MT3243

N-Channel Enhancement Mode MOSFET

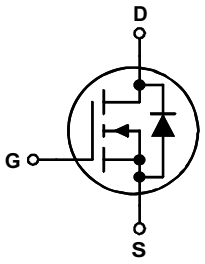
MT Semiconductor®

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Feature Description

- 30V/140A
  $R_{DS(ON)}$=1.8mΩ(typ.)@V_{GS} = 10V
  $R_{DS(ON)}$=2.8mΩ(typ.) @V_{GS} = 4.5V
- 100% avalanche tested
- Excellent CdV/dt effect decline
- Halogen - Free Device Available

Simplified Schematic

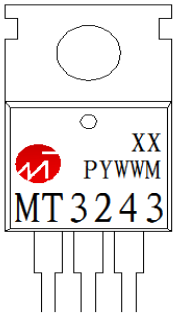


Applications

- Systems High Frequency Synchronous Buck Converters for Computer Processor Power
- High Frequency Isolated DC-DC Converters with Synchronous Rectification for Telecom and Industrial Use

MARKING DIAGRAM & PIN ASSIGNMENT

TO-220



Absolute Maximum Ratings (T_A = 25℃ unless otherwise noted)

Symbol	Parameter		Rating	Unit
Common Ratings (Tc=25°C Unless Otherwise Noted)				
V_{DSS}	Drain-Source Voltage		30	V
V_{GSS}	Gate-Source Voltage		±20	V
T_J	Maximum Junction Temperature		175	°C
T_{STG}	Storage Temperature Range		-55 to 175	°C
I_S	Drain Current-Continuous	Tc=25°C	140	A
Mounted on Large Heat Sink				
I_{DM}	Pulsed Drain Current *	Tc=25°C	560	A
I_D	Continuous Drain Current	Tc=25°C	140	A
		Tc=100°C	101	A
P_D	Maximum Power Dissipation	Tc=25°C	115	W
		Tc=100°C	57.5	W
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case		1.3	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient **		62.5	°C/W
E_{AS}	Single Pulsed-Avalanche Energy ***	L=0.3mH	186	mJ

Note: * Repetitive rating ; pulse width limited by max junction temperature.
** Surface mounted on FR-4 board.
*** Limited by $T_J$max , starting T_J=25°C, L = 0.3mH, R_G= 25Ω, V_{GS}=10V.

Electrical Characteristics(Tc =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}=250uA	30	-	-	V
I_{DSS}	Drain-to-Source LeakageCurrent	V_{DS}=30V, V_{GS}=0V	-	-	1	uA
		T_J=55°C	-	-	5	uA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_{DS}=250uA	1	1.5	3	V
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±20V,V_{DS}=0V	-	-	±100	nA
$R_{DS(ON)}$*	Drain-Source On-state Resistance	V_{GS}=10V,I_{DS}=70A	-	1.8	2.5	mΩ
		V_{GS}=4.5V,I_{DS}=70A	-	2.8	3.2	mΩ
Diode Characteristics						
V_{SD}*	Diode Forward Voltage	I_{SD}=70A,V_{GS}=0V	-	0.8	1.3	V
t_{rr}	Reverse Recovery Time	I_{SD}=70A,dI_{SD}/dt=100A/us	-	23	-	ns
Q_{rr}	Reverse Recovery Charge		-	58	-	nC

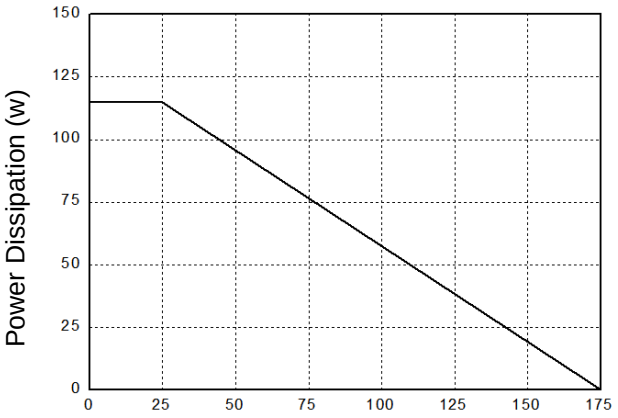
Electrical Characteristics (Cont.) (Tc =25°C Unless Otherwise Noted)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
Dynamic Characteristics						
R_G	Gate Resistance	V_{GS}=0V,V_{DS}=0V,F=1 MHz	-	1.9	-	Ω
Ciss	Input Capacitance	V_{GS}=0V,	-	6000	-	pF
Coss	Output Capacitance	V_{DS}=25V,	-	469	-	
Crss	Reverse Transfer Capacitance	Frequency=1.0MHz	-	322	-	
$t_{d(ON)}$	Turn-on Delay Time	V_{DD}=15V,R_G=4Ω, I_{DS}=70A,V_{GS}=10V	-	13	-	ns
T_r	Turn-on Rise Time		-	11	-	
$t_{d(OFF)}$	Turn-off Delay Time		-	41	-	
T_f	Turn-off Fall Time		-	14	-	
Gate Charge Characteristics						
Qg	Total Gate Charge	V_{DS} =24V, V_{GS}=10V, I_D=70A,	-	120	-	nC
Qgs	Gate-Source Charge		-	9	-	
Qgd	Gate-Drain Charge		-	26	-	

