

600V N-Channel Super Junction MOSFET

Voltage	600 V	Rdson	190 mΩ
Current	20 A	Qg	30 nC

Feature:

- $R_{DS(ON) \text{ Max, } V_{GS}@10V} : 190m\Omega$
- Body diode with fast recovery characteristics
- 100% Avalanche Tested
- 100% Rg Tested
- Lead free in compliance with EU RoHS 2.0
- Green molding compound as per IEC 61249 standard

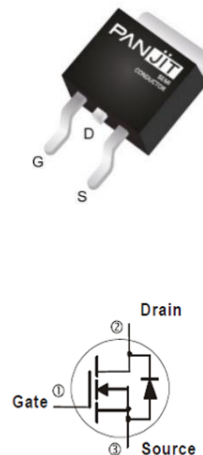
Mechanical Data

- Case: TO-252AA package
- Terminals: Solder able per MIL-STD-750, Method 2026
- Approx. Weight: 0.3217 grams

Application

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

TO-252AA



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

PARAMETER		SYMBOL	LIMIT	UNITS
Drain-Source Voltage		V_{DS}	600	V
Gate-Source Voltage		V_{GS}	± 30	
Continuous Drain Current	$T_C=25^\circ\text{C}$	I_D	20	A
	$T_C=100^\circ\text{C}$		12.5	
Pulsed Drain Current	$T_C=25^\circ\text{C}$	I_{DM}	42	A
Single Pulse Avalanche Energy (Note 6)		E_{AS}	101	mJ
MOSFET dv/dt ruggedness		dv/dt	50	V/ns
Reverse diode dv/dt		dv/dt	50	V/ns
Power Dissipation	$T_C=25^\circ\text{C}$	P_D	156	W
	$T_C=100^\circ\text{C}$		62.5	
Operating Junction and Storage Temperature Range		T_J, T_{STG}	-55~150	$^\circ\text{C}$

Thermal Characteristics

PARAMETER		SYMBOL	VALUES	UNITS
Thermal Resistance	Junction-to-Case (Bottom)	$R_{\theta JC}$	0.8	$^\circ\text{C/W}$
	Junction-to-Ambient (Note 3)	$R_{\theta JA}$	62	$^\circ\text{C/W}$

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

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNITS
Static						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	600	-	-	V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	3	3.9	5	
Drain-Source On-State Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=10A$ (Note 1)	-	167	190	m Ω
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=600V, V_{GS}=0V$	-	-	10	μA
Gate-Source Leakage Current	I_{GSS}	$V_{GS}=\pm 30V, V_{DS}=0V$	-	-	± 100	nA
Dynamic (Note 5)						
Total Gate Charge	Q_g	$V_{DS}=400V, I_D=10A,$ $V_{GS}=0V$ to 10V	-	30	-	nC
Gate-Source Charge	Q_{gs}		-	8.4	-	
Gate-Drain Charge	Q_{gd}		-	13.3	-	
Input Capacitance	C_{iss}	$V_{DS}=400V, V_{GS}=0V,$ $f=250KHz$	-	1215	-	pF
Output Capacitance	C_{oss}		-	25.7	-	
Reverse Transfer Capacitance	C_{rss}		-	2.8	-	
Effective Output Capacitance Energy Related	$C_{o(er)}$	$V_{DS}=0V$ to 400V, $V_{GS}=0V$, (Note 4)	-	45	-	pF
Turn-On Delay Time	$t_{d(on)}$	$V_{DD}=400V, I_D=10A,$ $V_{GS}=10V, R_G=25\Omega$ (Note 2)	-	35	-	ns
Turn-On Rise Time	t_r		-	42	-	
Turn-Off Delay Time	$t_{d(off)}$		-	104	-	
Turn-Off Fall Time	t_f		-	26	-	
Gate Resistance	R_g	$f=1.0MHz$	-	6.5	-	Ω
Drain-Source Diode						
Maximum Continuous Drain-Source Diode Forward Current	I_S	$T_C=25^\circ\text{C}$	-	-	20	A
Diode Forward Voltage	V_{SD}	$I_F=10A, V_{GS}=0V$	-	0.85	-	V
Reverse Recovery Charge	Q_{rr}	$I_F=10A, di/dt=100A/\mu s$ $V_{GS}=0V, V_{DD}=400V$	-	0.63	-	μC
Reverse Recovery Time	T_{rr}		-	105	-	ns
Reverse Recovery Current	I_{RRM}		-	11.7	-	A

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 400V.
5. Guaranteed by design, not subject to production testing.
6. E_{AS} is calculated based on the condition of $L = 10\text{ mH}$, $I_{AS} = 4.5A$, $V_{DD} = 50\text{ V}$, $V_G = 10\text{ V}$, $R_g = 25\text{ohm}$.

