

## P-Channel Enhancement Mode MOSFET

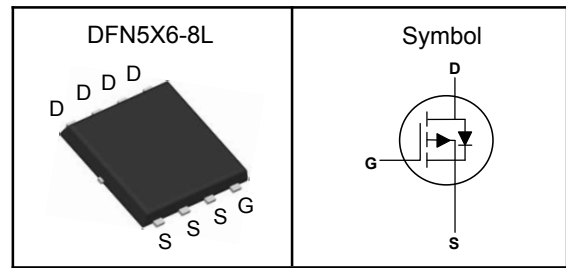
### Features

- Low  $R_{ds(on)}$  for low conduction loss
- Reliable and Rugged
- ROHS Compliant & Halogen-Free

### Applications

- Power Management in Desktop Computer
- DC/DC Converters

### Pin Description



$V_{bss}$	-30	V
$R_{ds(ON)-Typ}$	7.8	m $\Omega$
$I_D$	-59	A

### Absolute Maximum Ratings ( $T_C=25^\circ\text{C}$ , Unless Otherwise Noted)

Symbol	Parameter	P-Channel	Unit
$V_{bss}$	Drain-Source Voltage	-30	V
$V_{GSS}$	Gate-Source Voltage	$\pm 25$	V
$T_J$	Maximum Junction Temperature	-55 to 150	$^\circ\text{C}$
$T_{STG}$	Storage Temperature Range	-55 to 150	$^\circ\text{C}$
$I_{DM}^{①}$	Pulse Drain Current Tested	-180	A
$I_D$	Continuous Drain Current	-59	A
$P_D$	Maximum Power Dissipation	52.1	W
EAS	Single Pulse Avalanche Energy	153	mJ

### Thermal Characteristics

Symbol	Parameter	Rating	Unit
$R_{\theta JA}^{③}$	Thermal Resistance-Junction to Ambient	62	$^\circ\text{C}/\text{W}$
$R_{\theta JC}$	Thermal Resistance Junction-Case	2.4	$^\circ\text{C}/\text{W}$

Note ① : Max. current is limited by bonding wire.

Note ② : UIS tested and pulse width are limited by maximum junction temperature  $150^\circ\text{C}$ .

