

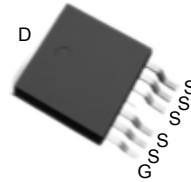
Features

- 40V/200A,
 $R_{DS(ON)} = 1m\Omega$ (typ.) @ $V_{GS}=10V$
- 100% UIS + R_g Tested
- Reliable and Rugged
- Lower $R_{DS(ON)}$ to Minimize Conduction Losses
- Lead Free and Green Devices Available
(RoHS Compliant)

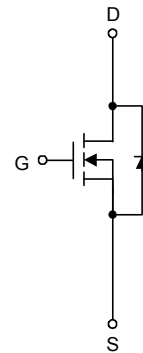
Applications

- SMPS Synchronous Rectification
- Load Switch
- DC-DC Conversion
- Or-ing

Pin Description



TO-263-7



N-Channel MOSFET

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

Symbol	Parameter		Rating	Unit
Common Ratings				
V _{DSS}	Drain-Source Voltage		40	V
V _{GSS}	Gate-Source Voltage		±20	
T _J	Maximum Junction Temperature		175	°C
T _{STG}	Storage Temperature Range		-55 to 175	
I _S ^a	Diode Continuous Forward Current	T _C =25°C	180	A
I _D ^a	Continuous Drain Current	T _C =25°C	200	
		T _C =100°C	200	
I _{DM} ^b	Pulsed Drain Current	T _C =25°C	1610	
P _D	Maximum Power Dissipation	T _C =25°C	380	W
		T _C =100°C	190	
R _{θJC}	Thermal Resistance-Junction to Case	Steady State	0.85	°C/W
I _S ^c	Diode Continuous Forward Current	T _A =25°C	2.2	A
I _D ^c	Continuous Drain Current	T _A =25°C	29	A
		T _A =70°C	24.3	
I _{DM} ^b	Pulsed Drain Current	T _A =25°C	116	A
P _D ^c	Maximum Power Dissipation	T _A =25°C	2.5	W
		T _A =70°C	1.7	
R _{θJA} ^c	Thermal Resistance-Junction to Ambient	t ≤ 10s	15	°C/W
		Steady State	62.5	
I _{AS} ^d	Avalanche Current, Single pulse	L=0.1mH	200	A
E _{AS} ^d	Avalanche Energy, Single pulse	L=0.1mH	2000	mJ

Note a : Maximum continue current is limited by bonding wire.

Note b : Pulse width is limited by maximum junction temperature 175°C .

Note c : $R_{\theta JA}$ steady state $t=999\text{s}$.

Note d : UIS tested and pulse width limited by maximum junction temperature 175°C (Initial temperature $T_J=25^\circ\text{C}$).

Electrical Characteristics (T_A = 25°C unless otherwise noted)

