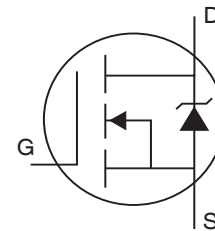
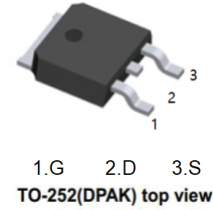


- $V_{DS}(V) = 100V$
- $I_D = 10A$ ($V_{GS} = 10V$)
- $R_{DS(ON)} < 185m\Omega$ ($V_{GS} = 10V$)
- $R_{DS(ON)} < 225m\Omega$ ($V_{GS} = 5V$)
- $R_{DS(ON)} < 265m\Omega$ ($V_{GS} = 4V$)



Absolute Maximum Ratings

	Parameter	Max.	Units
I_D @ $T_C = 25^\circ C$	Continuous Drain Current, V_{GS} @ 10V	10	A
I_D @ $T_C = 100^\circ C$	Continuous Drain Current, V_{GS} @ 10V	7.0	
I_{DM}	Pulsed Drain Current ①⑥	35	
P_D @ $T_C = 25^\circ C$	Power Dissipation	48	W
	Linear Derating Factor	0.32	W/ $^\circ C$
V_{GS}	Gate-to-Source Voltage	± 16	V
E_{AS}	Single Pulse Avalanche Energy②⑥	85	mJ
I_{AR}	Avalanche Current①⑥	6.0	A
E_{AR}	Repetitive Avalanche Energy①⑥	4.8	mJ
dv/dt	Peak Diode Recovery dv/dt ③	5.0	V/ns
T_J	Operating Junction and	-55 to + 175	$^\circ C$
T_{STG}	Storage Temperature Range		
	Soldering Temperature, for 10 seconds	300 (1.6mm from case)	

Thermal Resistance

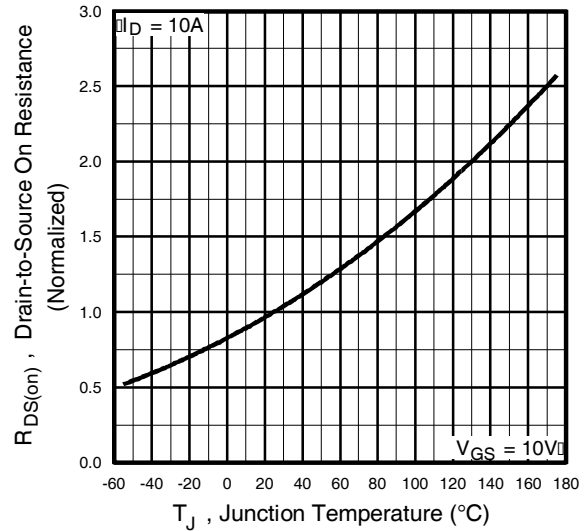
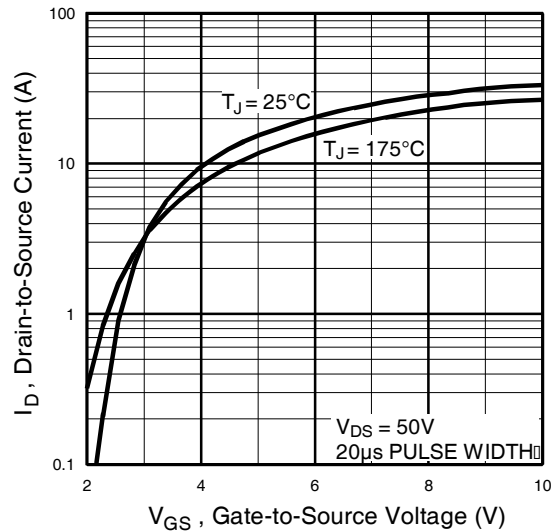
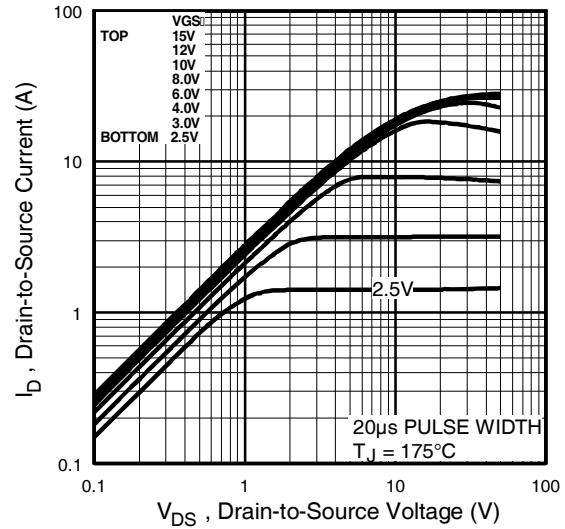
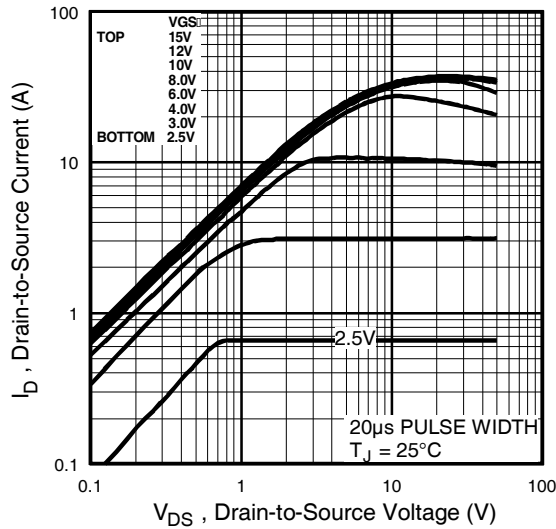
	Parameter	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-Case		3.1	$^\circ C/W$
$R_{\theta JA}$	Junction-to-Ambient (PCB mount) **		50	
$R_{\theta JA}$	Junction-to-Ambient		110	

