

40V_{DS}/±20V_{GS} N-Channel *Enhancement* Mode MOSFET

Features

- $V_{DS}=40V, I_D=130A$
- $R_{DS(ON)}=1.8m\Omega$ (TYP.) $V_{GS}=10V$
- Reliable and Rugged
- Avalanche Rated
- Low On-Resistance
- High Current Capability

Applications

- Load Switch
- Power management in portable/desktop PCs
- DC/DC conversion

Ordering Information

Device	package	Device Marking	Package Qty.
ESN6230	PDFN5060	**	5000/PCS

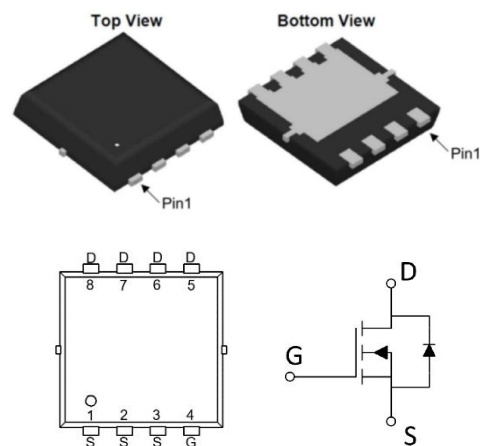
Absolute Maximum Ratings ($T_C=25^\circ C$, unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage ($V_{GS}=0V$)	V_{DS}	40	V
Gate-Source Voltage ($V_{GS}=0V$, static)	V_{GS}	±20	V
Continuous Drain Current ($T_C=25^\circ C$)	I_D	130	A
Continuous Drain Current ($T_C=100^\circ C$)		77	A
Pulsed Drain Current	I_{DM}	300	A
Single Pulsed Avalanche Energy	E_{AS}	210	mJ
V_{DS} Spike 100ns	V_{SPIKE}	43	V
Maximum Power Dissipation ($T_C=25^\circ C$)	P_D	-	W
Operating, Storage Temperature Range	T_J, T_{STG}	-55~150	$^\circ C$

Electrical Characteristics

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	40	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=30V, V_{GS}=0V$	-	-	1	μA
Gate -Source Leakage Current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	±100	nA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1.2		2.4	V
Drain-Source On-stage Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=20A$	-	1.6	2.2	m Ω
		$V_{GS}=4.5V, I_D=20A$	-	-	-	

PDFN5060



Thermal Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	-	1.2	-	$^{\circ}\text{C}/\text{W}$

Dynamic Characteristics

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Input capacitance	C_{iss}	$V_{DS}=15\text{V}$	-	-	-	pF
Output capacitance	C_{oss}	$V_{GS}=0\text{V}$	-	80	-	
Reverse transfer capacitance	C_{rss}	$f=1\text{MHz}$	-	-	-	
Gate Resistance	R_g	$f=1\text{MHz}$	-	-	-	Ω
Total Gate Charge	Q_g	$V_{DS}=15\text{V}$	-	85	-	nC
Gate Source Charge	Q_{gs}	$V_{GS}=10\text{V}$	-	12	-	
Gate Drain Charge	Q_{gd}	$I_D=20\text{A}$	-	9.5	-	
Turn-on delay Time	$t_{d(on)}$	$V_{GS}=10\text{V}$	-	18	-	ns
Rise time	t_r	$V_{DS}=15\text{V}$	-	55	-	
Turn-off delay Time	$t_{d(off)}$	$R_L=0.75\Omega$	-	60	-	
Fall time	t_f	$R_G=3\Omega$	-	12	-	

Reverse Diode Characteristics

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Body Diode Forward Voltage	V_{SD}	$V_{GS}=0\text{V}, I_{SD}=1\text{A}$	-	-	1.3	V
Reverse Recovery Time	t_{rr}	$V_{GS}=0\text{V}, I_{SD}=20\text{A}$	-	60	-	ns
Reverse Recovery Charge	Q_{rr}	$d_i/d_t=500\text{A}/\mu\text{s}$	-	120	-	nC

