MTP3055VL

Preferred Device

Power MOSFET 12 Amps, 60 Volts, Logic Level

N–Channel TO–220

This Power MOSFET is designed to withstand high energy in the avalanche and commutation modes. Designed for low voltage, high speed switching applications in power supplies, converters and power motor controls, these devices are particularly well suited for bridge circuits where diode speed and commutating safe operating areas are critical and offer additional safety margin against unexpected voltage transients.

- Avalanche Energy Specified
- I_{DSS} and $V_{DS(on)}$ Specified at Elevated Temperature

MAXIMUM RATINGS (T_C = 25°C unless otherwise noted)

Rating	Symbol	Value	Unit
Drain–Source Voltage	V_{DSS}	60	Vdc
Drain–Gate Voltage (R_{GS} = 1.0 MΩ)	V_{DGR}	60	Vdc
Gate–Source Voltage – Continuous – Single Pulse ($t_p \le 50$ μs)	 V_{GS} V_{GSM}	 ±15 ± 20	 Vdc Vpk
Drain Current – Continuous @ 25°C – Continuous @ 100°C – Single Pulse ($t_p \le 10$ μs)	I_D I_D I_{DM}	12 8.0 42	Adc Apk
Total Power Dissipation @ 25°C Derate above 25°C	P_D	48 0.32	Watts W/°C
Operating and Storage Temperature Range	T_J, T_{stg}	–55 to 175	°C
Single Pulse Drain–to–Source Avalanche Energy – Starting T_J = 25°C (V_{DD} = 25 Vdc, V_{GS} = 5.0 Vdc, I_L = 12 Apk, L = 1.0 mH, R_G =25 Ω)	E_{AS}	72	mJ
Thermal Resistance – Junction to Case – Junction to Ambient	 $R_{\theta JC}$ $R_{\theta JA}$	 3.13 62.5	°C/W
Maximum Lead Temperature for Soldering Purposes, 1/8″ from case for 10 seconds	T_L	260	°C

ON Semiconductor™

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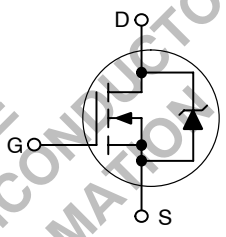
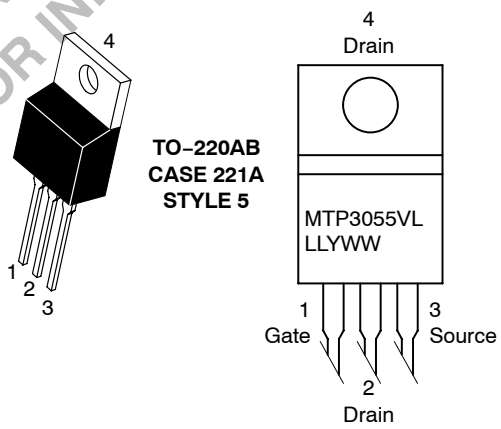
12 AMPERES
60 VOLTS
$R_{DS(on)}$ = 180 mΩ

N–Channel



MARKING DIAGRAM & PIN ASSIGNMENT



TO–220AB
CASE 221A
STYLE 5

MTP3055VL	= Device Code
LL	= Location Code
Y	= Year
WW	= Work Week

ORDERING INFORMATION

Device	Package	Shipping
MTP3055VL	TO–220AB	50 Units/Rail

Preferred devices are recommended choices for future use and best overall value.

ELECTRICAL CHARACTERISTICS (T_J = 25°C unless otherwise noted)

Characteristic		Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Drain−Source Breakdown Voltage (V_{GS} = 0 Vdc, I_D = 250 μAdc) Temperature Coefficient (Positive)		$V_{(BR)DSS}$	60 –	– 62	– –	Vdc mV/°C
Zero Gate Voltage Drain Current (V_{DS} = 60 Vdc, V_{GS} = 0 Vdc) (V_{DS} = 60 Vdc, V_{GS} = 0 Vdc, T_J = 150°C)		I_{DSS}	– –	– –	10 100	μAdc
Gate−Body Leakage Current (V_{GS} = ±15 Vdc, V_{DS} = 0)		I_{GSS}	–	–	100	nAdc
ON CHARACTERISTICS (Note 1)						
Gate Threshold Voltage (V_{DS} = V_{GS}, I_D = 250 μAdc) Temperature Coefficient (Negative)		$V_{GS(th)}$	1.0 –	1.6 3.0	2.0 –	Vdc mV/°C
Static Drain−Source On−Resistance (V_{GS} = 5.0 Vdc, I_D = 6.0 Adc)		$R_{DS(on)}$	–	0.12	0.18	Ohm
Drain−Source On−Voltage (V_{GS} = 5.0 Vdc) (I_D = 12 Adc) (I_D = 6.0 Adc, T_J = 150°C)		$V_{DS(on)}$	– –	1.6 –	2.6 2.5	Vdc
Forward Transconductance (V_{DS} = 8.0 Vdc, I_D = 6.0 Adc)		g_{FS}	5.0	8.8	–	mhos
DYNAMIC CHARACTERISTICS						
Input Capacitance	(V_{DS} = 25 Vdc, V_{GS} = 0 Vdc, f = 1.0 MHz)	C_{iss}	–	410	570	pF
Output Capacitance		C_{oss}	–	114	160	
Reverse Transfer Capacitance		C_{rss}	–	21	40	
SWITCHING CHARACTERISTICS (Note 2)						
Turn−On Delay Time	(V_{DD} = 30 Vdc, I_D = 12 Adc, V_{GS} = 5.0 Vdc, R_G = 9.1 Ω)	$t_{d(on)}$	–	9.0	20	ns
Rise Time		t_r	–	85	190	
Turn−Off Delay Time		$t_{d(off)}$	–	14	30	
Fall Time		t_f	–	43	90	
Gate Charge (See Figure 8)	(V_{DS} = 48 Vdc, I_D = 12 Adc, V_{GS} = 5.0 Vdc)	Q_T	–	8.1	10	nC
		Q_1	–	1.8	–	
		Q_2	–	4.2	–	
		Q_3	–	3.8	–	
SOURCE−DRAIN DIODE CHARACTERISTICS						
Forward On−Voltage (Note 1)	(I_S = 12 Adc, V_{GS} = 0 Vdc) (I_S = 12 Adc, V_{GS} = 0 Vdc, T_J = 150°C)	V_{SD}	– –	0.97 0.86	1.3 –	Vdc
Reverse Recovery Time (See Figure 14)	(I_S = 12 Adc, V_{GS} = 0 Vdc, dI_S/dt = 100 A/μs)	t_{rr}	–	55.7	–	ns
		t_a	–	37	–	
		t_b	–	18.7	–	
Reverse Recovery Stored Charge		Q_{RR}	–	0.116	–	μC
INTERNAL PACKAGE INDUCTANCE						
Internal Drain Inductance (Measured from contact screw on tab to center of die) (Measured from the drain lead 0.25″ from package to center of die)		L_D	–	3.5 4.5	–	nH
Internal Source Inductance (Measured from the source lead 0.25″ from package to source bond pad)		L_S	–	7.5	–	nH

1. Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2%.
2. Switching characteristics are independent of operating junction temperature.