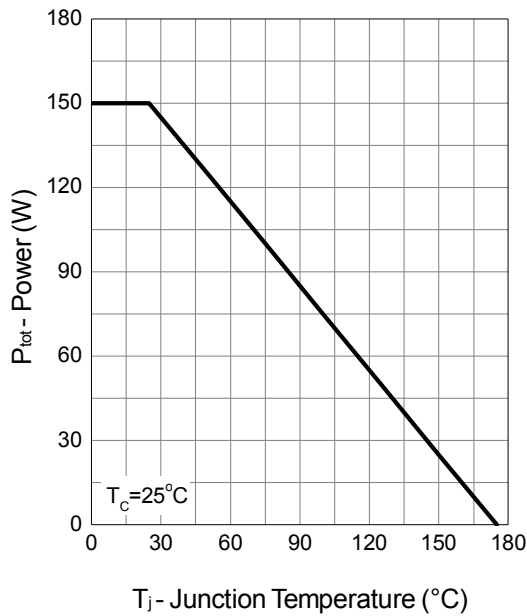
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
Static Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _{DS} =250μA	40	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =32V, V _{GS} =0V T _J =85°C	-	-	1 30	μA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _{DS} =250μA	2	3	4	V
I _{GSS}	Gate Leakage Current	V _{GS} =±20V, V _{DS} =0V	-	-	±100	nA
R _{DS(ON)} ^e	Drain-Source On-state Resistance	V _{GS} =10V, I _{DS} =25A T _J =125°C	-	1 1.9	1.5 -	mΩ
Gfs	Forward Transconductance	V _{DS} =5V, I _{DS} =20A	-	3.5	-	S
Diode Characteristics						
V _{SD} ^e	Diode Forward Voltage	I _{SD} =20A, V _{GS} =0V	-	0.78	1.1	V
t _{rr}	Reverse Recovery Time	I _{SD} =25A, dI _{SD} /dt=100A/μs V _{dd} =20V	-	61	-	ns
t _a	Charge Time		-	31	-	
t _b	Discharge Time		-	30	-	
Q _{rr}	Reverse Recovery Charge		-	67	-	nC
Dynamic Characteristics ^f						
R _G	Gate Resistance	V _{GS} =0V, V _{DS} =0V, F=1MHz	0.6	0.9	2	Ω
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =20V, Frequency=1.0MHz	-	5230	-	pF
C _{oss}	Output Capacitance		-	2000	-	
C _{rss}	Reverse Transfer Capacitance		-	175	-	
t _{d(ON)}	Turn-on Delay Time	V _{DD} =20V, R _L =20Ω, I _{DS} =1A, V _{GEN} =10V, R _G =1Ω	-	18.8	-	ns
t _r	Turn-on Rise Time		-	9.8	-	
t _{d(OFF)}	Turn-off Delay Time		-	50	-	
t _f	Turn-off Fall Time		-	90.8	-	
Gate Charge Characteristics ^f						
Q _g	Total Gate Charge	V _{DS} =20V, V _{GS} =10V, I _{DS} =25A	-	88.98	-	nC
Q _{gth}	Threshold Gate Charge		-	15.84	-	
Q _{gs}	Gate-Source Charge		-	24.75	-	
Q _{gd}	Gate-Drain Charge		-	15.63	-	

Note e : Pulse test ; pulse width≤300μs, duty cycle≤2%.

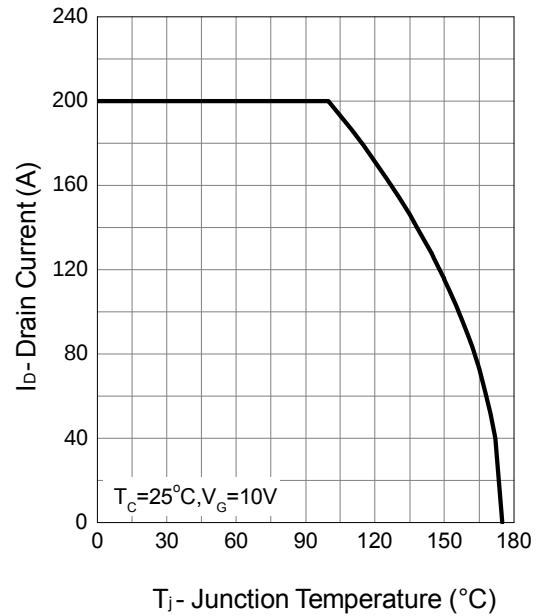
Note f : Guaranteed by design, not subject to production testing.

