

Absolute Maximum Ratings

Symbol	Parameter		Rating	Unit
Common Ratings ($T_C=25^\circ\text{C}$ Unless Otherwise Noted)				
V_{DSS}	Drain-Source Voltage		40	V
V_{GSS}	Gate-Source Voltage		± 20	
T_J	Maximum Junction Temperature		175	$^\circ\text{C}$
T_{STG}	Storage Temperature Range		-55 to 175	$^\circ\text{C}$
I_S	Diode Continuous Forward Current	$T_C=25^\circ\text{C}$	176	A
Mounted on Large Heat Sink				
I_{DM}	Pulsed Drain Current *	$T_C=25^\circ\text{C}$	648**	A
I_D	Continuous Drain Current	$T_C=25^\circ\text{C}$	176	A
		$T_C=100^\circ\text{C}$	120	
P_D	Maximum Power Dissipation	$T_C=25^\circ\text{C}$	192	W
		$T_C=100^\circ\text{C}$	96	
$R_{\theta JC}$	Thermal Resistance-Junction to Case		0.78	$^\circ\text{C/W}$
$R_{\theta JA}$	Thermal Resistance-Junction to Ambient		62.5	
Avalanche Ratings				
E_{AS}	Avalanche Energy, Single Pulsed	$L=0.5\text{mH}$	1.09***	J

Note : * Repetitive rating ; pulse width limited by junction temperature

** Drain current is limited by junction temperature

*** $V_D=32\text{V}$

Electrical Characteristics ($T_C = 25^\circ\text{C}$ Unless Otherwise Noted)