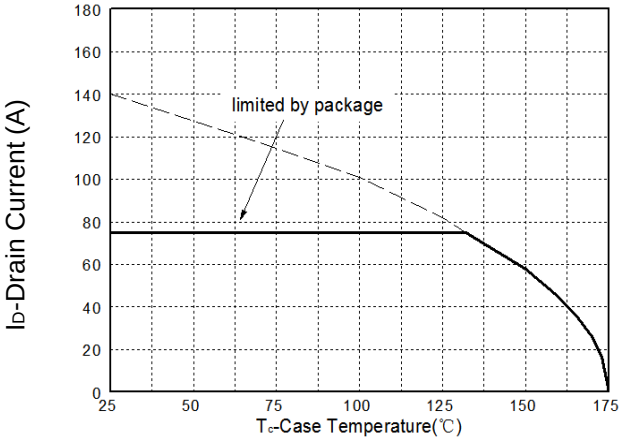
Note: *Pulse test; pulse width ≤ 300us，duty cycle ≤ 2%

Typical Operating Characteristics

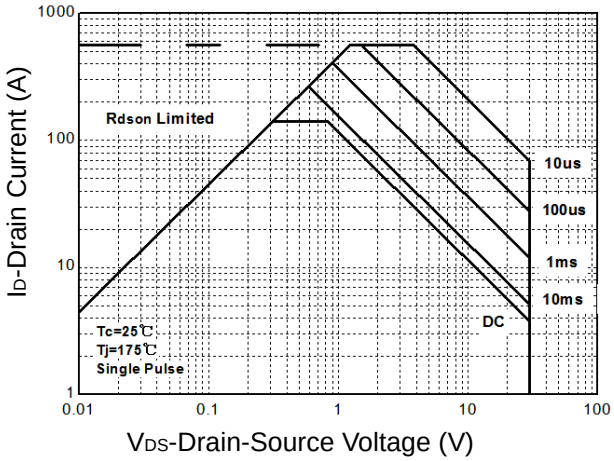
Power Dissipation



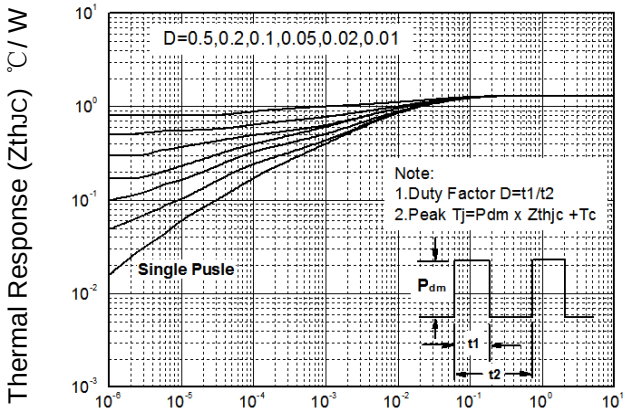
Drain Current



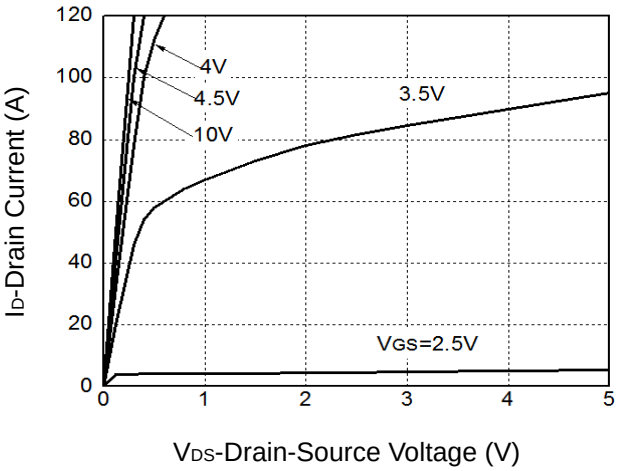
