

## IRLML0030TRPbF

$V_{DS}$	30	V
$V_{GS Max}$	± 20	V
$R_{DS(on) max}$ (@ $V_{GS} = 10V$ )	27	mΩ
$R_{DS(on) max}$ (@ $V_{GS} = 4.5V$ )	40	mΩ

### FEATURES

- Low  $R_{DS(on)}$  ( $\leq 27m\Omega$ )
- Industry-standard pinout
- Compatible with existing Surface Mount Techniques
- RoHS compliant containing no lead, no bromide and no halogen
- MSL1, Industrial qualification

### Benefits

- Lower switching losses
- Multi-vendor compatibility
- Easier manufacturing
- Environmentally friendly
- Increased reliability

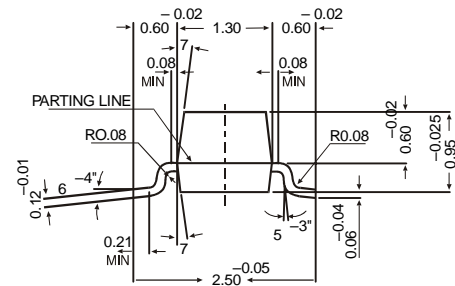
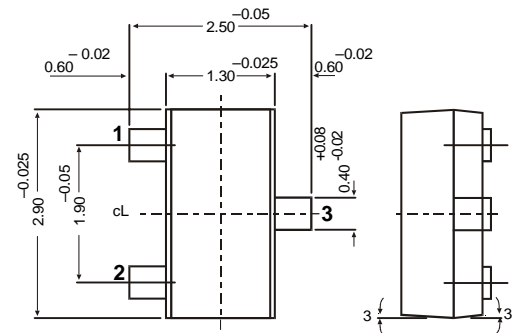
### Application(s)

- Load/ System Switch

Marking: N55G



SOT-23 Formed SMD Package



### Absolute Maximum Ratings

Symbol	Parameter	Max.	Units
$V_{DS}$	Drain-Source Voltage	30	V
$I_D @ T_A = 25^\circ C$	Continuous Drain Current, $V_{GS} @ 10V$	5.3	A
$I_D @ T_A = 70^\circ C$	Continuous Drain Current, $V_{GS} @ 10V$	4.3	
$I_{DM}$	Pulsed Drain Current	21	
$P_D @ T_A = 25^\circ C$	Maximum Power Dissipation	1.3	W
$P_D @ T_A = 70^\circ C$	Maximum Power Dissipation	0.8	
	Linear Derating Factor	0.01	W/°C
$V_{GS}$	Gate-to-Source Voltage	± 20	V
$T_J, T_{STG}$	Junction and Storage Temperature Range	-55 to + 150	°C

### Thermal Resistance

Symbol	Parameter	Typ.	Max.	Units
$R_{\theta JA}$	Junction-to-Ambient <sup>③</sup>	—	100	°C/W
$R_{\theta JA}$	Junction-to-Ambient (t<10s)	—	99	