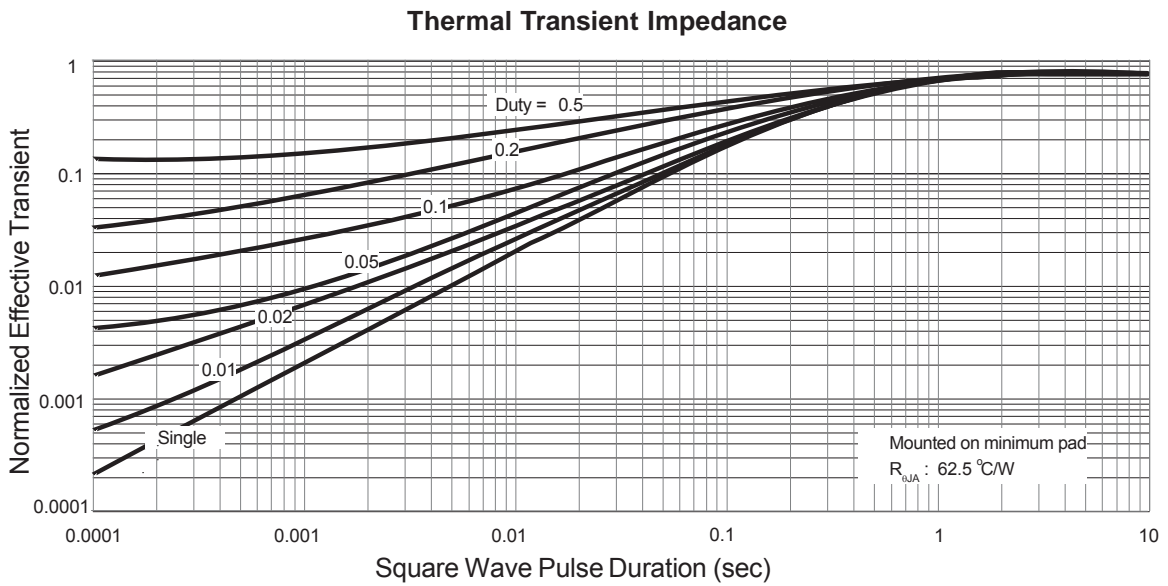
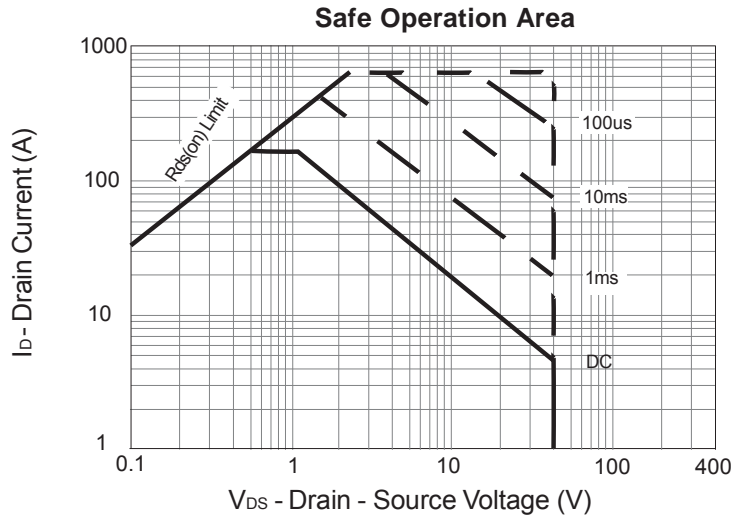
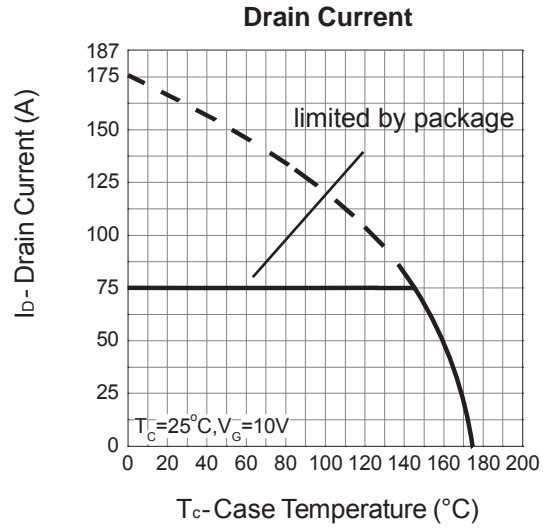
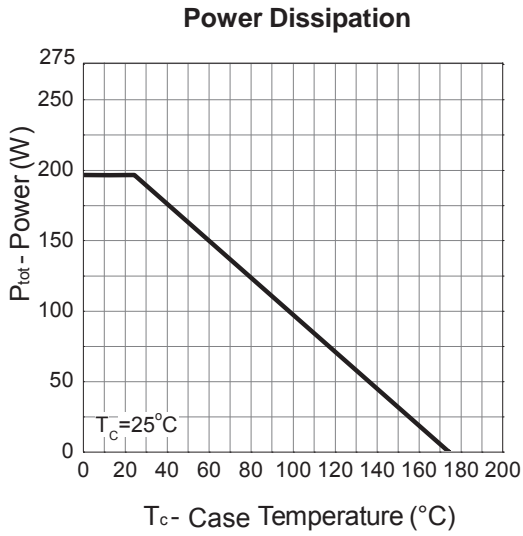
Symbol	Parameter	Test Conditions	HY3704			Unit
			Min.	Typ.	Max.	
Static Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0\text{V}, I_{DS}=250\mu\text{A}$	40	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=40\text{V}, V_{GS}=0\text{V}$ $T_J=85^\circ\text{C}$	-	-	1	μA
			-	-	10	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_{DS}=250\mu\text{A}$	2.0	3.0	4.0	V
I_{GSS}	Gate Leakage Current	$V_{GS}=\pm 20\text{V}, V_{DS}=0\text{V}$	-	-	± 100	nA
$R_{DS(ON)^*}$	Drain-Source On-state Resistance	$V_{GS}=10\text{V}, I_{DS}=88\text{A}$	-	3.0	3.6	$\text{m}\Omega$
Diode Characteristics						
V_{SD}^*	Diode Forward Voltage	$I_{SD}=88\text{A}, V_{GS}=0\text{V}$	-	0.8	1.2	V
t_{rr}	Reverse Recovery Time	$I_{SD}=88\text{A}, di_{SD}/dt=100\text{A}/\mu\text{s}$	-	28	-	ns
Q_{rr}	Reverse Recovery Charge		-	51	-	nC

Electrical Characteristics (Cont.) ($T_C = 25^\circ\text{C}$ Unless Otherwise Noted)