Typical Operating Characteristics

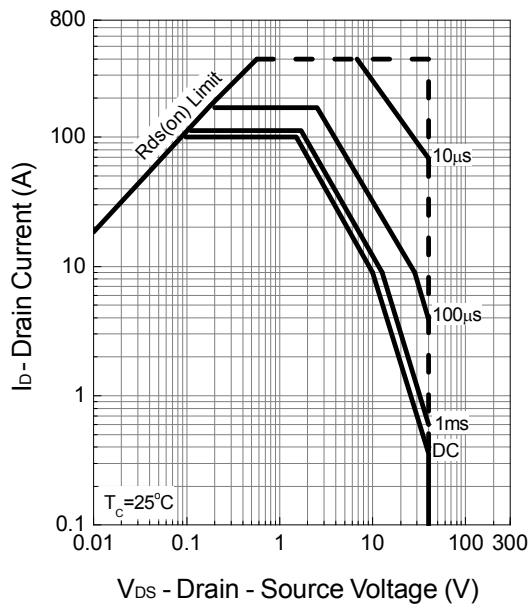
Power Dissipation



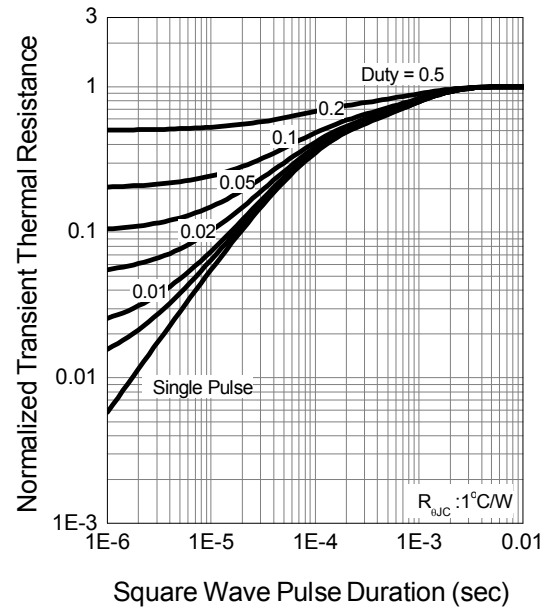
Drain Current