TYPICAL CHARACTERISTIC CURVES

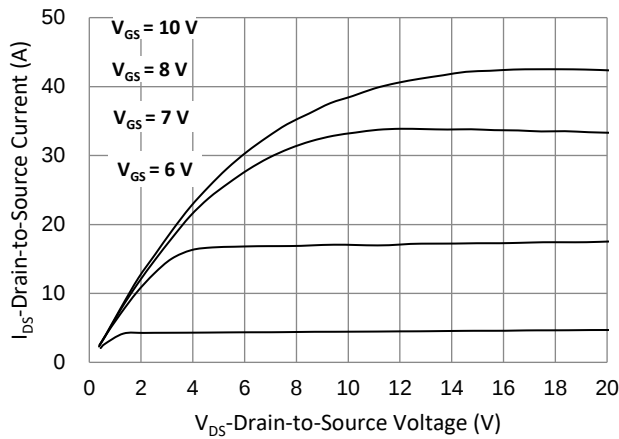


Fig.1 Output Characteristics

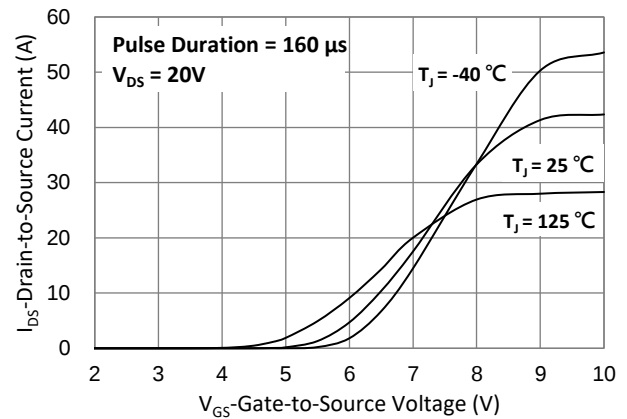


Fig.2 Transfer Characteristics

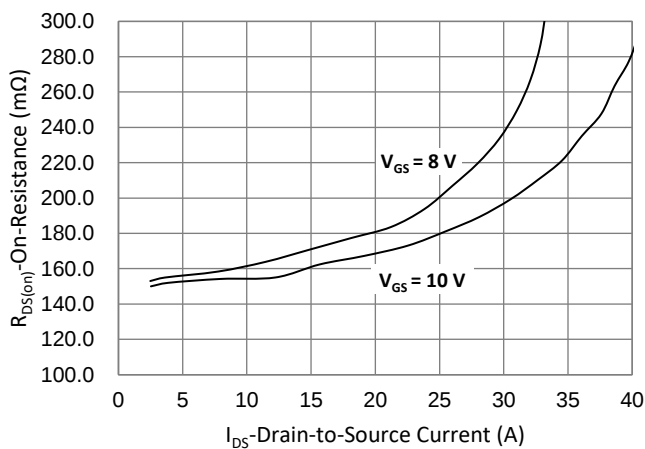


Fig.3 On-Resistance vs. Drain Current

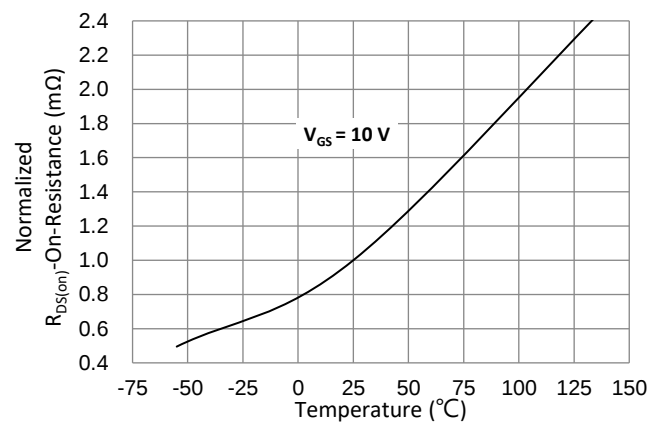


Fig.4 On-Resistance vs. Junction Temperature

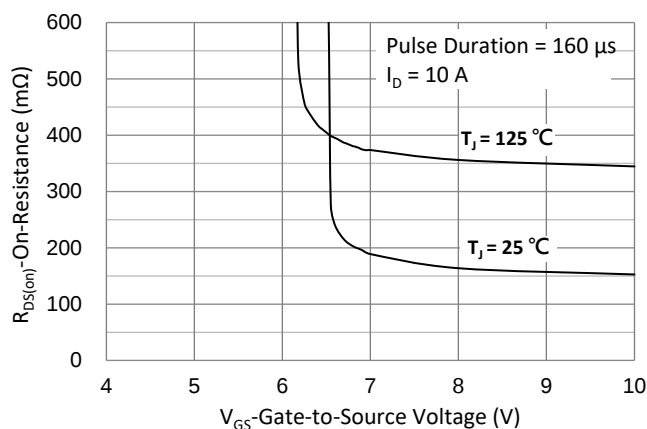