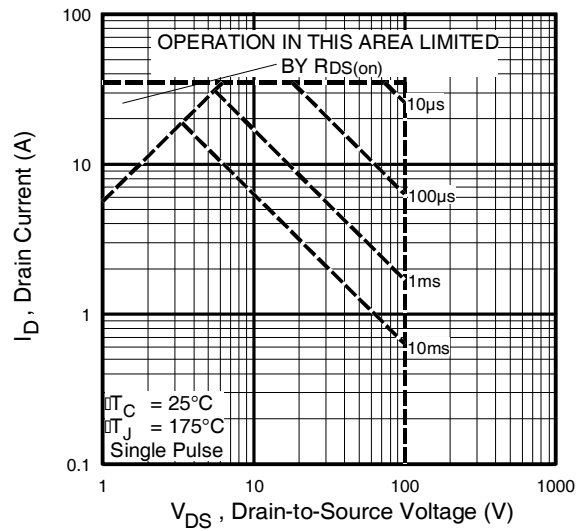
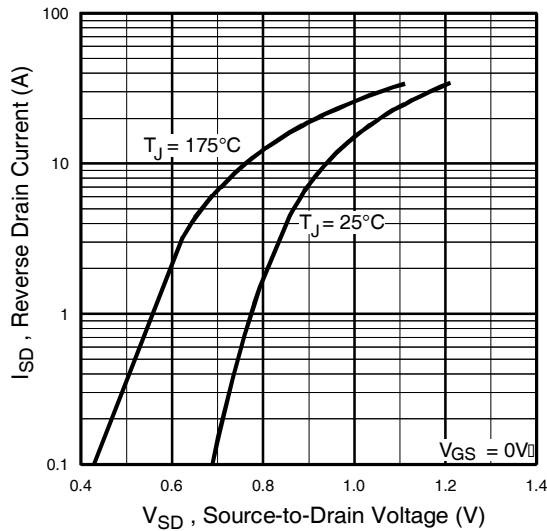
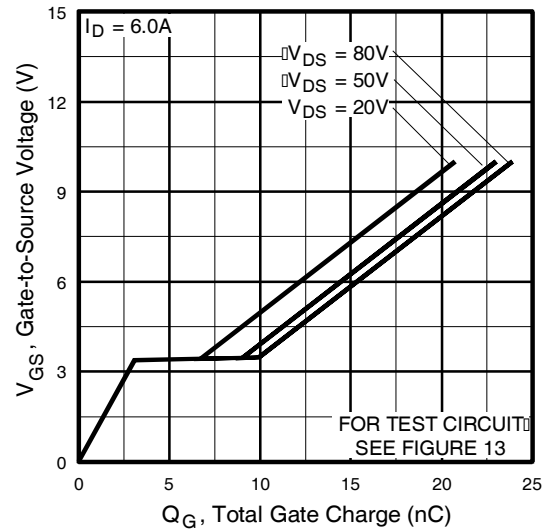
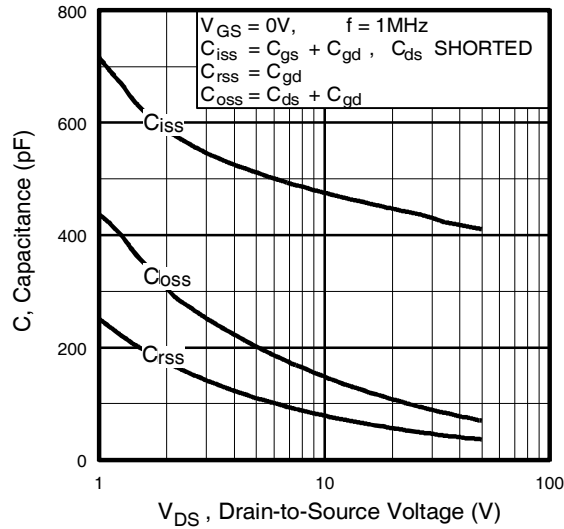
Electrical Characteristics @ $T_J = 25^\circ\text{C}$ (unless otherwise specified)

