

## 650V N-Channel Super Junction MOSFET

<b>Voltage</b>	<b>650 V</b>	<b>Rdson</b>	<b>130 mΩ</b>
<b>Current</b>	<b>29 A</b>	<b>Qg</b>	<b>51 nC</b>

### Feature:

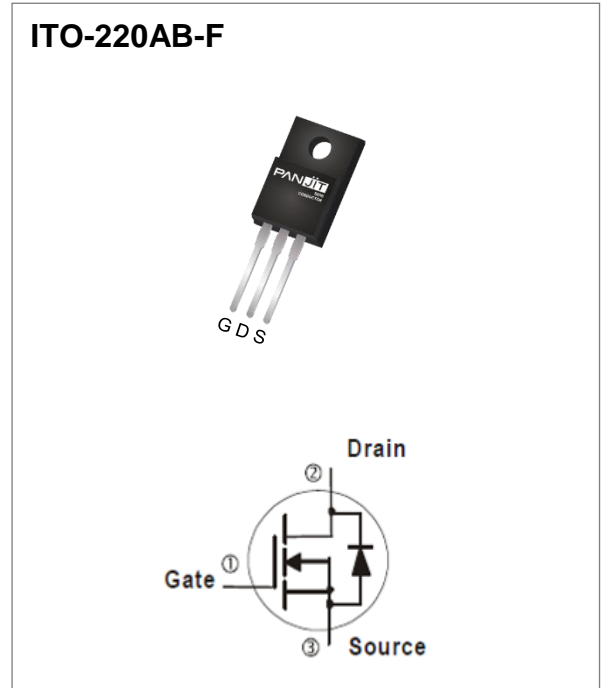
- $R_{DS(ON) Max, V_{GS}@10V}$ : 130mΩ
- Easy to use/ drive
- High Speed Switching and Low  $R_{DS(ON)}$
- 100% Avalanche Tested
- 100% Rg Tested
- Lead free in compliance with EU RoHS 2.0
- Green molding compound as per IEC 61249 standard

### Mechanical Data

- Case: ITO-220AB-F package
- Terminals: Solderable per MIL-STD-750, Method 2026
- Approx. Weight: 0.068 ounces, 2 grams

### Application

- PFC, TV Power, PC Power, PD Charger, Adapter, UPS



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

PARAMETER		SYMBOL	LIMIT	UNITS
Drain-Source Voltage @ $T_{jmax}$		$V_{DS}$	700	V
Drain-Source Voltage		$V_{DS}$	650	
Gate-Source Voltage		$V_{GS}$	$\pm 30$	
Continuous Drain Current	$T_C=25^\circ\text{C}$	$I_D$	29.0	A
	$T_C=100^\circ\text{C}$		17.7	
Pulsed Drain Current	$T_C=25^\circ\text{C}$	$I_{DM}$	63	A
Single Pulse Avalanche Energy		$E_{AS}$	640	mJ
MOSFET dv/dt ruggedness		dv/dt	50	V/ns
Power Dissipation	$T_C=25^\circ\text{C}$	$P_D$	33	W
	$T_C=100^\circ\text{C}$		14	
Insulation Withstand Voltage for ITO-220AB-F		$V_{ISO}$	3.5	kV
Operating Junction and Storage Temperature Range		$T_J, T_{STG}$	-55~150	$^\circ\text{C}$

### Thermal Characteristics

PARAMETER		SYMBOL	MAXIMUM	UNITS
Thermal Resistance	Junction-to-Case	$R_{\theta JC}$	3.8	$^\circ\text{C/W}$
	Junction-to-Ambient (Note 3)	$R_{\theta JA}$	62.5	$^\circ\text{C/W}$

