

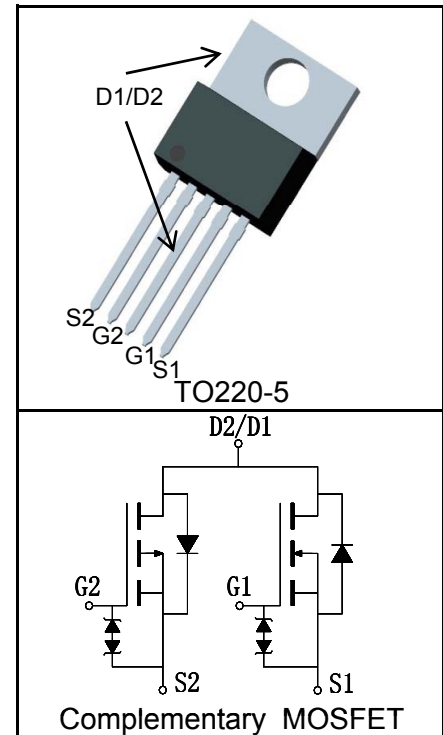
Features

- N-Channel
60V/20A,
 $R_{DS(ON)} = 30m\Omega (Typ.) @ V_{GS} = 10V$
- P-Channel
-60V/-15A,
 $R_{DS(ON)} = 110m\Omega (Typ.) @ V_{GS} = -10V$
- Reliable and Rugged
- ESD Protected
- Lead Free and Green Available

Applications

- Power Management

Pin Description



Absolute Maximum Ratings

Symbol	Parameter		N-Channel	P-Channel	Unit
Common Ratings ($T_C = 25^\circ C$ Unless Otherwise Noted)					
V_{DSS}	Drain-Source Voltage		60	-60	V
V_{GSS}	Gate-Source Voltage		± 16	± 16	
T_J	Maximum Junction Temperature		175	175	$^\circ C$
T_{STG}	Storage Temperature Range		-55 to 175	-55 to 175	$^\circ C$
I_S	Diode Continuous Forward Current	$T_C = 25^\circ C$	20	-15	A
Mounted on Large Heat Sink					
$I_{DP}^{①}$	300 μs Pulse Drain Current Tested	$T_C = 25^\circ C$	80	-60	A
$I_D^{②}$	Continuous Drain Current ($V_{GS} = \pm 10V$)	$T_C = 25^\circ C$	20	-15	A
		$T_C = 100^\circ C$	16	-10	
P_D	Maximum Power Dissipation	$T_C = 25^\circ C$	50	50	W
		$T_C = 100^\circ C$	25	25	
$R_{\theta JC}$	Thermal Resistance-Junction to Case		3	3	$^\circ C/W$
$R_{\theta JA}$	Thermal Resistance-Junction to Ambient		62.5	62.5	$^\circ C/W$
Drain-Source Avalanche Ratings					
$E_{AS}^{③}$	Avalanche Energy, Single Pulsed		42	72	mJ

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

Symbol	Parameter	Test Condition	RU60C20R5			Unit
			Min.	Typ.	Max.	
Static Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_{DS}=250\mu A$	N	60		V
		$V_{GS}=0V, I_{DS}=-250\mu A$	P	-60		
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=60V, V_{GS}=0V$	N		1	μA
		$T_J=125^\circ C$			30	
		$V_{DS}=-60V, V_{GS}=0V$	P		-1	
		$T_J=125^\circ C$			-30	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_{DS}=250\mu A$	N	2	4	V
		$V_{DS}=V_{GS}, I_{DS}=-250\mu A$	P	-2	-4	
I_{GSS}	Gate Leakage Current	$V_{GS}=\pm 16V, V_{DS}=0V$	N		± 10	μA
		$V_{GS}=\pm 16V, V_{DS}=0V$	P		± 10	
$R_{DS(ON)}^{(4)}$	Drain-Source On-state Resistance	$V_{GS}=10V, I_{DS}=10A$	N		30	m Ω
		$V_{GS}=-10V, I_{DS}=-8A$	P		110	
Diode Characteristics						
$V_{SD}^{(4)}$	Diode Forward Voltage	$I_{SD}=20A, V_{GS}=0V$	N		1.2	V
		$I_{SD}=-15A, V_{GS}=0V$	P		-1.2	
t_{rr}	Reverse Recovery Time	N-Channel $I_{SD}=20A, dI_{SD}/dt=100A/\mu s$	N		32	ns
			P		52	
Q_{rr}	Reverse Recovery Charge	P-Channel $I_{SD}=-15A, dI_{SD}/dt=100A/\mu s$	N		63	nC
			P		75	
Dynamic Characteristics⁽⁵⁾						
R_G	Gate Resistance	$V_{GS}=0V, V_{DS}=0V, F=1MHz$	N		1.8	Ω
			P		12	
C_{iss}	Input Capacitance	N-Channel $V_{GS}=0V, V_{DS}=30V,$ Frequency=1.0MHz	N		1340	pF
			P		910	
C_{oss}	Output Capacitance	P-Channel $V_{GS}=0V, V_{DS}=-30V,$ Frequency=1.0MHz	N		285	
			P		625	
C_{rss}	Reverse Transfer Capacitance	N-Channel $V_{GS}=0V, V_{DS}=-30V,$ Frequency=1.0MHz	N		90	
			P		170	

