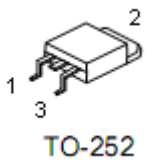
1. Features

- $R_{DS(ON)}$=6.2mΩ@V_{GS}=10V
- Lead free and green device available
- Low Rds-on to minimize conductive loss
- High avalanche current

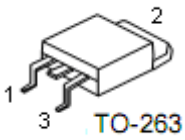
2. Applications

- Power supply
- DC-DC converters

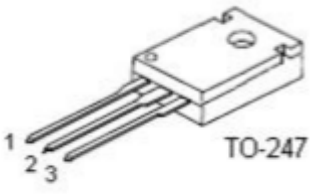
3. Pin configuration



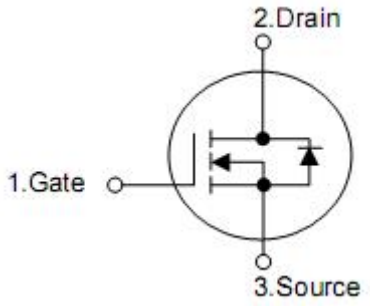
TO-252



TO-263



TO-247



Pin	Function
1	Gate
2	Drain
3	Source

4. Absolute maximum ratings

Parameter		Symbol	Maximum			Units
			TO-252	TO-263	TO-247	
Drain-source voltage		V_{DSS}	80			V
Gate-source voltage		V_{GSS}	±25			V
Continuous drain current	T_C=25 ºC	I_D[3]	80*	80	80	A
	T_C=100 ºC		70*	70	70	A
Pulse drain current	T_C=25 ºC	I_{DP}[4]	340			A
Avalanche current		I_{AS}[5]	20			A
Avalanche energy		E_{AS}[5]	410			mJ
Maximum power dissipation	T_C=25 ºC	P_D	120	240	288	W
	T_C=100 ºC		60	100	144	W
Junction & storage temperature range		T_J,T_{STG}	-55～175			ºC

*Drain current limited by maximum junction temperature.

5. Thermal characteristics

Parameter	Symbol	Typical			Units
		TO-252	TO-263	TO-247	
Thermal resistance-junction to case	$R_{\theta jc}$	1.04	0.52	0.44	ºC/W
Thermal resistance-junction to ambient	$R_{\theta ja}$	55			