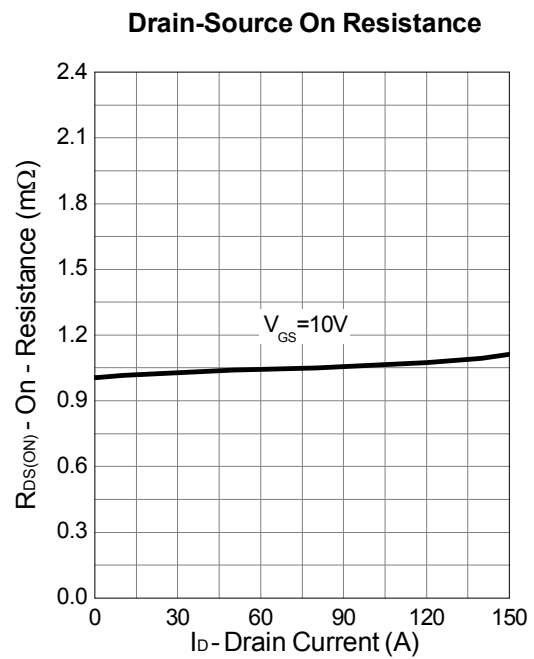
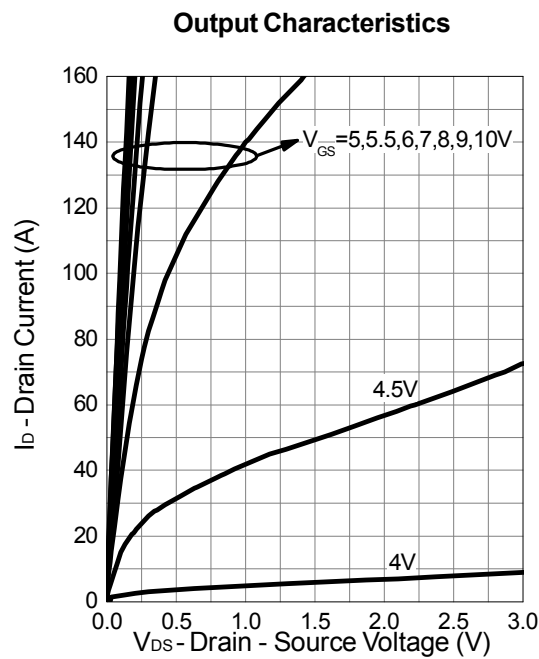
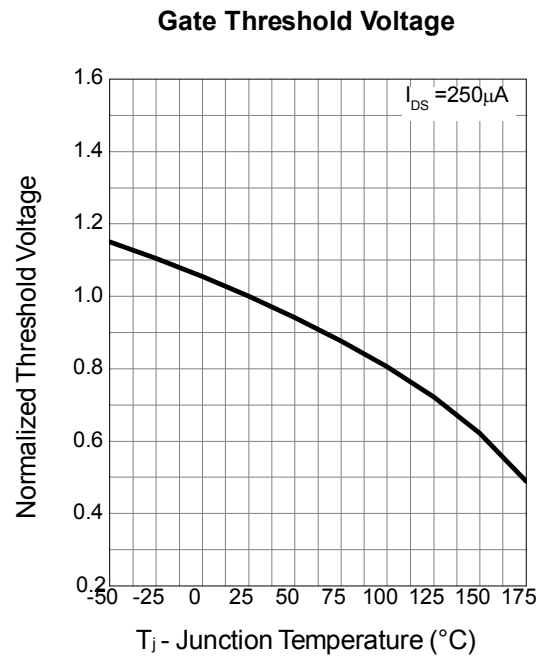
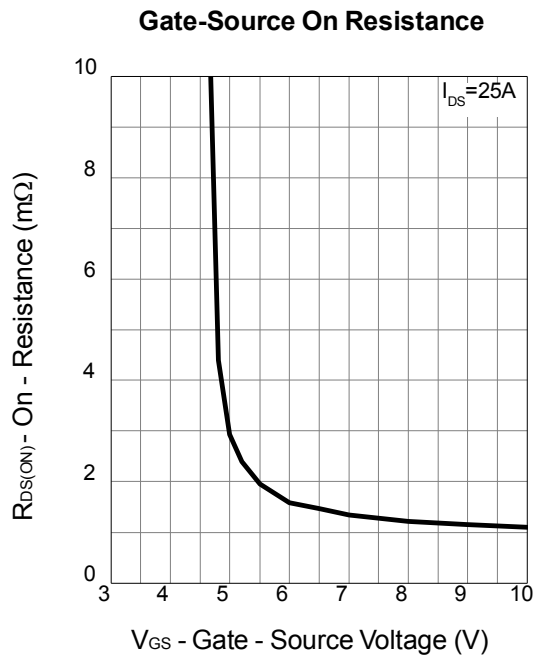
Safe Operation Area