Safe Operation Area



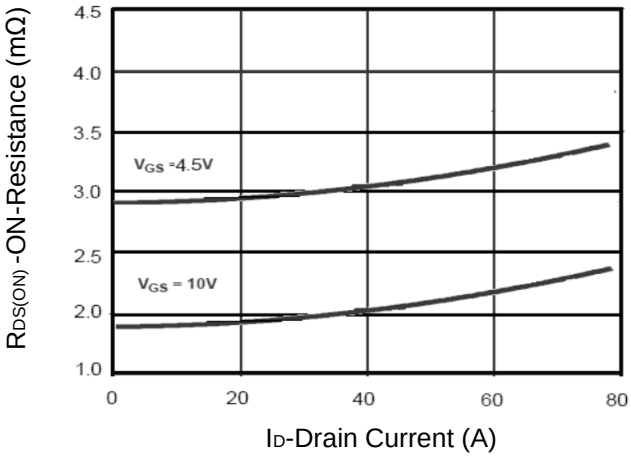
Thermal Transient Impedance



Output Characteristics

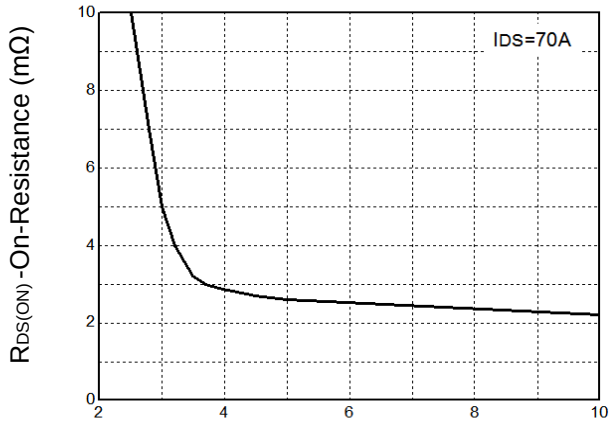


Drain-Source On Resistance

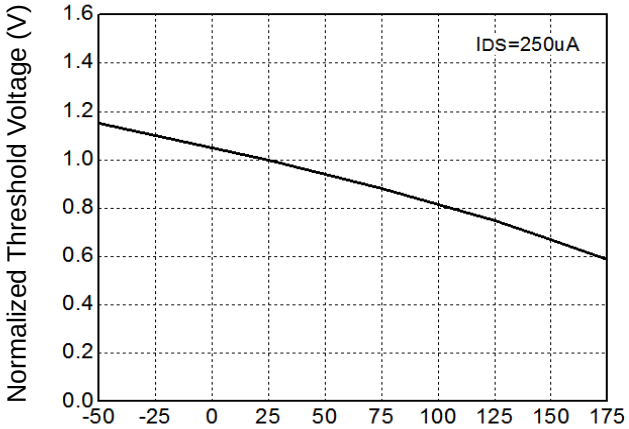


Typical Operating Characteristics(Cont.)