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

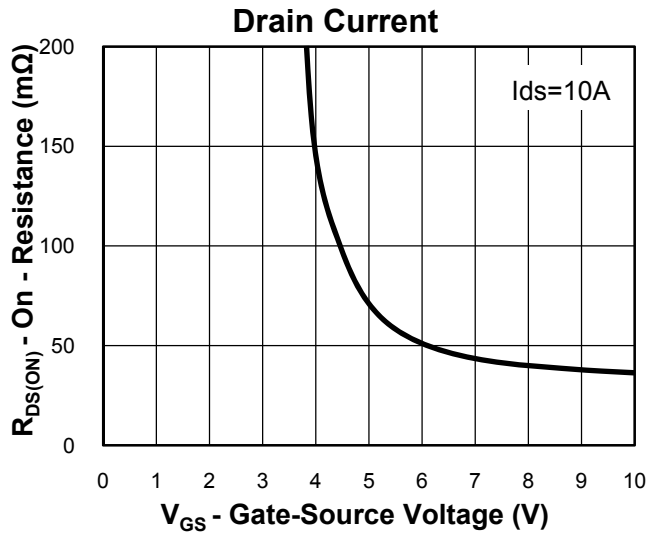
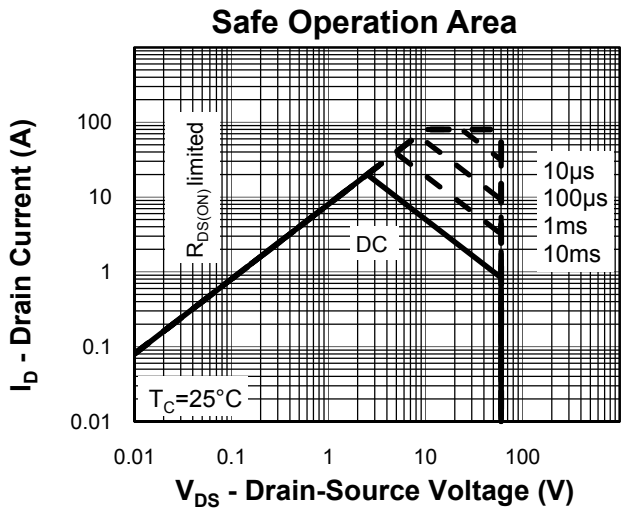
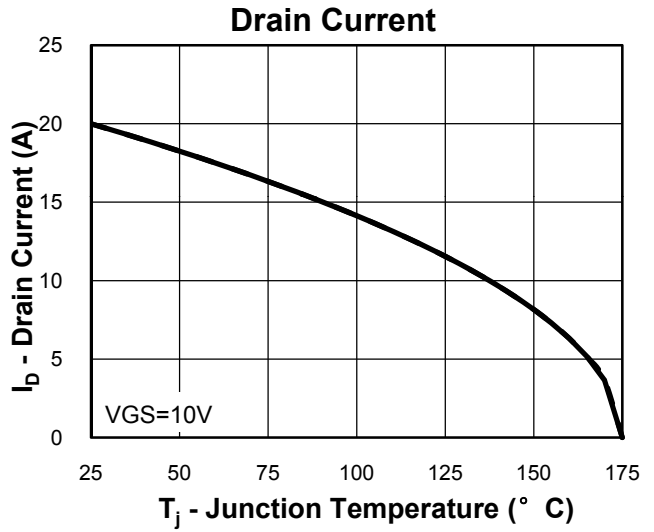
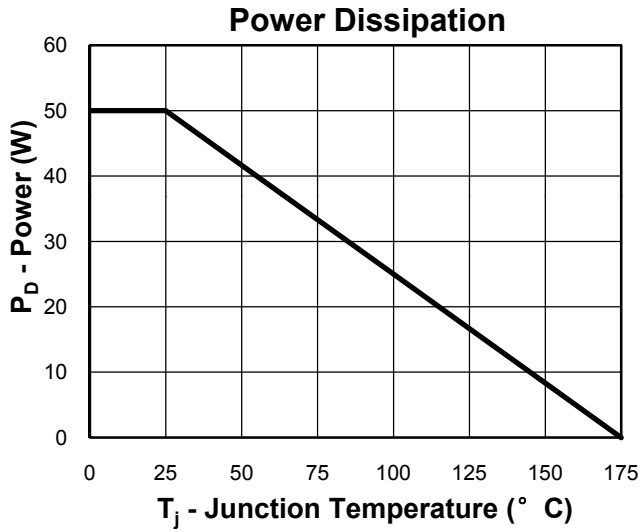
Symbol	Parameter	Test Condition	RU60C20R5			Unit	
			Min.	Typ.	Max.		
Dynamic Characteristics ^⑤							
$t_{d(ON)}$	Turn-on Delay Time	N-Channel $V_{DD}=30\text{V}, R_L=1.5\Omega, I_{DS}=20\text{A},$ $V_{GEN}=10\text{V}, R_G=6\Omega$ P-Channel $V_{DD}=-30\text{V}, R_L=2\Omega, I_{DS}=-15\text{A},$ $V_{GEN}=-10\text{V}, R_G=6\Omega$	N		12		ns
			P		16		
t_r	Turn-on Rise Time		N		15		
			P		24		
$t_{d(OFF)}$	Turn-off Delay Time		N		28		
			P		35		
t_f	Turn-off Fall Time		N		15		
			P		20		
Gate Charge Characteristics ^⑤							
Q_g	Total Gate Charge	N-Channel $V_{DS}=48\text{V}, V_{GS}=10\text{V},$ $I_{DS}=20\text{A}$ P-Channel $V_{DS}=-48\text{V}, V_{GS}=-10\text{V},$ $I_{DS}=-15\text{A}$	N		53		nC
			P		32		
Q_{gs}	Gate-Source Charge		N		8		
			P		5		
Q_{gd}	Gate-Drain Charge		N		27		
			P		11		