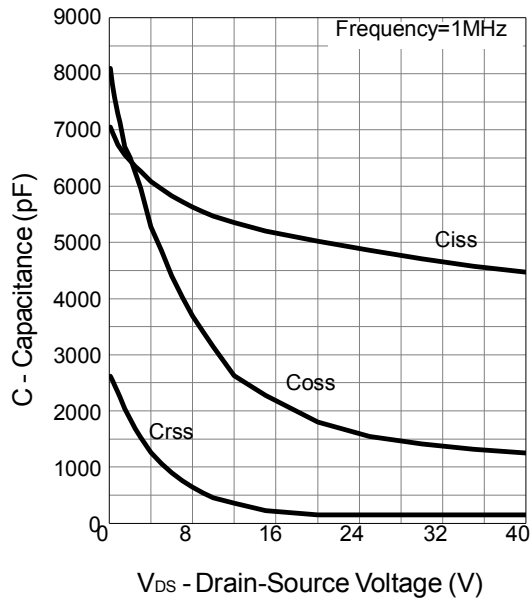
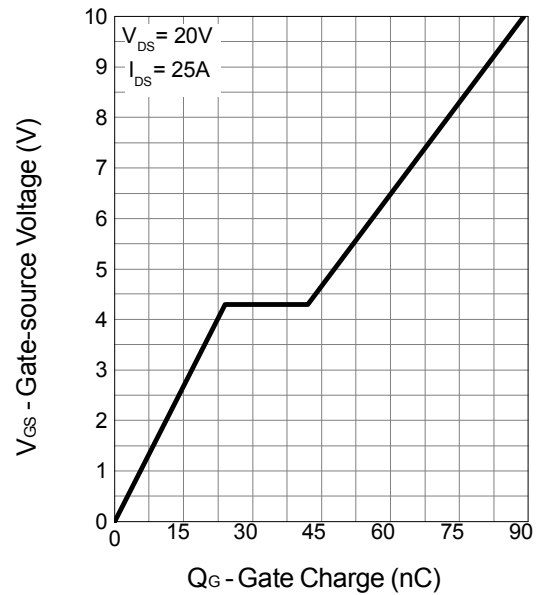
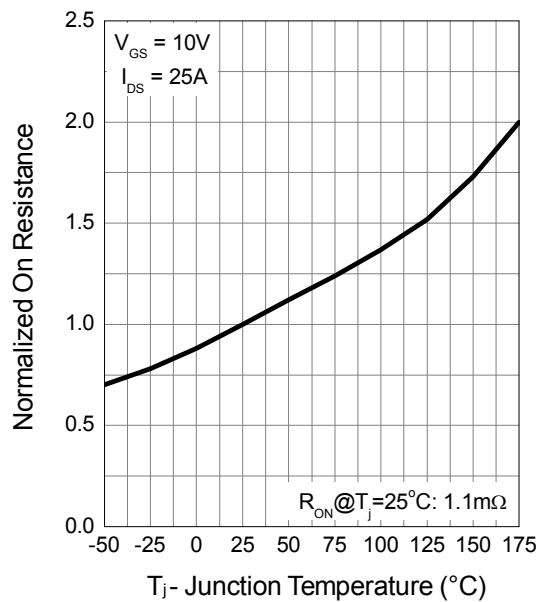
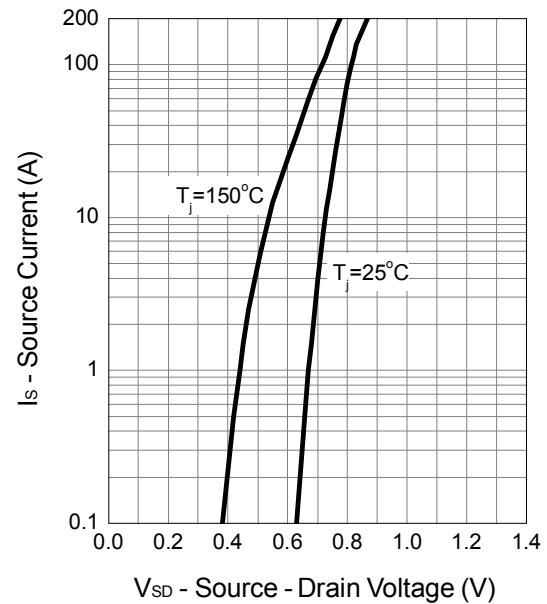
Thermal Transient Impedance