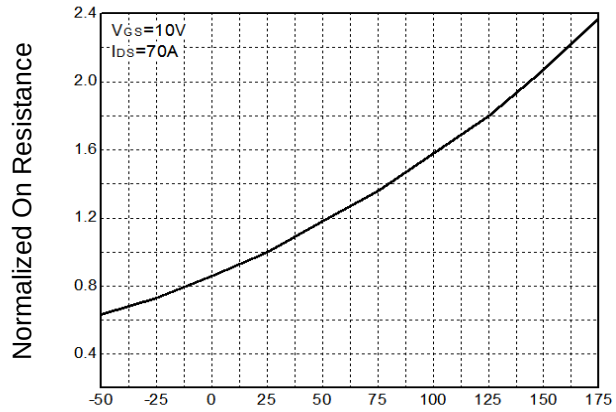
Gate-Source On Resistance



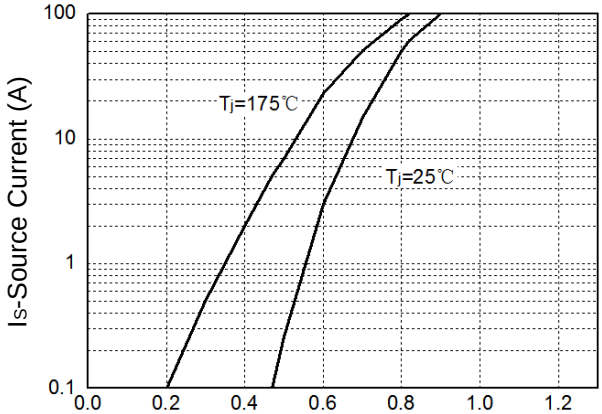
Gate Threshold Voltage



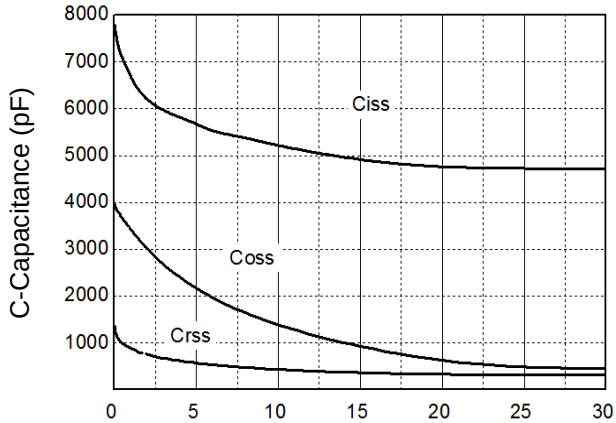
On-Resistance vs. Temperature



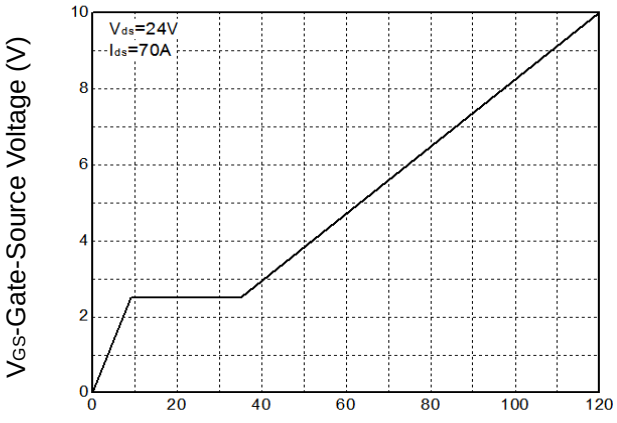
Source- Drain Diode Forward



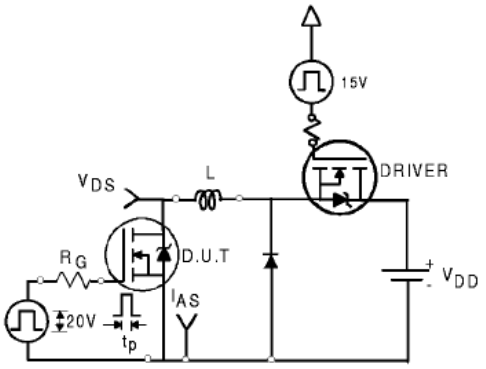
Capacitance Characteristics



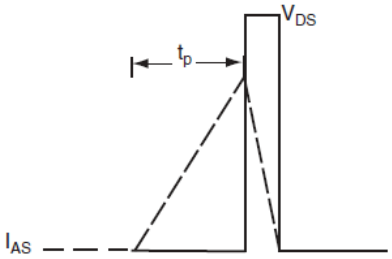
Gate Charge Characteristics



