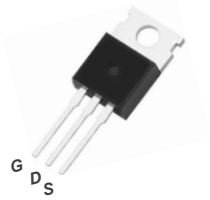
N-Channel Enhancement Mode MOSFET

Features

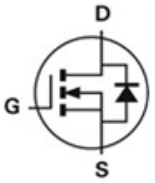
- Fast switching speed
- Reliable and Rugged
- ROHS Compliant & Halogen-Free

Pin Description

TO-220



Symbol



Applications

- Power Management in Desktop Computer
- DC/DC Converters

V_{DSS}	80	V
$R_{DS(ON)-Typ}$	3.3	mΩ
I_D	187	A

Absolute Maximum Ratings (T_J=25℃, Unless Otherwise Noted)

Symbol	Parameter		N-Channel	Unit
V_{DSS}	Drain-Source Voltage		80	V
V_{GSS}	Gate-Source Voltage		±20	V
T_J	Maximum Junction Temperature		-55 to 175	℃
T_{STG}	Storage Temperature Range		-55 to 175	℃
E_{AS}	Single Pulse Avalanche Energy		600	mJ
I_{DM} ①	Pulse Drain Current Tested		500	A
I_D	Continuous Drain Current(Silicon Limited)	T_C=25°C	187	A
	Continuous Drain Current(Package Limited)	T_C=25°C	120	A
P_D	Maximum Power Dissipation	T_C=25°C	250	W

Thermal Characteristics

Symbol	Parameter	Rating	Unit
$R_{\theta JA}$ ③	Thermal Resistance-Junction to Ambient	60	℃/W
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	0.6	℃/W

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

Note ②：UIS tested and pulse width are limited by maximum junction temperature 175℃.

Note ③：Surface Mounted on 1in^2 FR-4 board with 1oz.

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Electrical Characteristics (T_J=25℃, Unless Otherwise Noted)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
Static Electrical Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V, I_D=250uA	80	---	---	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=80V,V_{GS}=0V, T_J =25℃	---	---	1	uA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS} , I_D=250uA	2	3	4	V
I_{GSS}	Gate Leakage Current	V_{GS}=±20V, V_{DS}=0V	---	---	±100	nA
$R_{DS(ON)}$	Drain-Source On-state Resistance	V_{GS}=10V, I_D=20A	---	3.3	3.8	mΩ
Dynamic Characteristics⑤						
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=40V, Freq.=1.0MHz	---	4000	---	pF
C_{oss}	Output Capacitance		---	499	---	
C_{rss}	Reverse Transfer Capacitance		---	26	---	
$T_{d(on)}$	Turn-on Delay Time	V_{GS}=10V,V_{DD}=40V, I_D=20A,R_G=10Ω	---	25	---	nS
T_r	Turn-on Rise Time		---	55	---	
$T_{d(off)}$	Turn-off Delay Time		---	75	---	
T_f	Turn-off Fall Time		---	52	---	
Q_g	Total Gate Charge	V_{GS}=10V,V_{DD}=40V, I_D=25A	---	61	---	nC
Q_{gs}	Gate-Source Charge		---	12.5	---	
Q_{gd}	Gate-Drain Charge		---	12	---	
Source-Drain Characteristics						
I_S	Continuous Source Current		---	---	187	A
V_{SD}	Diode Forward Voltage	I_f=20A, V_{GS}=0V	---	0.82	1.2	V
t_{rr}	Reverse recovery time	I_F=20A,V_r=40V diF/dt=400A/μs	---	45	---	ns
Q_{rr}	Reverse recovery charge		---	155	---	nC