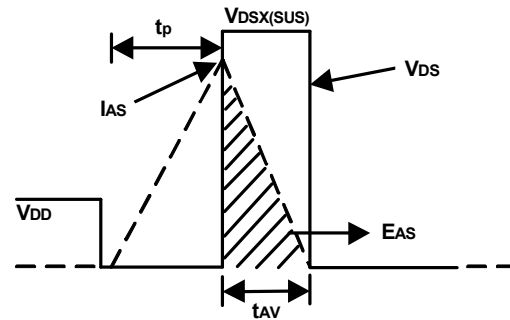
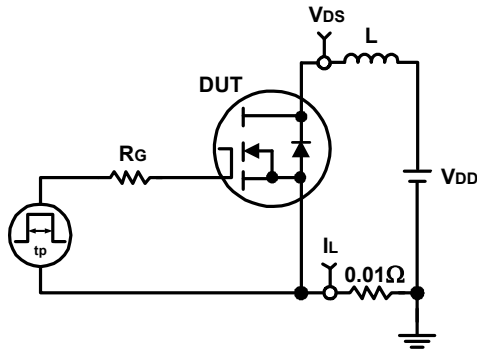
Typical Operating Characteristics (Cont.)



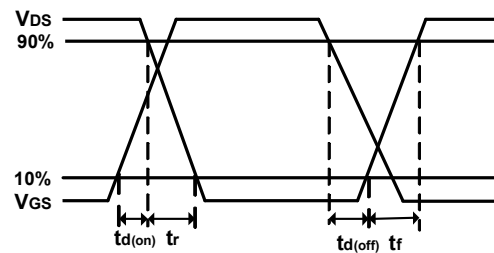
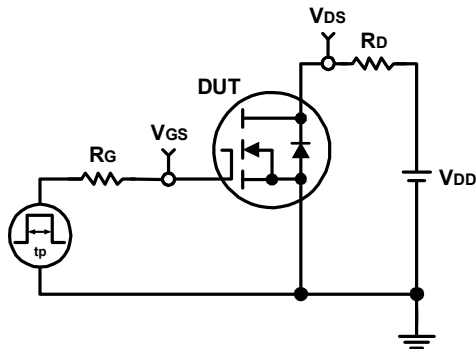
Typical Operating Characteristics (Cont.)

Capacitance

Gate Charge

Drain-Source On Resistance

Source-Drain Diode Forward


Avalanche Test Circuit and Waveforms

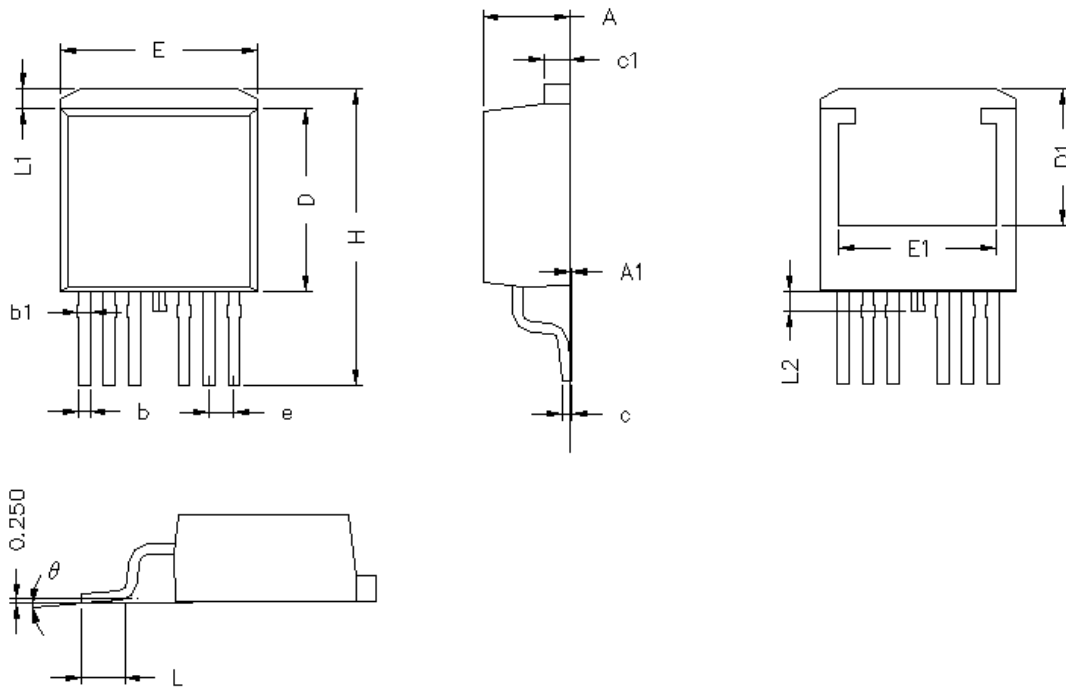


Switching Time Test Circuit and Waveforms



Package Information

TO-263-7



SYMBOLS	TO-263-7			
	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	4.25	4.55	0.167	0.179
A1	0.01	0.25	0.000	0.010
b	0.50	0.70	0.020	0.028
b1	0.60	0.84	0.024	0.033
c	0.40	0.60	0.016	0.024
c1	1.20	1.40	0.047	0.055
D	9.05	9.45	0.356	0.372
D1	6.90	9.00	0.272	0.354
E	9.80	10.20	0.386	0.402
E1	7.25	9.00	0.285	0.354
e	1.27 BSC		0.05 BSC	
H	14.65	15.35	0.577	0.604
L	2.40	3.00	0.094	0.118
L1	0.80	1.20	0.031	0.047
L2	0.85	1.15	0.033	0.045
θ	2°	8°	2°	8°

RECOMMENDED LAND PATTERN

