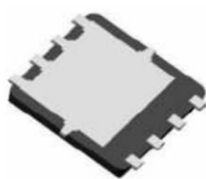
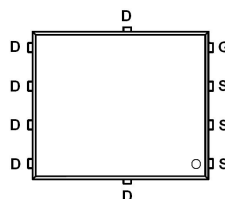
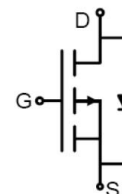


**Main Product Characteristics:**

$V_{DSS}$	-40V
$R_{DS(on)}$	4.3m $\Omega$ (typ.)
$I_D$	-78A


**PDFN5x6-8L**

**Pin Assignments**

**Schematic Diagram**
**Features and Benefits:**

- Advanced MOSFET process technology
- Special designed for PWM, load switching and general purpose applications
- Ultra low on-resistance with low gate charge
- Fast switching and reverse body recovery
- 150°C operating temperature


**Description:**

It utilizes the latest processing techniques to achieve the high cell density and reduces the on-resistance with high repetitive avalanche rating. These features combine to make this design an extremely efficient and reliable device for use in power switching application and a wide variety of other applications.

**Absolute Max Rating:**

Symbol	Parameter	Max.	Units
$I_D @ T_C = 25^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ 10\text{V}$ ①	-78	A
$I_D @ T_C = 100^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ 10\text{V}$ ①	-48	
$I_{DM}$	Pulsed Drain Current ②	-312	
$P_D @ T_C = 25^\circ\text{C}$	Power Dissipation ③	58	W
$V_{DS}$	Drain-Source Voltage	-40	V
$V_{GS}$	Gate-to-Source Voltage	$\pm 20$	V
$E_{AS}$	Single Pulse Avalanche Energy @ $L=0.5\text{mH}$	576	mJ
$T_J \quad T_{STG}$	Operating Junction and Storage Temperature Range	-55 to +150	$^\circ\text{C}$

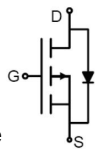
## Thermal Resistance

Symbol	Characterizes	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-case ③	—	2.15	°C/W

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

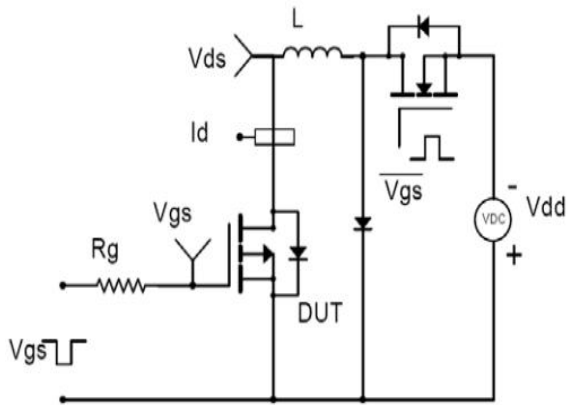
Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(BR)DSS}$	Drain-to-Source breakdown voltage	-40	—	—	V	$V_{GS} = 0V, I_D = -250\mu A$
$R_{DS(on)}$	Static Drain-to-Source on-resistance	—	4.3	5.6	m $\Omega$	$V_{GS} = -10V, I_D = -20A$
		—	5.9	7.8		$V_{GS} = -4.5V, I_D = -20A$
$V_{GS(th)}$	Gate threshold voltage	-1	—	-2.5	V	$V_{DS} = V_{GS}, I_D = -250\mu A$
$I_{DSS}$	Drain-to-Source leakage current	—	—	-1	$\mu A$	$V_{DS} = -40V, V_{GS} = 0V$
$I_{GSS}$	Gate-to-Source forward leakage	—	—	100	nA	$V_{GS} = 20V$
		—	—	-100		$V_{GS} = -20V$
$C_{iss}$	Input capacitance	—	6635	—	pF	$V_{GS} = 0V$
$C_{oss}$	Output capacitance	—	545	—		$V_{DS} = -20V$
$C_{rss}$	Reverse transfer capacitance	—	345	—		$f = 1MHz$
$Q_g$	Total gate charge	—	115	—	nC	$I_D = -20A,$
$Q_{gs}$	Gate-to-Source charge	—	10	—		$V_{DS} = -20V,$
$Q_{gd}$	Gate-to-Drain("Miller") charge	—	20	—		$V_{GS} = -10V$
$t_{d(on)}$	Turn-on delay time	—	16	—	ns	$V_{GS} = -10V, V_{DS} = -20V,$ $R_{GEN} = 3\Omega, R_L = 1\Omega$
$t_r$	Rise time	—	17	—		
$t_{d(off)}$	Turn-Off delay time	—	65	—		
$t_f$	Fall time	—	30	—		