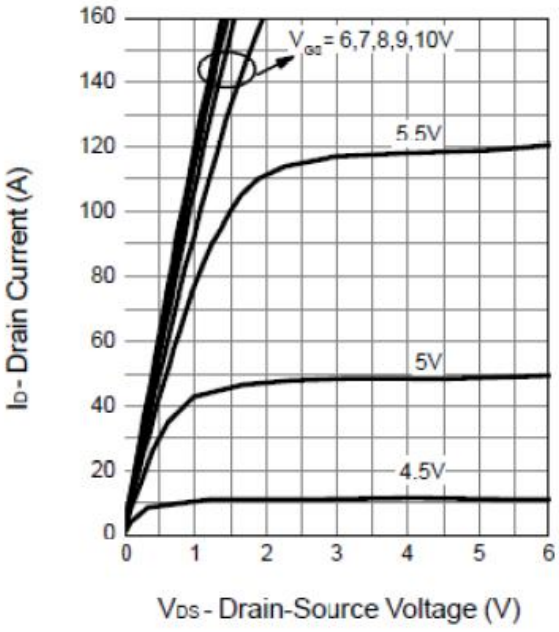
6. Electrical characteristics

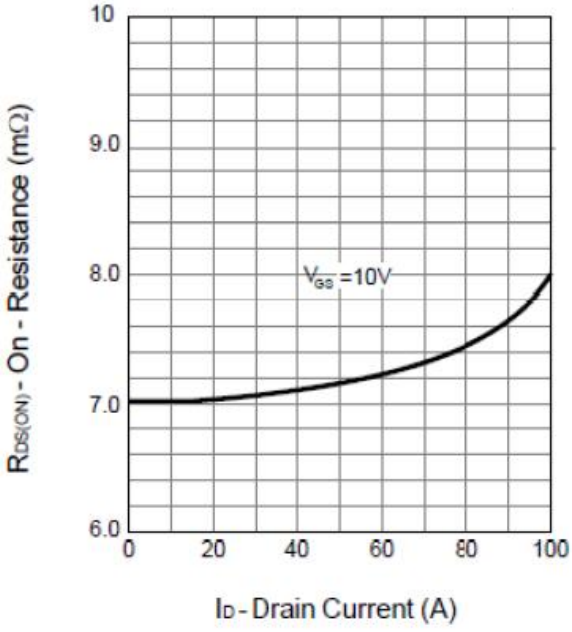
(T_A=25°C,unless otherwise noted)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Static characteristics						
Drain-source breakdown voltage	BV_{DSS}	V_{GS}=0V,I_{DS}=250μA	80	-	-	V
Zero gate voltage drain current	I_{DSS}	V_{DS}=64V,V_{GS}=0V	-	-	1	μA
		T_J=125 ºC	-	-	100	
Gate threshold voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_{DS}=250μA	2	3	4	V
Gate leakage current	I_{GSS}	V_{GS}=±25V,V_{DS}=0V	-	-	±100	nA
Drain-source on-state resistance	$R_{DS(on)}$[1]	V_{GS}=10V,I_{DS}=30A	-	6.2	9	mΩ
Diode characteristics						
Diode forward voltage	V_{SD}[1]	I_{SD}=40A,V_{GS}=0V	-	-	1.3	V
Diode continuous forward current	I_S[3]		-	-	80	A
Reverse recovery time	t_{rr}	I_F=40A,dI/dt=100A/μs	-	25	-	nS
Reverse recovery charge	Q_{rr}		-	18.5	-	nC
Dynamic characteristics[2]						
Gate resistance	R_G	V_{GS}=0V, V_{DS}=0V,F=1MHz	-	1.3	-	Ω
Input capacitance	C_{iss}	V_{GS}=0V, V_{DS}=25V, F=1.0MHz	-	3110	-	pF
Output capacitance	C_{oss}		-	445	-	
Reverse transfer capacitance	C_{rss}		-	270	-	
Turn-on delay time	$t_{d(ON)}$	V_{DD}=37.5V,I_D=40A, V_{GS}=10V,R_G=6.8Ω	-	20.4	-	nS
Turn-on rise time	t_r		-	63	-	
Turn-off delay time	$t_{d(OFF)}$			67	-	
Turn-off fall time	t_f		-	43	-	
Gate charge characteristics[2]						
Total gate charge	Q_g	V_{DS}=37.5V, V_{GS}=10V, I_D=40A,	-	76	-	nC
Gate-source charge	Q_{gs}		-	9.5	-	
Gate-drain charge	Q_{gd}		-	40	-	

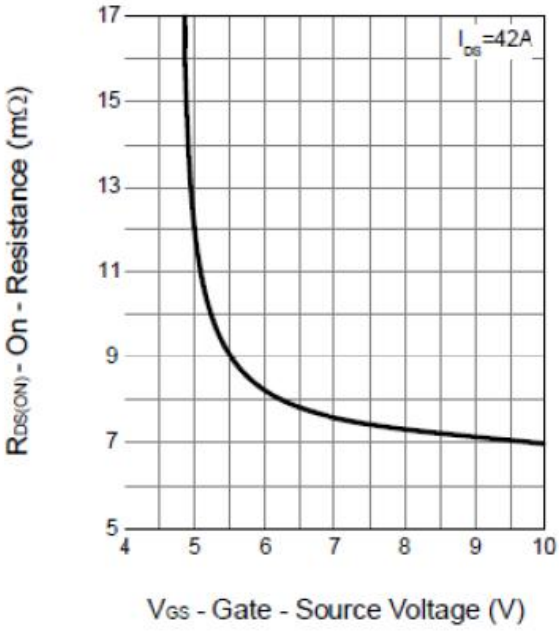
Note:1. Pulse test; pulse width ≤300μs, duty cycle ≤2%.
2.Guaranteed by design,not subject to production testing.
3.Package limitation current is 50A. Calculated continuous current based on maximum allowable junction temperature.
4.Repetitive rating, pulse width limited by max junction temperature.
5.Starting T_J=25 ºC, L=1mH,I_{AS}=40A.