Symbol	Parameter	Test Conditions	HY3704			Unit
			Min.	Typ.	Max.	
Dynamic Characteristics						
R_G	Gate Resistance	$V_{GS}=0V, V_{DS}=0V, F=1\text{MHz}$	-	1.1	-	Ω
C_{iss}	Input Capacitance	$V_{GS}=0V,$ $V_{DS}=25V,$ Frequency=1.0MHz	-	4427	-	pF
C_{oss}	Output Capacitance		-	1028	-	
C_{rss}	Reverse Transfer Capacitance		-	538	-	
$t_{d(ON)}$	Turn-on Delay Time	$V_{DD}=20V, R_G=6\Omega,$ $I_{DS}=88A, V_{GS}=10V,$	-	28	-	ns
T_r	Turn-on Rise Time		-	18	-	
$t_{d(OFF)}$	Turn-off Delay Time		-	42	-	
T_f	Turn-off Fall Time		-	54	-	
Gate Charge Characteristics						
Q_g	Total Gate Charge	$V_{DS}=32V, V_{GS}=10V,$ $I_{DS}=88A$	-	122	-	nC
Q_{gs}	Gate-Source Charge		-	29	-	
Q_{gd}	Gate-Drain Charge		-	35	-	

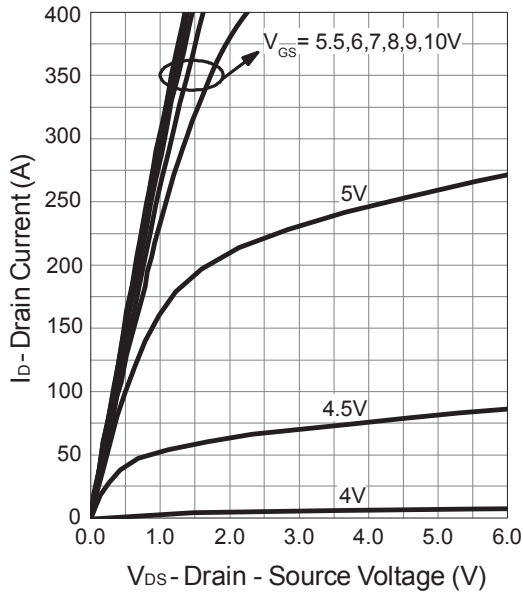
Note * : Pulse test ; pulse width $\leq 300\mu\text{s}$, duty cycle $\leq 2\%$.

Typical Operating Characteristics

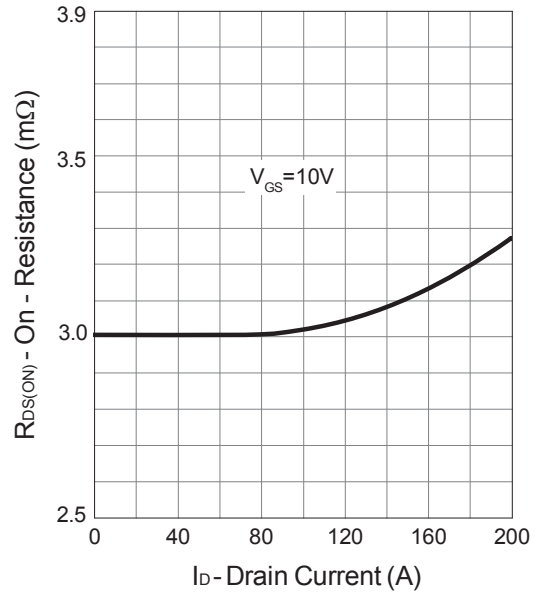


Typical Operating Characteristics (Cont.)