## Source-Drain Ratings and Characteristics

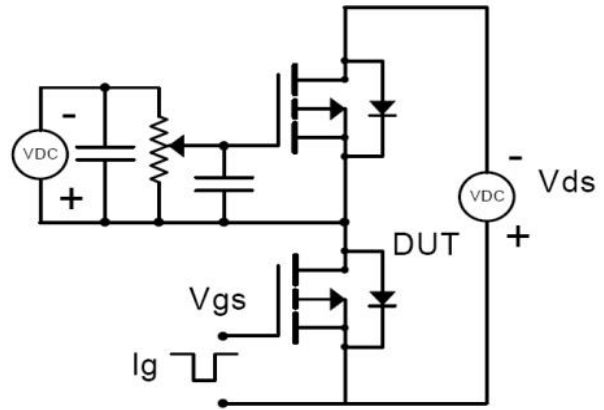
Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
$I_S$	Continuous Source Current (Body Diode)	—	—	-78	A	MOSFET symbol showing the integral reverse p-n junction diode 
$I_{SM}$	Pulsed Source Current (Body Diode)	—	—	-312	A	
$V_{SD}$	Diode Forward Voltage	—	—	-1.2	V	$I_S = -20A, V_{GS} = 0V$
$t_{rr}$	Reverse Recovery Time	—	24	—	ns	$T_J = 25^\circ\text{C}, I_F = -20A, di/dt =$
$Q_{rr}$	Reverse Recovery Charge	—	140	—	nC	$100A/\mu s$

## Test Circuits and Waveforms

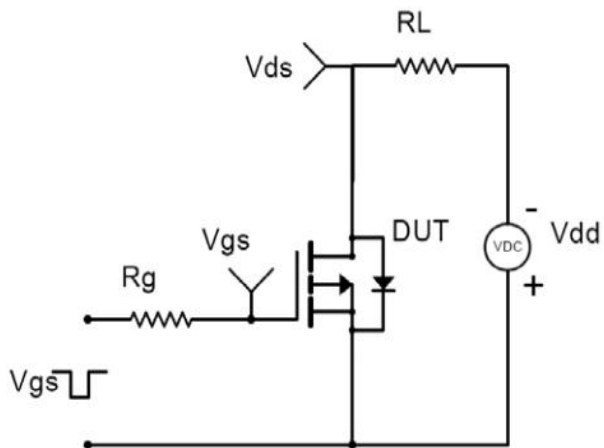
EAS Test Circuit:



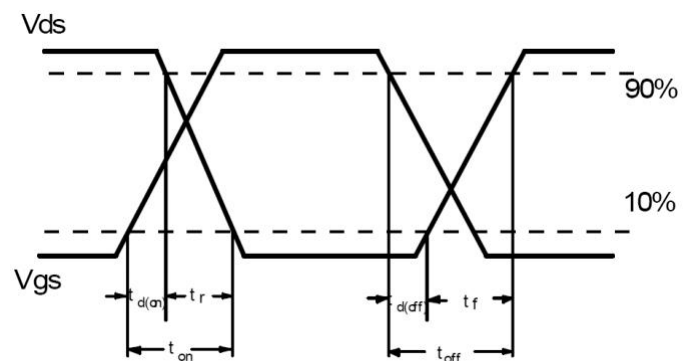
Gate Charge Test Circuit:



Switching Time Test Circuit:



Switching Waveforms:



### Notes:

- ① Calculated continuous current based on maximum allowable junction temperature.
- ② Repetitive rating, pulse width limited by max. junction temperature.
- ③ The power dissipation  $P_D$  is based on max. junction temperature, using junction-to-case thermal resistance.