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

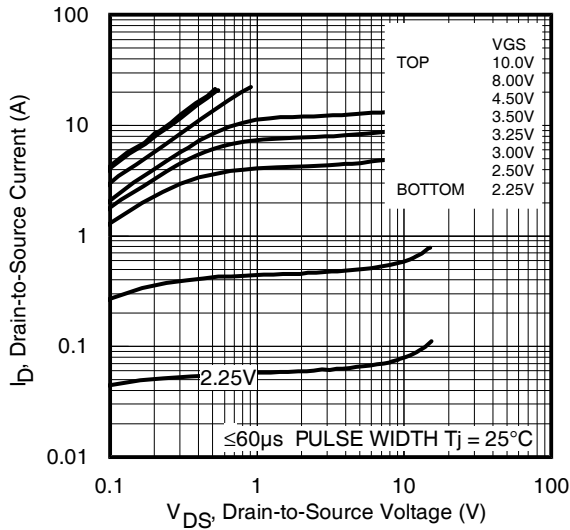
Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(BR)DSS}$	Drain-to-Source Breakdown Voltage	30	—	—	V	$V_{GS} = 0V, I_D = 250\mu A$
$\Delta V_{(BR)DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient	—	0.02	—	V/ $^\circ\text{C}$	Reference to $25^\circ\text{C}$ , $I_D = 1\text{mA}$
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	—	33	40	$\text{m}\Omega$	$V_{GS} = 4.5V, I_D = 4.2A$ ②
		—	22	27		$V_{GS} = 10V, I_D = 5.2A$ ②
$V_{GS(th)}$	Gate Threshold Voltage	1.3	1.7	2.3	V	$V_{DS} = V_{GS}, I_D = 25\mu A$
$I_{DSS}$	Drain-to-Source Leakage Current	—	—	1	$\mu A$	$V_{DS} = 24V, V_{GS} = 0V$
		—	—	150		$V_{DS} = 24V, V_{GS} = 0V, T_J = 125^\circ\text{C}$
$I_{GSS}$	Gate-to-Source Forward Leakage	—	—	100	nA	$V_{GS} = 20V$
	Gate-to-Source Reverse Leakage	—	—	-100		$V_{GS} = -20V$
$R_G$	Internal Gate Resistance	—	2.3	—	$\Omega$	
$g_{fs}$	Forward Transconductance	9.5	—	—	S	$V_{DS} = 10V, I_D = 5.2A$
$Q_g$	Total Gate Charge	—	2.6	—	nC	$I_D = 5.2A$
$Q_{gs}$	Gate-to-Source Charge	—	0.8	—		$V_{DS} = 15V$
$Q_{gd}$	Gate-to-Drain ("Miller") Charge	—	1.1	—		$V_{GS} = 4.5V$ ②
$t_{d(on)}$	Turn-On Delay Time	—	5.2	—	ns	$V_{DD} = 15V$ ②
$t_r$	Rise Time	—	4.4	—		$I_D = 1.0A$
$t_{d(off)}$	Turn-Off Delay Time	—	7.4	—		$R_G = 6.8\Omega$
$t_f$	Fall Time	—	4.4	—		$V_{GS} = 4.5V$
$C_{iss}$	Input Capacitance	—	382	—	pF	$V_{GS} = 0V$
$C_{oss}$	Output Capacitance	—	84	—		$V_{DS} = 15V$
$C_{riss}$	Reverse Transfer Capacitance	—	39	—		$f = 1.0\text{MHz}$

### Source - Drain Ratings and Characteristics

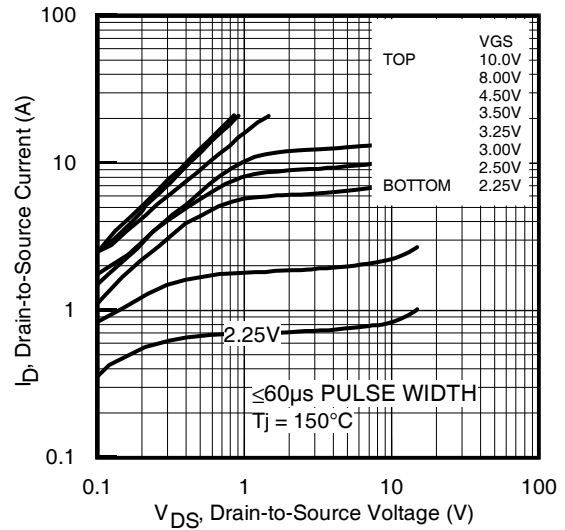
Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
$I_S$	Continuous Source Current (Body Diode)	—	—	1.6	A	MOSFET symbol showing the integral reverse p-n junction diode.
$I_{SM}$	Pulsed Source Current (Body Diode) ①	—	—	21		
$V_{SD}$	Diode Forward Voltage	—	—	1.0	V	$T_J = 25^\circ\text{C}, I_S = 1.6A, V_{GS} = 0V$ ②
$t_{rr}$	Reverse Recovery Time	—	11	17	ns	$T_J = 25^\circ\text{C}, V_R = 15V, I_F = 1.6A$
$Q_{rr}$	Reverse Recovery Charge	—	4.0	6.0	nC	$di/dt = 100A/\mu s$ ②