7. Test circuits and waveforms

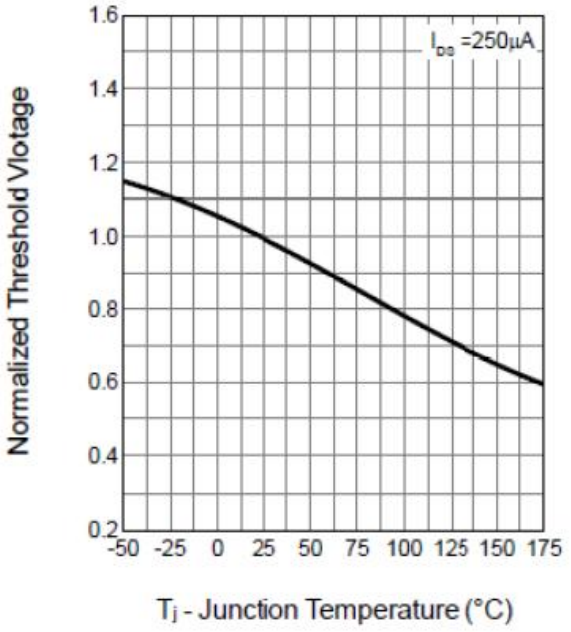




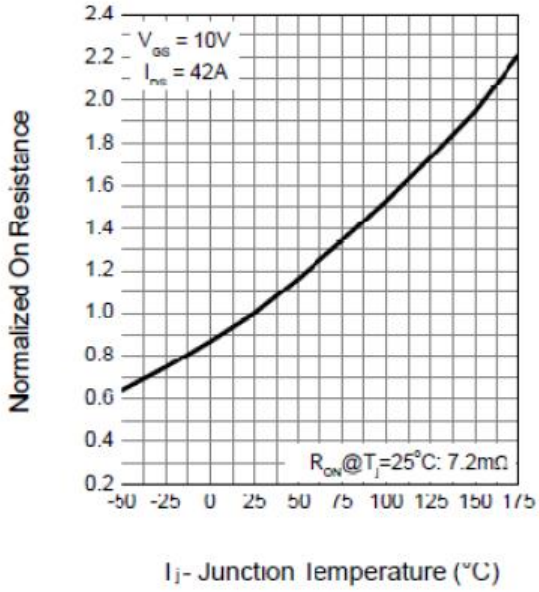
Drain-Source On Resistance



Gate Threshold Voltage

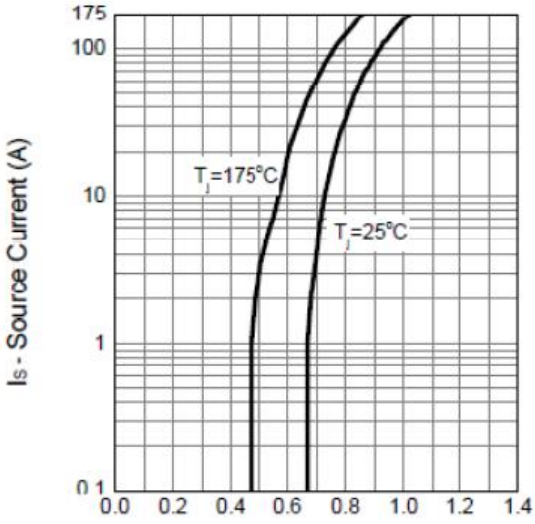


Drain-Source On Resistance



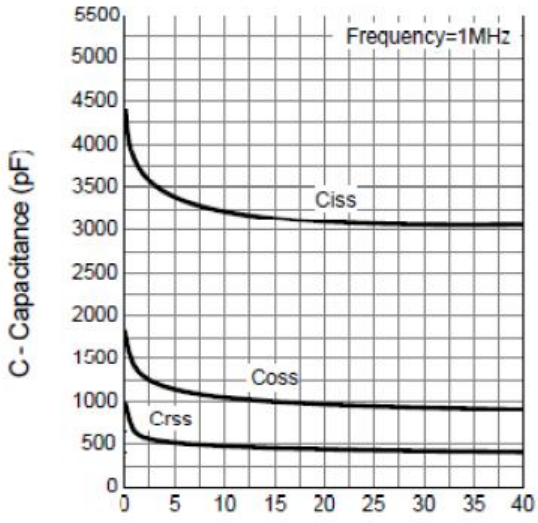
I_j- Junction Temperature (°C)