**Electrical Characteristics** ( $T_A = 25\text{ }^\circ\text{C}$  unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNITS
<b>Static</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0V, I_D=250\mu A$	650	730	-	V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	2	3.0	4	
Drain-Source On-State Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=10.8A$ <sup>(Note 1)</sup>	-	113	130	m $\Omega$
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=650V, V_{GS}=0V$	-	-	1	$\mu A$
Gate-Source Leakage Current	$I_{GSS}$	$V_{GS}=\pm 30V, V_{DS}=0V$	-	-	$\pm 100$	nA
Transfer characteristics	gfs	$V_{DS}=20V, I_D=21.5A$	-	23	-	S
<b>Dynamic</b> <sup>(Note 5)</sup>						
Total Gate Charge	$Q_g$	$V_{DS}=520V, I_D=22A,$ $V_{GS}=10V$	-	51	-	nC
Gate-Source Charge	$Q_{gs}$		-	11	-	
Gate-Drain Charge	$Q_{gd}$		-	20	-	
Input Capacitance	$C_{iss}$	$V_{DS}=400V, V_{GS}=0V,$ $f=250kHz$	-	1920	-	pF
Output Capacitance	$C_{oss}$		-	61	-	
Reverse Transfer Capacitance	$C_{rss}$		-	8	-	
Effective Output Capacitance Energy Related	$C_{o(er)}$	$V_{DS}=0V$ to 400V, $V_{GS}=0V, f=250kHz$ <sup>(Note 4)</sup>	-	84	-	
Turn-On Delay Time	$t_{d(on)}$	$V_{DD}=325V, I_D=22A,$ $V_{GS}=10V, R_G=25\Omega$ <sup>(Note 2)</sup>	-	62	-	
Turn-On Rise Time	$t_r$		-	79	-	
Turn-Off Delay Time	$t_{d(off)}$		-	201	-	
Turn-Off Fall Time	$t_f$		-	77	-	
Gate Resistance	$R_g$	$f=1.0MHz$	-	2.2	-	$\Omega$
<b>Drain-Source Diode</b>						
Maximum Continuous Drain-Source Diode Forward Current	$I_S$		-	-	29	A
Diode Forward Voltage	$V_{SD}$	$I_S=21.6A, V_{GS}=0V$	-	0.89	1.5	V
Reverse Recovery Charge	$Q_{rr}$	$I_S=21.6A$	-	6.6	-	$\mu C$
Reverse Recovery Time	$T_{rr}$	$di/dt=100A/\mu s$	-	413	-	ns

NOTES :

1. Pulse width $\leq 300\mu s$ , Duty cycle $\leq 2\%$
2. Essentially independent of operating temperature typical characteristics.
3.  $R_{\theta JA}$  is the sum of the junction-to-case and case-to-ambient thermal resistance.
4.  $C_{o(er)}$  is a capacitance that gives the same stored energy as  $C_{oss}$  while  $V_{DS}$  is rising from 0V to 80%  $V_{(BR)DSS}$
5. Guaranteed by design, not subject to production testing

