

650V N-Channel Super Junction MOSFET

Voltage	650 V	Rdson	640 mΩ
Current	7 A	Qg	13 nC

Feature:

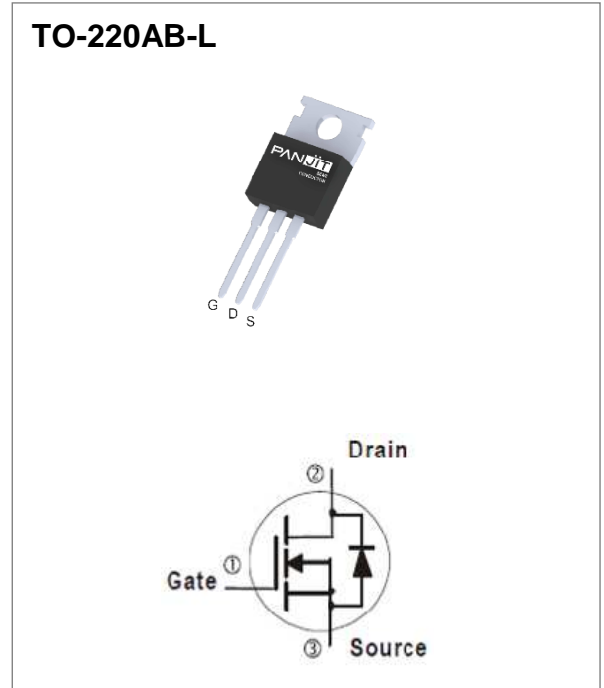
- $R_{DS(ON) Max}$, $V_{GS}@10V$: 640mΩ
- Easy to use/ drive
- High Speed Switching and Low $R_{DS(ON)}$
- 100% Avalanche Tested
- 100% Rg Tested
- Lead free in compliance with EU RoHS 2.0
- Green molding compound as per IEC 61249 standard

Mechanical Data

- Case: TO-220AB-L package
- Terminals: Solderable per MIL-STD-750, Method 2026
- Approx. Weight: 2.0948 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}	± 30	
Continuous Drain Current	$T_C=25^\circ\text{C}$	I_D	7.0	A
	$T_C=100^\circ\text{C}$		4.1	
Pulsed Drain Current	$T_C=25^\circ\text{C}$	I_{DM}	15.1	A
Single Pulse Avalanche Energy		E_{AS}	140	mJ
MOSFET dv/dt ruggedness		dv/dt	50	V/ns
Power Dissipation	$T_C=25^\circ\text{C}$	P_D	62.5	W
	$T_C=100^\circ\text{C}$		25	
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	$R_{\theta JC}$	2.0	$^\circ\text{C/W}$
	Junction-to-Ambient (Note 3)	$R_{\theta JA}$	62.5	$^\circ\text{C/W}$

Electrical Characteristics (T_A = 25 °C unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNITS
Static						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V, I _D =250uA	650	730	-	V
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250uA	2	3.0	4	
Drain-Source On-State Resistance	R _{DS(on)}	V _{GS} =10V, I _D =3.5A ^(Note 1)	-	556	640	mΩ
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =650V, V _{GS} =0V	-	-	1	uA
Gate-Source Leakage Current	I _{GSS}	V _{GS} =±30V, V _{DS} =0V	-	-	±100	nA
Transfer characteristics	gfs	V _{DS} =20V, I _D =7A	-	7	-	S
Dynamic ^(Note 5)						
Total Gate Charge	Q _g	V _{DS} =520V, I _D =7A, V _{GS} =10V	-	13	-	nC
Gate-Source Charge	Q _{gs}		-	2.8	-	
Gate-Drain Charge	Q _{gd}		-	5.7	-	
Input Capacitance	C _{iss}	V _{DS} =400V, V _{GS} =0V, f=250kHz	-	462	-	pF
Output Capacitance	C _{oss}		-	28.8	-	
Reverse Transfer Capacitance	C _{rss}		-	6.7	-	
Effective Output Capacitance Energy Related	C _{o(er)}		V _{DS} =0V to 400V, V _{GS} =0V, f=250kHz ^(Note 4)	-	33	
Turn-On Delay Time	t _{d(on)}	V _{DD} =325V, I _D =7A, V _{GS} =10V, R _G =25Ω ^(Note 2)	-	15.2	-	ns
Turn-On Rise Time	t _r		-	34.5	-	
Turn-Off Delay Time	t _{d(off)}		-	46.7	-	
Turn-Off Fall Time	t _f		-	34.1	-	
Gate Resistance	R _g	f=1.0MHz	-	5.4	-	Ω
Drain-Source Diode						
Maximum Continuous Drain-Source Diode Forward Current	I _s		-	-	7	A
Diode Forward Voltage	V _{SD}	I _s =7A, V _{GS} =0V	-	0.89	1.5	V
Reverse Recovery Charge	Q _{rr}	I _s =7A	-	2.37	-	μC
Reverse Recovery Time	T _{rr}	di/dt=100A/μs	-	237	-	ns