Electrical Characteristics Diagrames

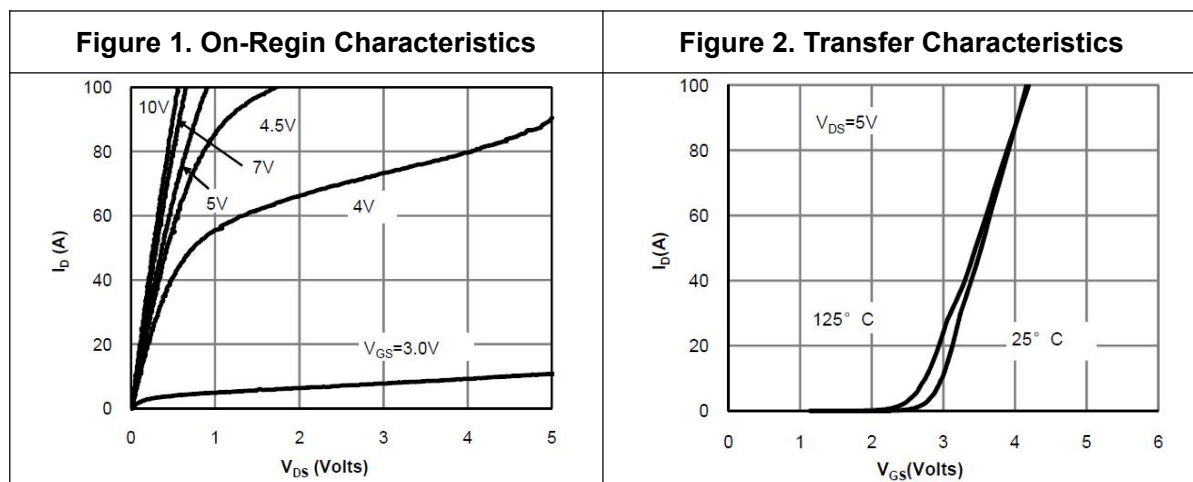


Figure 3. On-Resistance vs. Drain Current and Gate Voltage

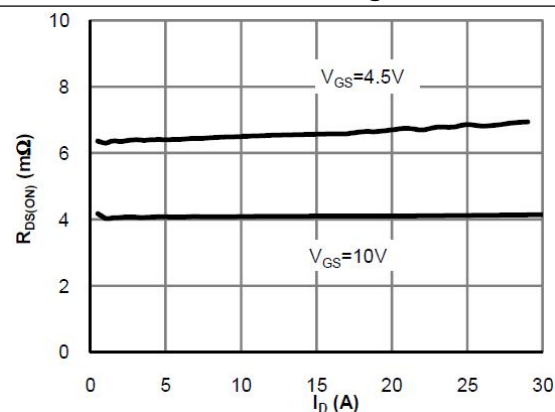


Figure 4. On-Resistance vs. Junction Temperature

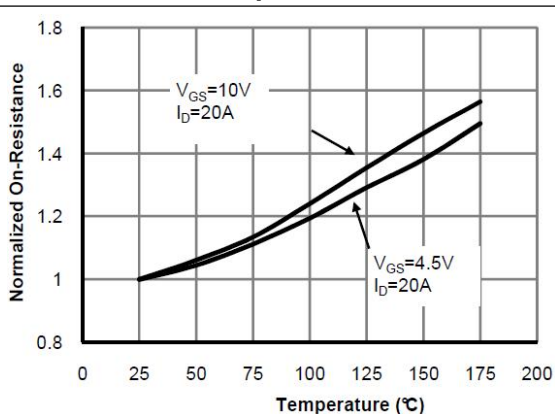


Figure 5. On-Resistance vs. Gate-Source Voltage

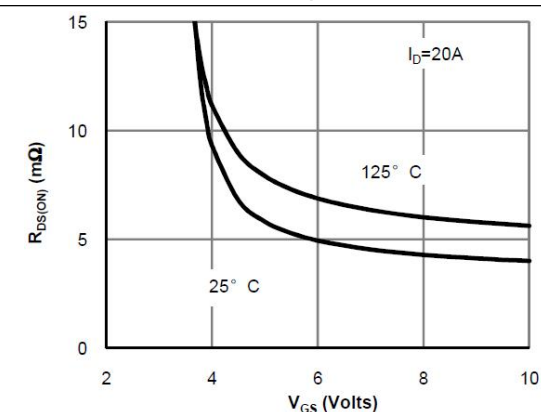


Figure 6. Body-Diode Characteristics

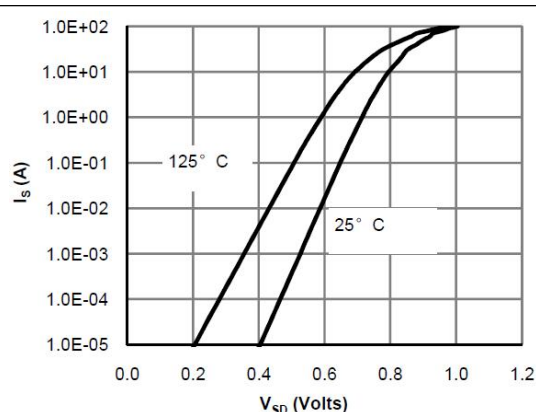


Figure 7. Gate-Charge Characteristics

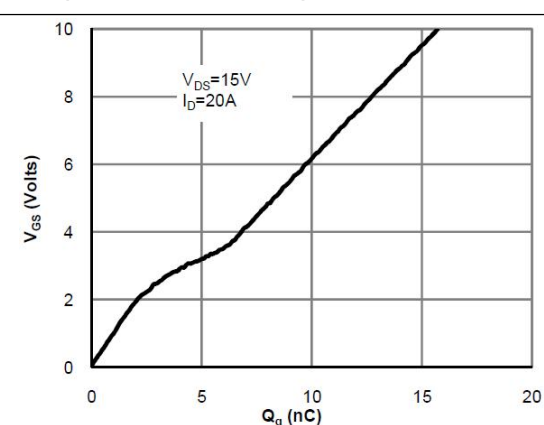