- Notes:
- ① Pulse width limited by safe operating area.
 - ② Calculated continuous current based on maximum allowable junction temperature.
 - ③ Limited by T_{Jmax} , N-Channel: $I_{AS}=13\text{A}, V_{DD}=48\text{V}, R_G=50\Omega$, P-Channel: $I_{AS}=-17\text{A}, V_{DD}=-48\text{V}, R_G=50\Omega$, Starting $T_J=25^\circ\text{C}$.
 - ④ Pulse test; Pulse width $\leq 300\mu\text{s}$, duty cycle $\leq 2\%$.
 - ⑤ Guaranteed by design, not subject to production testing.

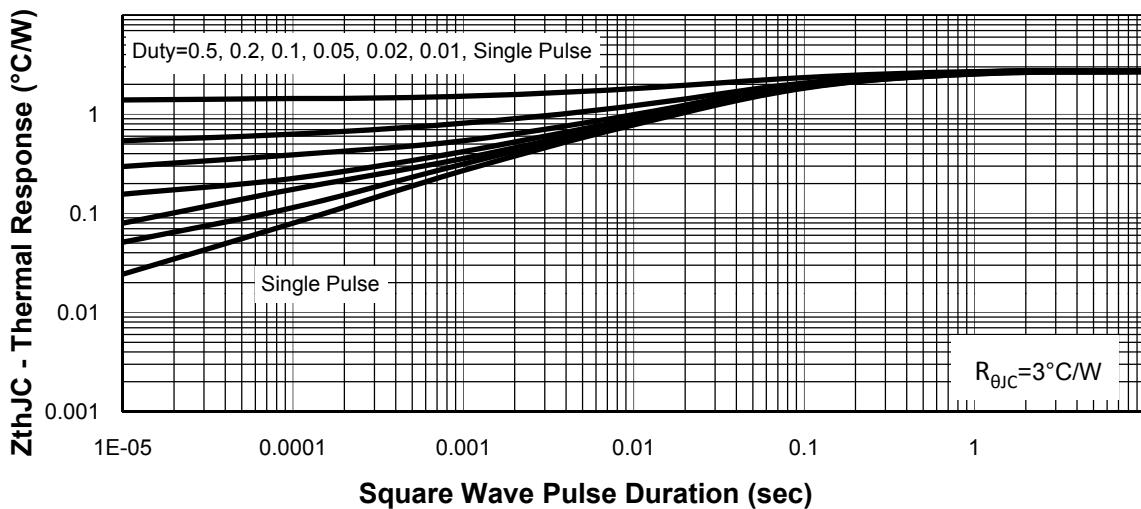
Ordering and Marking Information

Device	Marking	Package	Packaging	Quantity	Reel Size	Tape width
RU60C20R5	RU60C20R5	TO220-5	Tube	50	-	-