Fig.5 On-Resistance Variation with V_{GS}

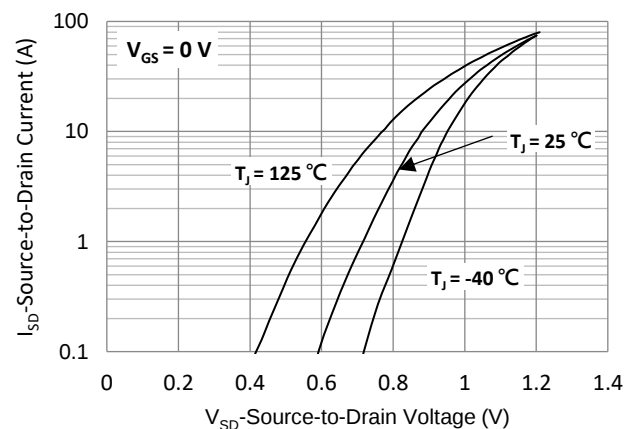


Fig.6 Body Diode Characteristics

TYPICAL CHARACTERISTIC CURVES

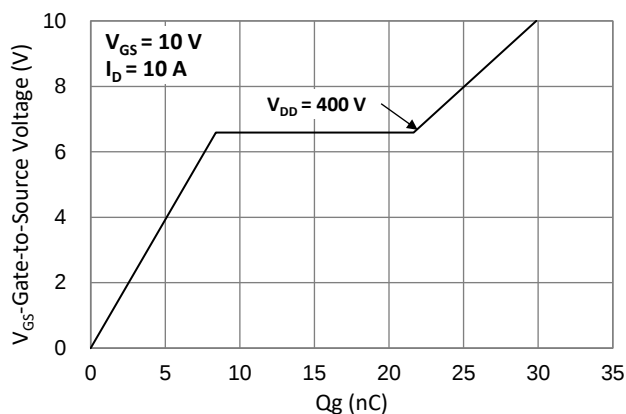


Fig.7 Gate-Charge Characteristics

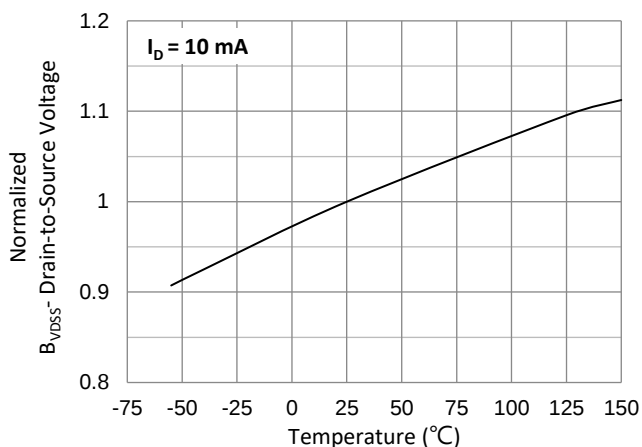


Fig.8 Breakdown Voltage Variation vs. Temperature

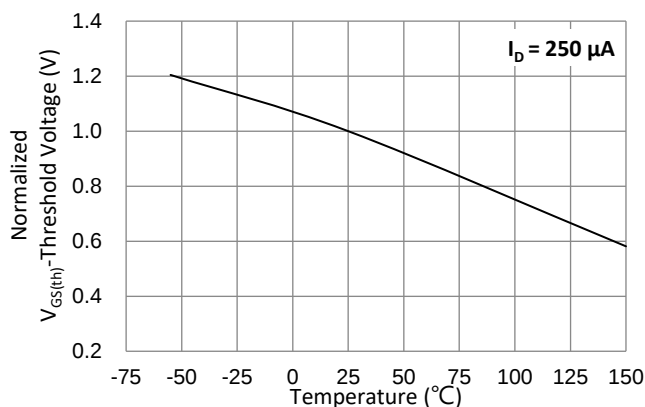