	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(BR)DSS}$	Drain-to-Source Breakdown Voltage	100			V	$V_{GS} = 0V, I_D = 250\mu A$
$\Delta V_{(BR)DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient		0.12		V/ $^\circ\text{C}$	Reference to 25°C , $I_D = 1\text{mA}$
$R_{DS(on)}$	Static Drain-to-Source On-Resistance			185	$m\Omega$	$V_{GS} = 10V, I_D = 6.0A$ ④
				225		$V_{GS} = 5.0V, I_D = 6.0A$ ④
				265		$V_{GS} = 4.0V, I_D = 5.0A$ ④
$V_{GS(th)}$	Gate Threshold Voltage	1.0		2.0	V	$V_{DS} = V_{GS}, I_D = 250\mu A$
g_{fs}	Forward Transconductance	3.1			S	$V_{DS} = 25V, I_D = 6.0A$ ⑥
I_{DSS}	Drain-to-Source Leakage Current			25	μA	$V_{DS} = 100V, V_{GS} = 0V$
				250		$V_{DS} = 80V, V_{GS} = 0V, T_J = 150^\circ\text{C}$
I_{GSS}	Gate-to-Source Forward Leakage			100	nA	$V_{GS} = 16V$
	Gate-to-Source Reverse Leakage			-100		$V_{GS} = -16V$
Q_g	Total Gate Charge			20	nC	$I_D = 6.0A$
Q_{gs}	Gate-to-Source Charge			4.6		$V_{DS} = 80V$
Q_{gd}	Gate-to-Drain ("Miller") Charge			10		$V_{GS} = 5.0V$, See Fig. 6 and 13 ④ ⑥
$t_{d(on)}$	Turn-On Delay Time		4.0		ns	$V_{DD} = 50V$ $I_D = 6.0A$ $R_G = 11\Omega, V_{GS} = 5.0V$ $R_D = 8.2\Omega$, See Fig. 10 ④ ⑥
t_r	Rise Time		35			
$t_{d(off)}$	Turn-Off Delay Time		23			
t_f	Fall Time		22			
L_D	Internal Drain Inductance		4.5		nH	Between lead, 6mm (0.25in.) from package and center of die contact ③
L_S	Internal Source Inductance		7.5			
C_{iss}	Input Capacitance		440		pF	$V_{GS} = 0V$ $V_{DS} = 25V$ $f = 1.0\text{MHz}$, See Fig. 5 ⑥
C_{oss}	Output Capacitance		97			
C_{rss}	Reverse Transfer Capacitance		50			
	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current (Body Diode)			10	A	MOSFET symbol showing the integral reverse p-n junction diode.
I_{SM}	Pulsed Source Current (Body Diode) ① ⑥			35		
V_{SD}	Diode Forward Voltage			1.3	V	$T_J = 25^\circ\text{C}, I_S = 6.0A, V_{GS} = 0V$ ④
t_{rr}	Reverse Recovery Time		110	160	ns	$T_J = 25^\circ\text{C}, I_F = 6.0A$
Q_{rr}	Reverse Recovery Charge		410	620	nC	$di/dt = 100A/\mu s$ ④ ⑥
t_{on}	Forward Turn-On Time	Intrinsic turn-on time is negligible (turn-on is dominated by $L_S + L_D$)				

