

30V N-Channel Power MOSFET

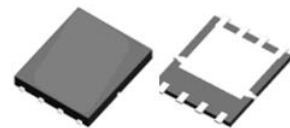
DESCRIPTION :

- Ultra-low On-Resistance
- 100% UIS Tested, 100% Rg Tested
- RoHS compliant
- Halogen Free

V_{DS}	30V
I_{D_MAX}	209A
$R_{DS(ON)_MAX} @ V_{GS}=10V$	1.3m Ω

TYPICAL APPLICATIONS :

- Motor Drive
- Li- Battery Protection
- Power Management for High Performance Application



PDFN5060-8L

MAXIMUM RATINGS (at $T_C = 25^\circ\text{C}$, unless otherwise specified)

Characteristic	Condition	Symbol	Value	Unit
Drain-Source Voltage		V_{DS}	30	V
Gate-Source Voltage		V_{GS}	± 20	V
Continuous Drain Current	$T_C=25^\circ\text{C}$ $T_C=100^\circ\text{C}$	I_D	209 132	A
Pulse Drain Current ⁽¹⁾		I_{DM}	838	A
Single Pulse Avalanche Energy ⁽²⁾		E_{AS}	336	mJ
Single Pulse Avalanche Current	$L=0.1\text{mH}$	I_{AS}	58	A
Maximum Power Dissipation	$T_C=25^\circ\text{C}$ $T_C=100^\circ\text{C}$	P_D	89 36	W
Junction & Storage Temperature Range		T_J, T_{STG}	-55~+150	$^\circ\text{C}$

THERMAL CHARACTERISTICS

Characteristic	Condition	Symbol	Value	Unit
Thermal Resistance, Junction to Ambient		$R_{\theta JA}$	40	$^\circ\text{C/W}$
Thermal Resistance, Junction to Case		$R_{\theta JC}$	1.4	$^\circ\text{C/W}$

Notes:

1.This current is calculated on single pulse with 10us Single Pulse.

2. Defined by design, not subject to production test, EAS condition: $T_J=25^\circ\text{C}$, $V_{DD}=15\text{V}$, $V_{GS}=10\text{V}$, $L=1.0\text{mH}$.

ELECTRICAL CHARACTERISTICS (at $T_J = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)

Characteristic	Symbol	Min.	Typ.	Max.	Unit
Drain-Source Breakdown Voltage $V_{GS} = 0\text{ V}$, $I_D = 250\text{ }\mu\text{A}$	$V_{(BR)DSS}$	30			V
Zero Gate Voltage Drain Current $V_{DS} = 30\text{ V}$, $V_{GS} = 0\text{ V}$ $T_J=25^{\circ}\text{C}$ $V_{DS} = 30\text{ V}$, $V_{GS} = 0\text{ V}$ $T_J=125^{\circ}\text{C}$	I_{DSS}			1 100	μA
Gate-Source Leakage Current $V_{GS} = \pm 20\text{ V}$, $V_{DS} = 0\text{ V}$	I_{GSS}			± 100	nA
Gate-Source Threshold Voltage $V_{DS} = V_{GS}$, $I_D = 250\text{ }\mu\text{A}$	$V_{GS(th)}$	1.2	1.6	2.5	V
Drain-Source On-State Resistance $V_{GS} = 10\text{ V}$, $I_D = 20\text{ A}$ $V_{GS} = 4.5\text{ V}$, $I_D = 20\text{ A}$	$R_{DS(ON)}$		1.0 1.5	1.3 2.1	m Ω
Forward Transconductance $V_{DS} = 5\text{ V}$, $I_D = 20\text{ A}$	G_{fs}		45		S
Input capacitance $f=1\text{ MHz}$, $V_{DS}=15\text{ V}$, $V_{GS}=0\text{ V}$	C_{iss}		2854		pF
Output capacitance $f=1\text{ MHz}$, $V_{DS}=15\text{ V}$, $V_{GS}=0\text{ V}$	C_{oss}		1839		pF
Reverse transfer capacitance $f=1\text{ MHz}$, $V_{DS}=15\text{ V}$, $V_{GS}=0\text{ V}$	C_{rss}		118		pF
Gate Resistance $f=1\text{ MHz}$, $V_{DS}=0\text{ V}$, $V_{GS}=0\text{ V}$	R_g		1.6		Ω
Total Gate Charge $V_{DS}= 15\text{ V}$, $I_D= 20\text{ A}$, $V_{GS}= 10\text{ V}$	Q_G		43		nC
Gate to Source Charge $V_{DS}= 15\text{ V}$, $I_D= 20\text{ A}$, $V_{GS}= 10\text{ V}$	Q_{GS}		7.3		nC
Gate to Drain Charge $V_{DS}= 15\text{ V}$, $I_D= 20\text{ A}$, $V_{GS}= 10\text{ V}$	Q_{GD}		7.2		nC
Turn-on delay time $V_{DS}=15\text{ V}$, $I_D=20\text{ A}$, $V_{GS}= 10\text{ V}$, $R_{GEN}=3\Omega$	$t_{d(ON)}$		5.3		ns
Rise time $V_{DS}=15\text{ V}$, $I_D=20\text{ A}$, $V_{GS}= 10\text{ V}$, $R_{GEN}=3\Omega$	t_r		4.2		ns
Turn-off delay time $V_{DS}=15\text{ V}$, $I_D=20\text{ A}$, $V_{GS}= 10\text{ V}$, $R_{GEN}=3\Omega$	$t_{d(OFF)}$		36		ns
Fall time $V_{DS}=15\text{ V}$, $I_D=20\text{ A}$, $V_{GS}= 10\text{ V}$, $R_{GEN}=3\Omega$	t_f		14		ns