Source-Drain Diode Forward



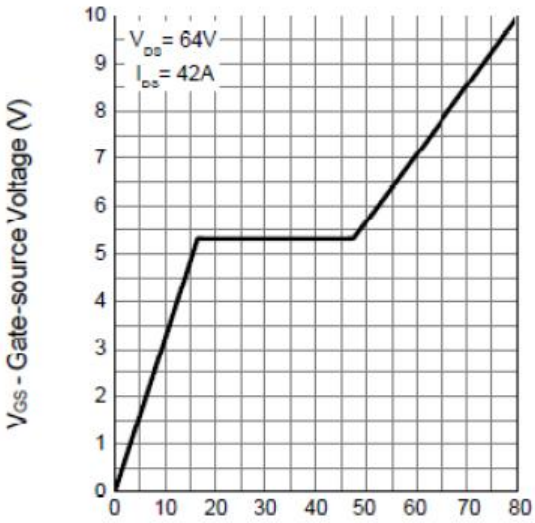
V_{SD} - Source-Drain Voltage (V)

Capacitance



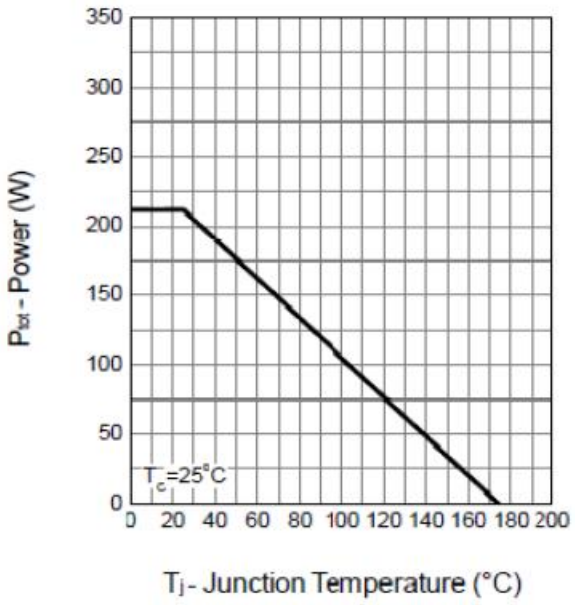
V_{DS} - Drain - Source Voltage (V)

Gate Charge

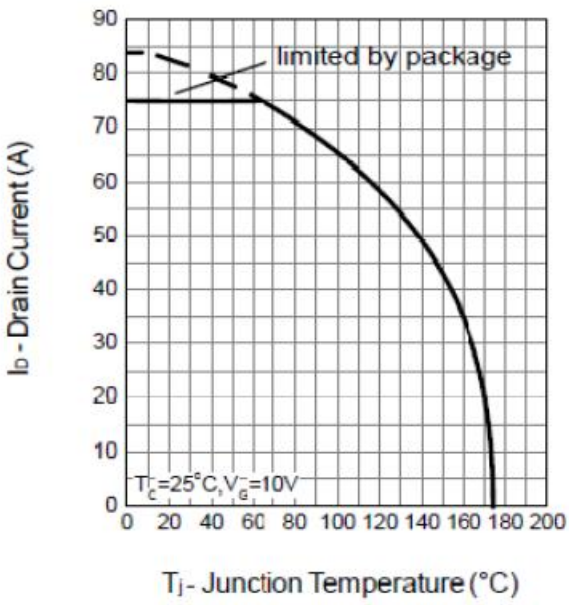


Q_G - Gate Charge (nC)