Notes:

- ① Repetitive rating; pulse width limited by max. junction temperature. (See fig. 11)
- ② $V_{DD} = 25V$, starting $T_J = 25^\circ\text{C}$, $L = 4.7\text{mH}$
 $R_G = 25\Omega, I_{AS} = 6.0A$. (See Figure 12)
- ③ $I_{SD} \leq 6.0A, di/dt \leq 340A/\mu s, V_{DD} \leq V_{(BR)DSS}$,
 $T_J \leq 175^\circ\text{C}$
- ④ Pulse width $\leq 300\mu s$; duty cycle $\leq 2\%$.
- ⑤ This is applied for I-PAK, L_S of D-PAK is measured between lead and center of die contact





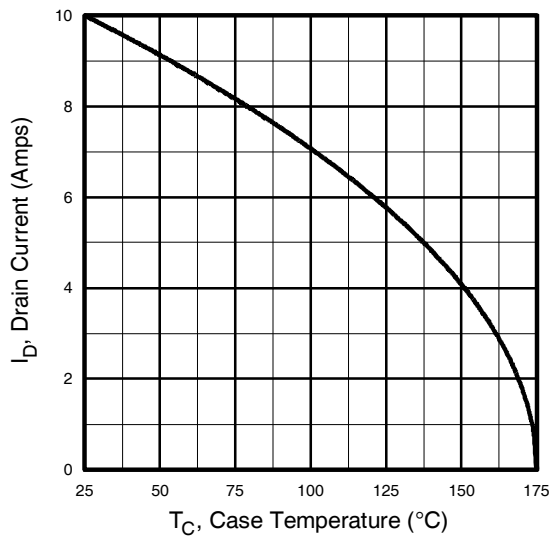


Fig 9. Maximum Drain Current Vs. Case Temperature

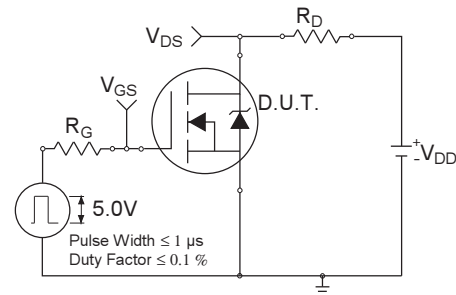


Fig 10a. Switching Time Test Circuit

