



N-Channel Enhancement Mode Power MOSFET

Description

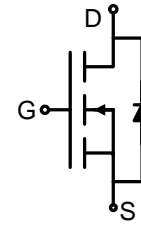
The PE8680K uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. It can be used in a wide variety of applications.

General Features

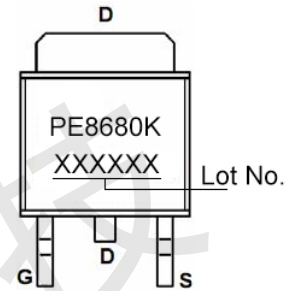
- $V_{DS}=60V, I_D=80A$
 $R_{DS(ON)} < 10.5m\Omega @ V_{GS}=10V$
- Advanced trench MOS technology
- Extremely low on-resistance $R_{DS(ON)}$
- Excellent $Q_g \times R_{DS(ON)}$ product(FOM)
- Qualified according to JEDEC criteria

Application

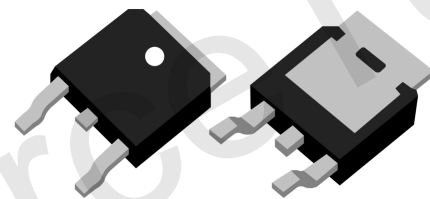
- Motor control and drive
- Battery management
- UPS(uninterruptible power supply)



Schematic diagram



Marking and pin assignment



TO-252-2L

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

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	60	V
Gate-Source Voltage	V_{GS}	± 20	V
Drain Current-Continuous	I_D	64	A
Drain Current-Continuous ($T_C=100^\circ C$)		41	A
Pulsed Drain Current	I_{DM}	256	A
Maximum Power Dissipation	P_D	88	W
Single pulse avalanche energy ^(Note 5)	E_{AS}	60	mJ
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 To 150	$^\circ C$
Soldering temperature	T_{SOLD}	260	$^\circ C$

Thermal Characteristic

Thermal Resistance, Junction-to-Case ^(Note 2)	$R_{\theta JC}$	1.42	$^\circ C/W$
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Electrical Characteristics (T_C=25°C unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V I _D =250μA	60	-	-	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =60V, V _{GS} =0V	-	-	1	μA
Gate-Body Leakage Current	I _{GSS}	V _{GS} =±20V, V _{DS} =0V	-	-	±100	nA
On Characteristics (Note 3)						
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250μA	1.3	1.8	2.3	V
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =10V, I _D =30A	-	8.5	10.5	mΩ
Forward Transconductance	g _{FS}	V _{DS} =5V, I _D =30A	-	65	-	S
Dynamic Characteristics (Note 4)						
Input Capacitance	C _{ISS}	V _{DS} =30V, V _{GS} =0V, F=1.0MHz	-	1940	-	PF
Output Capacitance	C _{OSS}		-	197	-	PF
Reverse Transfer Capacitance	C _{RSS}		-	142	-	PF
Switching Characteristics (Note 4)						
Turn-on Delay Time	t _{d(on)}	V _{DD} =30V, I _D =30A V _{GS} =10V, R _G =2.7Ω	-	10	-	nS
Turn-on Rise Time	t _r		-	50	-	nS
Turn-Off Delay Time	t _{d(off)}		-	30	-	nS
Turn-Off Fall Time	t _f		-	72	-	nS
Total Gate Charge	Q _g	V _{DS} =30V, I _D =30A, V _{GS} =10V F=1.0MHz	-	45	-	nC
Gate-Source Charge	Q _{gs}		-	9	-	nC
Gate-Drain Charge	Q _{gd}		-	13	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage (Note 3)	V _{SD}	V _{GS} =0V, I _S =30A	-	0.8	1.3	V
Diode Forward Current (Note 2)	I _S		-	-	63	A

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, t ≤ 10 sec.
3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
4. Guaranteed by design, not subject to production
5. EAS condition : T_j=25°C, V_{DD}=30V, V_G=10V, L=0.5mH, R_G=25Ω