#### Notes:

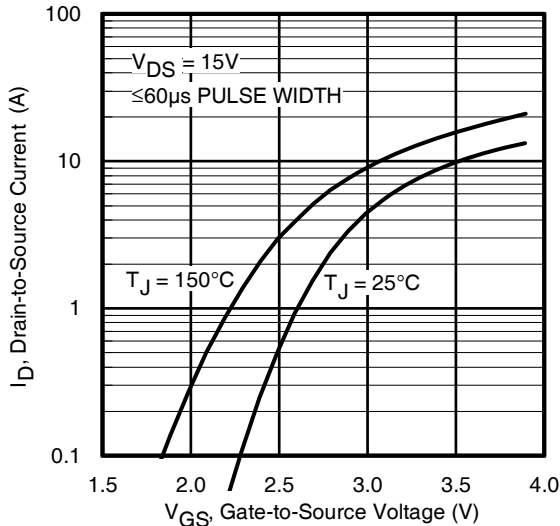
- ① Repetitive rating; pulse width limited by max. junction temperature.
- ② Pulse width  $\leq 400\mu s$ ; duty cycle  $\leq 2\%$ .
- ③ Surface mounted on 1 in square Cu board



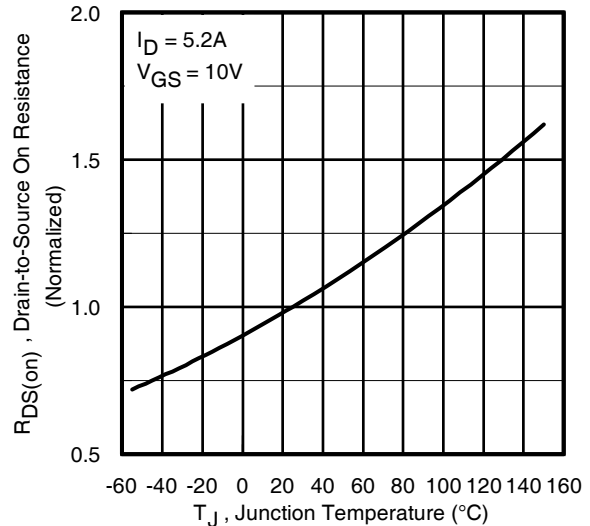
**Fig 1.** Typical Output Characteristics



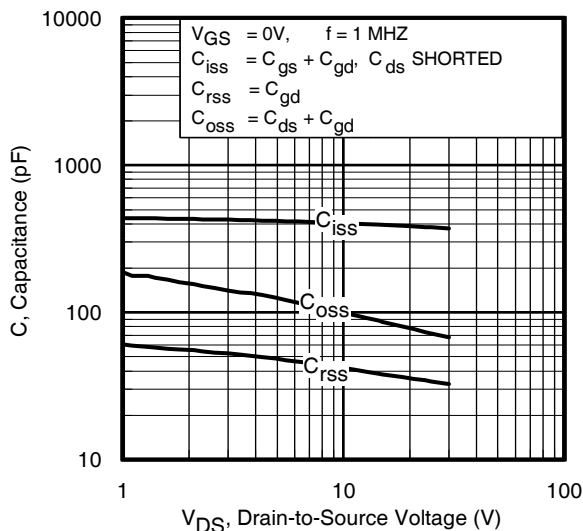
**Fig 2.** Typical Output Characteristics



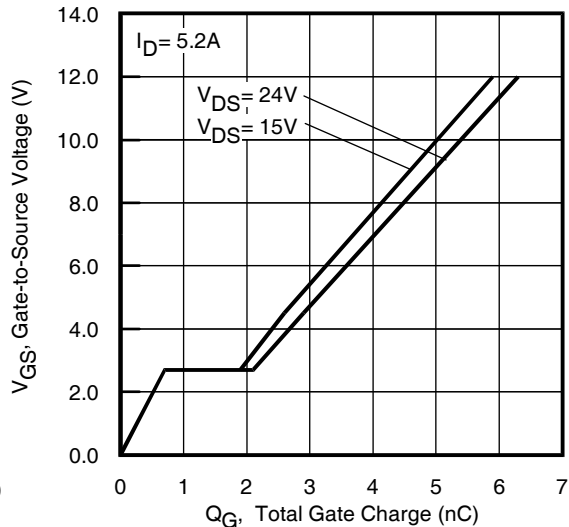
**Fig 3.** Typical Transfer Characteristics