Typical Electrical and Thermal Characteristics

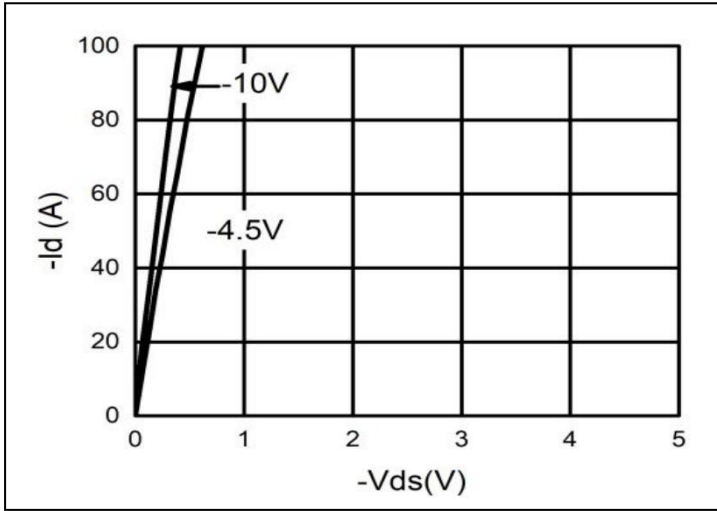


Figure1. Typical Output Characteristics

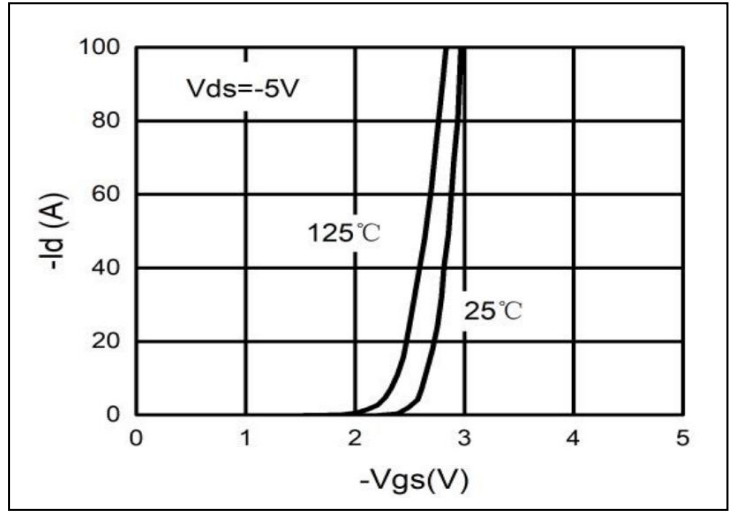


Figure2. Transfer Characteristics

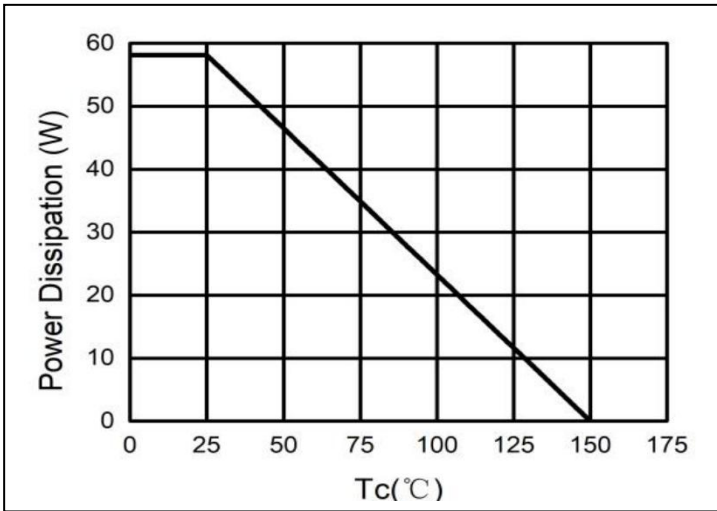


Figure3. Power Dissipation