Typical Electrical and Thermal Characteristics (Curves)

Fig 1: Output Characteristics

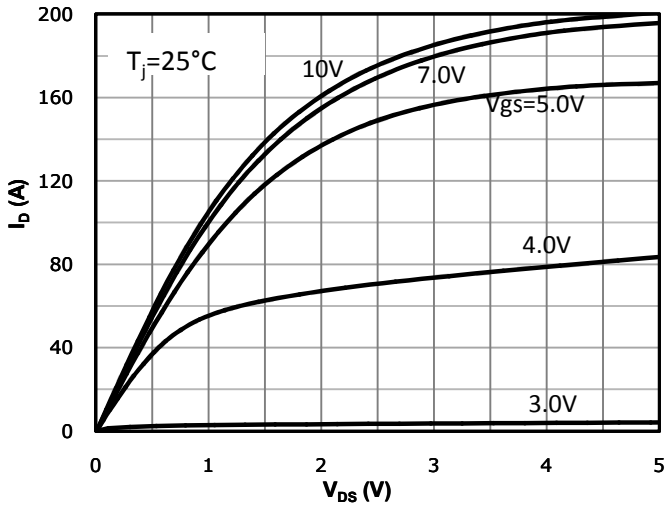


Fig 2: Transfer Characteristics

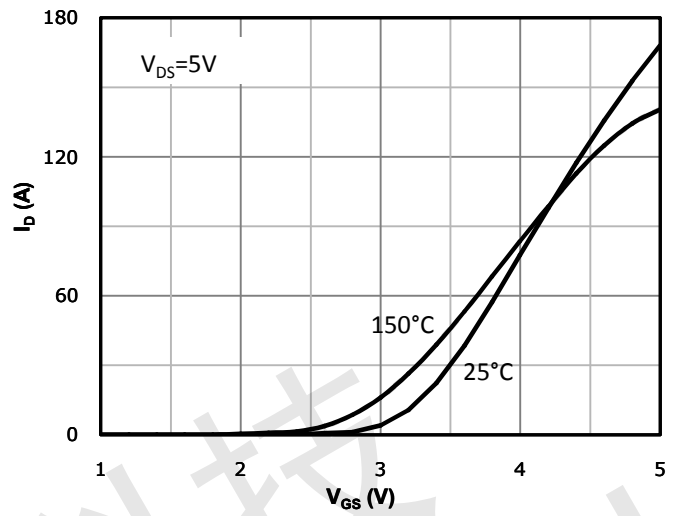


Fig 3: $R_{DS(on)}$ vs Drain Current and Gate Voltage

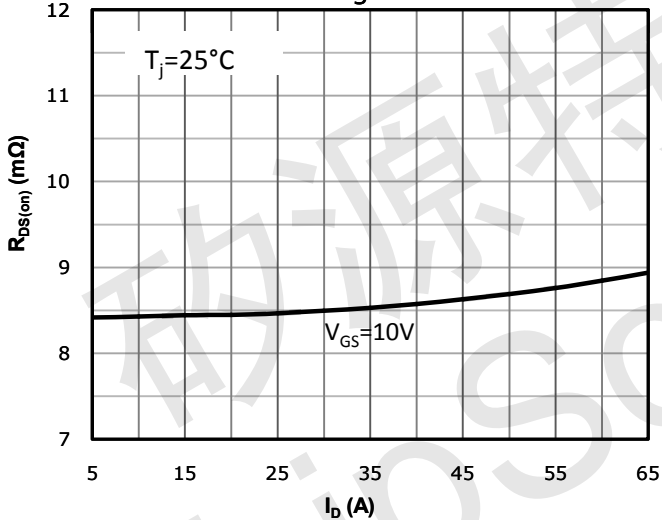