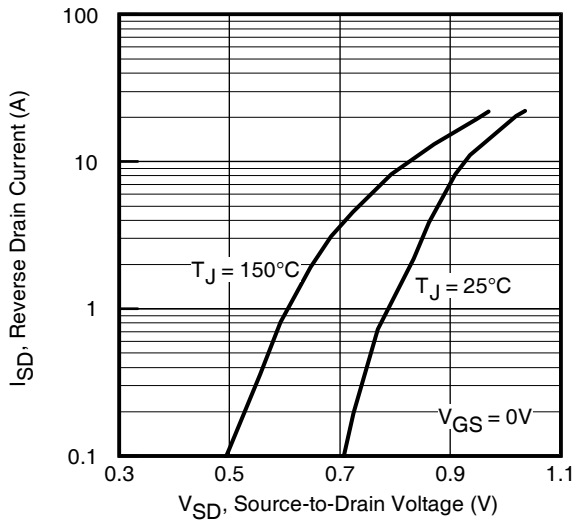
**Fig 4.** Normalized On-Resistance Vs. Temperature



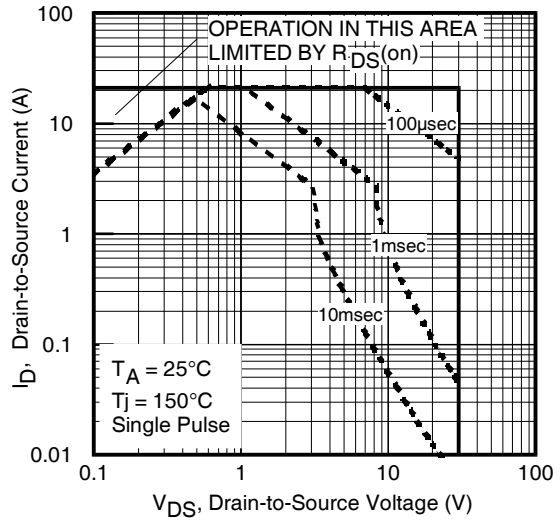
**Fig 5.** Typical Capacitance Vs. Drain-to-Source Voltage



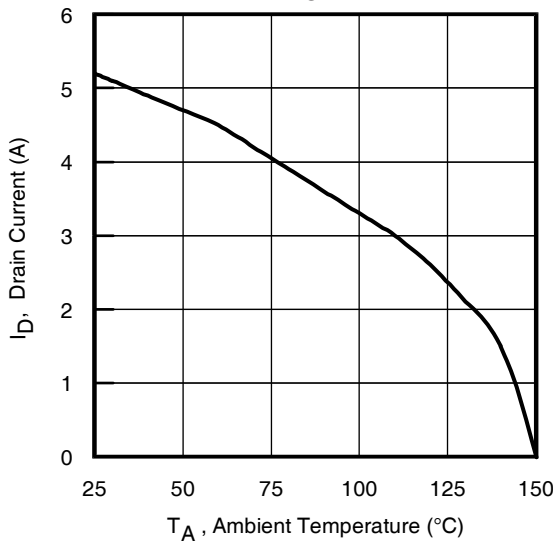
**Fig 6.** Typical Gate Charge Vs. Gate-to-Source Voltage



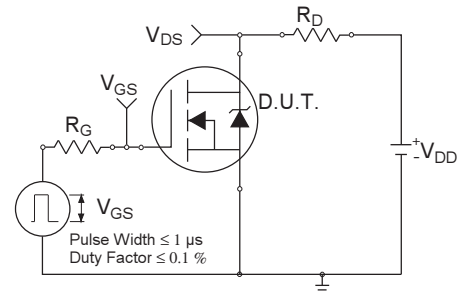
**Fig 7.** Typical Source-Drain Diode Forward Voltage