Body Diode

ELECTRICAL CHARACTERISTICS (at $T_J = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)

Characteristic	Symbol	Min.	Typ.	Max.	Unit
Diode Forward Voltage $V_{GS} = 0V, I_S = 2.0A \quad T_J = 25^{\circ}\text{C}$	V_{SD}		0.7	1.2	V
Diode Forward Current $T_J = 25^{\circ}\text{C}$	I_S			122	A
Revers Recovery Time $I_F = 20A, dI/dt = 100A/\mu s \quad T_J = 25^{\circ}\text{C}$	T_{rr}		47		ns
Revers Recovery Charge $I_F = 20A, dI/dt = 100A/\mu s \quad T_J = 25^{\circ}\text{C}$	Q_{rr}		36		nC

Typical Electrical and Thermal Characteristics

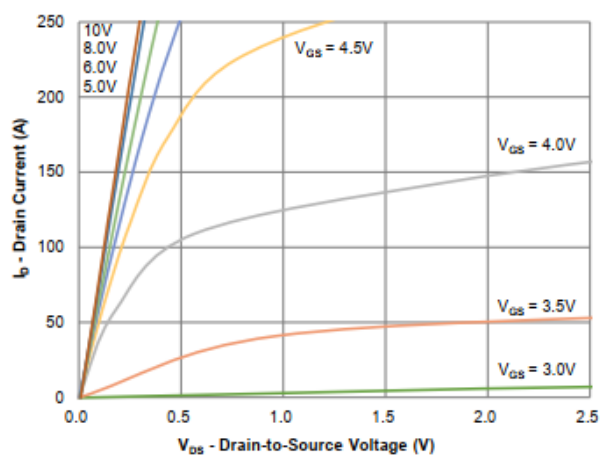
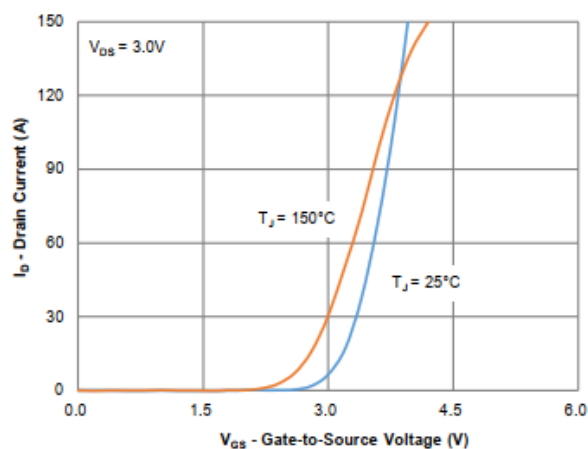
Figure 1. Typical output characteristics ($T_J=25^\circ\text{C}$)