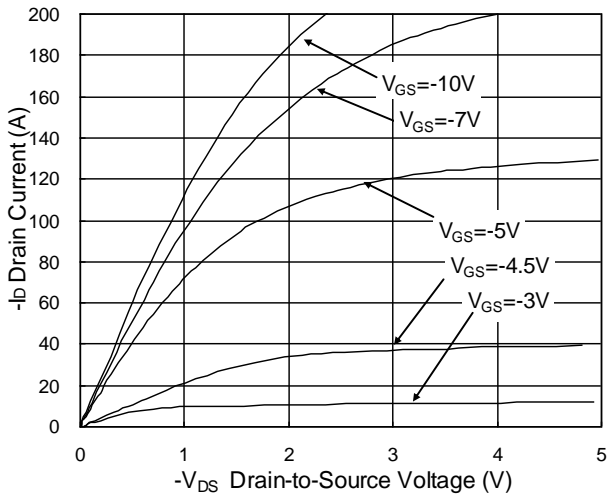
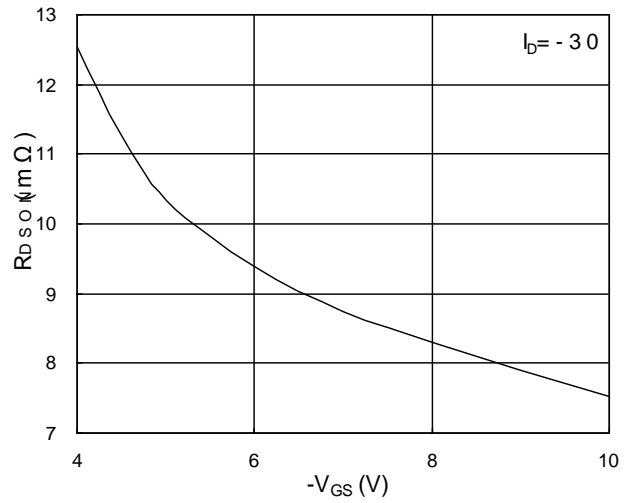
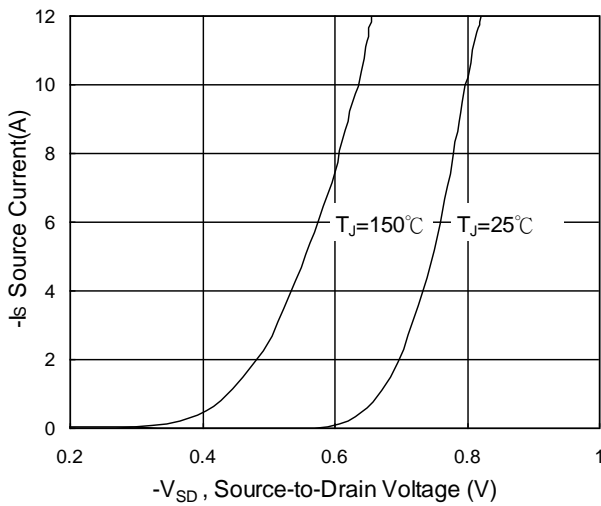
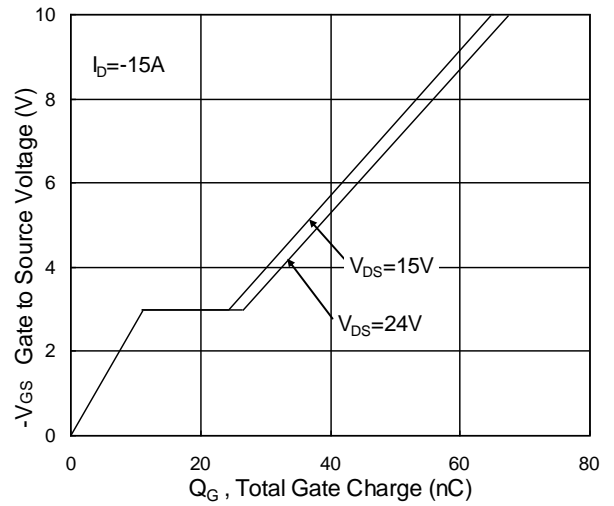
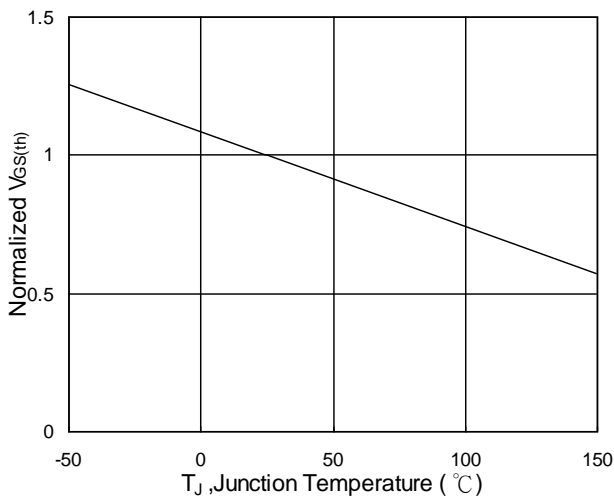
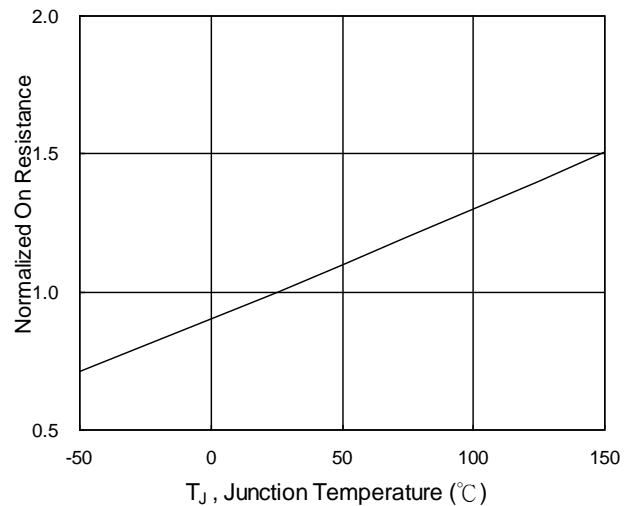
Note ③ : Surface Mounted on  $1\text{in}^2$  FR-4 board with 1oz.