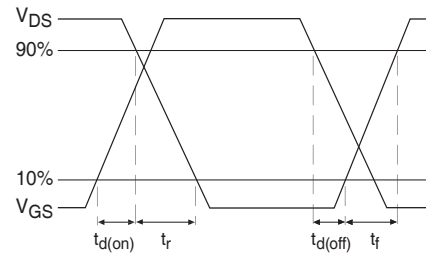
**Fig 8.** Maximum Safe Operating Area



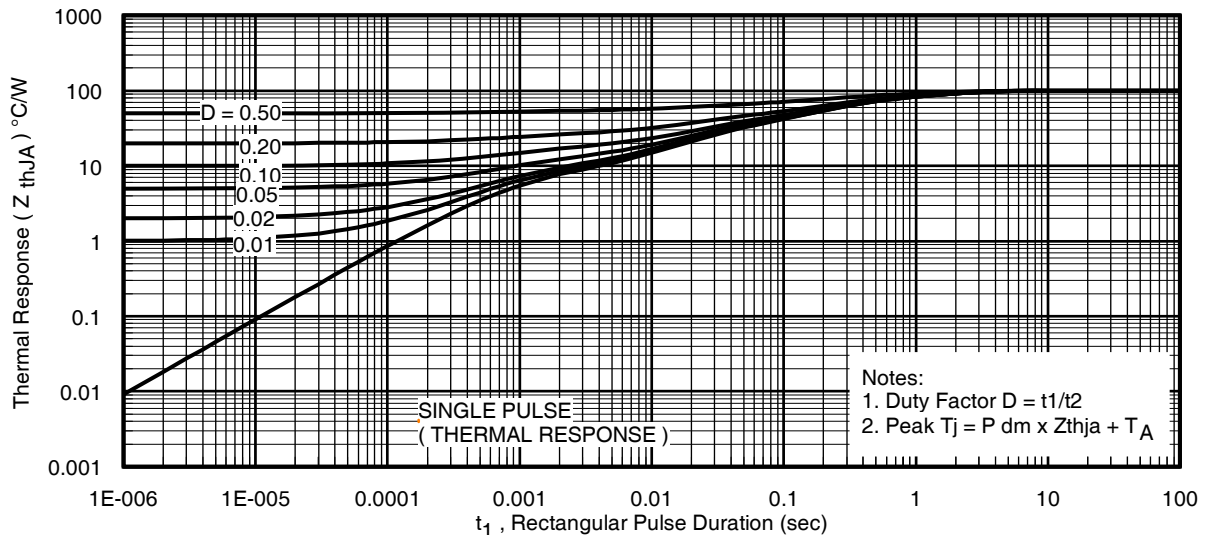
**Fig 9.** Maximum Drain Current Vs. Ambient Temperature



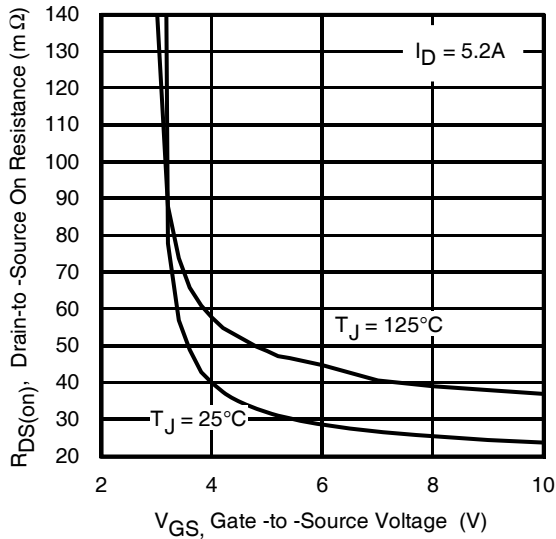
**Fig 10a.** Switching Time Test Circuit