Figure 2. Typical Transfer Characteristics

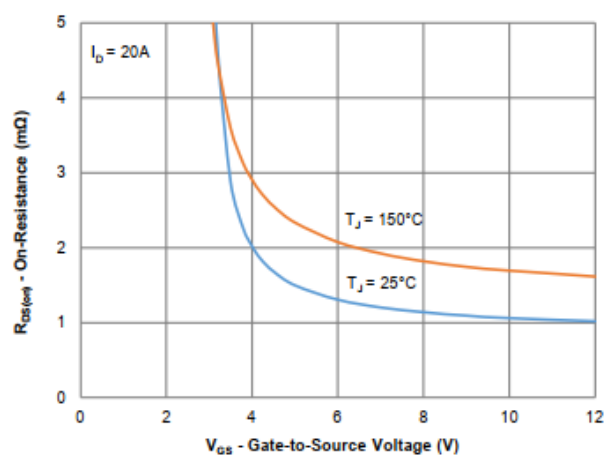


Figure 3. On-Resistance vs. Gate-Source Voltage

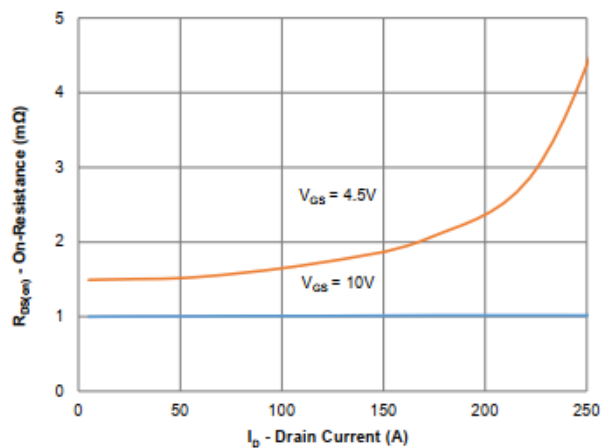


Figure 4. On-Resistance vs. Gate-Source Voltage

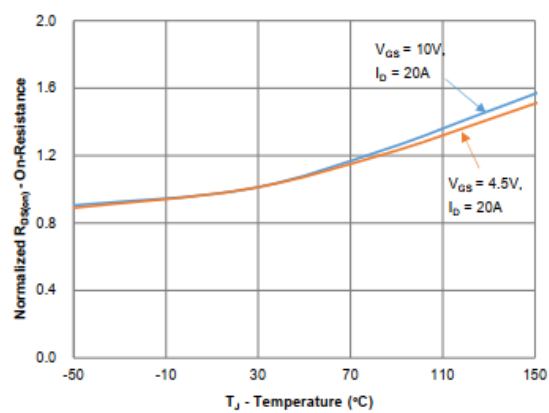


Figure 5: On-Resistance vs. Junction Temperature

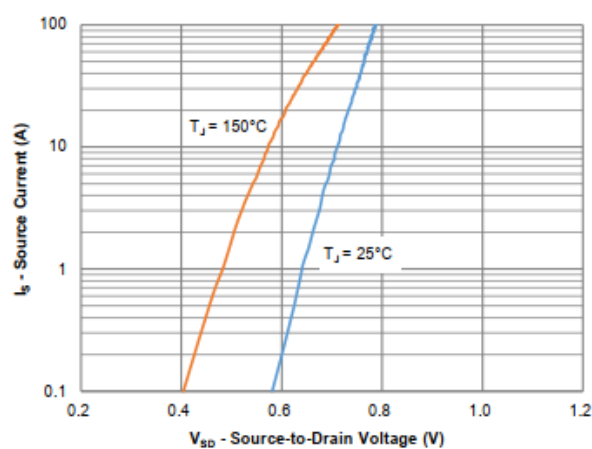


Figure 6. Source-Drain Diode Forward Voltage

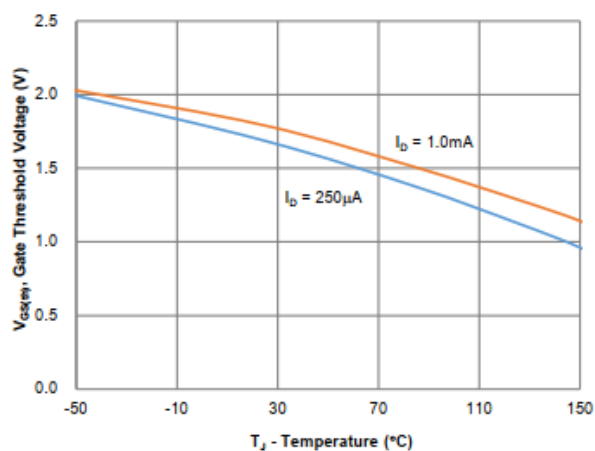


Figure 7. Gate Threshold Variation vs. Junction Temperature

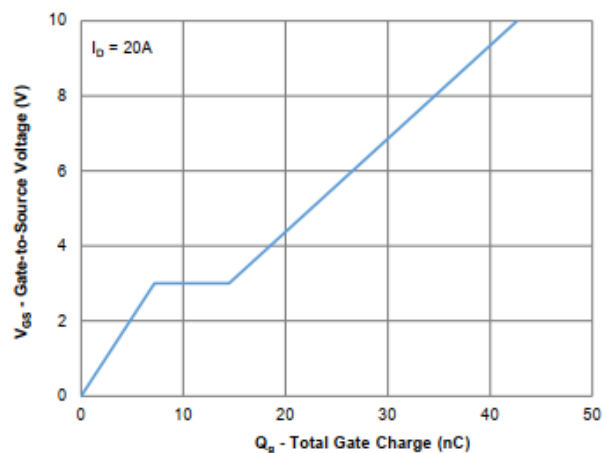