TYPICAL CHARACTERISTIC CURVES

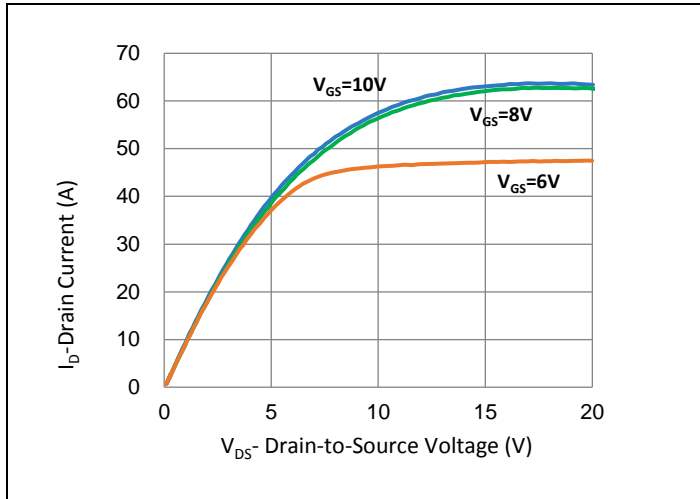


Fig.1 Output Characteristics

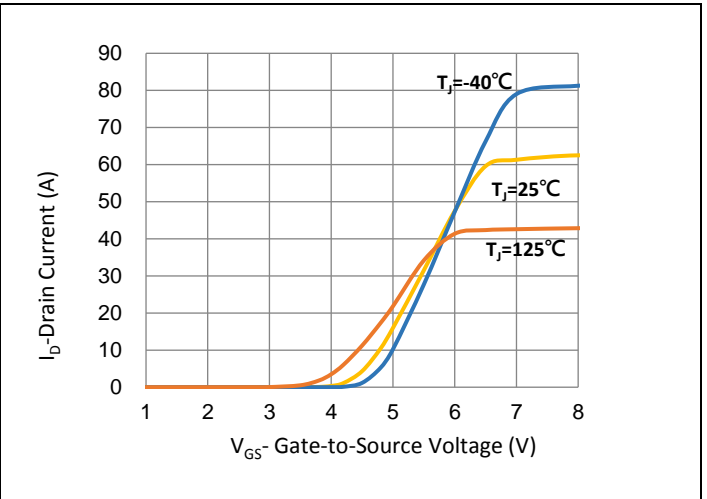


Fig.2 Transfer Characteristics

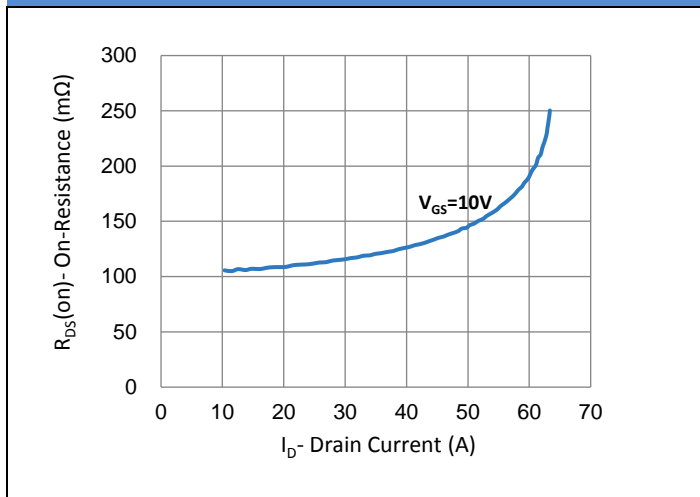


Fig.3 On-Resistance vs. Drain Current

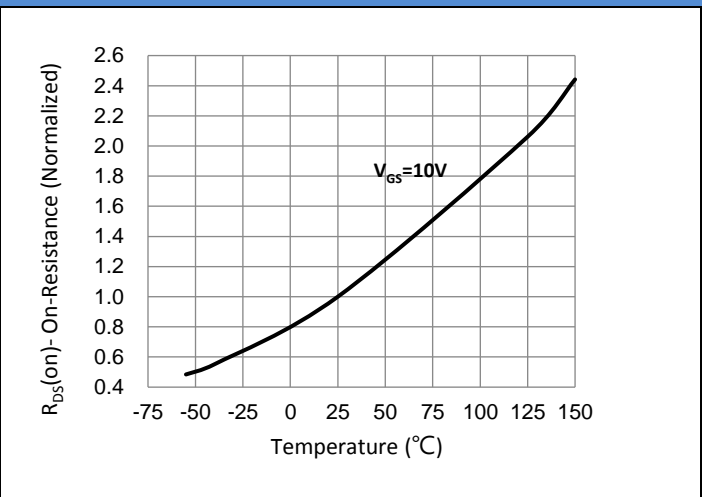


Fig.4 On-Resistance vs. Junction Temperature

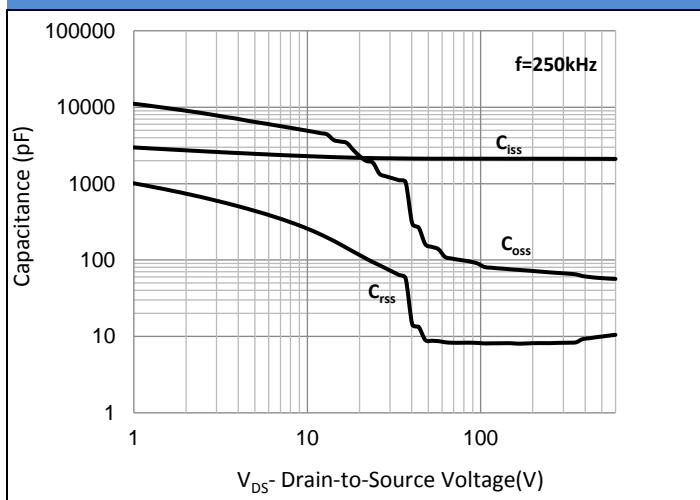