Fig 4: $R_{DS(on)}$ vs Gate Voltage

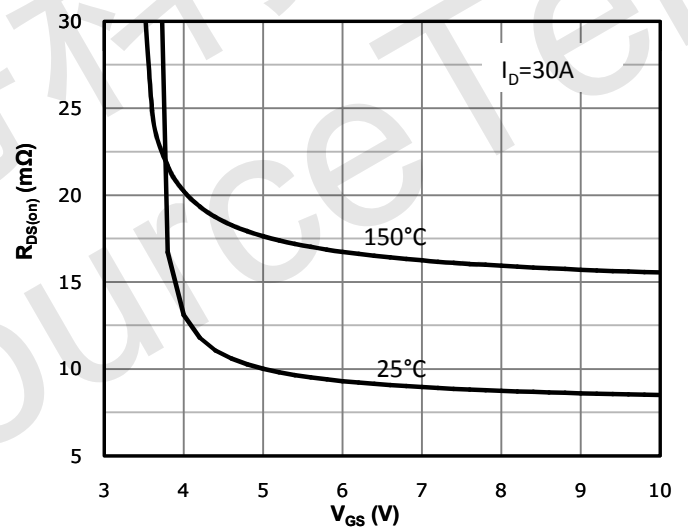


Fig 5: $R_{DS(on)}$ vs. Temperature

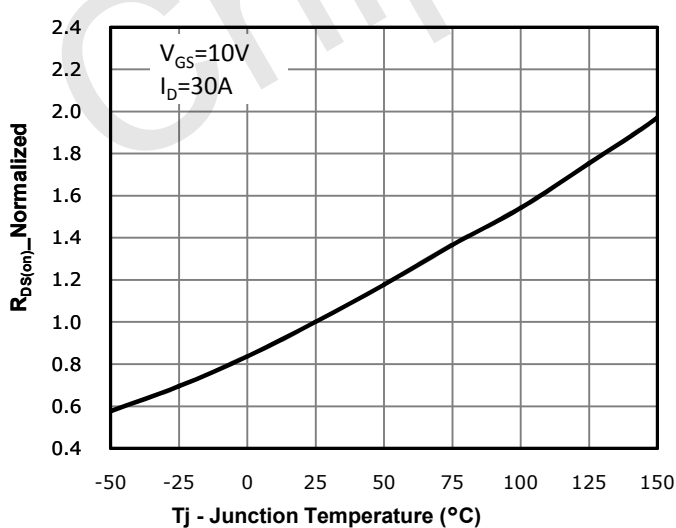
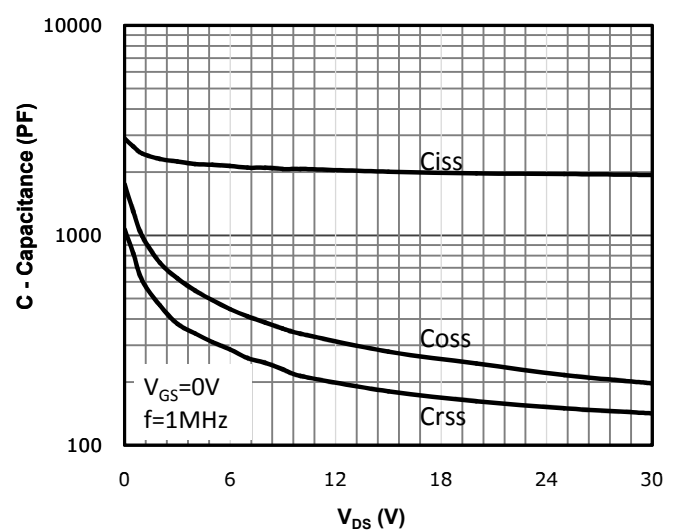


Fig 6: Capacitance Characteristics





Typical Electrical and Thermal Characteristics (Curves)