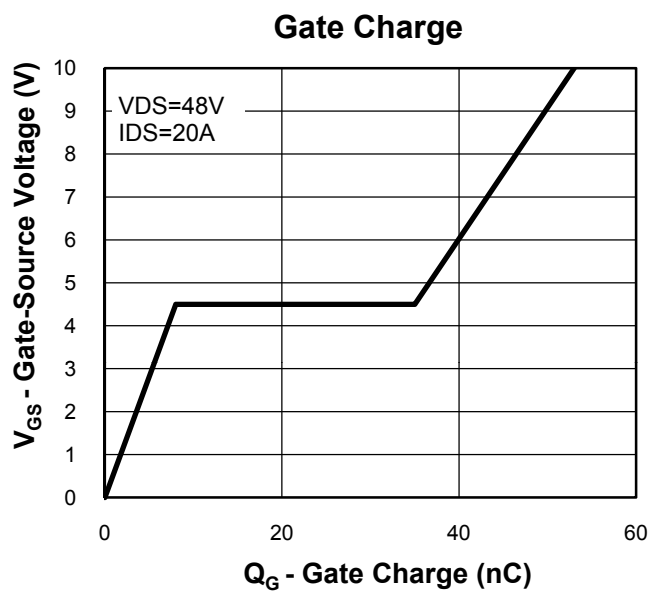
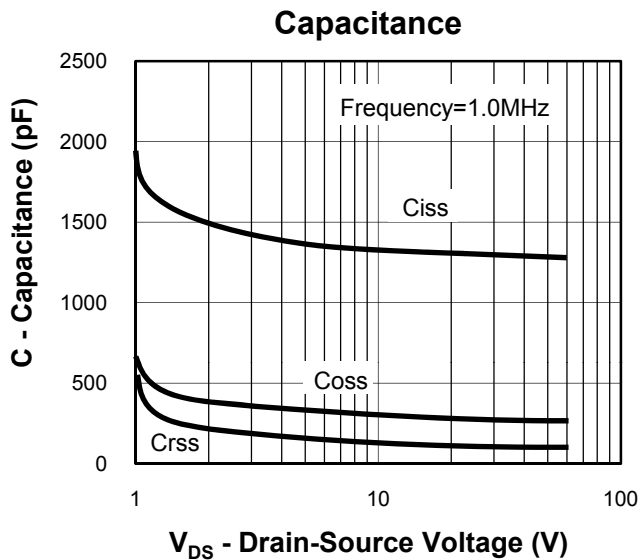
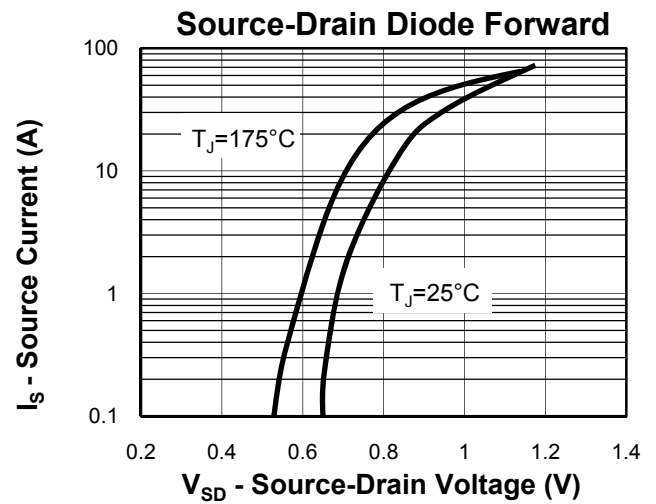
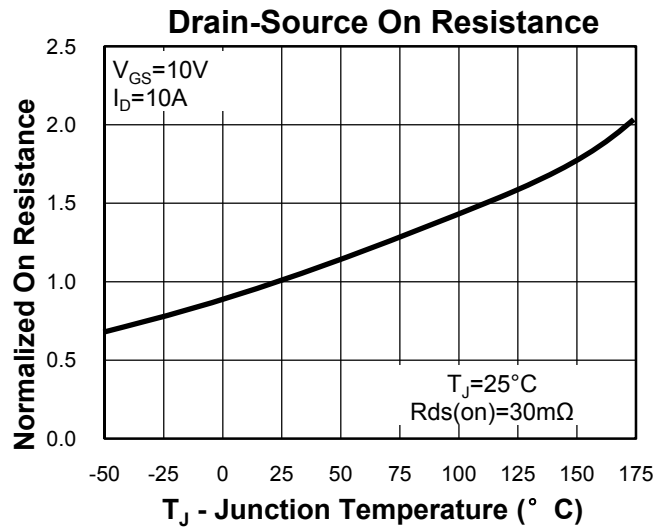
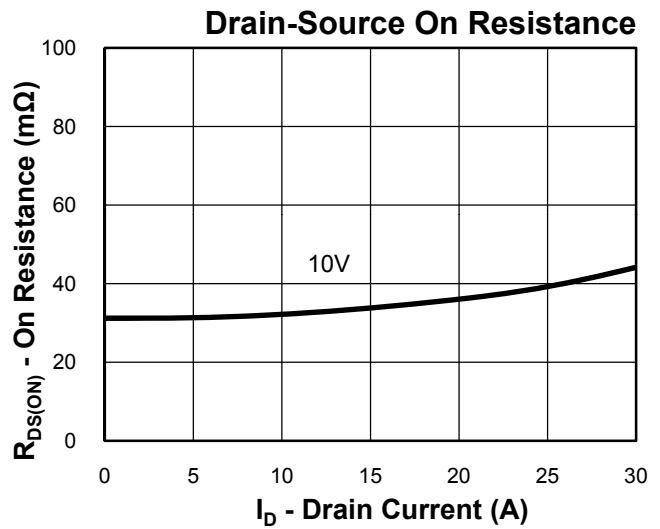
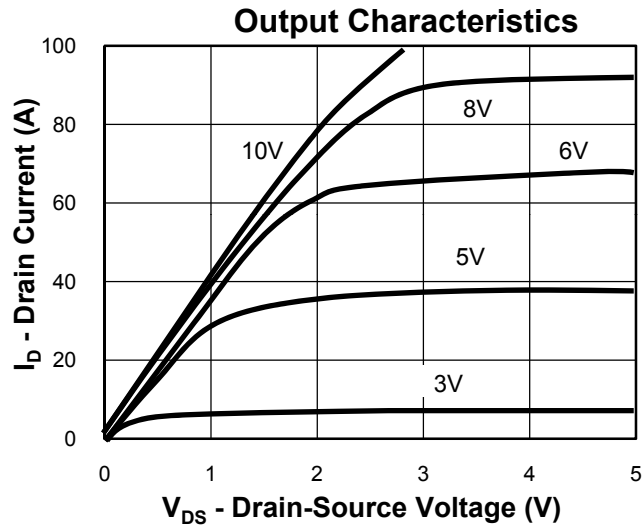
Typical Characteristics(N-Channel)