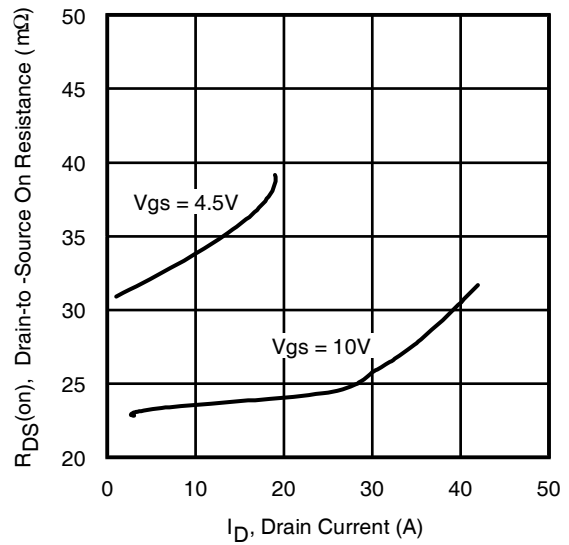
**Fig 10b.** Switching Time Waveforms



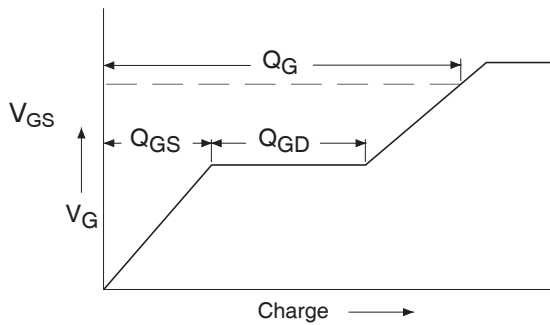
**Fig 11.** Typical Effective Transient Thermal Impedance, Junction-to-Ambient



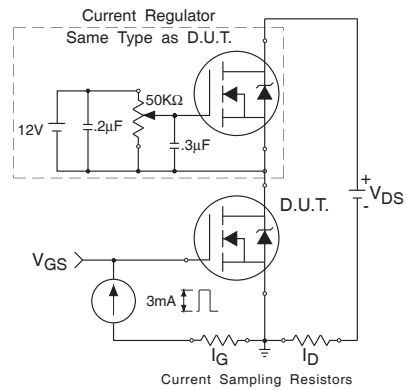
**Fig 12.** Typical On-Resistance Vs. Gate Voltage



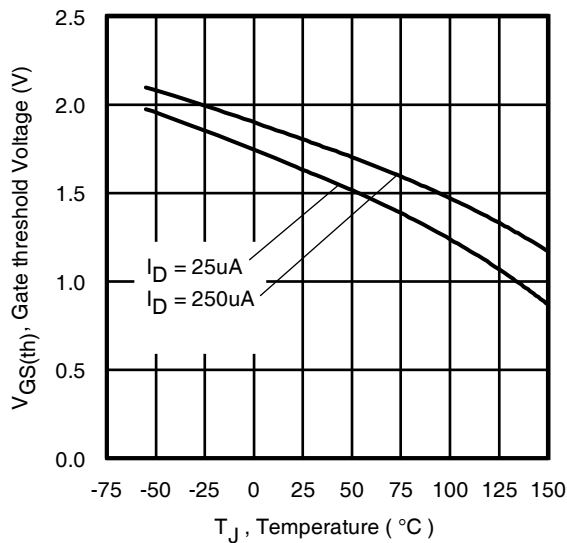
**Fig 13.** Typical On-Resistance Vs. Drain Current



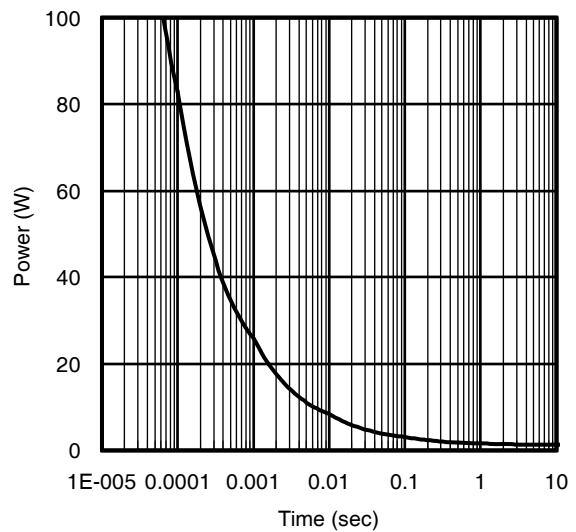
**Fig 14a.** Basic Gate Charge Waveform



**Fig 14b.** Gate Charge Test Circuit



**Fig 15.** Typical Threshold Voltage Vs. Junction Temperature



**Fig 16.** Typical Power Vs. Time