Fig 7: Gate Charge Characteristics

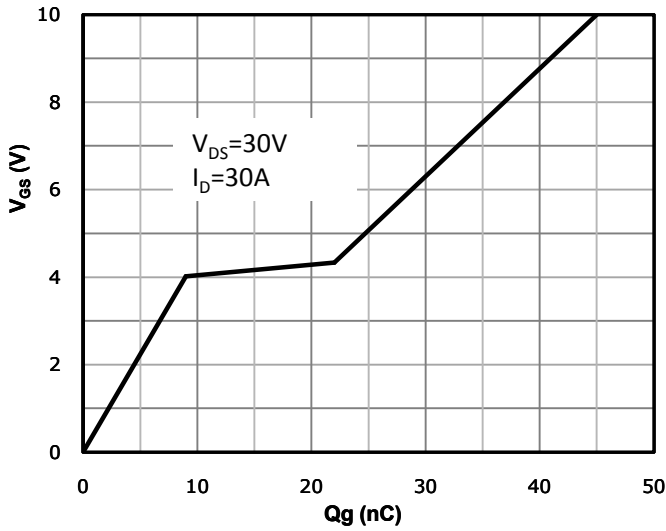


Fig 8: Body-diode Forward Characteristics

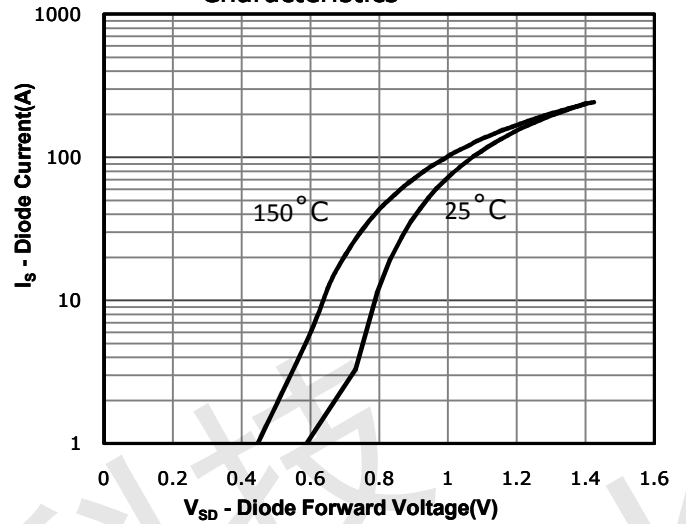


Fig 9: Power Dissipation

