

150V P-Channel Enhancement Mode MOSFET

General Features

- High Dense Cell Design for Low $R_{DS(ON)}$
- Rugged Polysilicon Gate Cell Structure
- RoHS Compliant
- Halogen-free Available
- 100% Avalanche Tested

Part Number	BV_{DSX}	$R_{DS(ON)}$ (Typ.)	I_D
FTE02P15G	-150V	0.20 Ω	-2.3A
FTP02P15G	-150V	0.20 Ω	-15A

TO-220AB

SOP-8



Applications

- Reset Switch for Active Clamp Reset
- DC-DC Converters

Ordering Information

Part Number	Package	Marking	Remark
FTE02P15G	SOP-8	02P15	Halogen Free
FTP02P15G	TO-220AB	02P15	Halogen Free

Absolute Maximum Ratings

 $T_A = 25^\circ\text{C}$ unless otherwise

Symbol	Parameter	FTE02P15G	FTP02P15G	Unit
V_{DSX}	Drain-to-Source Voltage ^[1]	-150	-150	V
V_{DGX}	Drain-to-Gate Voltage ^[1]	-150	-150	V
I_D	Continuous Drain Current	-2.3	-15	A
I_{DM}	Pulsed Drain Current ^[2]	-9.2	-60	
P_D	Power Dissipation	2.5	100	W
	Derating Factor above 25°C	0.02	0.8	W/°C
V_{GS}	Gate-to-Source Voltage	±20		V
E_{AS}	Single Pulse Avalanche Energy ^[3]	200		mJ
I_{AR}	Avalanche Current ^[2]	-4.0		A
T_L	Soldering Temperature Distance of 1.6mm from case for 10 seconds	300		°C
T_J and T_{STG}	Operating and Storage Temperature Range	-55 to 150		

Caution: Stresses greater than those listed in the "Absolute Maximum Ratings" may cause permanent damage to the device.

Thermal Characteristics

Symbol	Parameter	FTE02P15G	FTP02P15G	Unit
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	50	1.25	°C/W

Electrical Characteristics

OFF Characteristics

 $T_A = 25^\circ\text{C}$ unless otherwise specified

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
BV_{DSX}	Drain-to-Source Breakdown Voltage	-150	--	--	V	$V_{GS}=0V, I_{DS}=-250\mu A$
I_{DSS}	Drain-to-Source Leakage Current	--	--	-1	μA	$V_{DS}=-150V, V_{GS}=0V$
I_{GSS}	Gate-to-Source Leakage Current	--	--	100	nA	$V_{GS}=+20V, V_{DS}=0V$
		--	--	-100		$V_{GS}=-20V, V_{DS}=0V$

ON Characteristics

 $T_A = 25^\circ\text{C}$ unless otherwise specified

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
$R_{DS(ON)}$	Static Drain-to-Source On-Resistance	--	0.20	0.30	Ω	$V_{GS}=-10V, I_{DS}=-1.3A$ [4]
$V_{GS(th)}$	Gate Threshold Voltage	-1.8	--	-4.0	V	$V_{GD}=0V, I_{DS}=-250\mu A$
gfs	Forward Transconductance	--	4.5	--	S	$V_{DS}=-50V, I_{DS}=-1.3A$

Dynamic Characteristics

Essentially independent of operating temperature

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
C_{iss}	Input Capacitance	--	1420	--	pF	$V_{GS}=0V$ $V_{DS}=-25V$ $f=1.0MHz$
C_{oss}	Output Capacitance	--	180.5	--		
C_{rss}	Reverse Transfer Capacitance	--	38.4	--		
Q_g	Total Gate Charge	--	35.1	--	nC	$V_{DS}=-120V$ $I_D=-1.3A$ $V_{GS}=-10V$
Q_{gs}	Gate-to-Source Charge	--	9.6	--		
Q_{gd}	Gate-to-Drain (Miller) Charge	--	13.8	--		

Resistive Switching Characteristics

Essentially independent of operating temperature

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
$t_{d(on)}$	Turn-on Delay Time	--	16.5	--	ns	$V_{GS}=-10V$ $V_{DD}=-75V$ $R_G=6.5\Omega$ $I_D=-1.3A$
t_{rise}	Rise Time	--	14.6	--		
$t_{d(off)}$	Turn-off Delay Time	--	35.0	--		
t_{fall}	Fall Time	--	24.6	--		

Source-Drain Diode Characteristics

 $T_A = 25^\circ\text{C}$ unless otherwise specified

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
V_{SD}	Diode Forward Voltage	--	--	1.5	V	$I_{SD}=1.3A, V_{GS}=0V$

NOTE:

[1] $T_J = +25^\circ\text{C}$ to $+150^\circ\text{C}$.