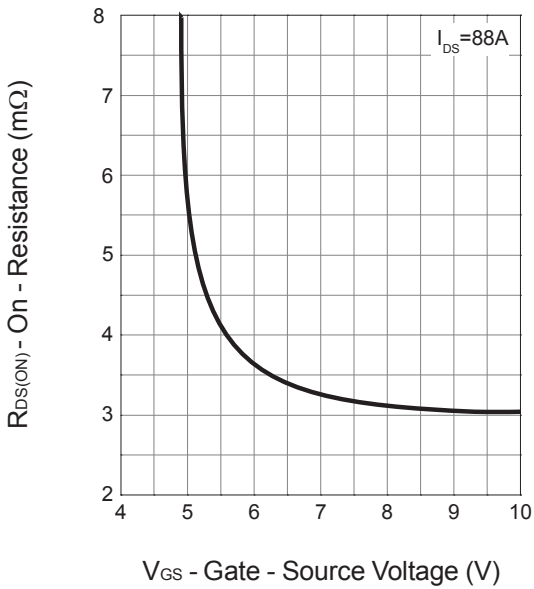
Output Characteristics



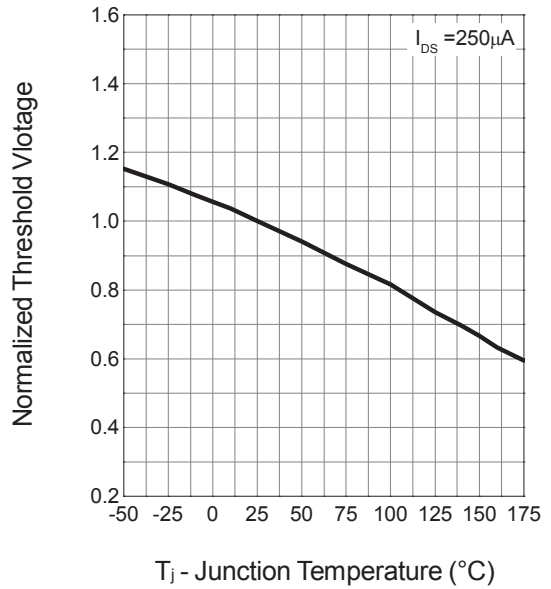
Drain-Source On Resistance



Drain-Source On Resistance

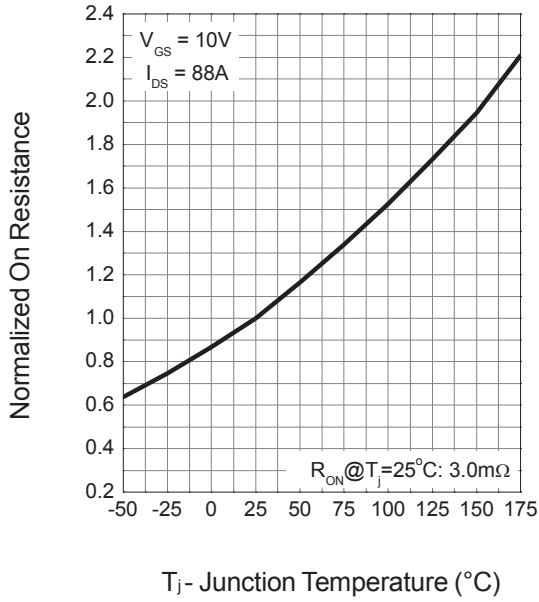


Gate Threshold Voltage

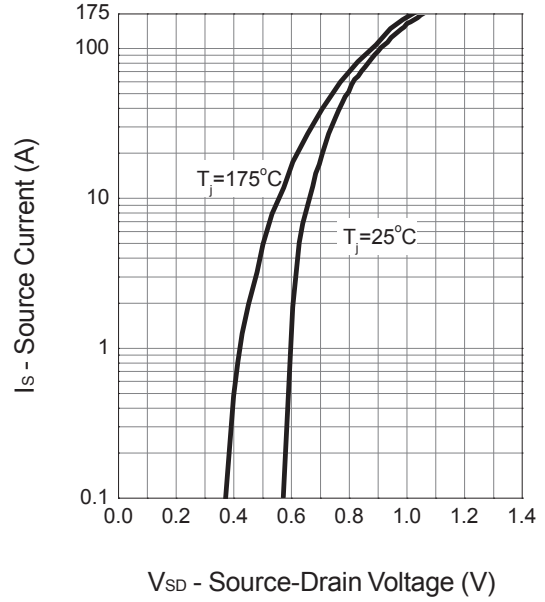


Typical Operating Characteristics (Cont.)