NOTES :

1. Pulse width ≤ 300us, Duty cycle ≤ 2%
2. Essentially independent of operating temperature typical characteristics.
3. R_{θJA} 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

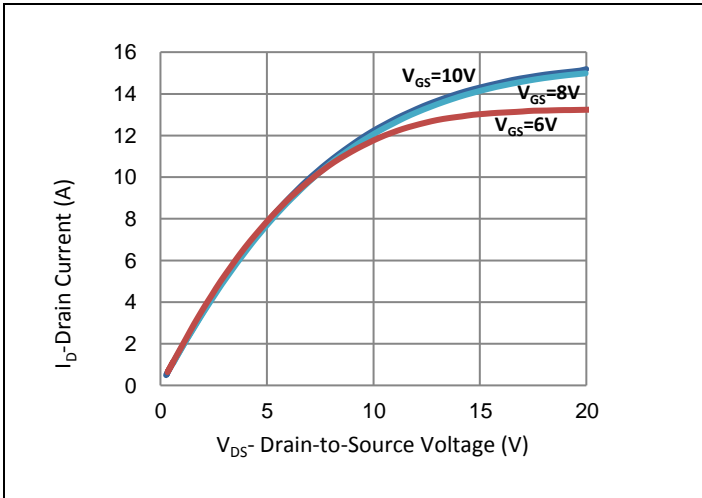


Fig.1 Output Characteristics

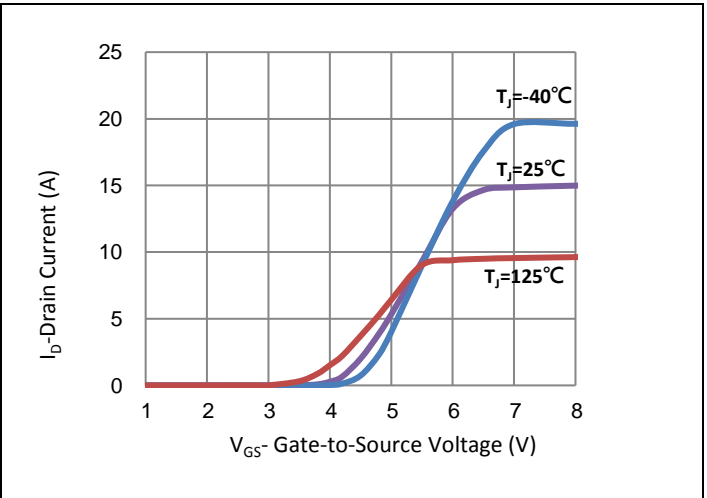


Fig.2 Transfer Characteristics