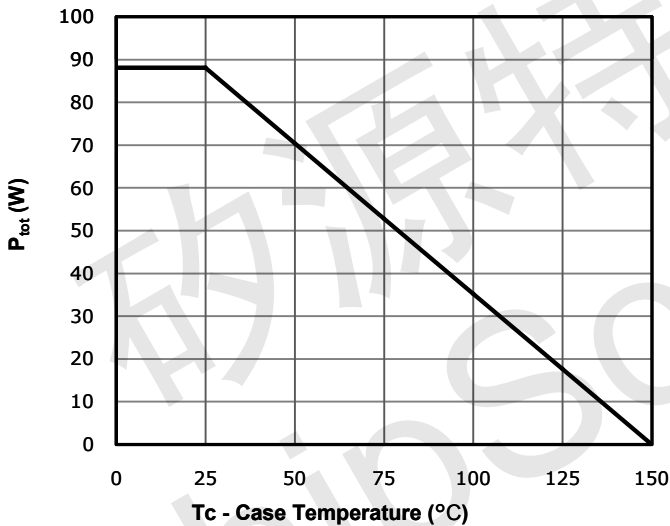


Fig 10: Drain Current Derating

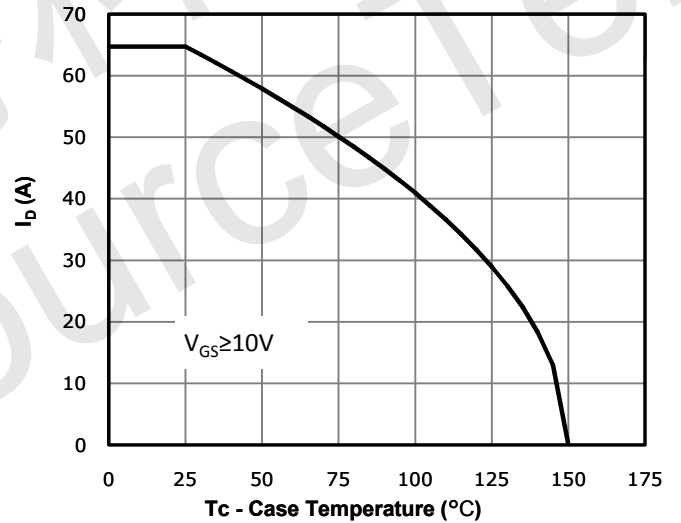


Fig 11: Safe Operating Area

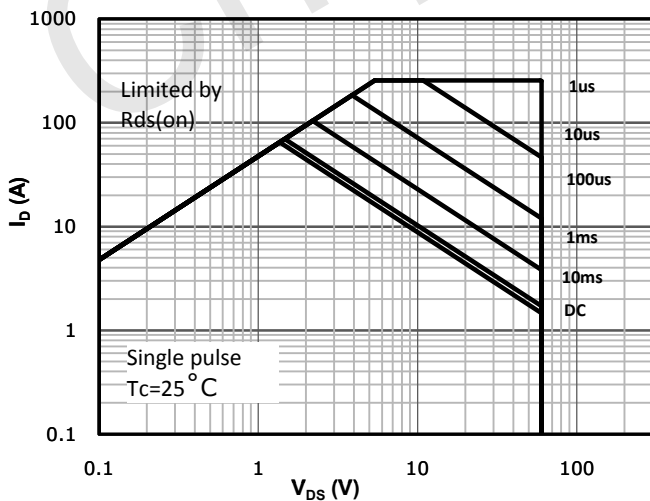
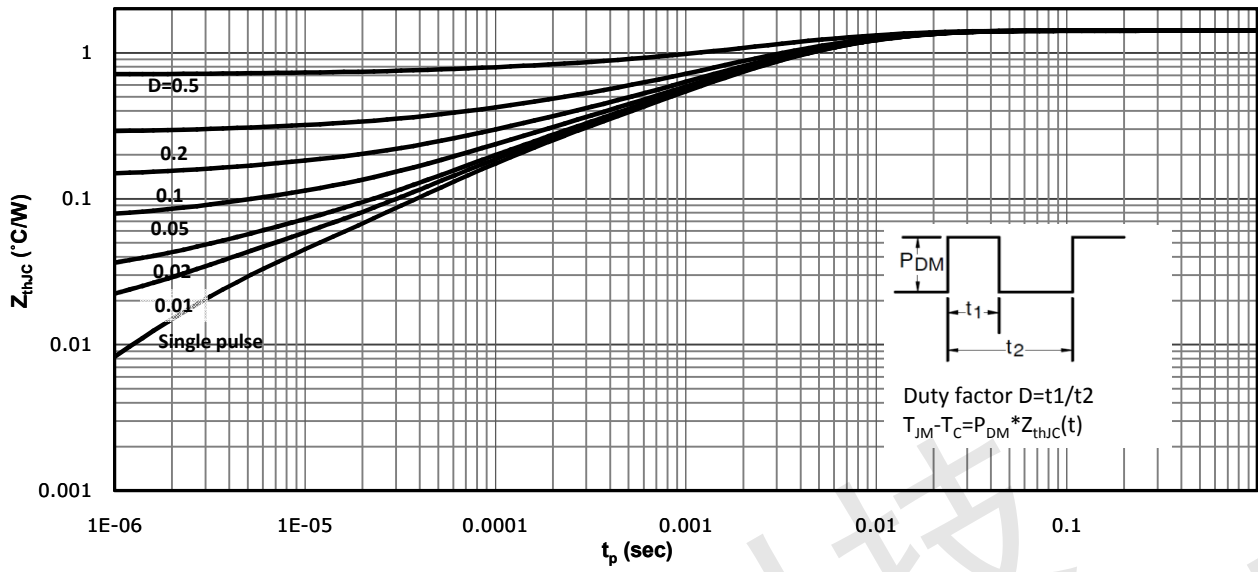