Figure 8. Gate Charge Characteristics

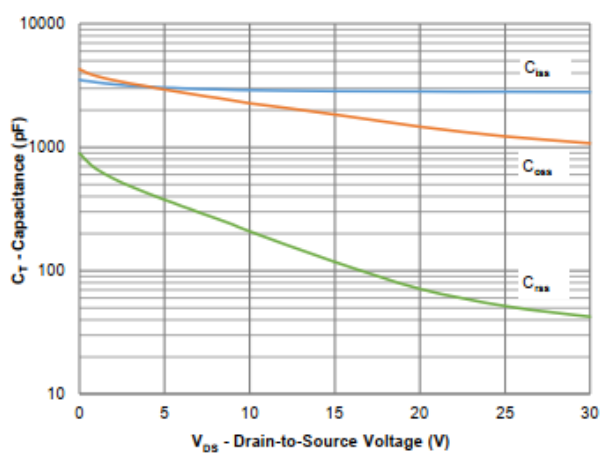


Figure 9. Capacitance Characteristics

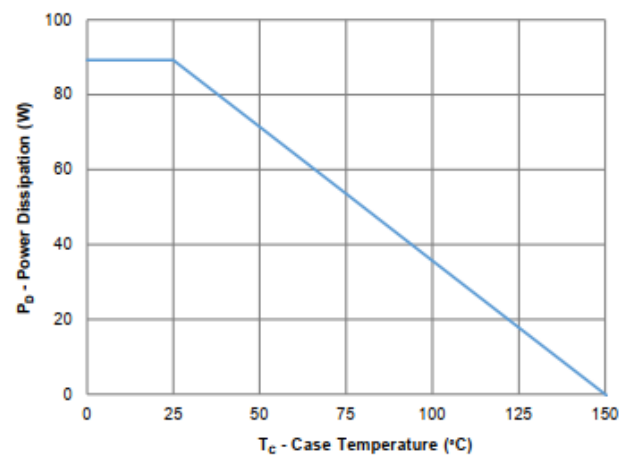


Figure 10. Power Derating

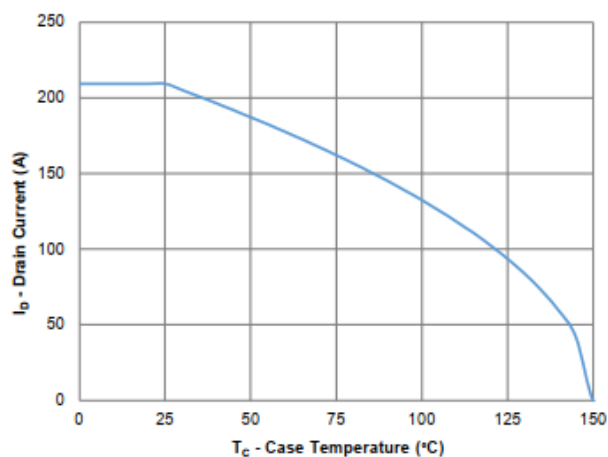


Figure 11. Current Derating

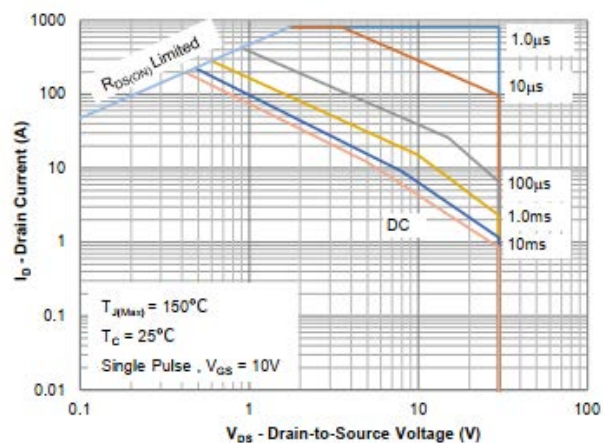


Figure 12. Safe Operating Area

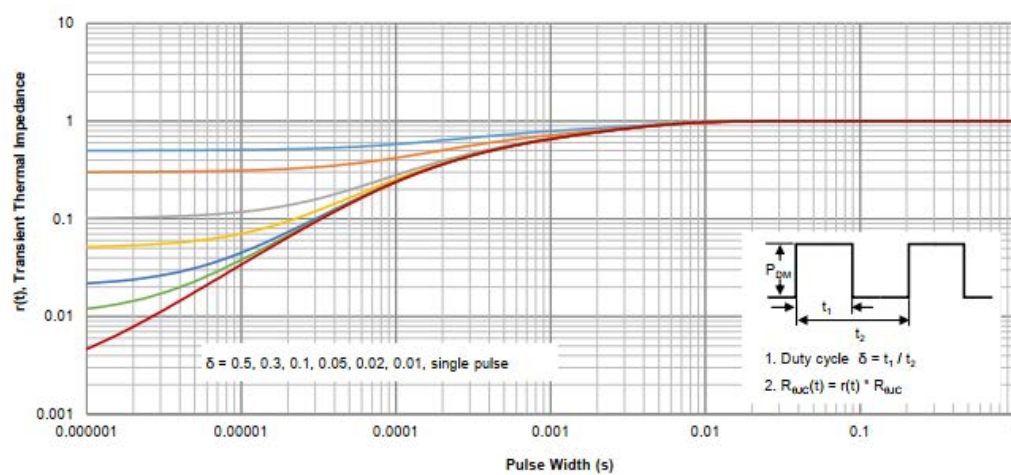
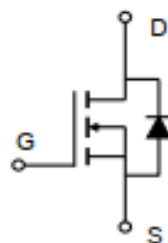
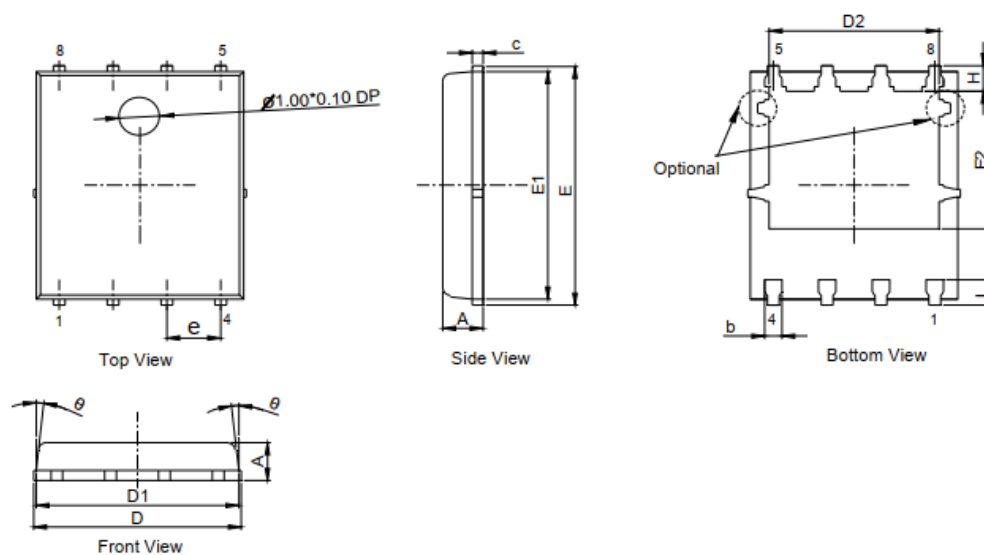


Figure 13. Max. Normalized Maximum Transient Thermal Impedance

- Circuit diagram



- PDFN5060-8L Package outlines : Dimensions in (mm)



NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. ALL DIMENSIONS IN MILLIMETER (ANGLE IN DEGREE).
3. DIMENSIONS D1 AND E1 DO NOT INCLUDE MOLD FLASH PROTRUSIONS OR GATE BURRS.

DIM.	MILLIMETER		
	MIN.	NOM.	MAX.
A	0.90	1.00	1.10
b	0.20	--	0.51
c	0.21	0.25	0.34
D	4.90	--	5.40
D1	4.80	--	5.15
D2	3.91	--	4.20
E	5.90	--	6.50
E1	5.65	5.80	5.95
E2	3.32	3.50	3.63
e	1.27BSC		
H	0.50	--	0.93
L	0.45	--	0.91
theta	0°	--	12°

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