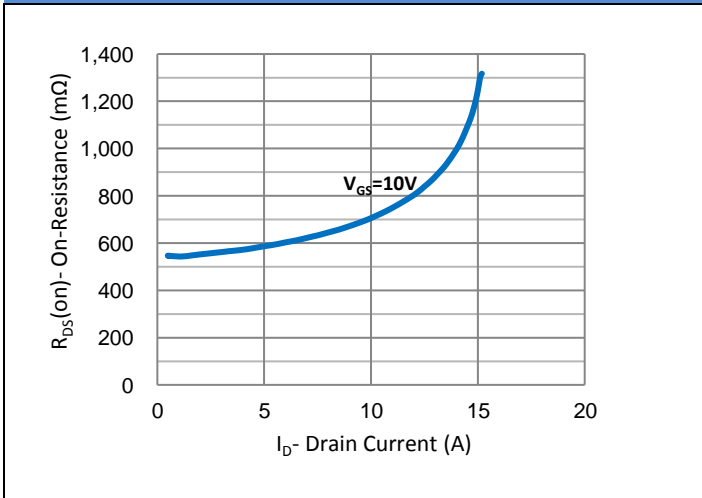


Fig.3 On-Resistance vs. Drain Current

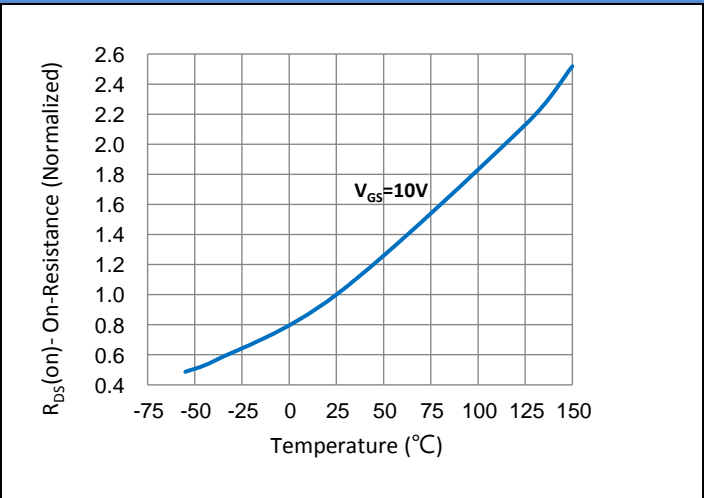


Fig.4 On-Resistance vs. Junction Temperature

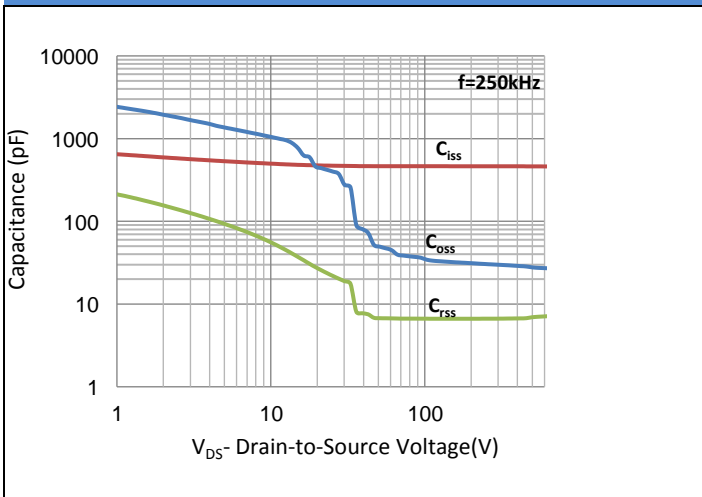


Fig.5 Capacitance vs. Drain-Source Voltage

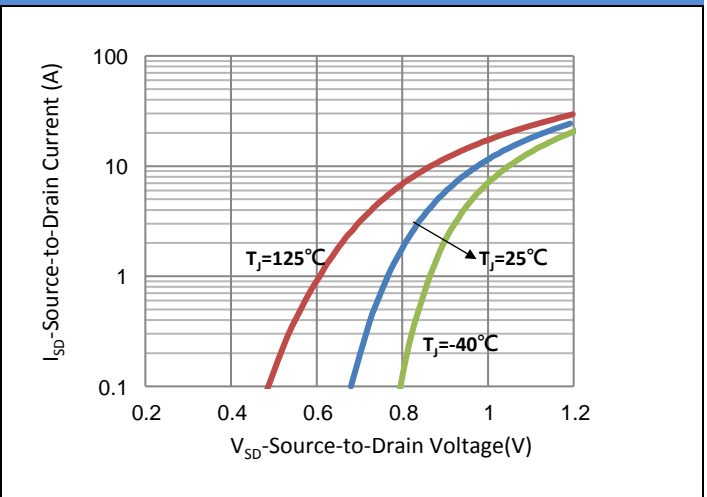


Fig.6 Source-Drain Diode Forward Voltage