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

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

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Typical Characteristics

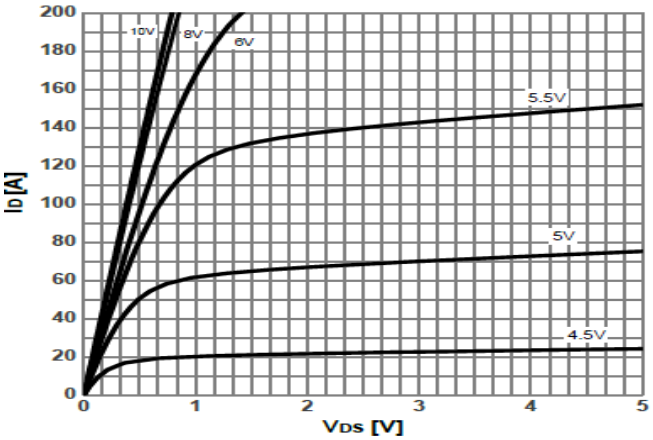

Diagram 1: Typ. output characteristics

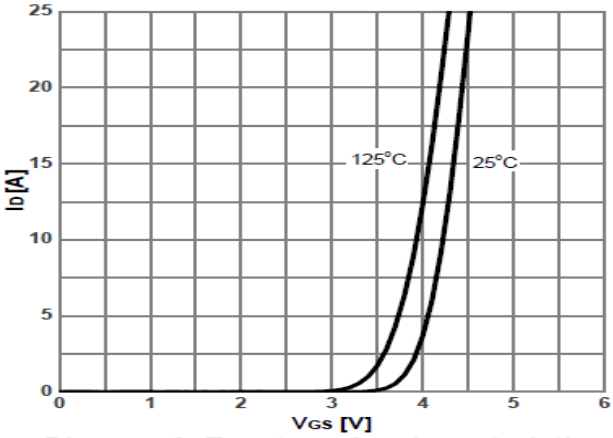

Diagram 2: Typ. transfer characteristics

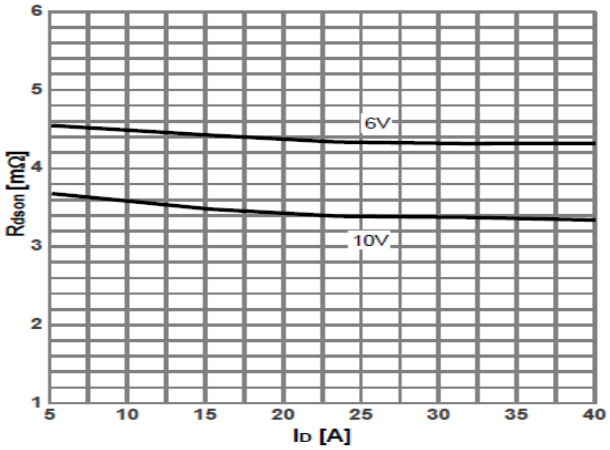

Diagram 3: On-state resistance vs. Drain current

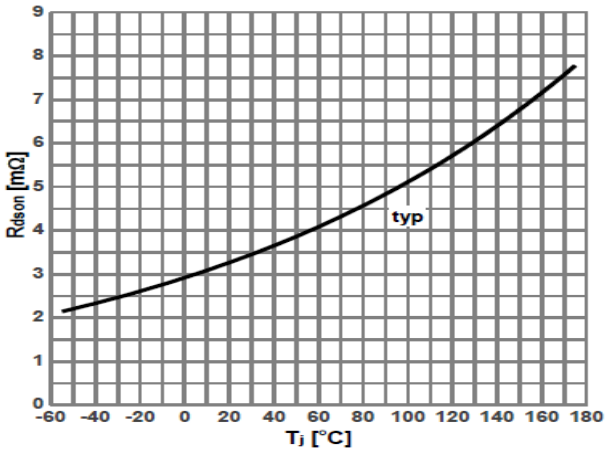

Diagram 4: On-state resistance vs. Junction temperature

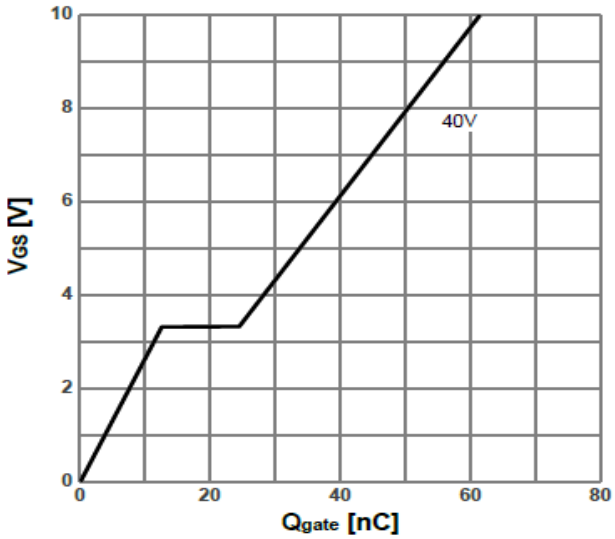

Diagram 5: Typ. gate charge

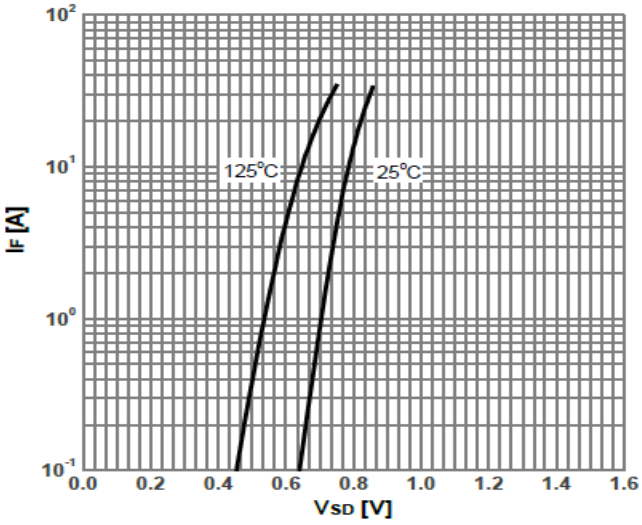

Diagram 6: Forward characteristics of reverse diode

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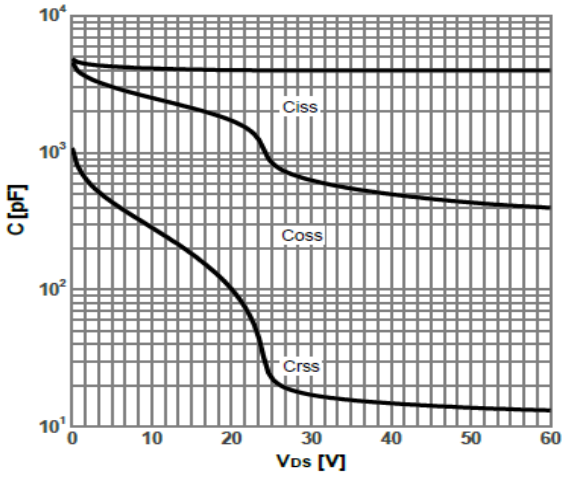