Fig.9 Threshold Voltage Variation with Temperature

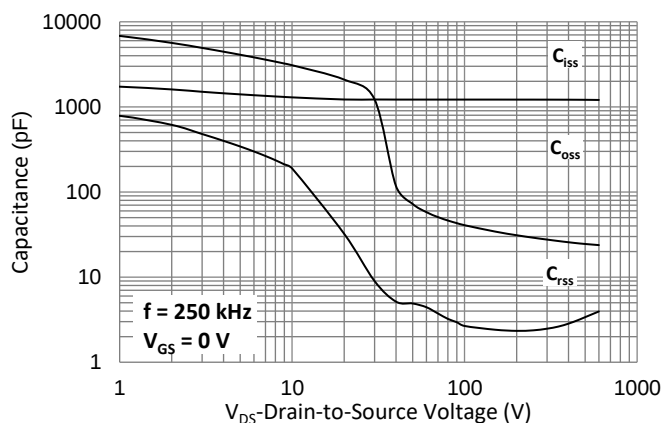


Fig.10 Drain Current vs. Case Temperature

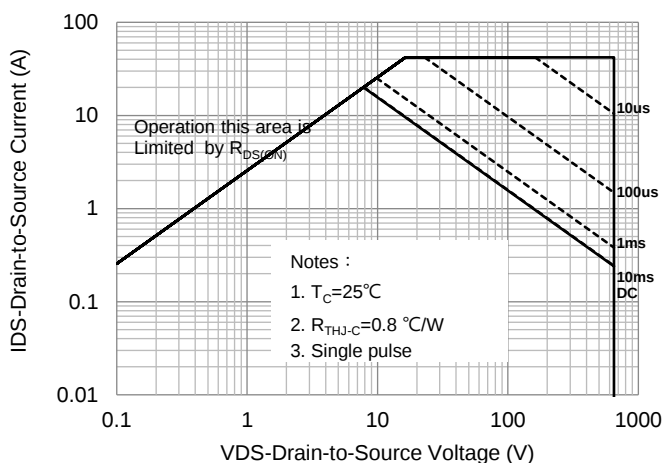


Fig.11 Maximum Safe Operating Area

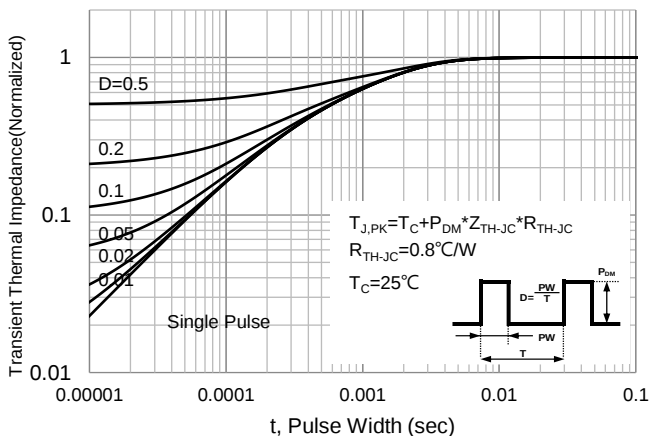


Fig.12 Normalized Transient Thermal Impedance

TYPICAL CHARACTERISTIC CURVES

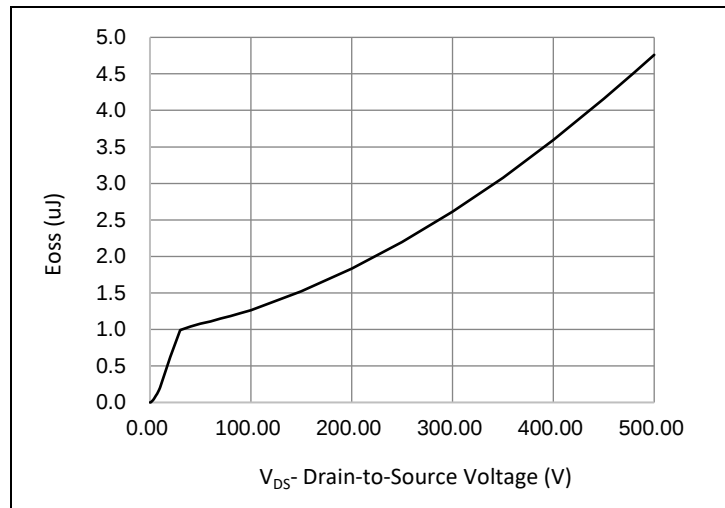