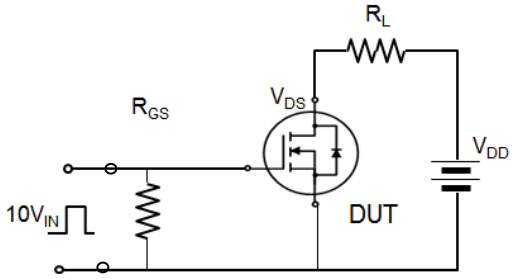
Avalanche Test Circuit and Waveforms

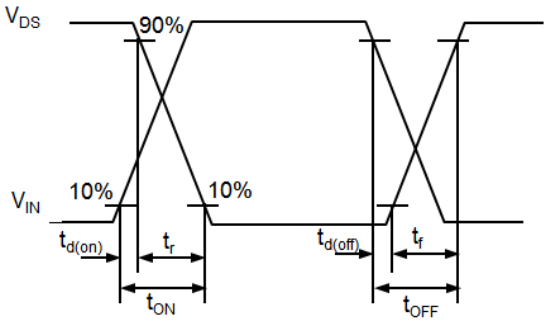


$$E_{AS} = \frac{1}{2} L I_{AS}^2$$

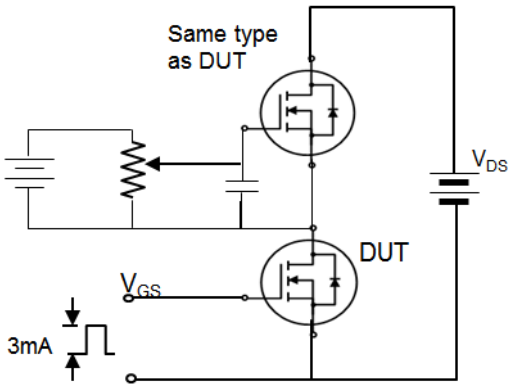


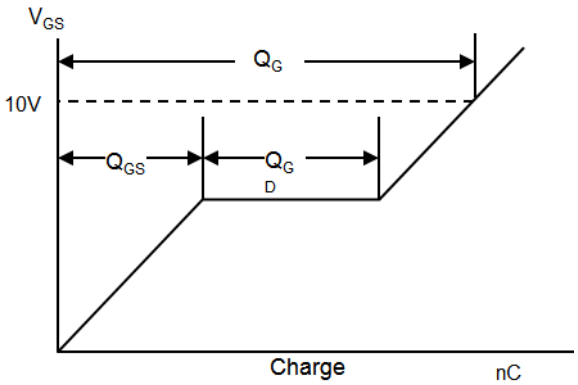
Switching Time Test Circuit and Waveforms





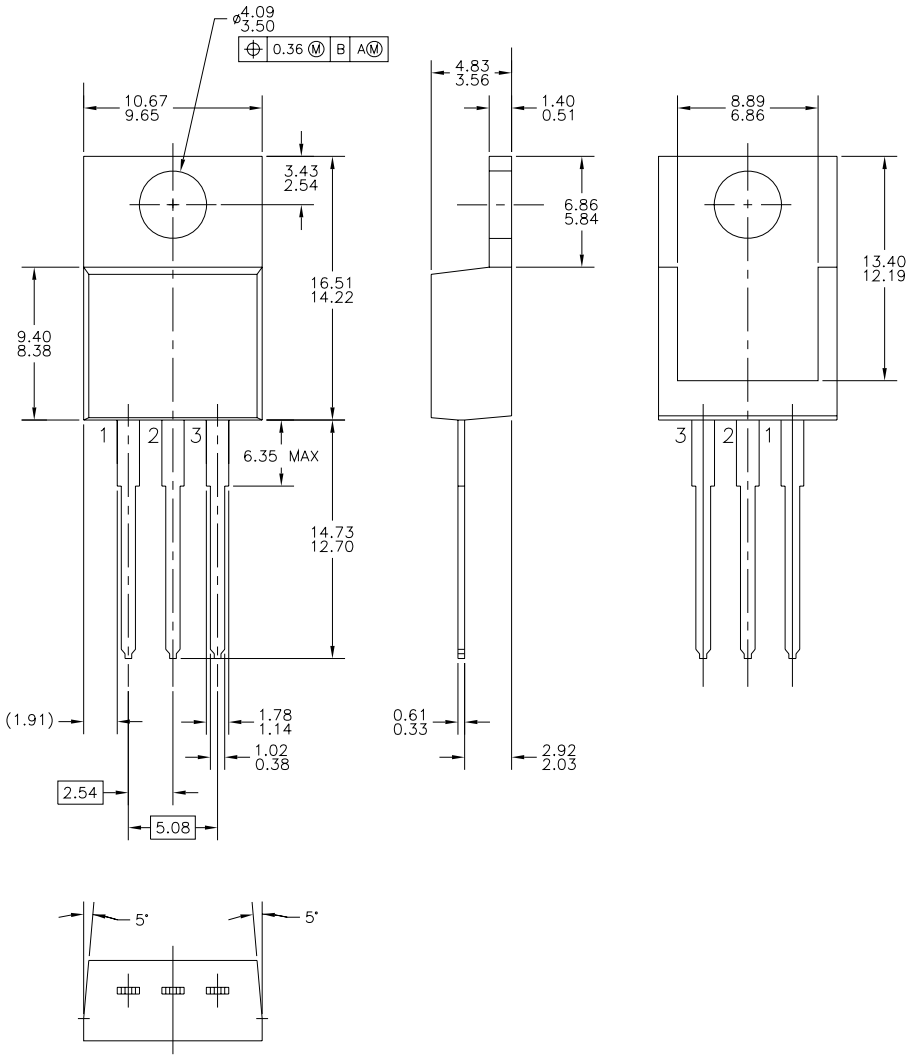
Qate Charge Test Circuit and Waveforms





Mechanical Dimensions

TO-220



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