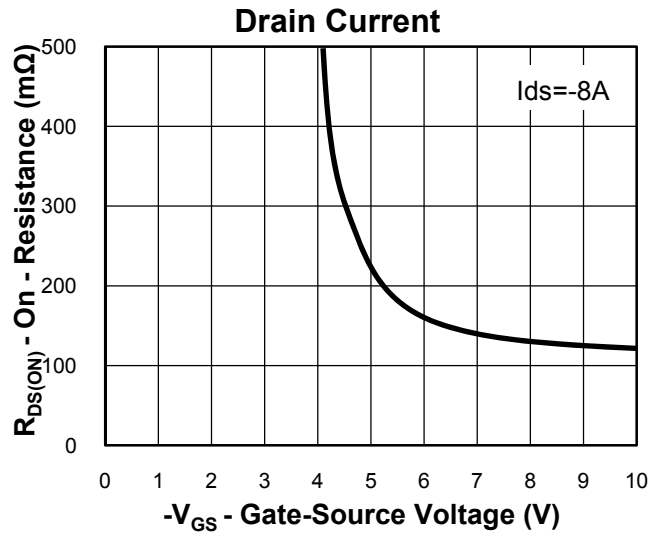
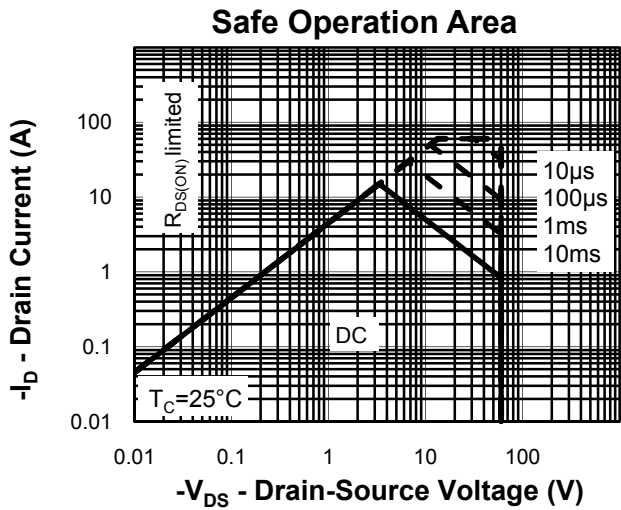
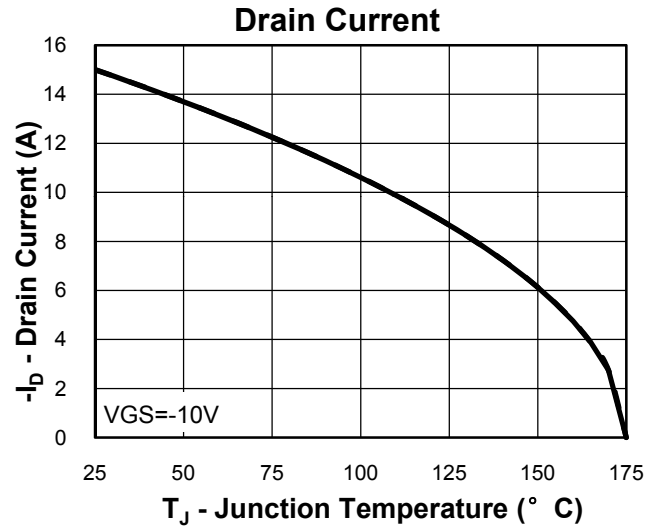
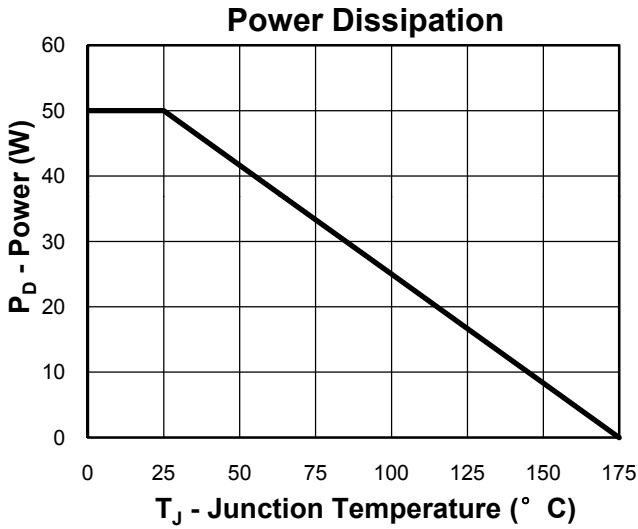
Thermal Transient Impedance