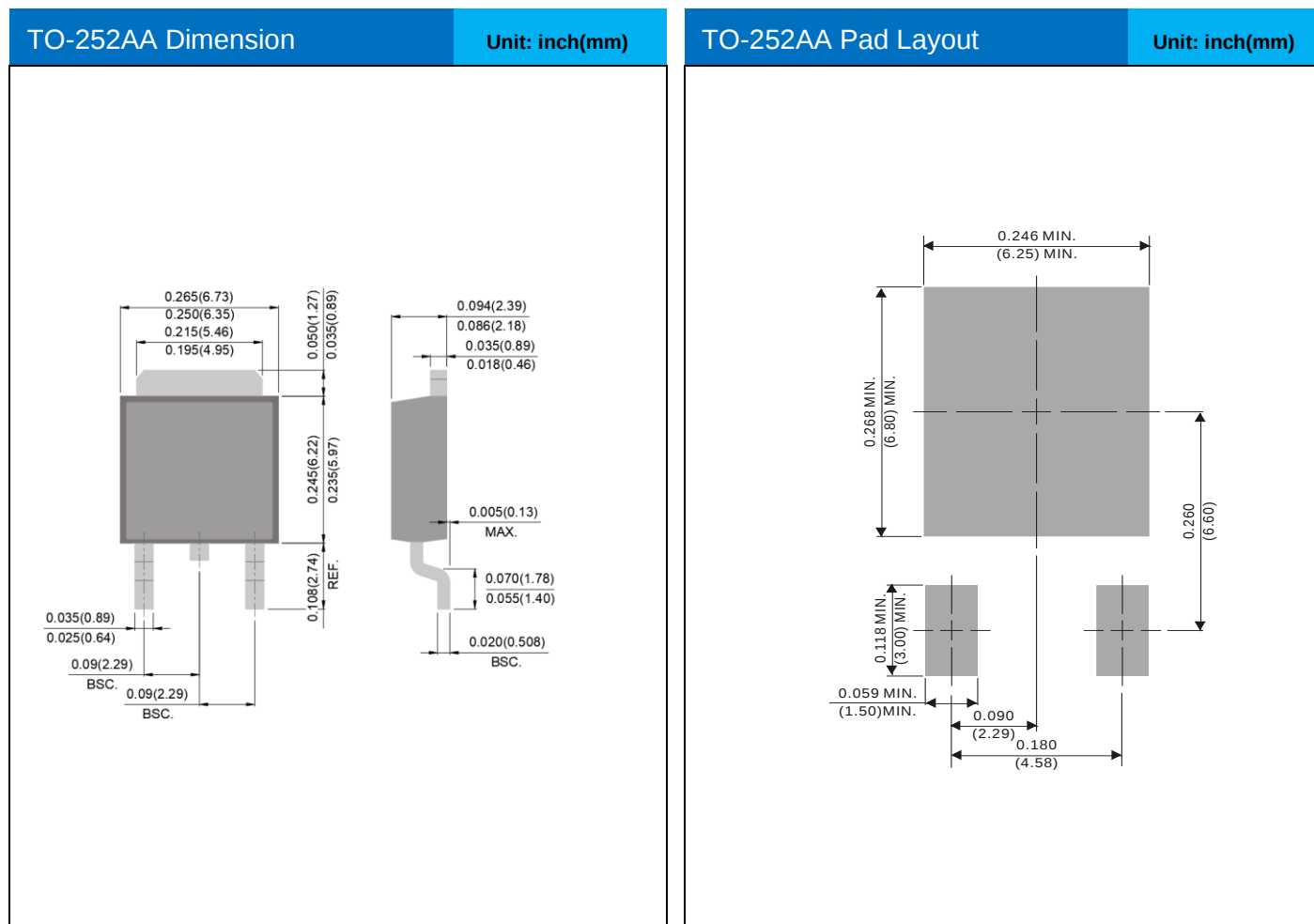


Fig.13 Typ. Coss Stored Energy

Product and Packing Information

Part No.	Package Type	Packing Type	Marking
PDMD60R190FRC1	TO-252AA	3,000 pcs / 13" reel	60R190FC

Packaging Information



Marking Diagram

PJ	Y = Year Code
60R190FC	W = Week Code (A~Z)
YWLL x	LL = Lot Code (00~99)
	x = Production Line Code

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