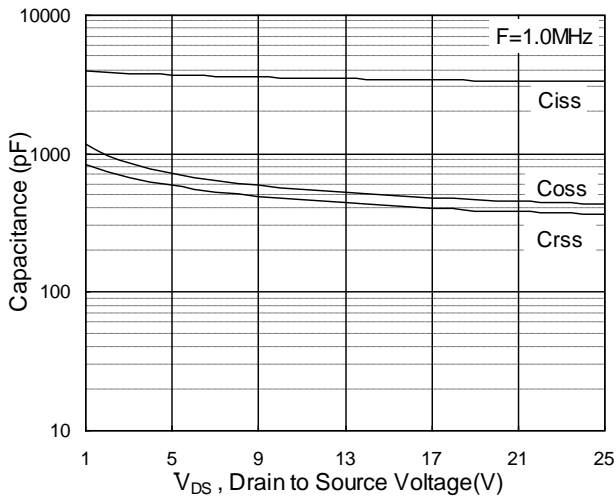
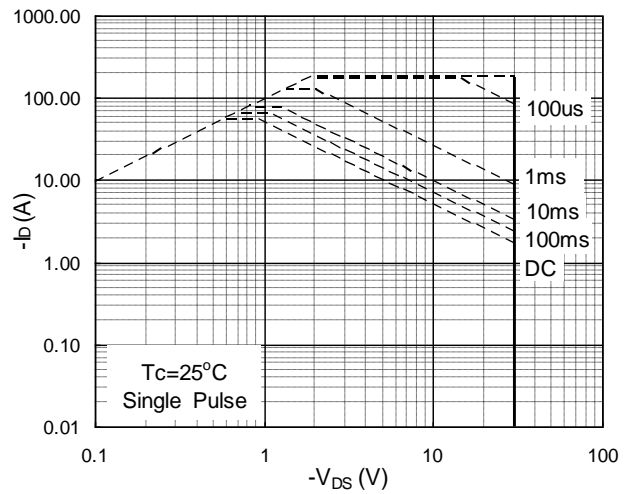
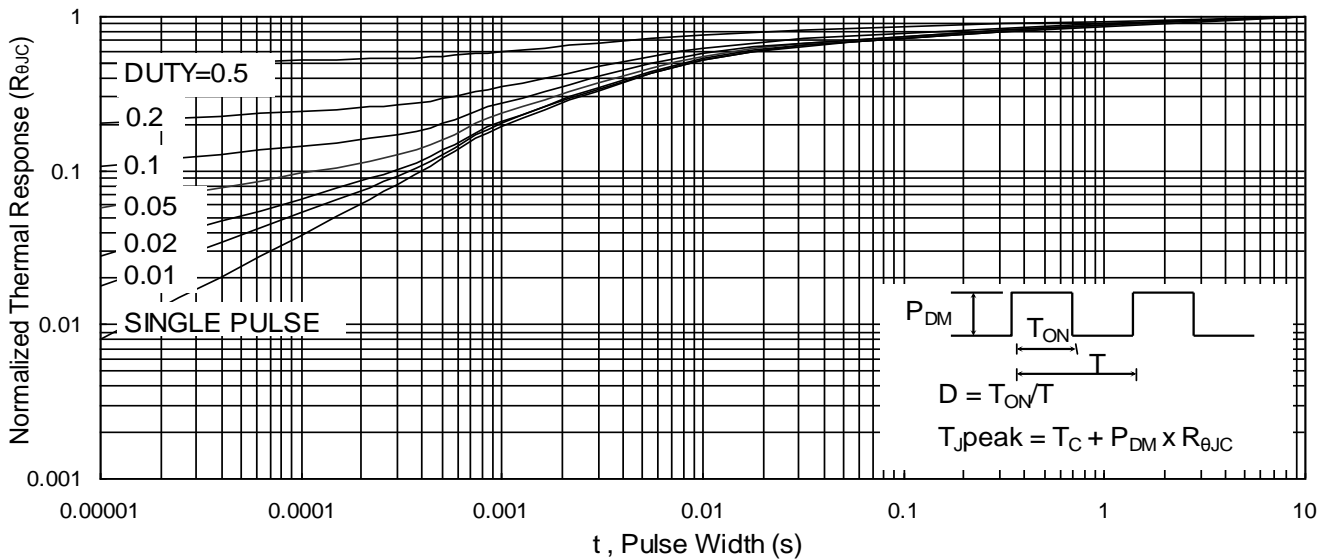
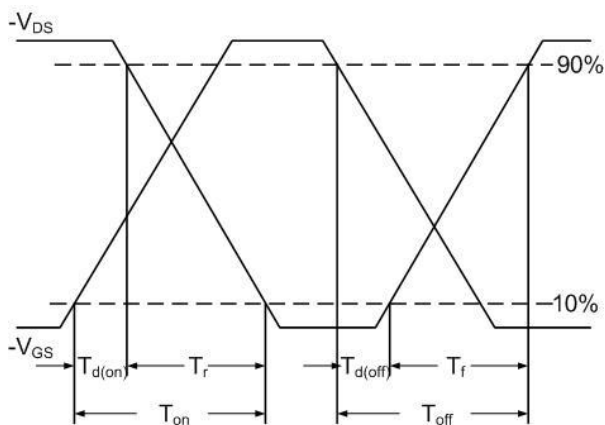
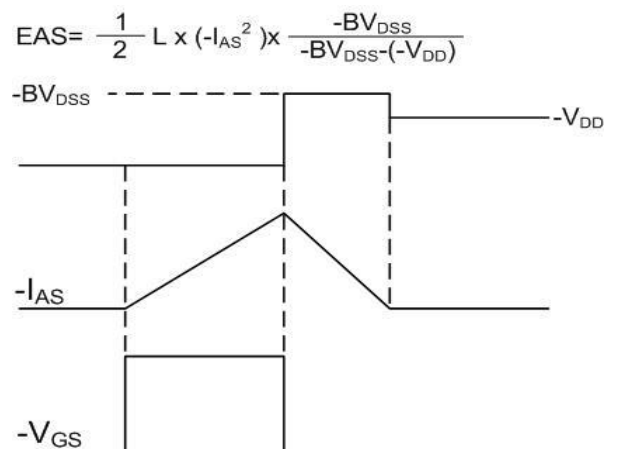
**P-Channel Enhancement Mode MOSFET****Electrical Characteristics** ( $T_J=25^\circ\text{C}$ , Unless Otherwise Noted)