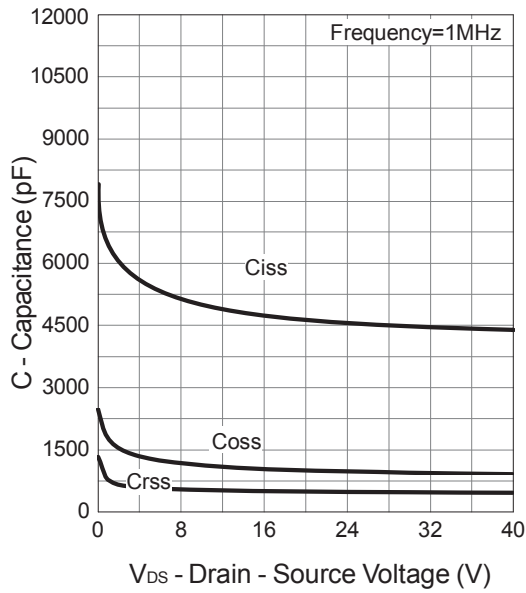
Drain-Source On Resistance



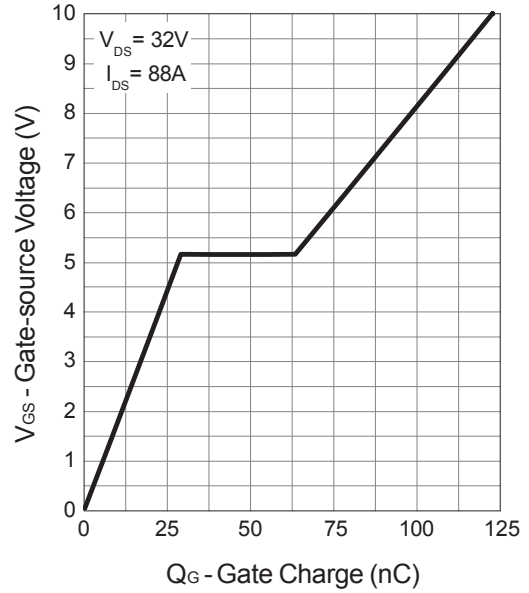
Source-Drain Diode Forward



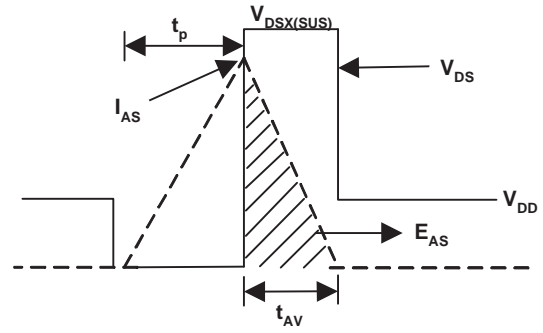
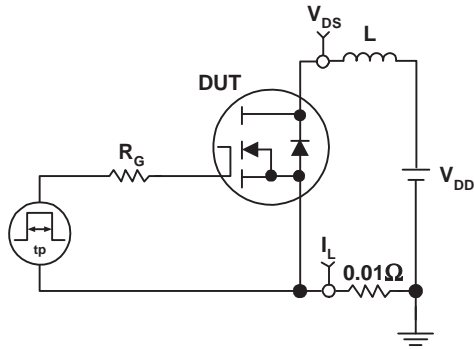
Capacitance



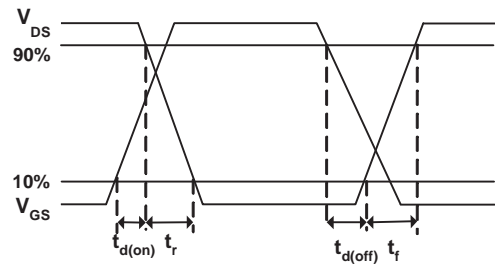
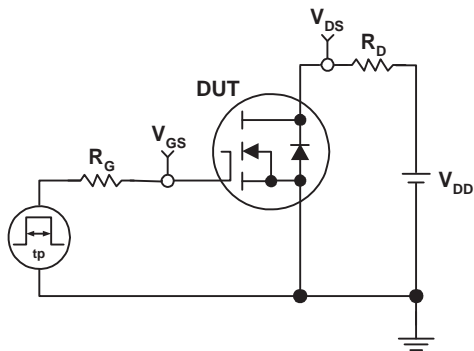
Gate Charge



Avalanche Test Circuit



Avalanche Test Circuit



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