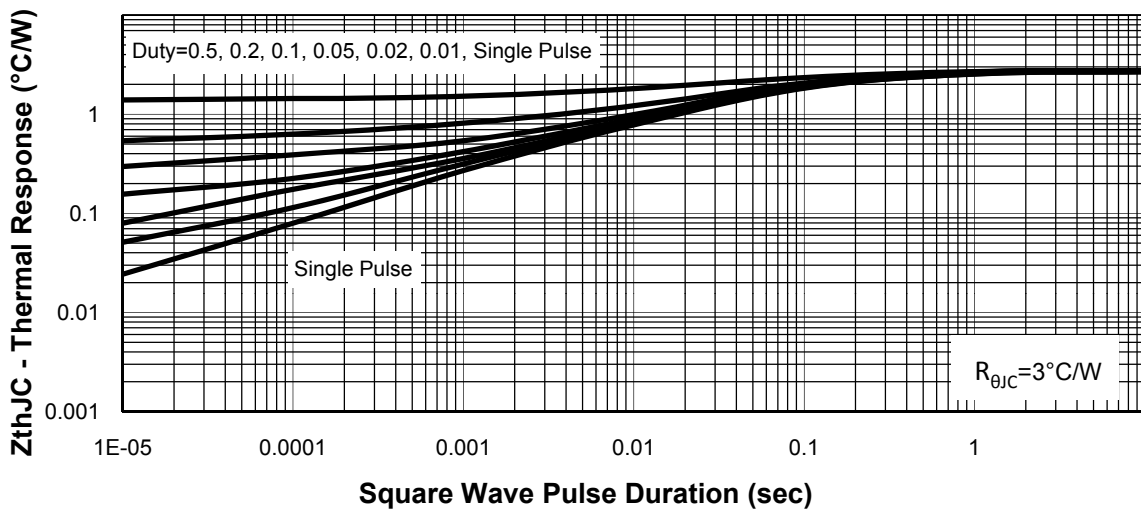
Typical Characteristics(N-Channel)