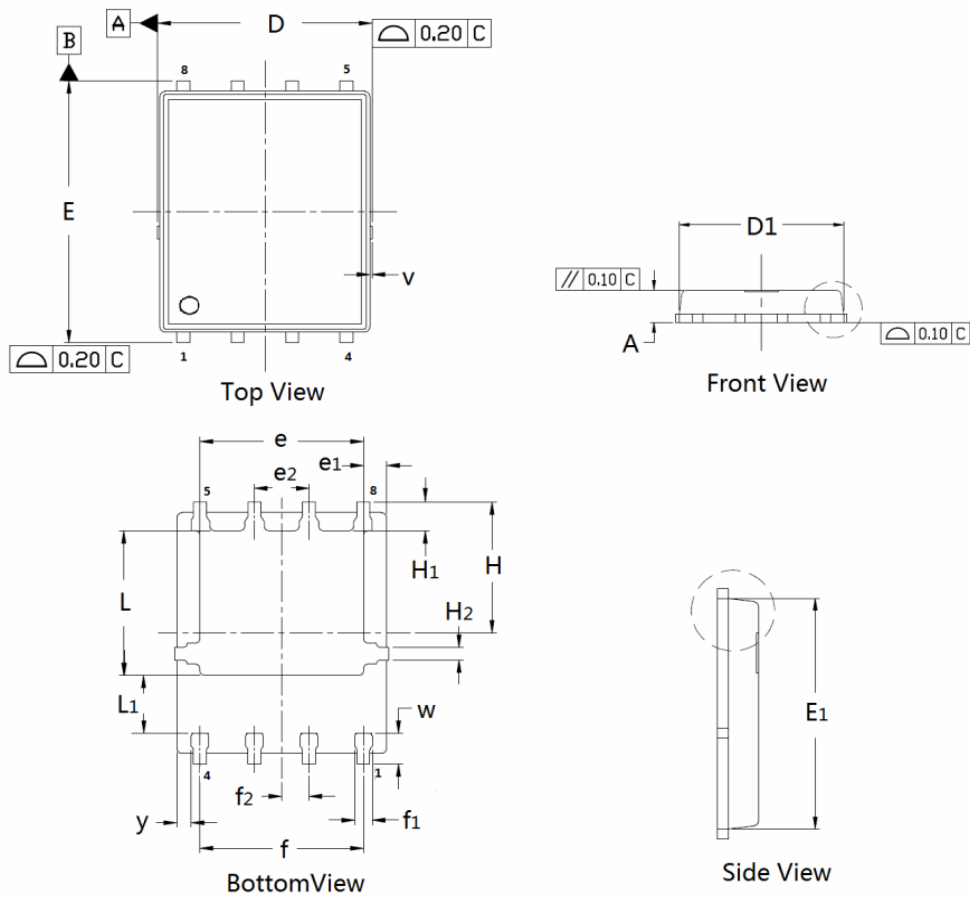
Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
<b>Static Electrical Characteristics</b>						
$BV_{DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=-250\mu A$	-30	---	---	V
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS}=-24V, V_{GS}=0V$	---	---	-1	$\mu A$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=-250\mu A$	-1.0	---	-2.5	V
$I_{GSS}$	Gate Leakage Current	$V_{GS}=\pm 25V, V_{DS}=0V$	---	---	$\pm 100$	nA
$R_{DS(on)}$	Drain-Source On-state Resistance	$V_{GS}=-10V, I_D=-20A$	---	7.8	9.8	$m\Omega$
		$V_{GS}=-4.5V, I_D=-9A$	---	11	15	$m\Omega$
gfs	Forward Transconductance	$V_{DS}=-5V, I_D=-30A$	---	26.4	---	S
<b>Dynamic Characteristics</b> <sup>⑤</sup>						
$C_{iss}$	Input Capacitance	$V_{GS}=0V,$ $V_{DS}=-15V,$ Freq.=1MHz	---	3448	---	pF
$C_{oss}$	Output Capacitance		---	508	---	
$C_{rss}$	Reverse Transfer Capacitance		---	421	---	
$T_{d(on)}$	Turn-on Delay Time	$V_{DD}=-15V, V_{GS}=-10V,$ $R_G=3.3\Omega, I_D=-15A$	---	8	---	nS
$T_r$	Turn-on Rise Time		---	17.8	---	
$T_{d(off)}$	Turn-off Delay Time		---	78.4	---	
$T_f$	Turn-off Fall Time		---	43.6	---	
$Q_g$	Total Gate Charge	$V_{DS}=-15V,$ $V_{GS}=-4.5V, I_D=-15A$	---	33	---	nC
$Q_{gs}$	Gate-Source Charge		---	10.7	---	
$Q_{gd}$	Gate-Drain Charge		---	12.8	---	
<b>Source-Drain Characteristics</b> ( $T_J=25^\circ\text{C}$ )						
$V_{SD}$ <sup>④</sup>	Diode Forward Voltage	$V_{GS}=0V, I_S=-1A, T_J=25^\circ\text{C}$	---	---	-1.2	V
$t_{rr}$	Reverse Recovery Time	$I_F=-15A,$ $di/dt=100A/\mu s, T_J=25^\circ\text{C}$	---	29	---	nS
$Q_{rr}$	Reverse Recovery Charge		---	15	---	nC