TYPICAL CHARACTERISTIC CURVES

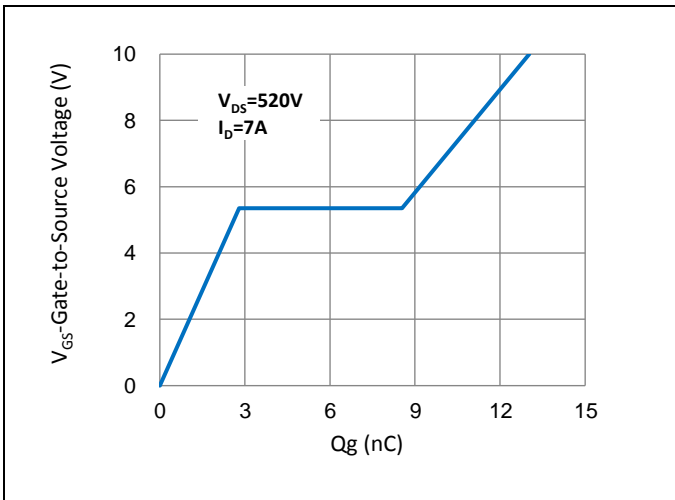


Fig.7 Gate-Charge Characteristics

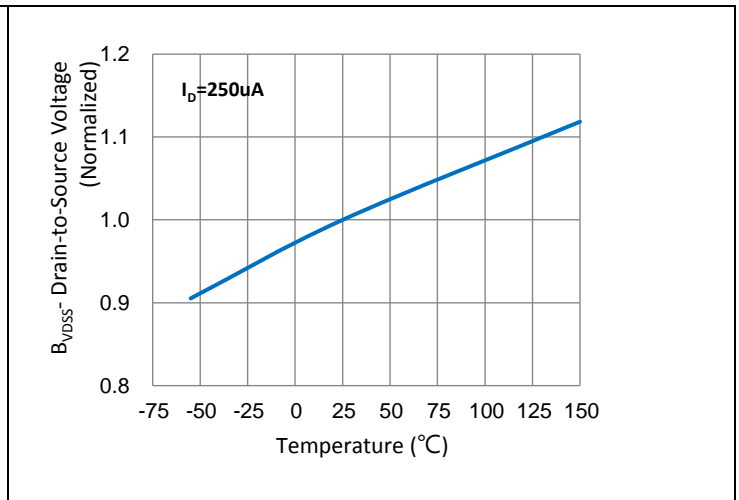


Fig.8 Breakdown Voltage Variation vs. Temperature

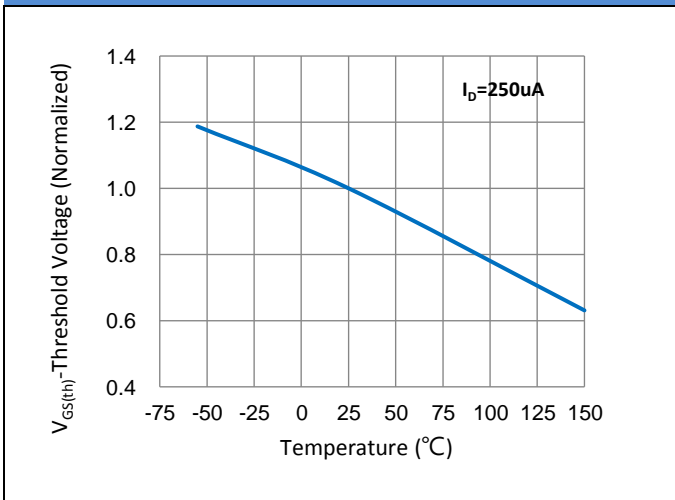


Fig.9 Threshold Voltage Variation with Temperature

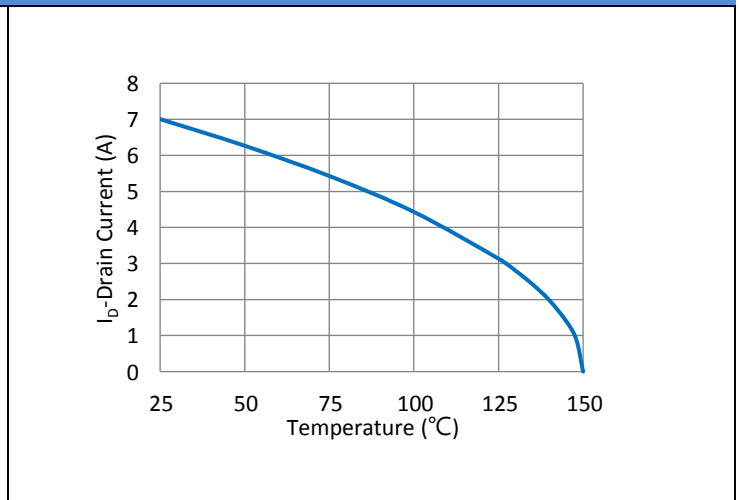