[2] Repetitive rating, pulse width limited by maximum junction temperature.

[3] $L=25mH, R_G=25\Omega, I_{AS}=-4.0A$, Starting $T_J=25^\circ\text{C}$.

[4] Pulse width $\leq 380\mu s$; duty cycle $\leq 2\%$.

Typical Characteristics

Figure 1. Maximum Power Dissipation vs. Case Temperature

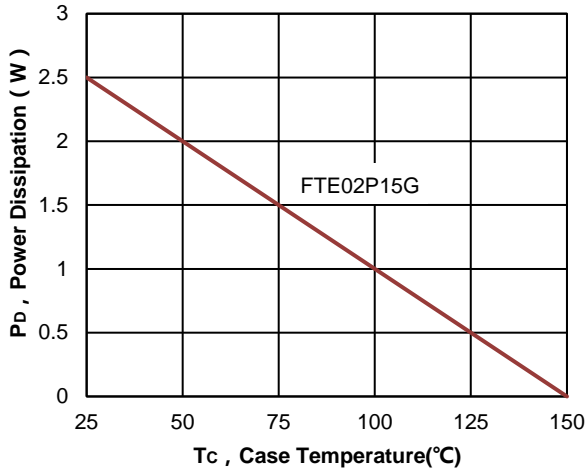


Figure 2. Maximum Power Dissipation vs. Case Temperature

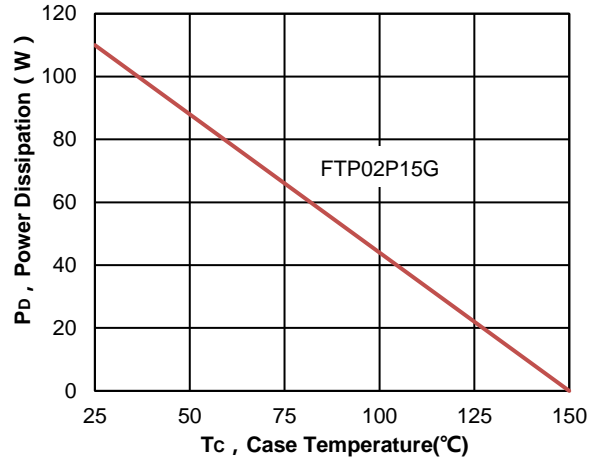


Figure 3. Maximum Continuous Drain Current vs. Case Temperature

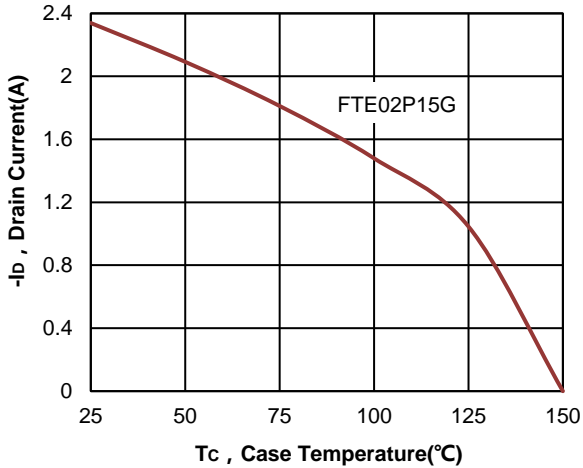