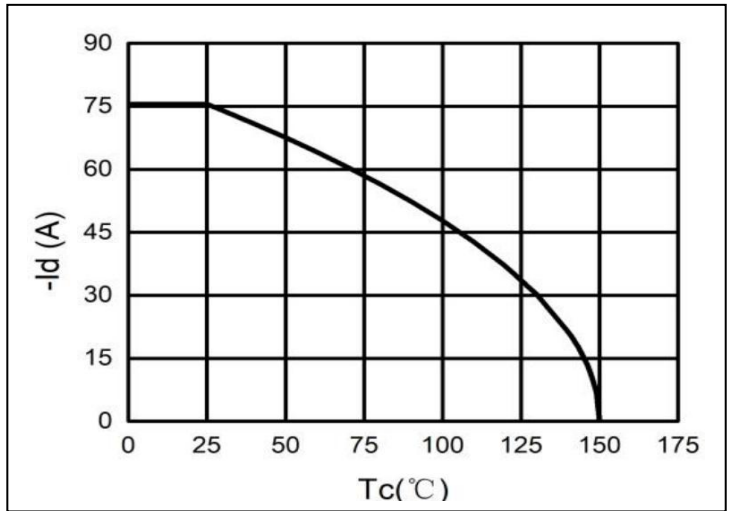


Figure 4. Drain Current

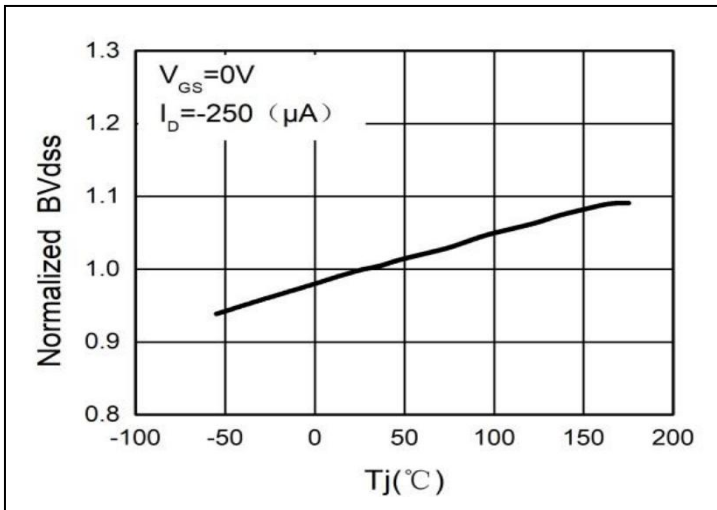


Figure5.  $BV_{DSS}$  vs Junction Temperature

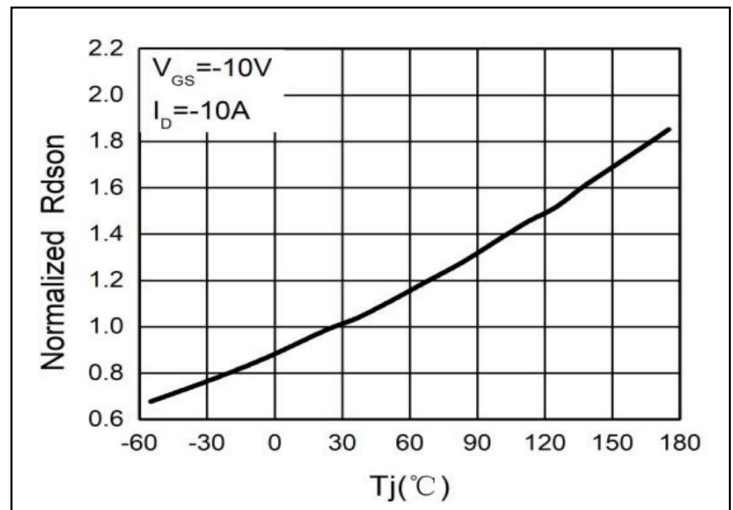


Figure6.  $R_{DS(ON)}$  vs Junction Temperature

Typical Electrical and Thermal Characteristics