Figure 8. Capacitance Characteristics

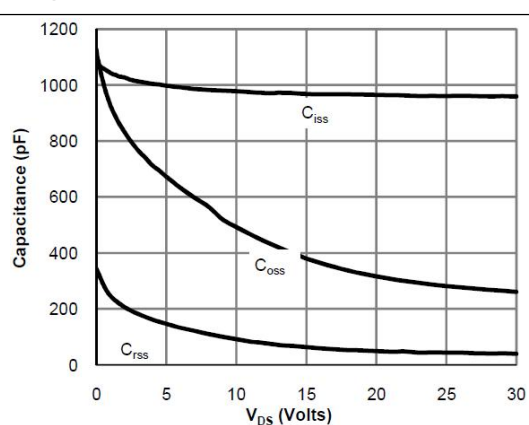


Figure 9. Maximum Forward Biased Safe Operating Area

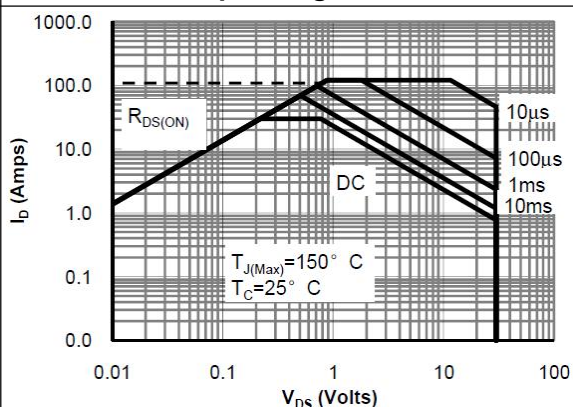


Figure 10. Single Pulse Power Rating Junction-to-Case

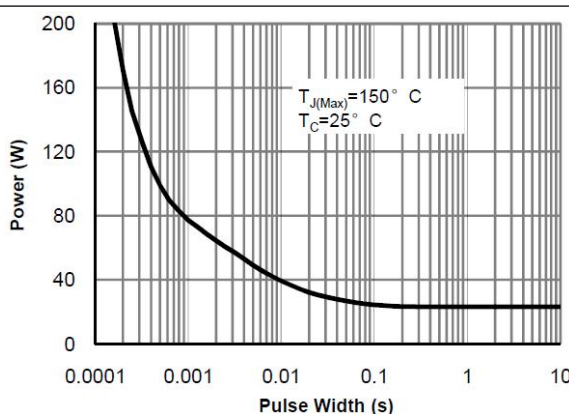
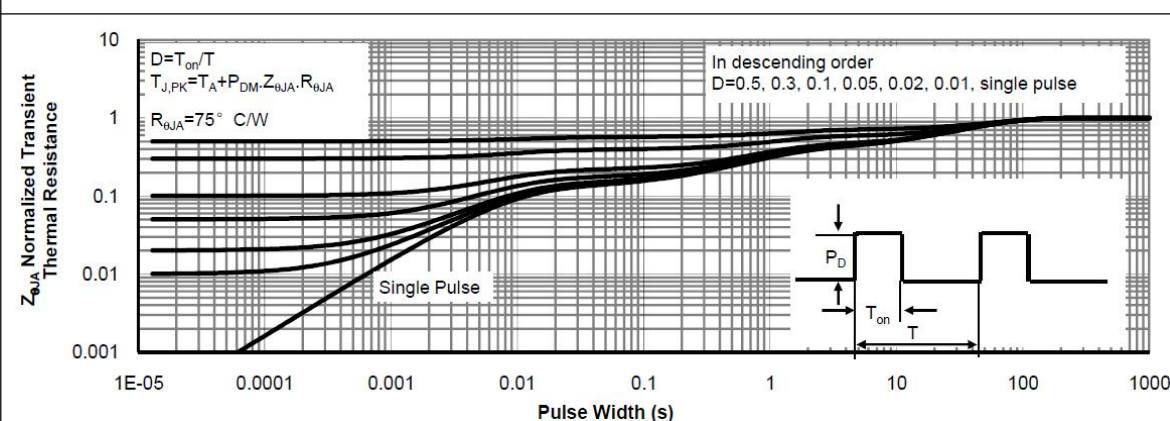


Figure 11. Single Pulse Power Rating Junction-to-Ambient

Figure 11. Normalized Maximum Transient Thermal Impedance



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