Diagram 7: Typ. capacitances

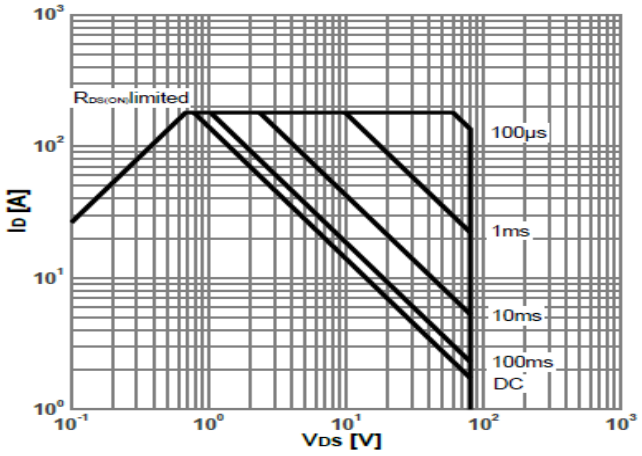

Diagram 8: Safe operating area

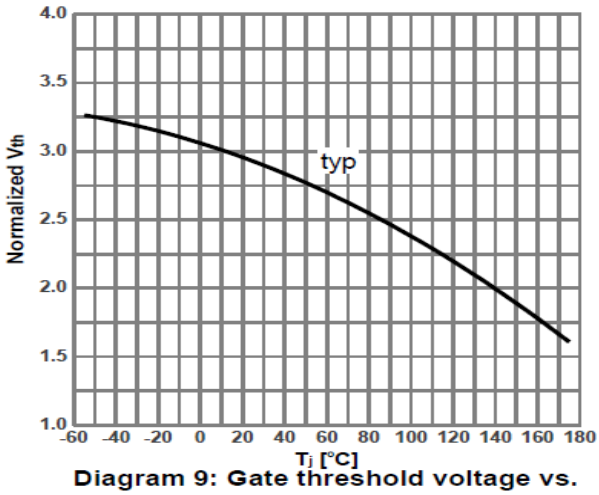

Diagram 9: Gate threshold voltage vs. Junction temperature

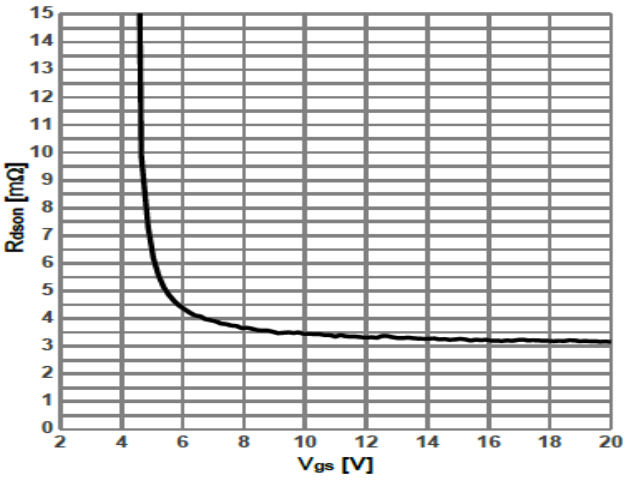

Diagram 10: On-state resistance vs. Vgs characteristics

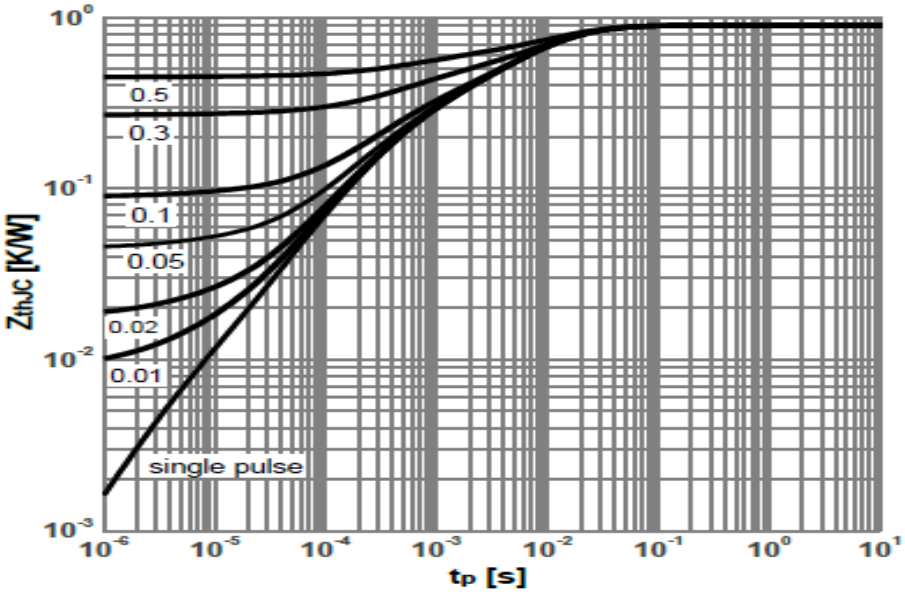

Diagram 11: Max. transient thermal impedance