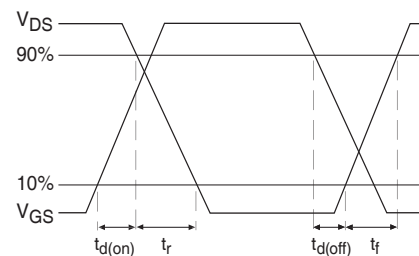


Fig 10b. Switching Time Waveforms

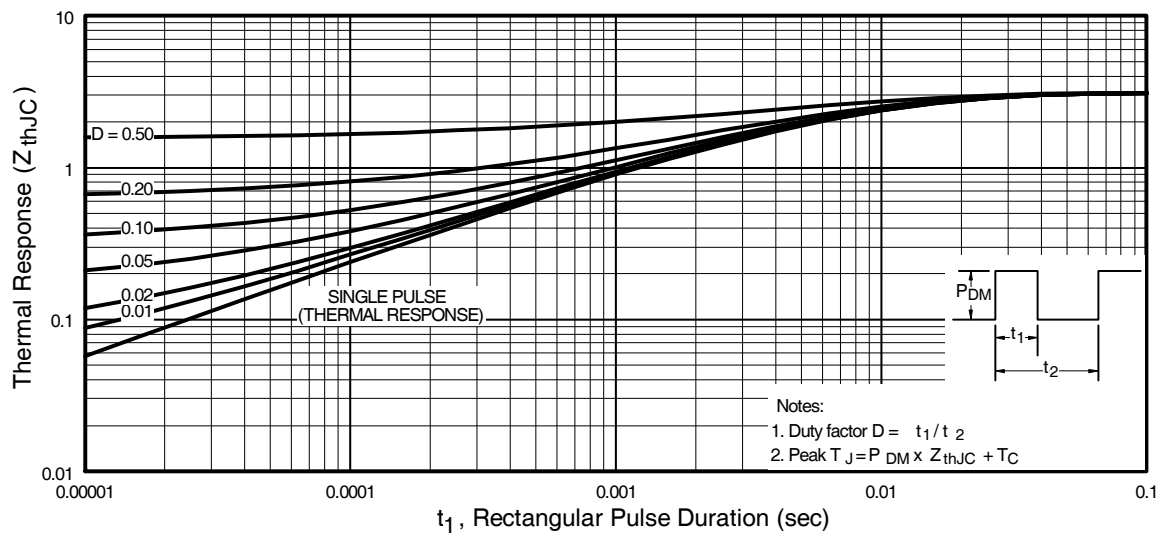


Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Case

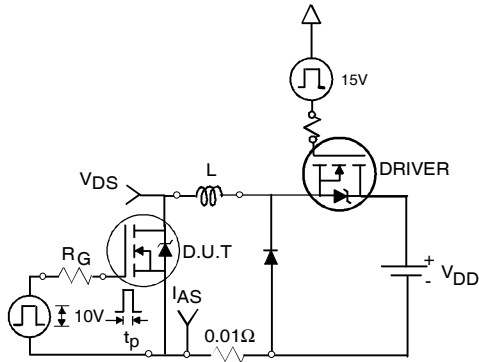


Fig 12a. Unclamped Inductive Test Circuit

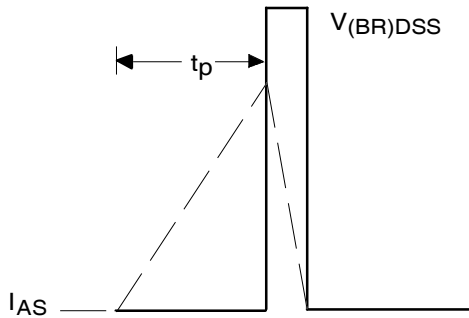


Fig 12b. Unclamped Inductive Waveforms

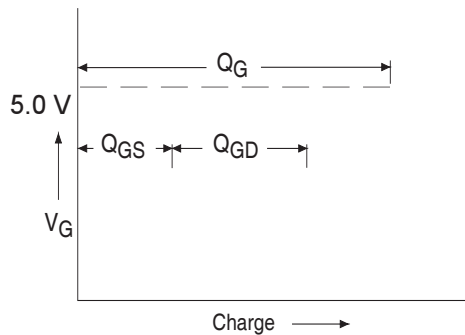


Fig 13a. Basic Gate Charge Waveform

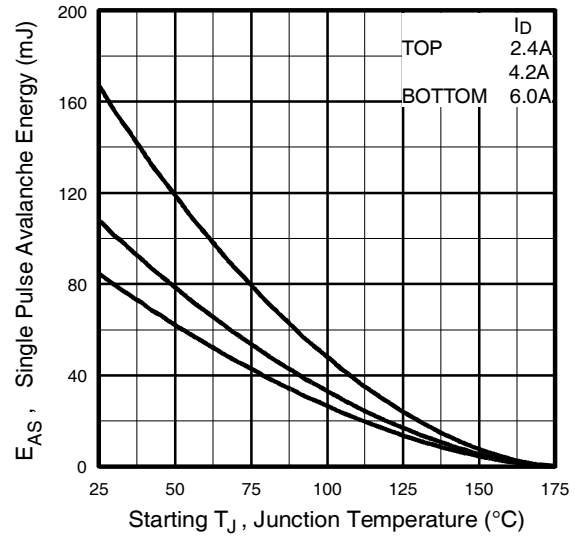


Fig 12c. Maximum Avalanche Energy Vs. Drain Current

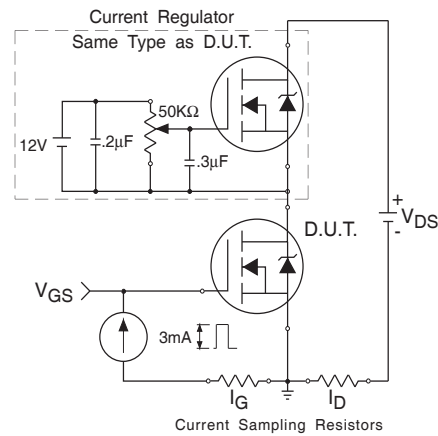
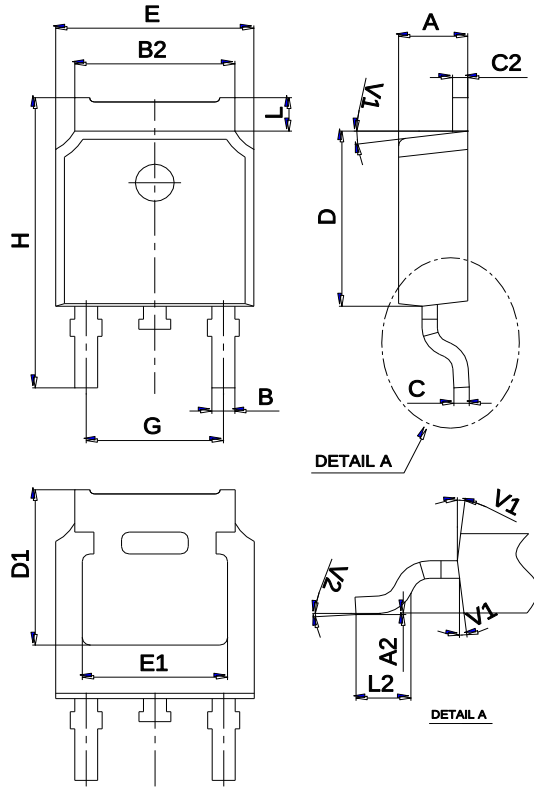


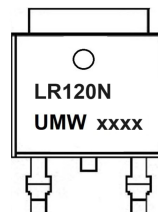
Fig 13b. Gate Charge Test Circuit

Package Mechanical Data TO-252



Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	2.10		2.50	0.083		0.098
A2	0		0.10	0		0.004
B	0.66		0.86	0.026		0.034
B2	5.18		5.48	0.202		0.216
C	0.40		0.60	0.016		0.024
C2	0.44		0.58	0.017		0.023
D	5.90		6.30	0.232		0.248
D1	5.30REF			0.209REF		
E	6.40		6.80	0.252		0.268
E1	4.63			0.182		
G	4.47		4.67	0.176		0.184
H	9.50		10.70	0.374		0.421
L	1.09		1.21	0.043		0.048
L2	1.35		1.65	0.053		0.065
V1		7°			7°	
V2	0°		6°	0°		6°

Marking



Ordering information

Order code	Package	Baseqty	Deliverymode
UMW IRLR120NTR	TO-252	2500	Tape and reel