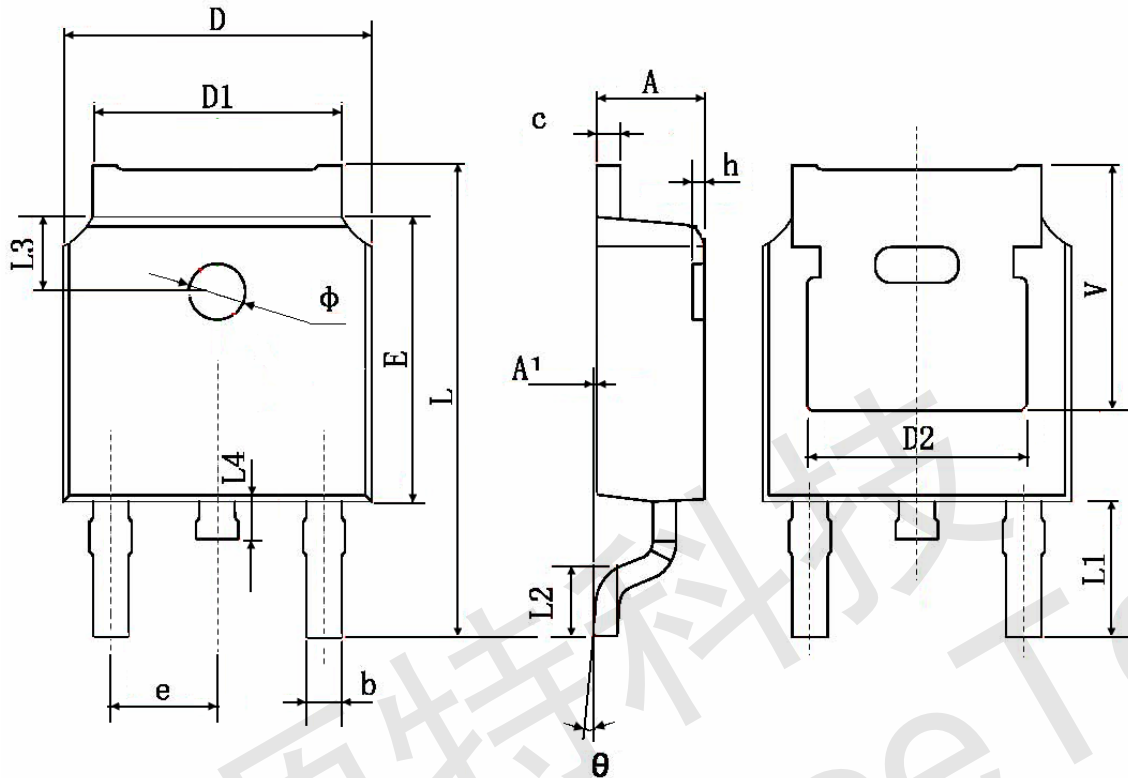
Fig 12: Max. Transient Thermal Impedance



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TO-252 Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.400	0.087	0.094
A1	0.000	0.127	0.000	0.005
b	0.660	0.860	0.026	0.034
c	0.460	0.580	0.018	0.023
D	6.500	6.700	0.256	0.264
D1	5.100	5.460	0.201	0.215
D2	4.830 TYP.		0.190 TYP.	
E	6.000	6.200	0.236	0.244
e	2.186	2.386	0.086	0.094
L	9.800	10.400	0.386	0.409
L1	2.900 TYP.		0.114 TYP.	
L2	1.400	1.700	0.055	0.067
L3	1.600 TYP.		0.063 TYP.	
L4	0.600	1.000	0.024	0.039
φ	1.100	1.300	0.043	0.051
θ	0°	8°	0°	8°
h	0.000	0.300	0.000	0.012
V	5.350 TYP.		0.211 TYP.	