Figure 4. Maximum Continuous Drain Current vs Case Temperature

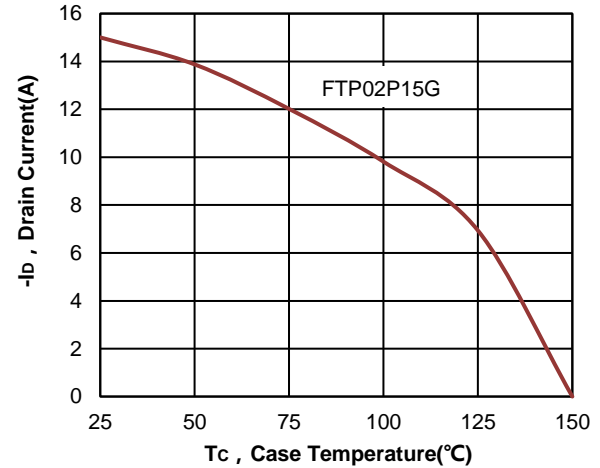


Figure 5. Typical Output Characteristics

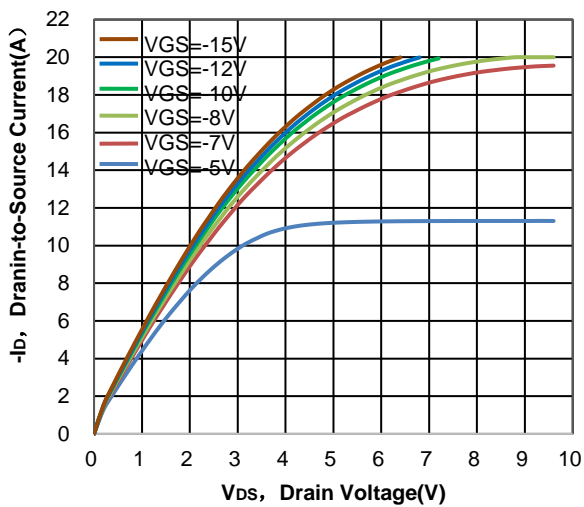


Figure 6. Typical Transfer Characteristics

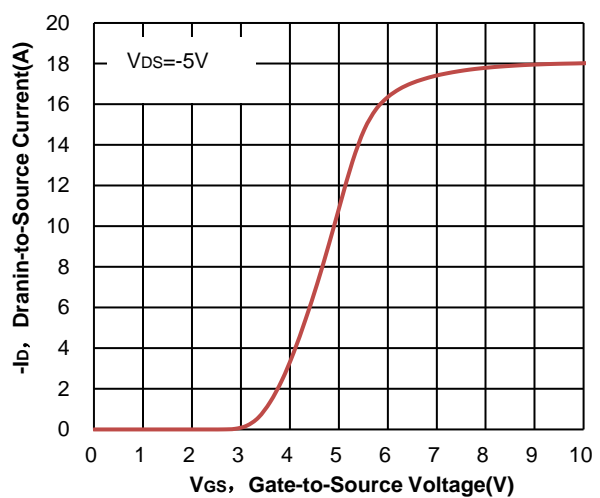


Figure 7. Typical Capacitance vs. Drain-to-Source Voltage

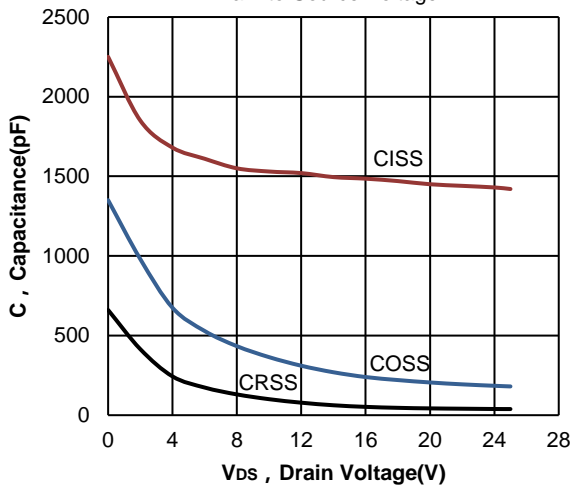


Figure 8. Typical Gate Charge vs. Gate-to-Source Voltage

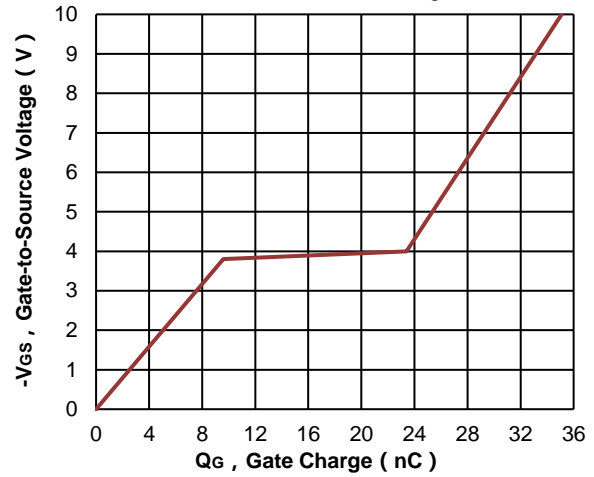


Figure 9. Maximum Rated Safe Operating Area

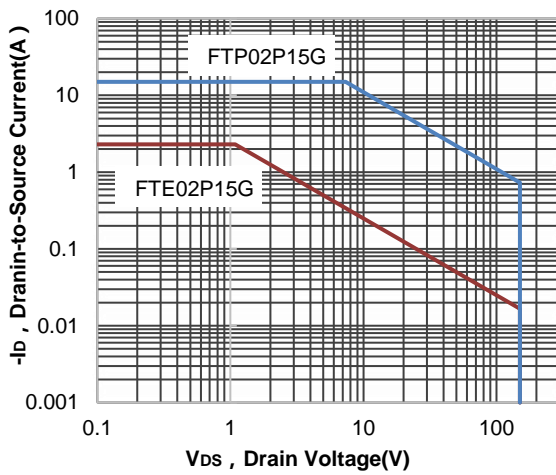