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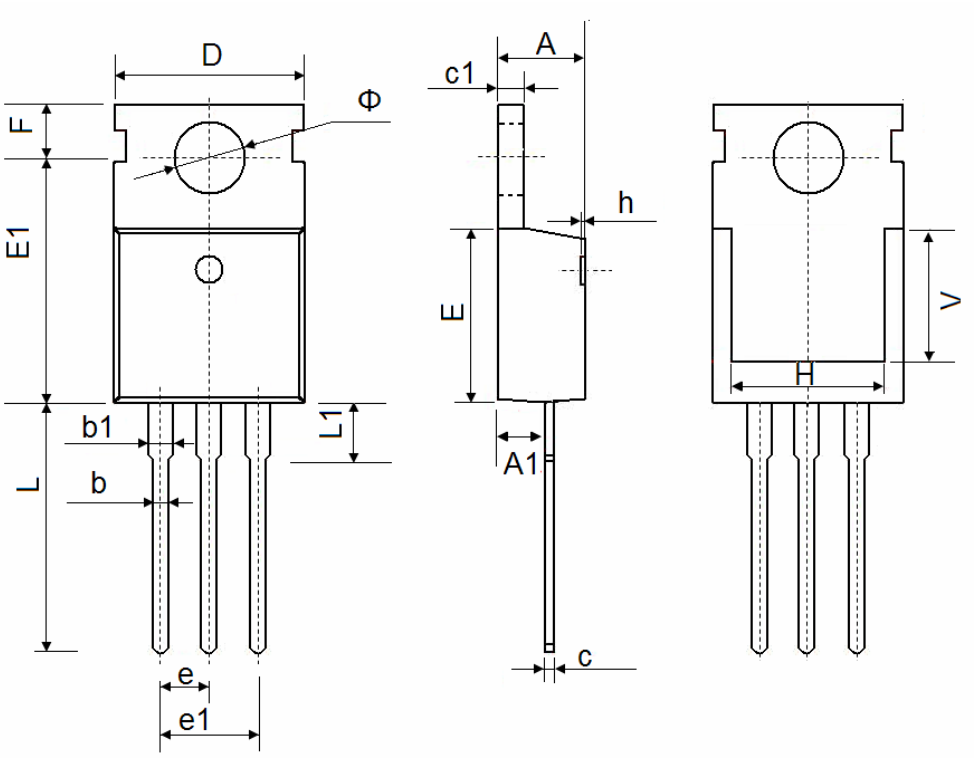
TO-220 Package Outline Data



Symbol	Dimensions In Millimeters	
	Min.	Max.
A	4.350	4.650
A1	2.250	2.550
b	0.710	0.910
b1	1.170	1.400
c	0.330	0.650
c1	1.200	1.400
D	9.910	10.250
E	8.9500	9.750
E1	12.650	12.950
e	2.540 TYP.	
e1	4.980	5.180
F	2.650	2.950
H	7.900	8.100
h	0.000	0.300
L	12.700	13.500
L1	2.850	3.250
V	7.500 REF.	
Φ	3.400	3.800