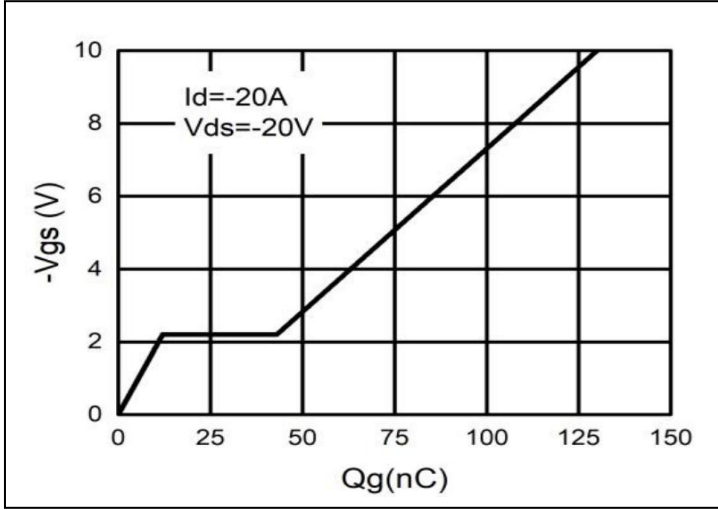


Figure7. Gate Charge

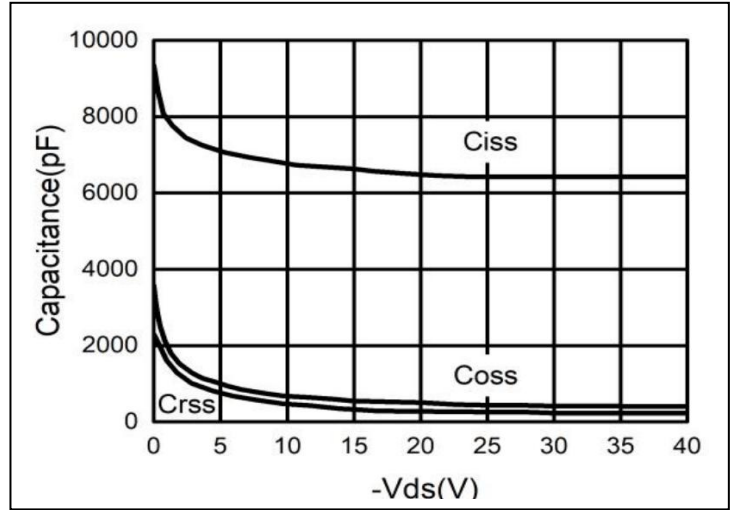


Figure8. Capacitance

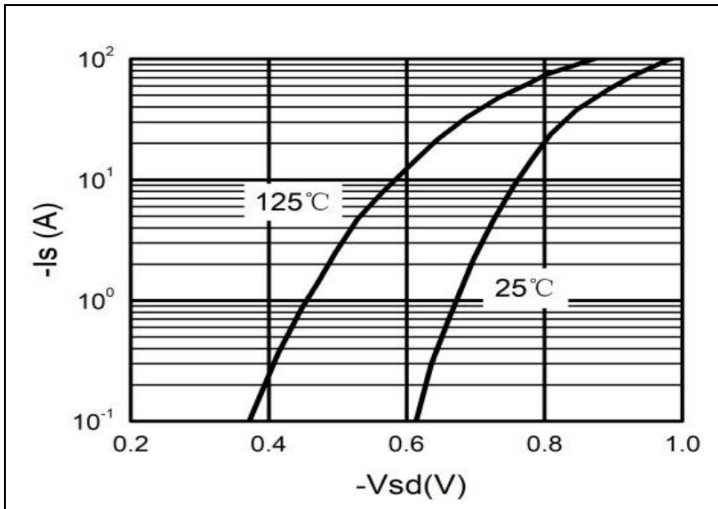


Figure9. Body-Diode Characteristics

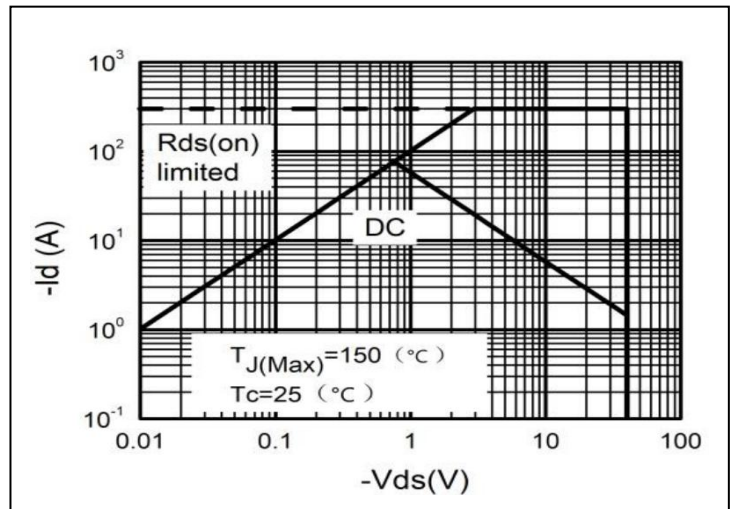
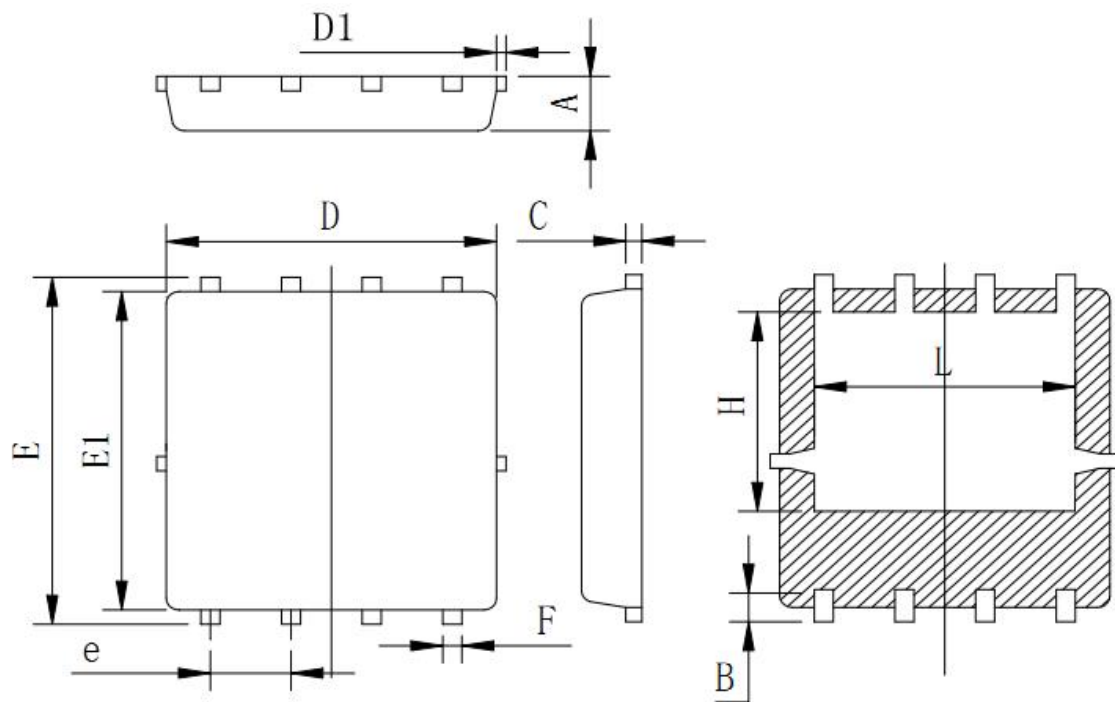


Figure10. Maximum Safe Operating Area

**Mechanical Data:**


Symbol	Min	Typ	Max
A	0.90	0.95	1.00
B	0.48	0.58	0.68
C	0.20	0.254	0.30
D	5.00	5.20	5.40
D1			0.15
E	5.90	6.05	6.20
E1	5.40	5.55	5.70
e	1.22	1.27	1.32
F	0.25	0.30	0.35
H	3.27	3.47	3.67
L	3.80	4.00	4.20

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