Figure 10. Drain-to-Source On-Resistance vs. Drain Current

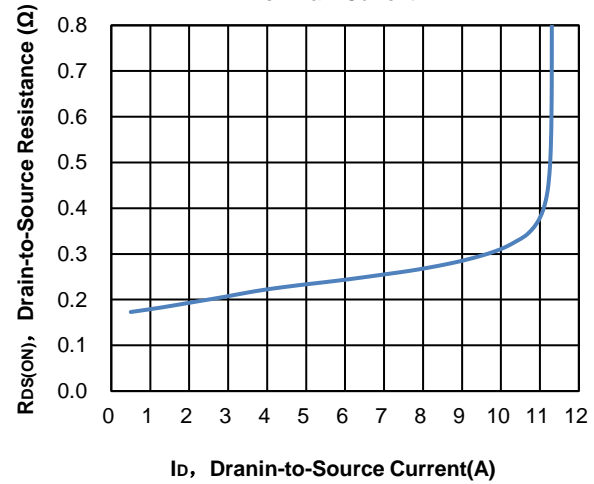


Figure 11. Drain-to-Source On-Resistance vs. Junction Temperature

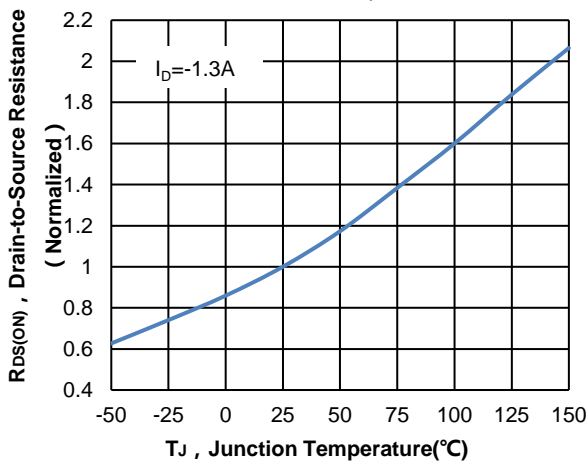
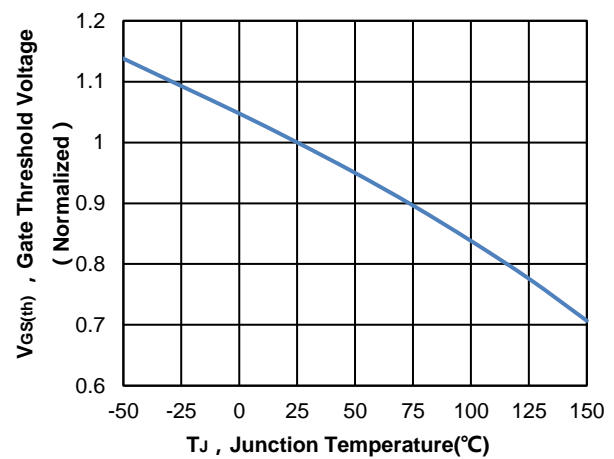
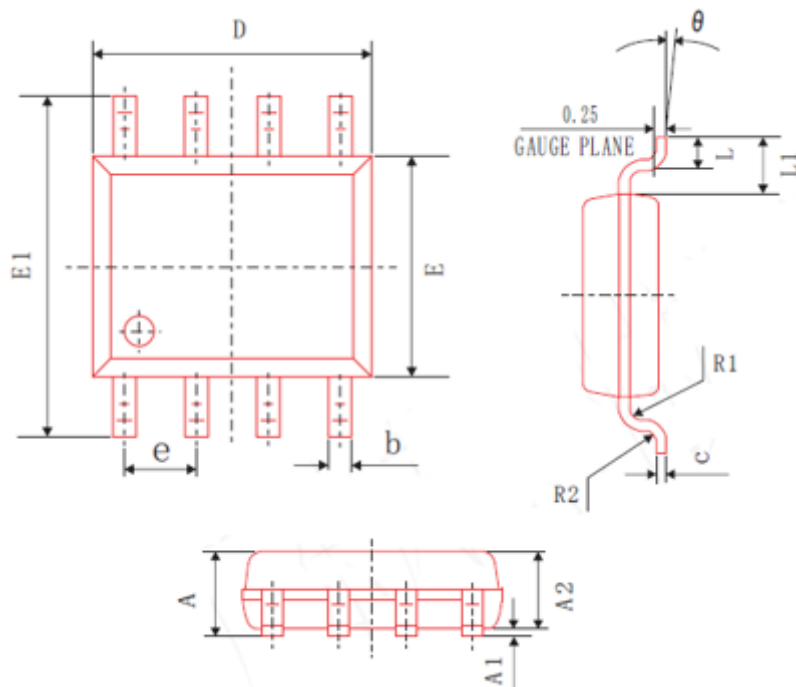
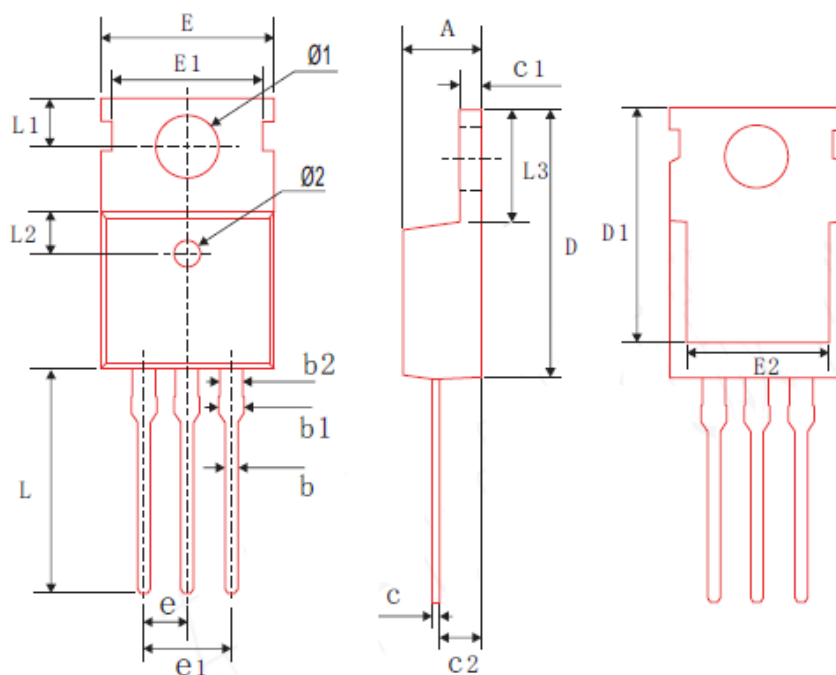


Figure 12. Gate Threshold Voltage vs. Junction Temperature



Package Dimensions
SOP-8


SYMBOL	MIN	NOM	MAX
A	1.40	1.60	1.80
A1	0.05	0.15	0.25
A2	1.35	1.45	1.55
b	0.30	0.40	0.50
c	0.153	0.203	0.253
D	4.80	4.90	5.00
E	3.80	3.90	4.00
E1	5.80	6.00	6.20
L	0.45	0.70	1.00
θ	2°	4°	6°
L1	1.04 REF		
e	1.27 BSC		
R1	0.07 TYP		
R2	0.07 TYP		

TO-220AB


SYMBOM	MIN	NOM	MAX
A	4.30	4.50	4.70
b	0.70	0.80	0.90
b1	--	--	1.42
b2	1.17	1.27	1.37
c	0.40	0.50	0.60
c1	1.25	1.30	1.35
c2	2.20	2.40	2.60
D	15.45	15.65	15.85
D1	13.20	13.40	13.60
E	9.80	10.0	10.2
E1	8.60	8.70	8.80
E2	7.80	8.00	8.20
e1	4.88	5.08	5.28
L	12.95	13.15	13.35
L1	2.70	2.80	2.90
L2	2.40	2.50	2.60
L3	6.30	6.50	6.70
Ø1	3.50	3.60	3.70
Ø2	1.35	1.50	1.65
e	2.54 BSC		



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