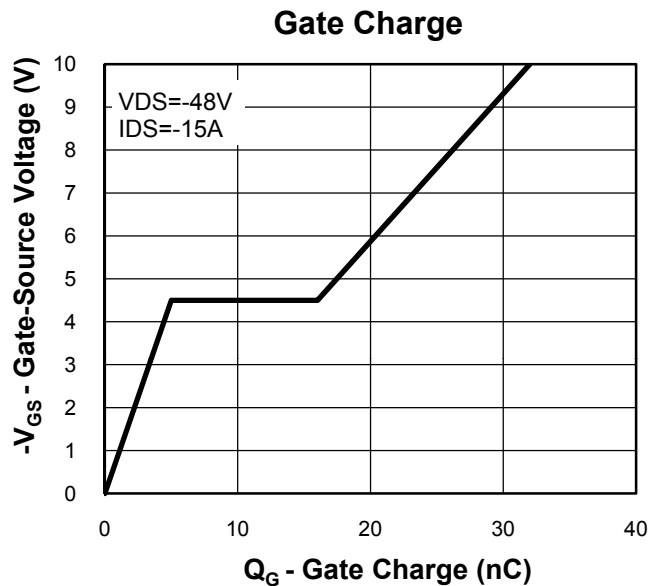
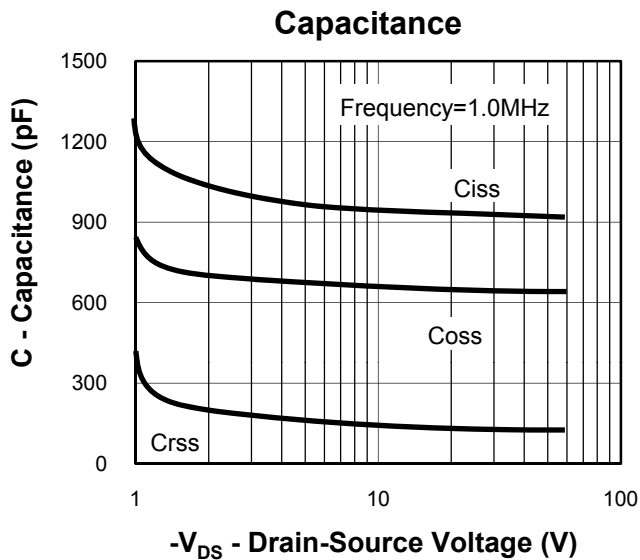
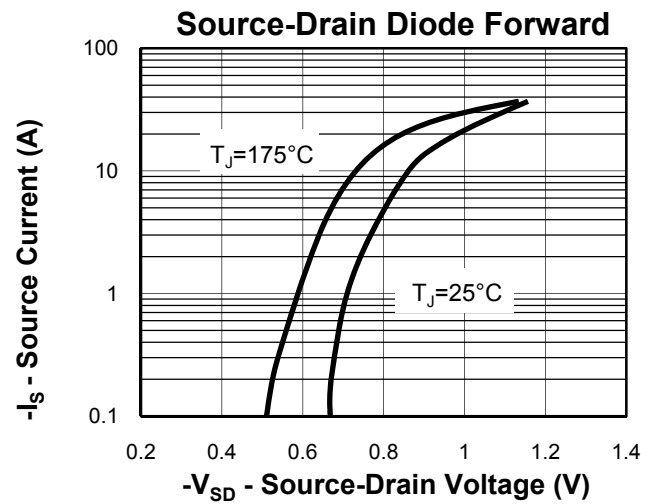
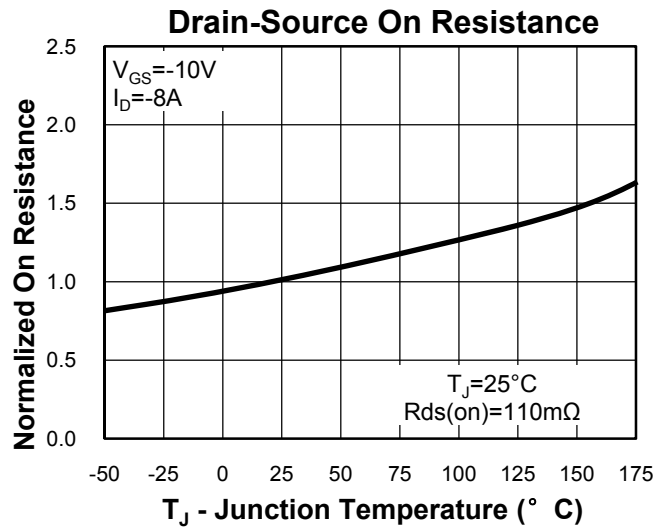
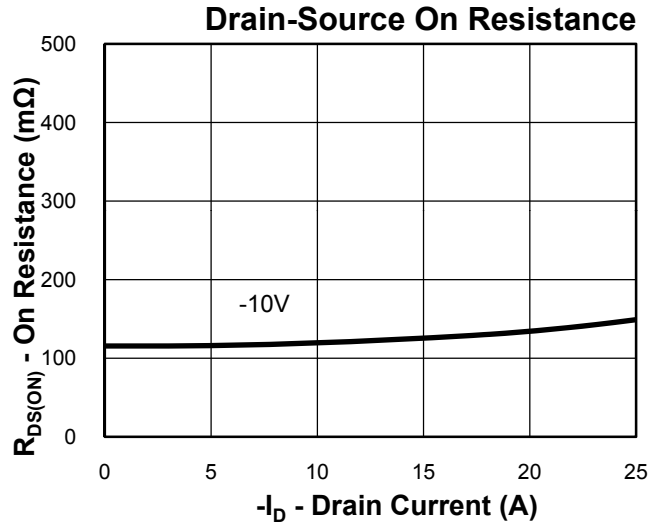
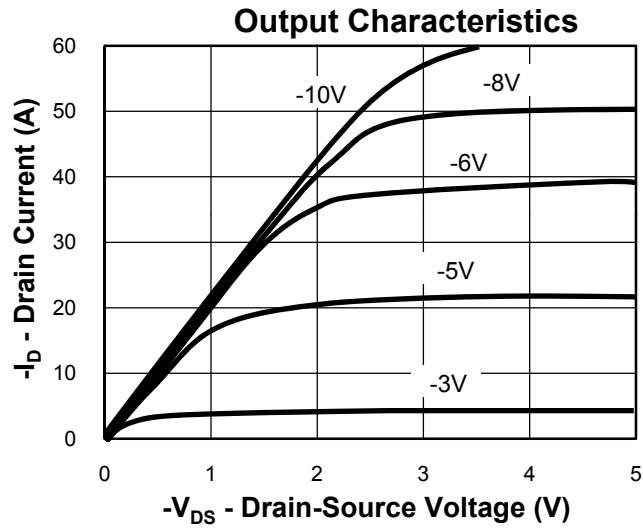
Typical Characteristics(P-Channel)



Thermal Transient Impedance



Typical Characteristics(P-Channel)



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