Note ④: Pulse test (pulse width 300us, duty cycle 2%).

Note ⑤: Guaranteed by design, not subject to production testing.

**P-Channel Enhancement Mode MOSFET**
**Typical Characteristics**

**Fig.1 Typical Output Characteristics**

**Fig.2 On-Resistance v.s Gate-Source**

**Fig.3 Forward Characteristics Of Reverse**

**Fig.4 Gate-Charge Characteristics**

**Fig.5 Normalized  $V_{GS(th)}$  v.s  $T_J$** 

**Fig.6 Normalized  $R_{DS(on)}$  v.s  $T_J$**

**P-Channel Enhancement Mode MOSFET**

**Fig.7 Capacitance**

**Fig.8 Safe Operating Area**

**Fig.9 Normalized Maximum Transient Thermal Impedance**

**Fig.10 Switching Time Waveform**

**Fig.11 Unclamped Inductive Switching Waveform**

**P-Channel Enhancement Mode MOSFET**
**DFN5×6-8L Package Outline Data**

**DIMENSIONS ( unit : mm )**

Symbol		Typ	Max	Symbol	Min	Typ	Max
A	0.90	1.02	1.10	D	4.90	4.98	5.10
D <sub>1</sub>	4.80	4.89	5.10	E	5.90	6.11	6.25
E <sub>1</sub>	5.65	5.74	5.95	e	3.72	3.80	3.92
e <sub>1</sub>	--	0.5	--	e <sub>2</sub>	--	1.	--
f	--	3.8	--	f <sub>1</sub>	0.31	0.37	0.51
f <sub>2</sub>	--	0.6	--	H	--	3.	--
H <sub>1</sub>	0.59	0.63	0.79	H <sub>2</sub>	0.26	0.28	0.32
L	3.35	3.45	3.65	L <sub>1</sub>	--	1.	--
v	--	0.1	--	w	0.64	0.68	0.84
y	--	0.3	--		--		--