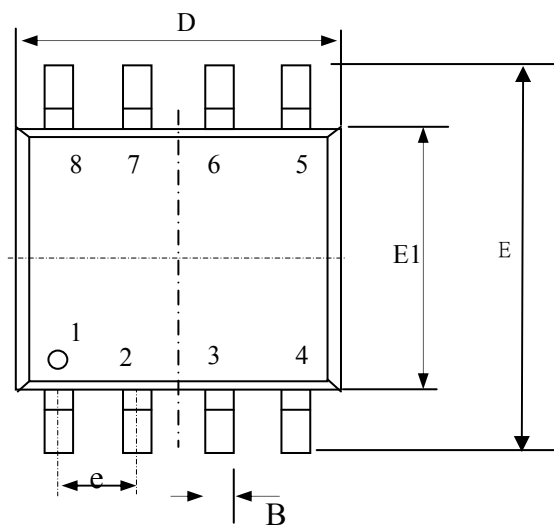


Fig 16. Transfer Characteristics

MARKING INFORMATION



Package Outline : SO-8



SYMBOLS	Millimeters		
	MIN	NOM	MAX
A	1.35	1.55	1.75
A1	0.05	0.15	0.25
B	0.30	0.41	0.51
D	4.80	5.05	5.30
E	5.79	6.00	6.20
E1	3.70	3.90	4.10
e	1.27 TYP		
G	0.17	0.21	0.25
F	0.38	0.83	1.27
α	0°	4°	8°

- 1.All Dimension Are In Millimeters.
- 2.Dimension Does Not Include Mold Protrusions.

SO-8 FOOTPRINT :