Fig.5 Capacitance vs. Drain-Source Voltage

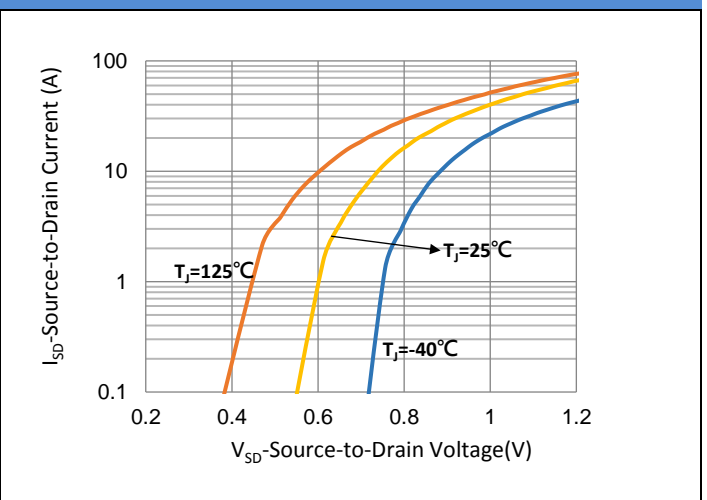


Fig.6 Source-Drain Diode Forward Voltage

TYPICAL CHARACTERISTIC CURVES

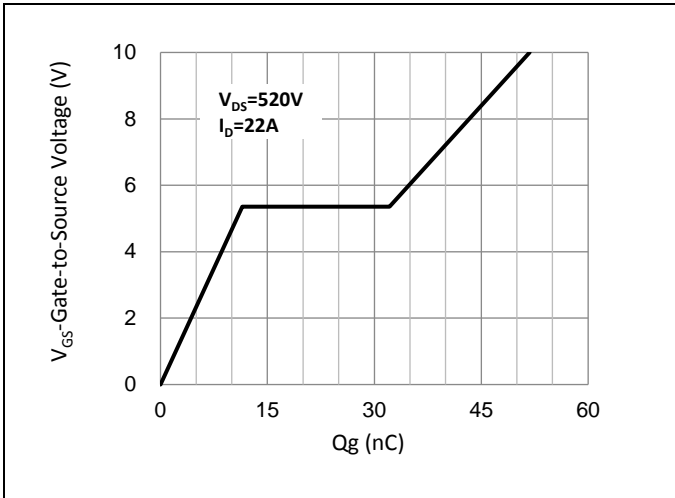


Fig.7 Gate-Charge Characteristics

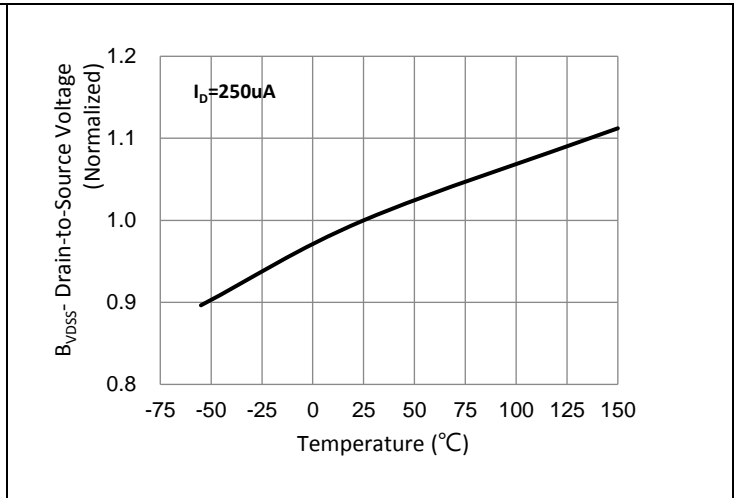


Fig.8 Breakdown Voltage Variation vs. Temperature

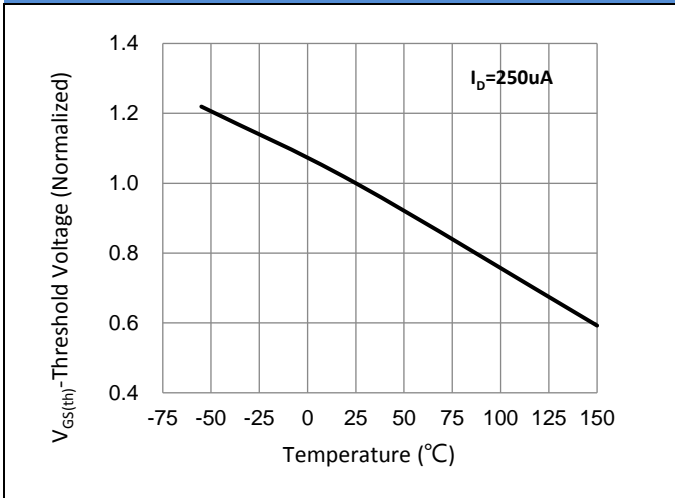