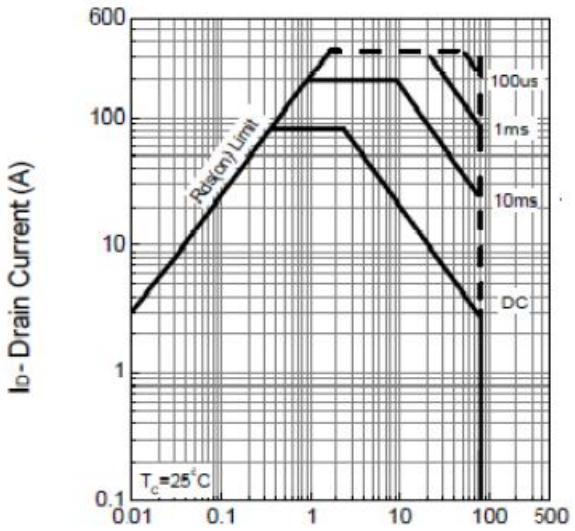
Power Dissipation



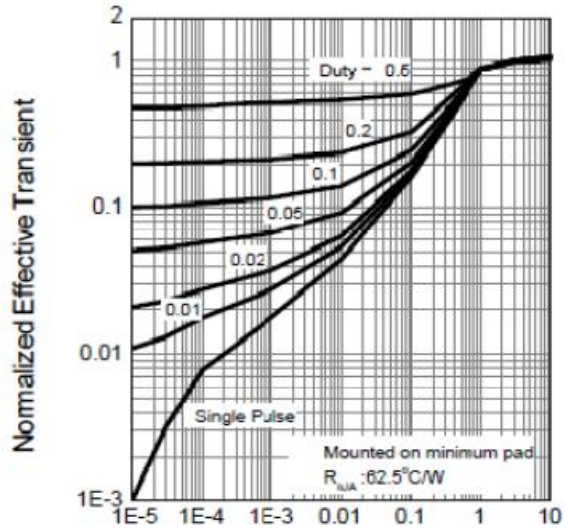
Drain Current

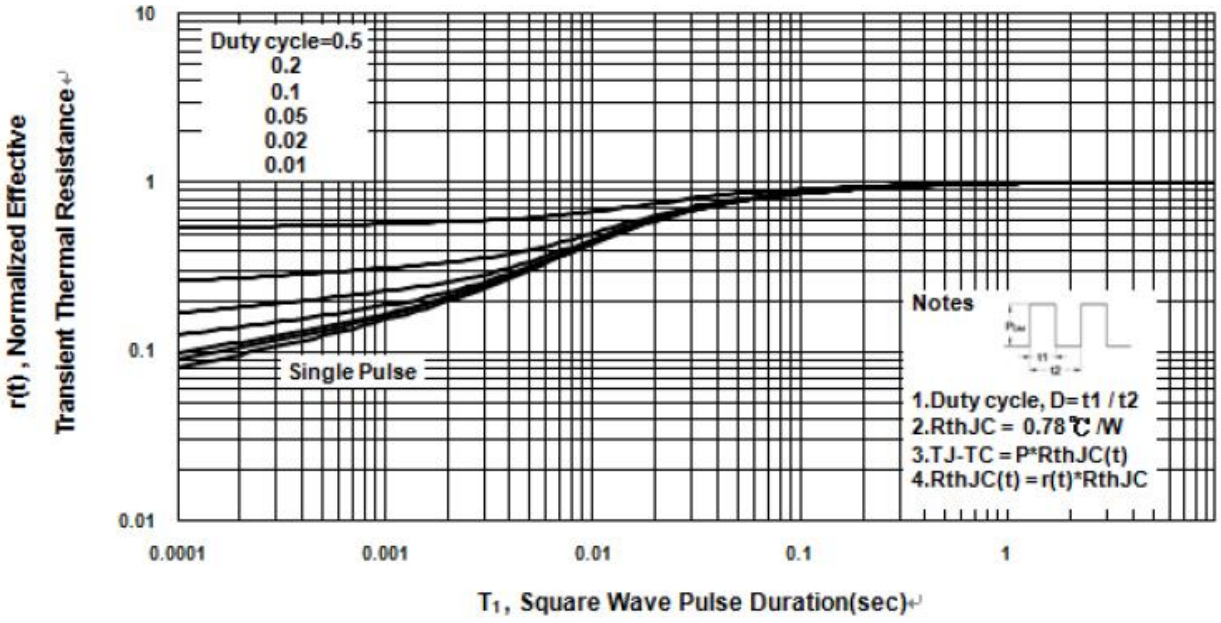


Safe Operation Area



Thermal Transient Impedance




r(t), Normalized Effective
Transient Thermal Resistance
10
1
0.1
0.01
Duty cycle=0.5
0.2
0.1
0.05
0.02
0.01
Single Pulse
Notes
1.Duty cycle, D=t1 / t2
2.RthJC = 0.78℃ /W
3.TJ-TC = P*RthJC(t)
4.RthJC(t) = r(t)*RthJC
0.0001
0.001
0.01
0.1
1
T1, Square Wave Pulse Duration(sec)

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