Fig.10 Drain Current vs. Case Temperature

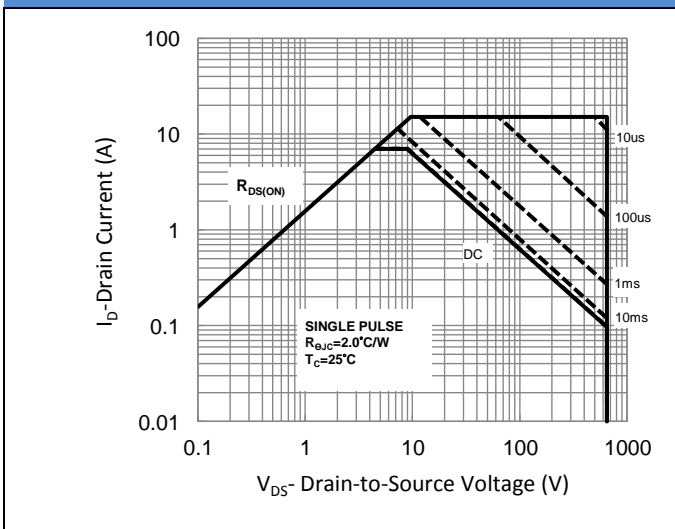


Fig.11 Maximum Safe Operating Area

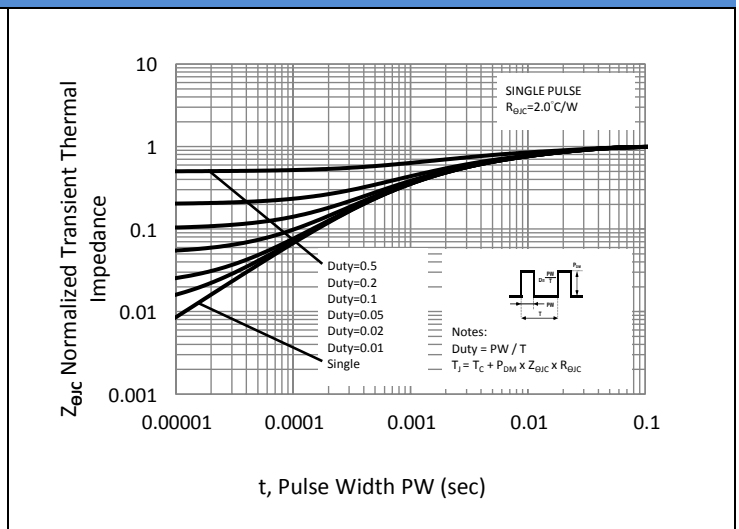


Fig.12 Normalized Transient Thermal Impedance

TYPICAL CHARACTERISTIC CURVES

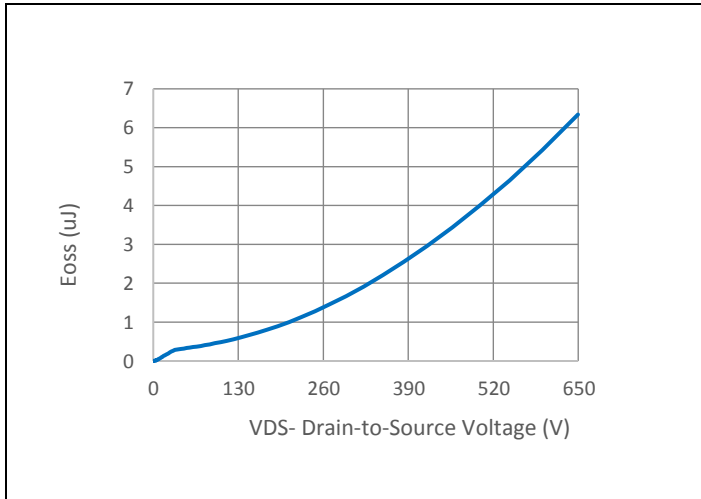
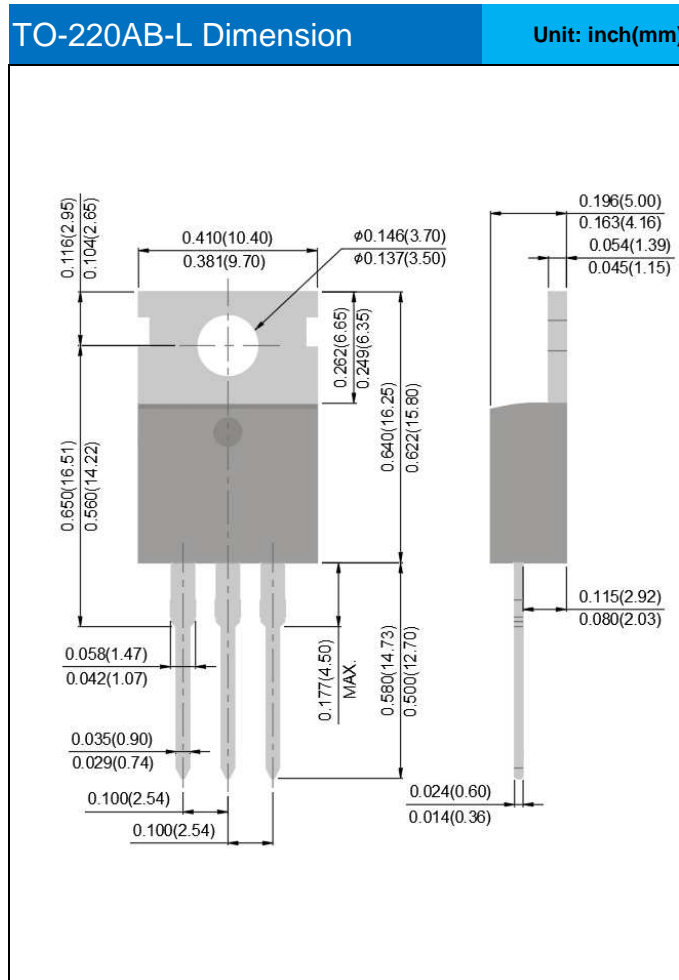


Fig.13 Typ. Coss Stored Energy

Product and Packing Information

Part No.	Package Type	Packing Type	Marking
PJMP640N65EC	TO-220AB-L	50pcs / Tube	640N65EC

Packaging Information



Marking Diagram

PJ
640N65EC
YWLL x

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

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