Fig.9 Threshold Voltage Variation with Temperature

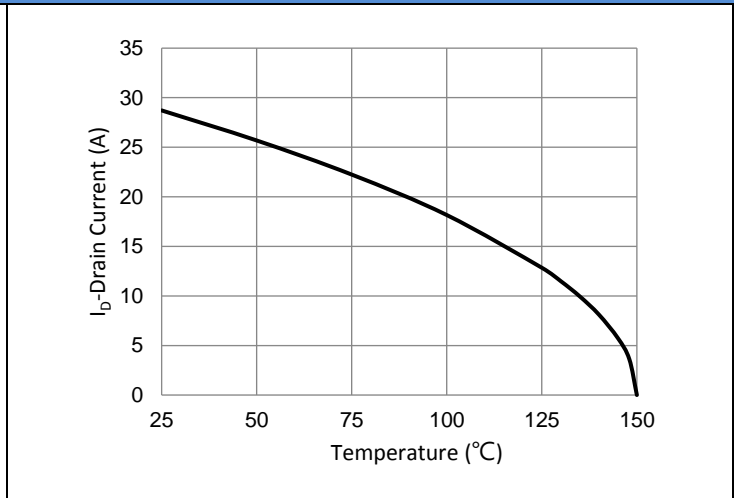


Fig.10 Drain Current vs. Case Temperature

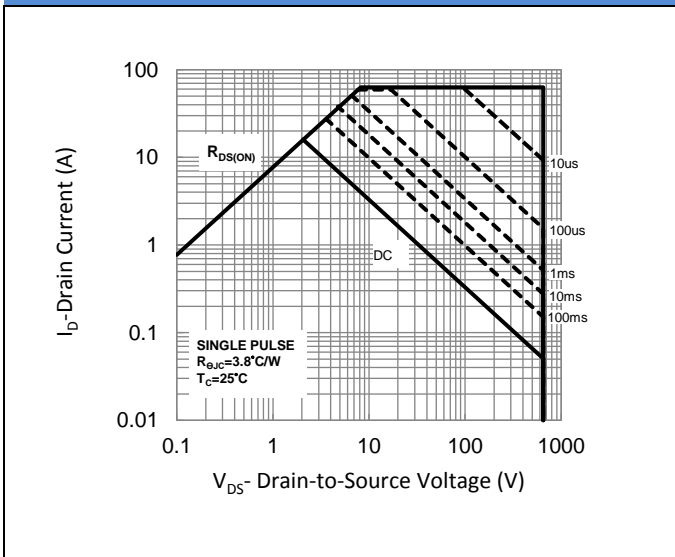


Fig.11 Maximum Safe Operating Area

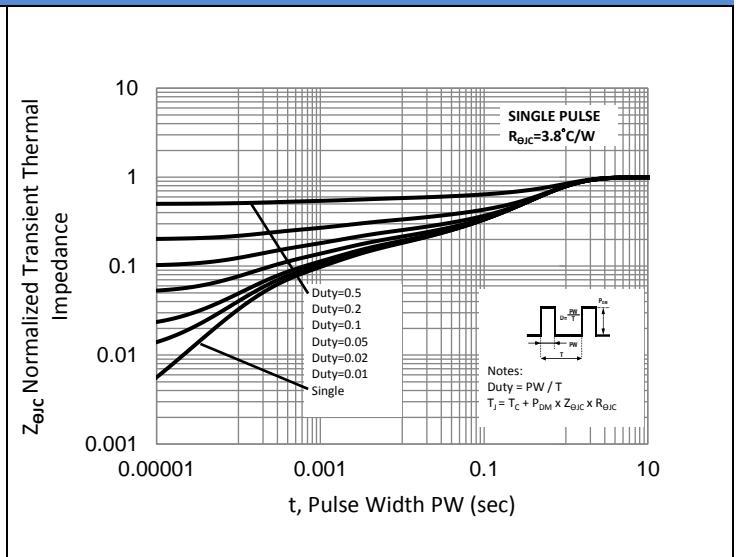
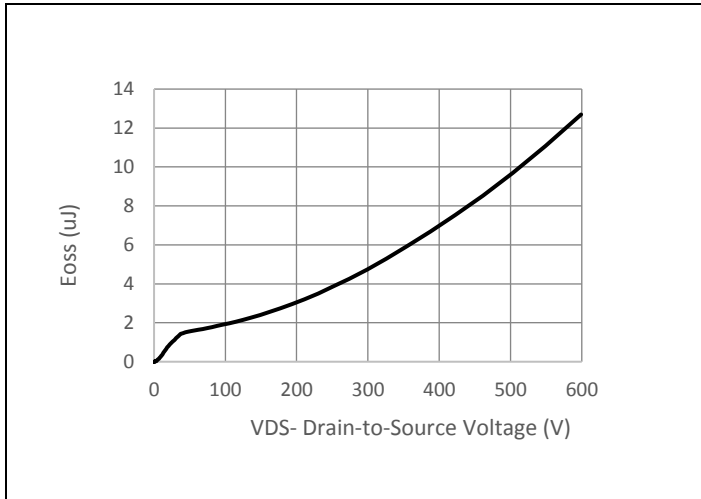


Fig.12 Normalized Transient Thermal Impedance

## TYPICAL CHARACTERISTIC CURVES

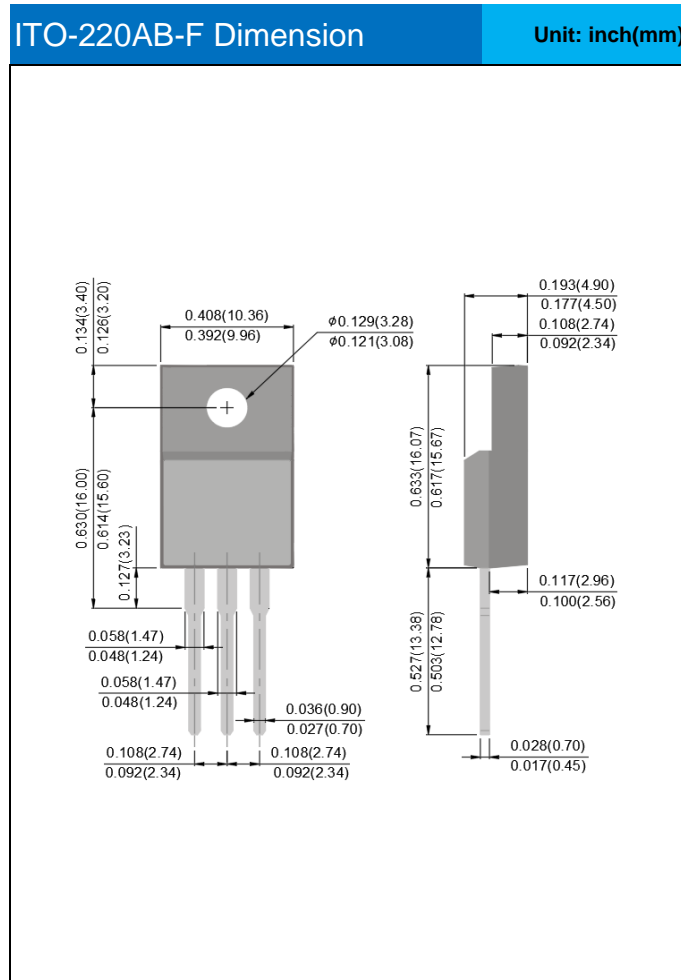


**Fig.13 Typ. Coss Stored Energy**

**Product and Packing Information**

Part No.	Package Type	Packing Type	Marking
PJMF130N65EC	ITO-220AB-F	50pcs / Tube	130N65EC

**Packaging Information**



**Marking Diagram**

PJ  
130N65EC  
YWLL x

- Y** = Year Code
- W** = Week Code (A~Z)
- LL** = Lot Code (00~99)
- x** = Production Line Code